



AMITY UNIVERSITY MADHYA PRADESH

(Established by Ritand Balved Education Foundation)

Date: 22/02/2017

BOARD OF STUDIES (Computer Science & Engineering and IT) MINUTES OF THE MEETING (07 Pages Only)

1. A meeting of board of studies of Department of Computer Science & Engineering and Information Technology, Amity School of Engineering & Technology, Amity University Madhya Pradesh was held on 22nd February 2017 at AUMP, under the Chairmanship of Prof. (Dr.) Anil Vashisht, Director (ASET). The following members attended the meeting:-

(a) Chairman: Prof. (Dr.) Anil Vashisht, Director (ASET)

(b) Member

i) Prof. (Dr.) R. S. Jadon, Professor, MITS Gwalior, External Member

ABSENT

ii) Prof. (Dr.) Sanjay Kumar Gupta, Professor, Jiwaji University, Gwalior, External Member

iii) Mr. Hemant Kumar Soni, Asst. Prof & Head – CSE

iv) Dr. A. K. Upadhyay, Professor

v) Mr. Vivek Kashar, Asst. Profesor

2. The agenda of the meeting included the following:

- (a) Review of existing syllabus and modification if any.
- (b) Discussion on trends and technologies in CSE & IT and consideration of its inclusion in the syllabus.
- (c) Any other point with due permission of the Chairperson.

3. Discussions/Comments:

a. (i) Discussion: on Alumni meet.

(ii) Comments: An alumni meet may be planned on a suitable date to encourage interaction between Amity alumnus and the current batch. Such informal gatherings play important roles in career building and placement activities. It is also benefitted by addressing suggestions shared by Alumnus for academic improvement of the University.

b. (i) Discussion: on a National / International Seminar / Conference.

(ii) Comments: Members were of the view that the present national seminar of CSE & ECE may be improvised to include international participation. Initiatives may be taken to ensure greater participation by academia and research

c. (i) Discussion: On a journal of Computer Science Engineering.

(ii) Comments: Members suggested publishing a journal on latest research in the area of Computer Science & Engineering. It may provide a platform to our budding researchers and faculty members.





22.17

 22/12





4. Recommendations:

B. Tech Program:

- i. Module I and II of BTC 606 deleted and replaced by modules III, IV and V of BTC-506 viz. Programming in C-I, Programming in C-II and data structures respectively. These modules to be inserted as modules I, II and III of BTC 606. No change in credits.
- ii. BTC 720 be appropriately modified to include Experiments of BTC 621 with credits to be unchanged for 1 credits.
- iii. Modules of BTC 503 be appropriately modified to include some Modules from BTC 802 with same credits, to avoid duplication.
- iv. Modules of BTI 503 and BTI 522 be appropriately modified to match the scheme of B Tech CSE.
- v. Module I and II of BTI 606 deleted and replaced by modules III, IV and V of BTI-506 viz. Programming in C-I, Programming in C-II and data structures respectively. These modules to be inserted as modules I, II and III of BTI 606. No change in credits.
- vi. Appropriately modified the Credits of the Subject BTI 701, BTI 707 (New Code) and BTI 801 to as per the coverage of Syllabus and to match the course structure of B.Tech (CSE).
- vii. BTI 726 Compiler construction lab Introduced to match the scheme of B.Tech. CSE.
- viii. BTI 707(Old code) Mobile Computing is changed as BTI 709 with new code.

BCA Program:

- i. BCA 220 be appropriately modified to include Experiments of Microprocessor with credits to be unchanged for 2 credits.
- ii. BCA 404 be appropriately modified to include .Net Framework with credits to be unchanged for 4 credits.
- iii. BCA 420 be appropriately modified to include Experiments based on .Net Framework with credits to be unchanged for 2 credits.

M. Tech Program:

There is no change in the scheme and syllabus of the M.Tech. course.

Ph.D. Course Work Syllabus

There is no change in the scheme and syllabus of the Ph.D. course work.

CBCS: There is no change in the scheme and syllabus of the CBCS courses.



Approved
22/02/17



22.2.17

5. Summary of changes is given below:-

Current Syllabus					Proposed Changes/Modifications (addition/deletion in the Syllabus)	New Course Code	No. of Credits
Sr. No	Course Title	Module of the syllabus	Old Course Code	No. of Credits			
1.	Problem Solving and Placement Practices	I and II	BTC 606	4	Deletion of existing modules I & II and addition of modules III, IV & V of BTC 506	BTC 606	4
2.	Compiler Construction Lab	Experiments	BTC 720	1	Addition	BTC 720	1
3.	Advanced Computer Architecture	I, II and III	BTC 503	3	Modifications (New contents added)	BTC 503	3
4	Advanced Computer Architecture	I, II and III	BTI 503	3	Modifications (New contents added)	BTI 503	3
5	Advanced Computer Architecture Lab	Experiments	BTI 522	1	Modifications (New contents added)	BTI 522	1
6	Problem Solving and Placement Practices	I and II	BTI 606	4	Deletion of existing modules I & II and addition of modules III, IV & V of BTI 506	BTI 606	4
7	Artificial Intelligence	Change in Credit	BTI 701	4	No change	BTI 701	3
8	Compiler Construction	Change in Credit	BTI 707	3	No change	BTI 707	4
9	Compiler Construction Lab	Experiments	NIL	1	Introduced	BTI 726	1
10	Digital Image Processing	Change in Credit	BTI 801	4	No change	BTI 801	3

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22/2/17

22.2.17

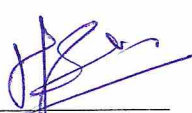
11	DS and Micro. Lab	Experiments	BCA 220	2	Addition	BCA 220	2
12	Intor. To .Net framework with VB	I	BCA 404	4	Modifications (New contents added)	BCA 404	4
13	CG and VB(with .Net framework) Lab with	Experiments	BCA 420	2	Addition (New contents added)	BCA 420	2
Total Credit				36	35		

The total number of credits after revision for B. Tech & BCA works out to 36 credits as against 35 credits, and the credits for M.Tech remains same.

Signature of Members:

- ABSENT -
Prof. (Dr.) R. S. Jadon

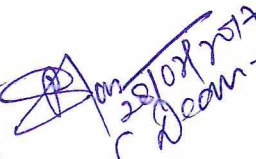

Prof. (Dr.) Sanjay kumar Gupta


Mr. Hemant Kumar Soni

 22.2.17
Dr. AK Upadhyay

 22/2/17
Mr. Vivek Parashar


Signature of Chairman- BOS

Forwarded  28/02/2017
(Dean-Acad)

 28/2/17
APPROVED BY
Hon'ble Vice Chancellor
AUMP, Gwalior

 28/02/17
Prof. (Dr.) M. K. Kaushal
Pro-VC, AUMP



AMITY UNIVERSITY

MADHYA PRADESH

(Established by Ritand Balved Education Foundation)

MEETING OF BOARD OF STUDIES (BOS)

(Computer Science & Engineering)

Amity School of Engineering & Technology

Remarks & Suggestions by BOS Members

- (i) An alumni meet may be organised on a suitable date to foster placement activities and to nourish academic excellence.
- (ii) Members were of the opinion that a research expression in the form of research journal may be promoted to encourage researchers and faculty members to publish research articles and new findings.
- (iii) The national Seminar of CES & ECE may be upgraded & support international outlook. Also efforts may be put in to invite internationally acclaimed speakers and academicians for broader perspectives.
- (iv) Faculty members may be enrolled for CSE, ISTE, IEEE members.
- (v) An incubation centre may be planned to encourage entrepreneurs & skill developments among students.
- (vi) Measures may be taken to initiate CISCO certified courses, AMPRO courses etc.
- (vi) A course on cloud computing may be incorporated in future.

Signature of Members:

Dr. Anil Vashisht

ABSENT

Prof. (Dr.) R. S. Jadon

Prof. (Dr.) Sanjay Kumar Gupta

Mr. Hemant Kumar Soni

Dr. AK Upadhyay

Mr. Vivek Parashar



AMITY UNIVERSITY

MADHYA PRADESH

(Established by Ritm and Balved Education Foundation)

MEETING OF BOARD OF STUDIES (BOS)

(Computer Science & Engineering)

Amity School of Engineering & Technology

Remarks & Suggestions by BOS Members

- (I) Department of CSE/IT, ASET, AUMP is running standard procedure followed at premier national & International Universities.
- (II) The intake of new students in CSE/IT at ASET, AUMP has shown tremendous improvement over the years, admissions have increased in CSE/IT branches of ASET.
- (III) Considerable emphasis has been laid down on organising workshops and seminars on latest development in science & technology with particular eye on CSE/IT.
- (IV) Research and innovations have shown significant improvements by CSE/IT faculty members.

Signature of Members:

Dr. Anil Vashisht

ABSENT

Prof. (Dr.) R. S. Jadon

Prof. (Dr.) Sanjay Kumar Gupta

Mr. Hemant Kumar Soni

Dr. AK Upadhyay

Mr. Vivek Parashar



AMITY UNIVERSITY

MADHYA PRADESH

(Established by Ritnand Balved Education Foundation)

Date: 06/03/2018

BOARD OF STUDIES (Computer Science & Engineering and IT)
MINUTES OF THE MEETING
(09 Pages Only)

1. A meeting of board of studies of Department of Computer Science & Engineering and IT, Amity School of Engineering & Technology, Amity University Madhya Pradesh was held on March 06, 2018 at AUMP, under the Chairmanship of Maj Gen (Dr) SC Jain, VSM** (Retd), Director (ASET). The following members attended the meeting:-
 - (a) **Chairman:** Maj Gen (Dr) SC Jain, VSM** (Retd), Director (ASET)
 - (b) **Member**
 - i) Prof. (Dr.) Sanjay Kumar Gupta, Professor & Head Computer Science and Application
Jiwaji University, Gwalior, External Member
 - ii) Mr. Hemant Kumar Soni, Asst. Prof & Offg. Head – CSE
 - iii) Dr. A. K. Upadhyay, Professor
 - iv) Mr. Ashok Kumar Shrivastava, Asst. Professor
2. The agenda of the meeting included the following:
 - (a) Review of existing syllabus and modification if any.
 - (b) Discussion on trends and technologies in CSE and consideration of its inclusion in syllabus.
 - (c) Any other point with due permission of the Chairperson.

3. Discussions/Comments:

- a. (i) Discussion: National/International Conferences provide a platform to students, researchers and faculty members to know about latest in research area.
- (ii) Comments: Through National/International Conference an opportunity is created to contribute and update knowledge. The department of CSE organises National Conference every year to enable students to showcase their research findings.

b. (i) Discussion:

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(ii) Comments:

c. (i) Discussion:

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(ii) Comments:

4. Recommendations:

B. Tech Program:

- i. Industrial Visit is added as one additional module in BTC/BTI/BCA-303 of III sem. BTC/BTI/BCA-503 of V sem. and BTC/BTI-701 of VII semester respectively. This addition is for better exposure about industry to the students. (Refer Annexure-1)
- ii. In place of BTC 602 System Programming by introducing new paper Internet of Things (IOT) with same paper code BTC 602 and same credit 3. (Refer Annexure-2)
- iii. In place of BTI 602 System Programming by introducing new paper Internet of Things (IOT) with same paper code BTI 602 and same credit 3 (Refer Annexure-3)
- iv. In BTC 505 Java Programming, updated and systematically arranged entire syllabus. (Refer Annexure-4)
- v. In BTI 505 Java Programming, updated and systematically arranged entire syllabus. (Refer Annexure-5)

BCA Program:

- i. In BCA 502 Java Programming, updated and systematically arranged entire syllabus. (Refer Annexure-6)

M. Tech Program:

There is no change in the scheme and syllabus of the course.

Pre Ph.D. Course:

There is no change in the scheme and syllabus of the course.

CBCS:

- i In NS4404 Wireless and Mobile Network a new module IV is added and credit changed from 3 to 4. (Annexure-7)
- ii. In NS4405 Cryptography And Network Security modify the content of Module I,II and III and credit changed from 3 to 4.
- iii. In NS4406 project (Network Security) credit modify from 3 to 1.
- iv. In CC4503 Storage and Computer Virtualization module II removed to simplify the syllabus. (Annexure-8)
- v. In CC4504 Network Virtualization a new module IV is added and credit changed from 3 to 4.
- vi. In CC4505 Cloud Computing a new module VI is added and credit changed from 3 to 4.
- vii. In CC4506 project is added in-place of paper Information Storage and Management and credit modify from 3 to 1.
- viii. **Introducing new CBCS namely Web Technologies with the six subjects namely** WT4601 Fundamental of computers, WT4602 Operating System and Application Program, WT4603 Web Technologies, WT4604 Introduction to Client Side Programming using Java Script, WT4605 Introduction To Open Source Technologies (PHP) and WT4606 Project (Web Technology) the syllabus for all 6 semesters is designed to make it interesting for students of other branches/Institutions.(Annexure-9)

All the aforesaid points have been approved by all the board members present in the meeting.

5. Summary of changes is given below:-

Current Syllabus					Proposed Changes/Modifications (addition/deletion in the Syllabus)	New Course Code	No. of Credits
Sr. No.	Course Title	Module of the syllabus	Old Course Code	No. of Credits			
1.					Additional module of Industrial visit is added in III, V and VII Sem. without any change in syllabus	BTC/BT I/BCA-303, BTC/BT I/BCA - 503, BTC/BT I-701	
2.	IOT	All	BTC 602	3	Introducing New Paper IOT in place of System Programming	BTC 602	3
3.	IOT	All	BTI 602	3	Introducing New Paper IOT in place of System Programming	BTI 602	3
4.	Java Programming	All	BTC 505	4	Improvised and systematically arranged entire syllabus	BTC 505	4
5.	Java Programming	All	BTI 505	4	Improvised and systematically arranged entire syllabus	BTI 505	4
6.	Java Programming	All	BCA 502	4	Improvised and systematically arranged entire syllabus	BCA 502	4
7	Network Security (Wireless And Mobile Network) (CBCS)	New Module	NS4404	3	Addition of Module VI (Change in credit due to reallocate credits to courses of minor track)	NS4404	4
8.	Network Security (Cryptography And Network Security)(CBCS)	I, II and III	NS4405	3	Modifications in Module I, II and III (Change in credit due to reallocate credits to courses of minor track)	NS4405	4
9	Network Security (Project)(CBCS)		NS4406	3	Change in credit due to reallocate credits to courses of minor track	NS4406	1
10.	Cloud Computing (STORAGE AND COMPUTER VIRTUALIZATION) (CBCS)	II	CC4503	3	Removed Module II	CC4503	3

11	Cloud Computing (Network Virtualization) (CBCS)	Module IV	CC4504	3	Addition of Module IV (Change in credit due to reallocate credits to courses of minor track)	CC4504	4
12	Cloud Computing (CLOUD COMPUTING) (CBCS)	Module VI	CC4505	3	Addition of Module VI (Change in credit due to reallocate credits to courses of minor track)	CC4505	4
13	Cloud Computing (Project) (CBCS)	ALL	CC4506	3	Introducing new paper as project. (Change in credit due to reallocate credits to courses of minor track)	CC4506	1
14	Web Technology(Fundamental of computers) (CBCS)	All			Introducing new subject in CBCS	WT4601	3
15	Web Technology (Operating System and Application Program) (CBCS)	All			Introducing new subject in CBCS	WT4602	3
16	Web Technology(Web Technologies) (CBCS)	All			Introducing new subject in CBCS	WT4603	3
17	Web Technology(Introduction of Client Side Programming using Java Script)) (CBCS)	All			Introducing new subject in CBCS	WT4604	4
18	Web Technology(Introduction To Open Source Technologies(Php)) (CBCS)	All			Introducing new subject in CBCS	WT4605	4
19	Web Technology (Project) (CBCS)	All			Introducing new subject in CBCS	WT4606	1
Total Credit				39 (18 Th + 21 CBCS)	57 (18 Theory + 39 CBCS)		

The total number of credits after revision for B. Tech CSE works out to 7 credits as against 7 credits, B.Tech. IT works out to 7 credits as against 7 credits, BCA works out to 4 credits as against 4 credits, and the credits for M. Tech. remains same. The total number of credits after revision for CBCS works out to 21 credits as against 21 credits and introduced one new CBCS of 18 credits.

Signature of Members:



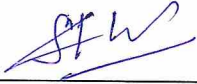
Mr. Ashok Kumar Shrivastava



Dr. AK Upadhyay



Mr. Hemant Kumar Soni



Prof. (Dr.) Sanjay Gupta
External Member



Maj Gen (Dr) S C Jain
Chairman- BOS



Prof. (Dr.) M.P. Kaushik
Hon'ble Pro Vice Chancellor
AUMP, Gwalior

APPROVED BY



Hon'ble Vice Chancellor
AUMP, Gwalior

12/3/18



AMITY UNIVERSITY

MADHYA PRADESH

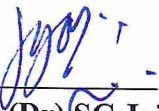
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**MEETING OF BOARD OF STUDIES (BOS)
(Computer Science & Engineering and IT)
Amity School of Engineering & Technology**

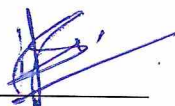
Remarks & Suggestions by BOS Members

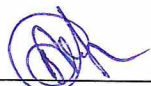
- 1. Faculty should be encouraged to take membership of standard research forums like IEEE, ISTC and CSI etc.
- 2. While teaching, faculty should emphasize on latest technologies and should include case studies to illustrate concepts.

Signature of Members:


Maj Gen (Dr) SC Jain


Prof. (Dr.) Sanjay Gupta


Mr. Hemant Kumar Soni


Dr. AK Upadhyay


Mr. Ashok Kumar Shrivastava



AMITY UNIVERSITY

MADHYA PRADESH

(Established by Ritnand Balved Education Foundation)

MEETING OF BOARD OF STUDIES (BOS) (Computer Science & Engineering and IT) Amity School of Engineering & Technology

Remarks & Suggestions by BOS Members

- 1- The Courses should be designed in such a way that they are more practical oriented and are real time based.
- 2- Course should be designed so as to include Web Technology Concepts.
- 3- Students should be motivated to develop working skills.

Signature of Members:

Maj Gen (Dr) SC Jain

Prof. (Dr.) Sanjay Gupta

Mr. Hemant Kumar Soni

Dr. AK Upadhyay

Mr. Ashok Kumar Shrivastava



AMITY UNIVERSITY

MADHYA PRADESH

(Established by Ritnand Balved Education Foundation)

Date: 06/03/2019

BOARD OF STUDIES (Computer Science & Engineering, IT and BCA)

MINUTES OF THE MEETING

(5 Pages Only)

1. Board of Studies (BoS) meeting has been held by the Department of Computer Science & Engineering, Amity School of Engineering & Technology, Amity University Madhya Pradesh on March 06, 2019 at AUMP, Gwalior, under the Chairmanship of Maj Gen (Dr) SC Jain, VSM** (Retd), Director (ASET). The following members attended the meeting: -

(a) **Chairman:** Maj Gen (Dr) SC Jain, VSM** (Retd), Director (ASET)

(b) **Members**

- i) Dr. Sanjay Kumar Gupta, Professor & Head, Dept of Computer Science and Applications, Jiwaji University, Gwalior- External Member
- ii) Dr. Venkatadri M., Professor & Head, Dept of Computer Science and Engineering, Amity University Madhya Pradesh, Gwalior, Member
- iii) Dr Arvind Kumar Upadhyay, Professor, Dept of Computer Science and Engineering, Amity University Madhya Pradesh, Gwalior, Member.
- iv) Mr. Ashok Kumar Shrivastava, Asst. Professor, Dept of Computer Science and Engineering, Amity University Madhya Pradesh, Gwalior, Member

2. The agenda of the meeting includes the following points:

(a) **B.Tech CSE 2018-22 Batch:**

In continuation with the 1st year AICTE model curriculum approved for B.Tech CSE in the academic year 2018-19, 2nd year B.Tech CSE scheme and syllabus has been put forward for approval for 2018-22 batch.

(b) **B.Tech CSE 2019-23 Batch:**

Introducing new curriculum with uniform course coding for B.Tech CSE as per AICTE Model curriculum from the academic year 2019-20, 2020-21 (1st & 2nd year) for 2019-23 batch.

(c) **B.Tech IT 2019-23 Batch:**

Introducing new curriculum with uniform course coding for B.Tech IT as per AICTE Model curriculum from the academic year 2019-20 for 2019-23 batch.

(d) **BCA 2019-22 Batch:**

Introducing new curriculum with uniform course coding for BCA Program as per the UGC guidelines from the academic year 2019-20, 2020-21 (1st year) for 2019-22 batch.

- (e) Discussion on IT trends and technological advancement to improve the skill sets in graduates in Computer Science field and consideration of their inclusion in syllabus.
- (f) Any other point with due permission of the Chairperson.

3. Discussions/Comments:

- a. (i) **Discussion (B.Tech 2018-22 Batch)** : The scheme and syllabus of Second year B.Tech CSE presented before the members of the Board of Studies. The syllabus of all the courses has been reviewed. Further the courses offered by the Dept of CSE to 2nd year (2018-22 batch) ECE, CE and ME also reviewed.
- (ii) **Comments:** The syllabus recommended by AICTE model curriculum has been adopted for Second year B.Tech CSE and the courses offered by Dept of CSE to other departments. Uniform course coding has been adopted for the common courses and value added courses in all B.Tech programs at ASET in Second year 2019-20 for 2018-22 batch.
- b. (i) **Discussion (B.Tech 2019-23 Batch)** : The existing syllabi of the courses offered by Department of CSE in 1st and 2nd semester B.Tech CSE, ECE, ME and CE presented before the members of the Board of Studies. The syllabus of all the courses has been reviewed.
- (ii) **Comments:** The existing syllabus is well aligned with the syllabus recommended by AICTE model curriculum and few changes were recommended in some subjects. Uniform course coding has been adopted for common courses and value-added courses.
- c. (i) **Discussion:** The existing scheme and syllabus of B.Tech IT, Bachelor of Computer Applications (BCA) programs offered by Dept of CSE presented before members of Board of Studies. The scheme and syllabus have been reviewed.
- (ii) **Comments:** The existing syllabus B.Tech IT needs to change as per AICTE model curriculum and BCA Program as per the UGC guidelines.
- d. (i) **Discussion:** The syllabus of M. Tech, CBCS and Pre-PhD course work courses was presented to BOS members and reviewed.
- (ii) **Comments:** The Syllabus of M. Tech., CBCS and Pre-PhD course work subjects is well aligned and needs no change. Uniform course coding has been adopted for Value added subjects of M. Tech. and CBCS subjects.

4. Recommendations:

B. Tech Program:

- i. **CSE 2018-22 Batch:** As per the guidelines of AICTE 2018, Dept. of Computer Science & Engineering in ASET, AUMP, Gwalior has adapted the AICTE model curriculum from the academic year 2018-19 onwards for 2018-22 batch B.Tech CSE. The BOS meeting held on 16/05/2018 had approved the first year CSE AICTE model curriculum and syllabus. Further in continuation, 2018-22 batch's second year B.Tech CSE scheme and syllabus with uniform course coding put forward for the BOS member's kind approval. Uniform course coding adopted in all the courses except the Course code for Mathematics-III ie BTC-301 (remains same for 2nd year B.Tech CSE program for the academic year 2019-20) for batch-2018-22
(Refer Annexure-I)
- ii. **CSE 2019-23 Batch:** Uniform course coding has been recommended to all the courses B.Tech CSE programs from the academic year 2019-20, 2020-21 (1st & 2nd year) for 2019-23 batch. The new curriculum as per the AICTE model curriculum with uniform course coding is put forward to the kind approval of BoS members.
(Refer Annexure -II)
- iii. **IT 2019-23 Batch:** Uniform course coding has been recommended to all the courses B.Tech IT program from the academic year 2019-20 for 2019-23- B.Tech IT batch . The new curriculum as per the AICTE model curriculum B.Tech IT scheme and syllabus is put forward for the kind approval of BoS members.
(Refer Annexure-III)
- iv. Uniform course coding has been adopted for value added courses (All semesters), Basic science courses (Physics, Chemistry, Mathematics) and courses offered to other Institutes by the department.

BCA Program:

- i. Uniform course coding has been recommended to all the courses BCA program from the academic year 2019-20 (1st year) for 2019-22 batch. The new curriculum as per the UGC guidelines, scheme and syllabus is put forward for the kind approval of BoS members.

(Refer Annexure-IV)

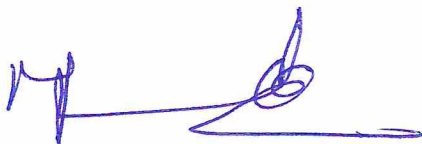
M. Tech Program:

There is no change in the scheme and syllabus of the course.

Pre Ph.D. Course:

Pre PhD course work subjects to be decided in accordance to the Appendix-G of URC dated February, 08, 2019.

(All codes are subject to change as per further alignment and higher directions)



CBCS:

- There is no change in the scheme and syllabus of the course.
- Uniform course coding has been adopted for all courses offered by the department.
- MOOC courses are included in three courses as per the UGC guidelines (Cloud Computing, Data Analytics and Network Security) in Semester-I.

S.No	Name of the Minor Track	MOOC Course by UGC	Course Code	Semester	Credits
1	Cloud Computing	Cloud Computing	noc19-cs65	I	3

All the aforesaid points have been approved by all the board members present in the meeting.

5. Summary of changes are given below: -

- Annexure I, II, III and IV for the courses of CSE Dept.
- SUMMARY OF EXISTING AND PROPOSED COURSES/CODES OFFERED BY CSE WITHIN ASET (ECE, Civil, and ME)

Present Course Code					Proposed Changes/ Modifications		
Sr.No	Programme	Course Title	Old Course Code	No. of Credits	Title/ Syllabus	Uniform Course	No. of Credits
1	B.Tech ECE I Sem	Programming for Problem Solving	BTE 103	3	No Changes in title and Syllabus	BTC 101	3
2	B.Tech CSE I Sem	Programming for Problem Solving	BTC 103	3			3
3	B.Tech Civil II Sem	Programming for Problem Solving	BTCE 203	3			3
4	B.Tech ME II Sem	Programming for Problem Solving	BTM 203	3			3
5	B.Tech ECE I Sem	Programming for Problem Solving	BTE 121	2		BTC 121	2
6	B.Tech CSE I Sem	Programming for Problem Solving	BTC 121	2			2
7	B.Tech Civil II Sem	Programming for Problem Solving	BTCE 221	2			2
8	B.Tech ME II Sem	Programming for Problem Solving	BTM 221	2			2
9	B.Tech ME IV Sem	Principle of Computer Graphics	BTM 406	2		CSE 401	2
10	B.Tech ME IV Sem	Principle of Computer Graphics Lab	BTM 423	1		CSE 421	1
11	B.Tech ECE III Sem	Java Programming	BTE-305	3		BTC 404	3
12	B.Tech ECE III Sem	Java Programming Lab	BTE-322	1		BTC 424	1+1

The course codes of BTE 103, BTC 103, BTCE 203 and BTM 203 changed to BTC 101.

The course codes of BTE 121, BTC 121, BTCE 221 and BTM 221 changed to BTC 121.

MINUTES OF BOS DEPT OF CSE

Signature of Members:



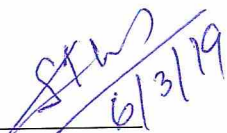
Mr. Ashok Kumar Shrivastava



Prof.(Dr.) A K Upadhyay



Prof.(Dr.) Venkatadri.M


6/3/19

Prof. (Dr.) Sanjay Gupta
External Member



Maj Gen (Dr) S C Jain
Chairman- BOS


12/03/19

Prof.(Dr.) M.P. Kaushik
Hon'ble Pro Vice Chancellor
AUMP, Gwalior

APPROVED BY



Hon'ble Vice Chancellor
AUMP, Gwalior



AMITY UNIVERSITY

MADHYA PRADESH

(Established by Ritnand Balved Education Foundation)

Date: 06/03/2019

NOTE- SHEET

1. The Department of Computer Science & Engineering, ASET, AUMP, Board of Studies Meeting was held on **06 March 2019**.
2. The minutes of the meeting submitted for your kind perusal & approval please.

Prof. (Dr) Venkatadri M.
HoD (CSE)

Director-ASET

Dean (Academics)

Submit a copy (soft & hard) of BOS minutes & syllabus
11/3/2019

Hon'ble Pro Vice Chancellor

MAHARAJ
12/03/19

Hon'ble Vice Chancellor

U. K. Singh
12/3/19



Date: 04/03/2020

BOARD OF STUDIES
DEPT OF COMPUTER SCIENCE AND ENGINEERING
MINUTES OF THE MEETING
(8 Pages Only)

1. Board of Studies (BoS) meeting has been held by the Department of Computer Science & Engineering, Amity School of Engineering & Technology, Amity University Madhya Pradesh on 4/03/2020 at AUMP, Gwalior, under the Chairmanship of Maj Gen (Dr) SC Jain, VSM** (Retd), Director (ASET). The following members attended the meeting: -

(a) **Chairman:** Maj Gen (Dr) SC Jain, VSM** (Retd), Director (ASET)

(b) **Members**

- i. Dr. Sanjay Kumar Gupta, Professor & Head, Dept of Computer Science and Applications, Jiwaji University, Gwalior. (External Member).
- ii. Dr. Venkatadri M., Professor & Head, Dept of Computer Science and Engineering, Amity University Madhya Pradesh, Gwalior. (Member).
- iii. Dr. Subhrendu Guha Neogi, Associate Professor, Dept of Computer Science and Engineering, Amity University Madhya Pradesh, Gwalior. (Member).
- iv. Mr. Ashok Kumar Shrivastava, Asst. Professor, Dept of Computer Science and Engineering, Amity University Madhya Pradesh, Gwalior. (Member).

2. The agenda of the meeting includes the following points:

- (a) Curriculum of B.Tech CSE, B.Tech IT Program for batch 2020-24, BCA program for batch 2020-23, B.Sc. IT program for batch 2020-23, MCA program for batch 2020-23, M.Sc. IT program for batch 2020-22 and M.Tech CSE for batch 2020-22.
- (b) Introducing uniform course codes for Pre-Ph.D course work. Changing the credit hours of the courses for Ph.D program as per the UGC norms and syllabus accordingly.
- (c) Discussion on trends and technologies in CSE and consideration of its inclusion in syllabus.
- (d) Any other point with due permission of the Chairperson.

3. Discussions/ Comments:

- a. (i) Discussion: The scheme and syllabus of the programs to be offered by CSE Department to B. Tech. CSE for batch 2020-24, B.Tech IT for batch 2020-24, BCA for batch 2020-23, M.Tech CSE for batch 2020-22, M.Sc. IT for batch 2020-22, B.Sc. IT for batch 2020-23 and MCA for batch 2020-23 was presented before the members of the Board of Studies. The Scheme and syllabus of all the subjects was reviewed.
- (ii) Comments: The presented scheme and syllabus is well aligned, and no changes were recommended for the scheme and syllabus of B.Tech CSE, B.Tech IT, M.Tech CSE, M.Sc. IT, B.Sc. IT, MCA and BCA.
- b. (i) Discussion: The syllabus of Pre-PhD course work subjects was presented to BOS members and reviewed.
- (ii) Comments: The syllabus of Pre-PhD course work subjects are well aligned and needs no changes. Uniform course coding is adopted for Pre-PhD course work subjects and credit structure has been reviewed.
- c. (i) Discussion: The syllabus of Minor Track (CBCS) subjects was presented to BoS members and reviewed.
- (ii) Comments: The existing scheme and syllabus mentioned for CBCS tracks are well aligned. In view of ICT and ICT enabled technologies in teaching learning and professional growth in career, a need arises to introduce a new CBCS Minor Track with name, "IT Skills for Professionals" is recommended.
- d. (i) Discussion: Industry interaction is crucial to understand the academic curriculum amendments.
- (ii) Comments: Interaction between academia and industry can be addressed through industrial visits by the students.

4. Recommendations:

B. Tech Programs

The scheme and syllabus of the programs to be offered by CSE Department to B. Tech. CSE and B.Tech IT for batch 2020-24 were presented before the members of the Board of Studies. The BOS members approved the curriculum and syllabus as per the Annexures.

(B.Tech CSE : Refer Annexure-1)
(B.Tech IT : Refer Annexure-2)

MCA, BCA and B.Sc. IT Programs

The scheme and syllabus of the programs to be offered by CSE Department to MCA, BCA and B.Sc. IT for batch 2020-23 were presented before the members of the Board of Studies. The BOS members approved the curriculum and syllabus as per the Annexures.

(MCA : Refer Annexure-3)
(BCA : Refer Annexure-4)
(B.Sc. IT : Refer Annexure-5)

M.Tech CSE and M.Sc. IT Programs

The scheme and syllabus of the programs to be offered by CSE Department to M.Tech CSE and M.Sc. IT for batch 2020-22 were presented before the members of the Board of Studies. The BOS members approved the curriculum and syllabus as per the Annexures.

(M.Tech CSE : Refer Annexure-6)
(M.Sc. IT : Refer Annexure-7)

Pre Ph.D. Course:

The changes in the scheme and syllabus of the courses.

(Refer Annexure-8)

CBCS:

All CBCS programs of CSE Specializations, AI & ML, Data Science and Internet of Things in first semester will be of 3 credits only (2 credits lecture and 1 credit tutorial)

(AI & ML : Refer Annexure-9)

(Data Science : Refer Annexure-10)

(Internet of Things : Refer Annexure-11)

Introducing new Minor Track with title, "IT Skills for Professionals". (Refer Annexure-12)

All the aforesaid points have been approved by all the board members present in the meeting.

5. Summary of changes:

Changes within Dept of CSE for Existing Programs

Current Syllabus					Proposed Changes/ Modifications			
Sr. No	Program	Course Title	Old Course Code	No. of Credits	Addition/ deletion in the Syllabus	New Course Title	New Course Code	No. of Credits
1	Ph.D	Advanced Computer Networks	PhDEC 102	3	Course deleted from the Scheme	-	-	-
2	Ph.D	-	-	-	Introducing new course	Advanced Data Structures & Algorithm Design	PCS 104	4
3	PhD	Network Security and Management	PhDEC 107	3	Course code and Credit changed in the Scheme	Network Security and Management	PCS 105	4
4	PhD	Data Warehousing and Data Mining	PhDEC 106	3	Course code and Credit changed in the Scheme	Data Warehousing and Data Mining	PCS 106	4
5	PhD	Object Oriented Software Engineering	PhDEC 108	3	Course deleted from the Scheme	-	-	-
6	Ph.D	-	-	-	Introducing new course	Artificial Intelligence & Machine Learning	PCS 107	4
7	Ph.D	Software Project Planning and Management	PhDEC 109	3	Course deleted from the Scheme	-	-	-
8	Ph.D	-	-	-	Introducing new course	Cloud Computing	PCS 108	4
9	Ph.D	Soft Computing	PhDEC 105	3	Course code and Credit changed in the Scheme	Soft Computing	PCS 109	4

9

10	Ph.D	Software Testing and Quality Assurance	PhDEC 110	3	Course deleted from the Scheme	-	-	-
11	Ph.D	-	-	-	Introducing new course	Image Processing & Pattern Recognition	PCS 110	4
12	CBCS (Minor Track)	-	-	-	Introducing new Minor Track	IT Skills for Professionals	-	18

Summary of CSE Dept courses offering in B.Tech Bio-Technology (AY 2020-21)

Sr. No	Program	Course Title	Old Course Code	No. of Credits	Addition/ deletion in the Syllabus	New Course Title	New Course Code	No. of Credits
1	B.Tech Bio Tech 4 th Sem	Database Management System	CSE 304	3	Course has been removed	-	-	-
2	B.Tech Bio Tech 4 th Sem	Database Management System lab	CSE 324	1	Course has been removed	-	-	-
3	B.Tech Bio Tech 4 th Sem	-	-	-	Course has been introduced	Java Programming	CSE 403	3
4	B.Tech Bio Tech 4 th Sem	-	-	-	Course has been introduced	Java Programming Lab	CSE 423	2
5	B.Tech Bio Tech 5 th Sem	Java Programming	CSE 403	3	Course has been removed	-	-	-
6	B.Tech Bio Tech 5 th Sem	Java Programming Lab	CSE 423	2	Course has been removed	-	-	-
7	B.Tech Bio Tech 5 th Sem	-	-	-	New Course has been introduced	Advanced Programming through Python	CSE 510	3
8	B.Tech Bio Tech 5 th Sem	-	-	-	New Course has been introduced	Advanced Programming through Python Lab	CSE 530	1
9	B.Tech Bio Tech 7 th Sem	Advanced Java Programming	CSE 504	3	Course has been removed	-	-	-
10	B.Tech Bio Tech 7 th Sem	Advanced Java Programming Lab	CSE 524	1	Course has been removed	-	-	-
11	B.Tech Bio Tech 7 th Sem	-	-	-	New course has been introduced	Relational Database Management System	CSE 710	3
12	B.Tech Bio Tech 7 th Sem	-	-	-	New course has been introduced	Relational Database Management System Lab	CSE 730	1
13	B.Tech Bio Tech 8 th Sem	ASP .NET	CSE 804	3	Course has been removed	-	-	-
14	B.Tech Bio Tech 8 th Sem	ASP .NET	CSE 824	1	Course has been removed	-	-	-

Summary of CSE Dept courses offering in B.Tech ECE (AY 2020-21)

Sr. No	Program	Course Title	Old Course Code	No. of Credits	Addition/ deletion in the Syllabus	New Course Title	New Course Code	No. of Credits
1	B.Tech ECE 2 nd Sem	-	-	-	Course has been introduced	Object Oriented Programming Using C++	CSE 204	3
2	B.Tech ECE 2 nd Sem	-	-	-	Course has been introduced	Object Oriented Programming Using C++ Lab	CSE 224	1
3	B.Tech ECE 2 nd Sem	Data Structures through C++	CSE 202	3	Course has been removed	-	-	-
4	B.Tech ECE 2 nd Sem	Data Structures through C++ Lab	CSE 222	1	Course has been removed	-	-	-
5	B.Tech ECE 3 rd Sem	-	-	-	Course has been introduced	Data Structures through C++	CSE 202	3
6	B.Tech ECE 3 rd Sem	-	-	-	Course has been introduced	Data Structures through C++ Lab	CSE 222	1
7	B.Tech ECE 5 th Sem	-	-	-	New Course has been introduced	Advanced Programming through Python	CSE 510	3
8	B.Tech ECE 5 th Sem	-	-	-	New Course has been introduced	Advanced Programming through Python Lab	CSE 530	1
9	B.Tech ECE 6 th Sem	Advanced Java Programming	CSE 504	3	Course has been removed	-	-	-
10	B.Tech ECE 6 th Sem	Advanced Java Programming Lab	CSE 524	1	Course has been removed	-	-	-
11	B.Tech ECE 6 th Sem	-	-	-	New Course has been introduced	Problem Solving Techniques	CSE 604	3
12	B.Tech ECE 6 th Sem	-	-	-	New Course has been introduced	Problem Solving Techniques Lab	CSE 624	2
13	B.Tech ECE 7 th Sem	-	-	-	New course has been introduced	Relational Database Management System	CSE 710	3
14	B.Tech ECE 7 th Sem	-	-	-	New course has been introduced	Relational Database Management System Lab	CSE 730	1

Summary of Semester wise Common Subjects offered by Dept of CSE

6

Subject Details			Programs and Semester						
S. No.	Subject Code	Subject title	BCA	B.Tech (CSE/IT)	B.Tech (ECE)	B.Tech (CE)	B.Tech (ME)	B.Tech (BT)	Credits
1	CSE 104	Programming for Problem Solving	1 st	1 st	1 st	1 st	1 st	1 st	3
2	CSE 124	Programming for Problem Solving Lab	1 st	1 st	1 st	1 st	1 st	1 st	2
3	CSE 204	Object Oriented Programming Using C++	2 nd	2 nd	2 nd	2 nd	2 nd	2 nd	3
4	CSE 224	Object Oriented Programming Using C++ Lab	2 nd	2 nd	2 nd	2 nd	2 nd	2 nd	1
5	CSE 202	Data Structures through C++	3 rd	3 rd	3 rd	-	-	3 rd	3
6	CSE 222	Data Structures through C++ Lab	3 rd	3 rd	3 rd	-	-	3 rd	1
7	CSE 403	Java Programming	4 th	4 th	4 th	-	-	4 th	3
8	CSE 423	Java Programming Lab	4 th	4 th	4 th	-	-	4 th	2
9	CSE 302	Python Programming	3 rd	3 rd	-	-	-	-	3
10	CSE 322	Python Programming Lab	3 rd	3 rd	-	-	-	-	1
11	CSE 304	Database Management Systems	3 rd	3 rd	-	-	-	-	3
12	CSE 324	Database Management Systems Lab	3 rd	3 rd	-	-	-	-	1
13	CSE 303	Design and Analysis of Algorithms	5 th	5 th	-	-	-	-	4
14	CSE 323	Design and Analysis of Algorithms lab	5 th	5 th	-	-	-	-	1
15	CSE 510	Advanced Programming through Python	-	-	5 th	-	-	5 th	3
16	CSE 530	Advanced Programming through Python Lab	-	-	5 th	-	-	5 th	1
17	CSE 604	Problem Solving Techniques	-	6 th	6 th	-	-	-	-
18	CSE 624	Problem Solving Techniques Lab	-	6 th	6 th	-	-	-	-
19	CSE 710	Relational Database Management Systems	-	-	7 th	-	-	7 th	3
20	CSE 730	Relational Database Management Systems Lab	-	-	7 th	-	-	7 th	1
21	CSE 605	Software Engineering	6 th	6 th	-	-	-	-	-
22	CSE 625	Software Engineering Lab	6 th	6 th	-	-	-	-	-

28/6

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8

7

MOOC courses are included in three courses as per the UGC guidelines (Cloud Computing, Data Analytics and Network Security) as per the following details.

S. No.	Name of the Minor Track	MOOC Course by UGC	Course Code	Semester	Credits
1	Cloud Computing	Cloud Computing	4739	II	3
2	Data Analytics	Discrete Data Analytics	5726	IV	4
3	Network Security	Computer Network and Internet Protocol	4759	III	3

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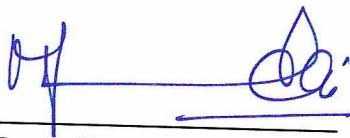
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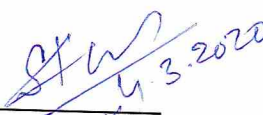
BOARD OF STUDIES
DEPT OF COMPUTER SCIENCE AND ENGINEERING

Signature of Members:


Mr. Ashok Kumar Shrivastava
Member

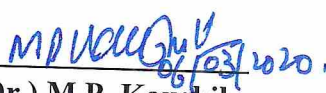

Dr. Subhrendu Guha Neogi
Member


Prof. (Dr.) Venkatadri. M
Member


Prof. (Dr.) Sanjay Gupta
External Member


Prof. (Dr.) R S Tomar
Dean (Academics)
AUMP, Gwalior


Maj Gen (Dr) S C Jain
Chairman- BOS


Prof. (Dr.) M.P. Kaushik
Hon'ble Pro Vice Chancellor
AUMP, Gwalior


APPROVED BY
Hon'ble Vice Chancellor
AUMP, Gwalior



AMITY UNIVERSITY

MADHYA PRADESH

(Established by Ritnand Balved Education Foundation)

MEETING OF BOARD OF STUDIES (BOS)
(Computer Science & Engineering)
Amity School of Engineering & Technology

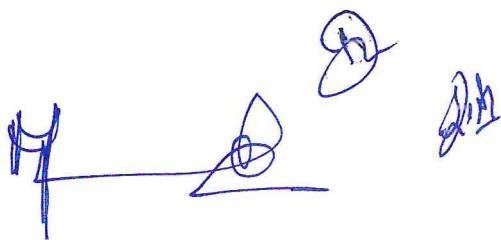
Remarks & Suggestions by BOS Members

I

MOOC Courses for the Department of Computer Science & Engineering

The following course of SWAYAM are recommended to be given as CBCS "Cloud Computing", "Network Security" in the Batch 2020-2024: -

S No.	Name of Minor Track	Semester	Name of course from SWAYAM	Duration	Credits
1	Cloud Computing	II [CBA 202]	Cloud Computing	12 Weeks	3
2	Network Security	III [CBC 302]	Computer Network and Internet Protocol	12 Weeks	3

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AMITY UNIVERSITY

MADHYA PRADESH

(Established by Ritnand Balved Education Foundation)

Date: 10 / 3 / 2021

BOARD OF STUDIES (Computer Science & Engineering)

MINUTES OF THE MEETING

(07 Pages Only)

1. Board of Studies (BoS) meeting for Department of Computer Science & Engineering, Amity School of Engineering & Technology, Amity University Madhya Pradesh held on 10 March 2021 at AUMP, under the Chairmanship of Maj Gen (Dr) S C Jain VSM** (Retd), Director (ASET). The following members attended the meeting: -

(a) **Chairman:** Maj Gen (Dr) S C Jain VSM** (Retd), Director (ASET)

(b) **Member:**

- i) Dr. Anirban Mitra, Associate Professor, Dept. of Computer Science and Engineering, Amity University, Kolkata - External Member
- ii) Dr. Venkatadri M., Professor & Head, Dept. of Computer Science and Engineering, Amity University Madhya Pradesh, Gwalior, Member
- iii) Dr. Subhrendu Guha Neogi, Associate Professor, Dept. of Computer Science and Engineering, Amity University Madhya Pradesh, Gwalior, Member.
- iv) Dr. Ashok Kumar Shrivastava, Asst. Professor, Dept. of Computer Science and Engineering, Amity University Madhya Pradesh, Gwalior, Member

2. **The agenda of the meeting included the following:**

- (a) Review of M. Tech (Computer Science & Engineering) curriculum.
- (b) Review of B. Tech (Computer Science & Engineering) curriculum.
- (c) Review of B. Tech (Information Technology) curriculum.
- (d) Review of MCA (Master of Computer Applications) curriculum.
- (e) Review of BCA (Bachelor of Computer Applications) curriculum.
- (f) Review of BSc (Information Technology) curriculum.
- (g) Review of Specializations (AI & ML, Data Science and Internet of Things) curriculum.
- (h) Review of CBCS curriculum.
- (i) Any other point with due permission of the Chairperson.

3. Discussions/Comments:

- a. (i) Discussion: The syllabus of the courses offered in M. Tech (Computer Science & Engineering) 2021-23 Batch was presented before the members of the Board of Studies.
(ii) Comments: The existing Scheme and syllabus are well aligned.
- b. (i) Discussion: The syllabus of the courses offered in B. Tech (Computer Science & Engineering) 2021-25 Batch was presented before the members of the Board of Studies.
(ii) Comments: The existing Scheme and syllabus is well aligned,
- c. (i) Discussion: The syllabus of the courses offered in B. Tech (Information Technology) 2021-25 Batch was presented before the members of the Board of Studies.
(ii) Comments: The existing Scheme and syllabus are well aligned, and appropriate changes were recommended.
- d. (i) Discussion: The syllabus of the courses offered in MCA 2021-23 Batch was presented before the members of the Board of Studies.
(ii) Comments: The existing Scheme and syllabus is well aligned,
- e. (i) Discussion: The syllabus of the courses offered in BCA 2021-24 Batch was presented before the members of the Board of Studies.
(ii) Comments: The existing Scheme and syllabus are well aligned, and appropriate changes were recommended.
- f. (i) Discussion: The syllabus of the courses offered in B.Sc. (Information Technology) 2021-24 Batch was presented before the members of the Board of Studies.
(ii) Comments: The existing Scheme and syllabus are well aligned, and appropriate changes were recommended.
- g. (i) Discussion: The syllabus of the courses offered in Specialization (AI & ML, Data Science and Internet of Things) was presented before the members of the Board of Studies.
(ii) Comments: The existing Scheme and syllabus is well aligned, and appropriate changes were recommended.
- h. (i) Discussion: The syllabus of the courses offered in CBCS was presented before the members of the Board of Studies.
(ii) Comments: The existing Scheme and syllabus are well aligned, and appropriate changes were recommended.

4. Recommendations for 2021 Batch onwards:

M. Tech Program:

- a) There is no change in the scheme and syllabus of M. Tech (Computer Science & Engineering). (Refer Annexure-1)

B. Tech(CSE) Program:

- a) There is no change in the scheme and syllabus of B. Tech (CSE). (Refer Annexure-2)

B. Tech (IT) Program:

- a) There is change in the scheme and syllabus of B. Tech (Information Technology). (Refer Annexure-3)

MCA Program:

- a) There is no change in the scheme and syllabus of MCA. (Refer Annexure-4)

BCA Program:

- a) Minor changes has been incorporated in the scheme and syllabus of BCA. (Refer Annexure-5)

BSc.(IT) Program:

- a) Minor changes has been incorporated in the scheme and syllabus of B.Sc.(IT). (Refer Annexure-6)

Specialization:

- a) There is change in the scheme and syllabus of AI & ML Specialization. (Refer Annexure-7)
 b) There is change in the detailed syllabus of Data Science Specialization. (Refer Annexure-8)
 c) There is change in the detailed syllabus of Internet of Things Specialization. (Refer Annexure-9)

Pre Ph.D. Course:

There is no change in the scheme and syllabus of the courses. (Refer Annexure-10)

CBCS:

- a) Minor changes has been incorporated in the existing scheme and syllabus of (Cloud Computing) CBCS (Refer Annexure-11)
 b) Minor changes has been incorporated in the existing scheme and syllabus of CBCS (Data Analytics) (Refer Annexure-12)
 c) Minor changes has been incorporated in the existing scheme and syllabus of CBCS (Network Security) (Refer Annexure-13)
 d) Minor changes has been incorporated in the existing scheme and syllabus of CBCS (Web Technology) (Refer Annexure-14)
 e) Introducing new CBCS course with title "IT Skills for Professionals".(Refer Annexure-15)

All the aforesaid points have been approved by all the board members present in the meeting.

Summary of changes:

Current Syllabus					Proposed Changes/Modifications			
Sr. No.	Course Title	Module of the syllabus	Old Course Code	No. of Credits	Addition/deletion in the Syllabus	New Course Title	New Course Code	No. of Credits
1.	Web Design & Development	I,III and IV	BCA 202 (BCA II Sem)	3	Updated the Syllabus	No Change	No Change	No Change
2.	Web Design & Development Lab	Lab Experiments	BCA 222 (BCA II Sem)	1	Updated the Syllabus	No Change	No Change	No Change
3	Web Design & Development	I,III and IV	BCA 202 (BSc(IT)II Sem)	3	Updated the Syllabus	No Change	No Change	No Change

4	Web Design & Development Lab	Lab Experiments	BCA 222 (BSc(IT)II Sem)	1	Updated the lab experiments as per the theory course	No Change	No Change	No Change
5	Analog Electronic Circuits theory and Analog Electronics Circuits lab	All Module	ECE 406 and ECE 426 (B.Tech- IT IV sem))	3+1	Removed from Scheme			
6	--	--	--	--	Introduced New course for B.Tech IT (IV Sem)	Formal Languages and Automata Theory	IT 401	4
7	Theory of Computation	All Module	CSE 501 (B.Tech- IT V sem)	4	Removed from Scheme			
8	--	--	--	--	Introduced New Course for B.Tech IT (V Sem)	Introduction to Blockchain Technology	IT 501	3
9	Data Communication and Computer Networks	All Module	CSE 601 (B.Tech- IT VI sem)	3	Updated the Syllabus	Computer Networks	IT 601	No Change
10	Introduction to Data Science	All Module	CSD 101 (Specialization)	3	Updated the Syllabus	No Change	No Change	No Change
11	Introduction to Artificial intelligence and Machine Learning	IV,V	CSA 101	3	Updated the syllabus of IV and V Modules	No Change	No Change	No Change
12	Cognitive Science in Artificial Intelligence	I,II,III,I V,V	CSA 301	3	Replaced with new course title and updated the syllabus	Machine Learning Techniques	No Change	No Change
13	Cognitive Science in Artificial Intelligence Lab	I,II,III,I V,V	CSA 321	1	Replaced with new course title and updated the syllabus	Machine Learning Techniques Lab	No Change	No Change
14	Machine Learning Techniques	I,II,III,I V,V	CSA 401	3	Replaced with new course title and updated the syllabus	Neural Networks and Deep Learning	No Change	No Change
15	Machine Learning Techniques Lab	I,II,III,I V,V	CSA 421	1	Replaced with new course title and updated the syllabus	Neural Networks and Deep Learning Lab	No Change	No Change
16	Neural Networks and Deep Learning	I,II,III,I V,V	CSA 501	3	Replaced with new course title and updated the syllabus	Artificial Intelligence for	No Change	No Change

						Robotics		
17	Neural Networks and Deep Learning Lab	I,II,III,I V,V	CSA 521	1	Replaced with new course title and updated the syllabus	Artificial Intelligence for Robotics Lab	No Change	No Change
18	Artificial Intelligence for Robotics	I,II,III,I V,V	CSA 601	3	Replaced with new course title and updated the syllabus	Problem Solving Through AI&ML	No Change	No Change
19	Artificial Intelligence for Robotics Lab	I,II,III,I V,V	CSA 621	1	Replaced with new course title and updated the syllabus	Problem Solving Through AI&ML Lab	No Change	No Change
20	Introduction to Internet of Things	I, II, III, IV	CSI 101	3	Updated the Syllabus	No Change	No Change	No Change
21	Wireless Sensor Networks and IoT Standards	II,III & IV	CSI 301	3	Updated the Syllabus	No Change	No Change	No Change
22	IoT Programming and Big Data	I, II & III	CSI 401	3	Updated the Syllabus	No Change	No Change	No Change
23	TCP/IP	All	CBA 202	3	Replaced with new course title and updated the syllabus	Storage and Computer Virtualization	No Change	No Change
24	Storage and Computer Virtualization	All	CBA 302	3	Replaced with new course title and updated the syllabus	Network Virtualization	No Change	No Change
25	Network Virtualization	All	CBA 402	4	Replaced with new course title and updated the syllabus	Cloud Computing	No Change	No Change
26	Cloud Computing	All	CBA 502	4	Replaced with new course title and updated the syllabus	Advanced Cloud Computing	No Change	No Change
27	Optimization Techniques	I	CBB 102	3	Replaced with new course title and updated the syllabus	Introduction to Data Analytics	No Change	No Change
28	Basic Statistics	II	CBB 202	3	Replaced with new course title and updated the syllabus Randomization Test, Regression & ANOVA Regression ANOVA(Analysis of	Tools and Techniques for Data Analytics	No Change	No Change

					Variance)			
29	Database Management System	III	CBB 302	3	Updated the Syllabus	Data Base Management System	No Change	No Change
30	Data Mining Techniques	IV	CBB 402	4	Replaced with new course title and updated the syllabus	Data Warehousing and Mining	No Change	No Change
31	Introduction to Financial Modelling	V	CBB 502	4	Replaced with new course title and updated the syllabus	Data Analytics for Business	No Change	No Change
32	Introduction to Computer Network	I,II,III, IV	CBC 102	3	Updated the syllabus	No Change	No Change	No Change
33	TCP/IP	I,II,III,I V	CBC 202	3	Replaced with new course title and updated the syllabus	Foundation of Cyber Security	No Change	No Change
34	Network Management	I,II,III,I V	CBC 302	3	Replaced with new course title and updated the syllabus	Secure Electronic Commerce	No Change	No Change
35	Wireless and Mobile Network	I,II,III,I V	CBC 402	4	Replaced with new course title and updated the syllabus	Information and Network Security	No Change	No Change
36	Cryptography and Network Security	I,II,III,I V	CBC 502	4	Replaced with new course title and updated the syllabus	Digital Marketing and Security	No Change	No Change
37	Operating System and Application Program	All Module	CBD 202	3	Replaced with new course title and updated the syllabus	Web Technologies	No Change	No Change
38	Web Technologies	All Module	CBD 302	3	Replaced with new course title and updated the syllabus	Introduction of Client-Side Programming Using Java Script	No Change	No Change
39	Introduction of Client-Side Programming Using Java Script	All Module	CBD 402	4	Replaced with new course title and updated the syllabus	Networking and Operating System Concepts	No Change	No Change

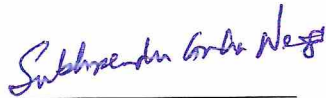
BOARD OF STUDIES (Computer Science & Engineering)

MINUTES OF THE MEETING

Signature of Members:



Dr. Ashok Kumar Shrivastava
(Member)



Dr. Subhrendu Guha Neogi
(Member)



Dr. Venkatadri M.
(Member)

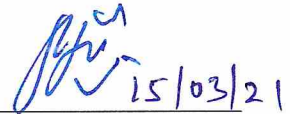
15.3.2021



Dr. Anirban Mitra
External Member

ABSENT

Prof. (Dr.) Sanjay Kumar Gupta
External Member



Maj Gen (Dr) S C Jain
Chairman- BOS



Prof. (Dr.) R. S. Tomar
Dean Academics
AUMP, Gwalior



Prof. (Dr.) M.P. Kaushik
Hon'ble Pro Vice Chancellor
AUMP, Gwalior



APPROVED BY

Hon'ble Vice Chancellor
AUMP, Gwalior



AMITY UNIVERSITY

MADHYA PRADESH

(Established by Ritnand Balved Education Foundation)

Date: 28 / 02 / 2022

BOARD OF STUDIES (Computer Science & Engineering)

MINUTES OF THE MEETING

(05 Pages Only)

1. Board of Studies (BoS) meeting for Department of Computer Science & Engineering, Amity School of Engineering & Technology, Amity University Madhya Pradesh held on 28 February 2022 at AUMP, under the Chairmanship of Maj Gen (Dr) S C Jain VSM** (Retd), Director (ASET). The following members attended the meeting: -

(a) **Chairman:** Maj Gen (Dr) S C Jain VSM** (Retd), Director (ASET)

(b) **Member:**

- i) Dr. Anirban Mitra, Associate Professor, Dept. of Computer Science and Engineering, Amity University, Kolkata - External Member
- ii) Dr. Sanjay Kumar Gupta, Professor & Head, Dept of Computer Science and Applications, Jiwaji University, Gwalior- External Member
- iii) Dr. Venkatadri M., Professor & Head, Dept. of Computer Science and Engineering, Amity University Madhya Pradesh, Gwalior, Member
- iv) Dr. Subhrendu Guha Neogi, Associate Professor, Dept. of Computer Science and Engineering, Amity University Madhya Pradesh, Gwalior, Member.
- v) Dr. Ashok Kumar Shrivastava, Associate Professor, Dept. of Computer Science and Engineering, Amity University Madhya Pradesh, Gwalior, Member

2. The agenda of the meeting included the following:

- (a) Review of M. Tech (Computer Science & Engineering) curriculum.
- (b) Review of B. Tech (Computer Science & Engineering) curriculum.
- (c) Review of B. Tech (Information Technology) curriculum.
- (d) Review of MCA (Master of Computer Applications) curriculum.
- (e) Review of BCA (Bachelor of Computer Applications) curriculum.
- (f) Review of BSc (Information Technology) curriculum.
- (g) Review of Specializations (AI & ML, Data Science and Internet of Things) curriculum.
- (h) Review of CBCS curriculum.
- (i) Any other point with due permission of the Chairperson.

3. Discussions/Comments:

- a. (i) Discussion: The syllabus of the courses offered in M. Tech (Computer Science & Engineering) 2022-24 Batch was presented before the members of the Board of Studies.
(ii) Comments: The existing Scheme and syllabus are well aligned.
- b. (i) Discussion: The syllabus of the courses offered in B. Tech (Computer Science & Engineering) 2022-26 Batch was presented before the members of the Board of Studies.
(ii) Comments: The existing Scheme and syllabus are well aligned,
- c. (i) Discussion: The syllabus of the courses offered in B. Tech (Information Technology) 2022-26 Batch was presented before the members of the Board of Studies.
(ii) Comments: The existing Scheme and syllabus are well aligned.
- d. (i) Discussion: The syllabus of the courses offered in MCA 2022-24 Batch was presented before the members of the Board of Studies.
(ii) Comments: The existing Scheme and syllabus is well aligned,
- e. (i) Discussion: The syllabus of the courses offered in BCA 2022-25 Batch was presented before the members of the Board of Studies.
(ii) Comments: The existing Scheme and syllabus are well aligned.
- f. (i) Discussion: The syllabus of the courses offered in B.Sc. (Information Technology) 2022-25 Batch was presented before the members of the Board of Studies.
(ii) Comments: The existing Scheme and syllabus are well aligned.
- g. (i) Discussion: The syllabus of the courses offered in Specialization (AI & ML, Data Science and Internet of Things) was presented before the members of the Board of Studies.
(ii) Comments: The existing Scheme and syllabus is well aligned.
- h. (i) Discussion: The syllabus of the courses offered in CBCS was presented before the members of the Board of Studies.
(ii) Comments: The existing Scheme and syllabus are well aligned, and appropriate changes were recommended.

4. Recommendations for 2022 Batch onwards:

M. Tech Program:

- a) There is no change in the scheme and syllabus of M. Tech (Computer Science & Engineering). (Refer Annexure-1)

B. Tech(CSE) Program:

- a) There is no change in the scheme and syllabus of B. Tech (CSE). (Refer Annexure-2)

B. Tech (IT) Program:

- a) There is no change in the scheme and syllabus of B. Tech (Information Technology). (Refer Annexure-3)

MCA Program:

- a) There is no change in the scheme and syllabus of MCA. (Refer Annexure-4)

BCA Program:

- a) There is no change in the scheme and syllabus of BCA. (Refer Annexure-5)

BSc.(IT) Program:

a) There is no change in the scheme and syllabus of B.Sc. (IT).

(Refer Annexure-6)

Specialization:

a) There is no change in the scheme and syllabus of AI & ML Specialization. (Refer Annexure-7)

b) There is no change in the detailed syllabus of Data Science Specialization. (Refer Annexure-8)

c) There is no change in the detailed syllabus of Internet of Things Specialization.

(Refer Annexure-9)

d) Introducing new Specialization course with title "Cyber Security".

(Refer Annexure-10)

Pre Ph.D. Course:

There is no change in the scheme and syllabus of the courses. (Refer Annexure-11)

CBCS:

a) There is no change in the existing scheme and syllabus of CBCS (Cloud Computing)
(Refer Annexure-12)

b) There is no change in the existing scheme and syllabus of CBCS (Data Analytics)
(Refer Annexure-13)

c) There is no change in the existing scheme and syllabus of CBCS (Network Security)
(Refer Annexure-14)

d) There is no change in the existing scheme and syllabus of CBCS (Web Technology)
(Refer Annexure-15)

e) There is no change in the existing scheme and syllabus of CBCS (IT Skills for Professionals)
(Refer Annexure-16)

f) MOOC Courses are included in three courses as per the UGC guidelines (Cloud Computing, Data Analytics and Network Security) as per the following details.

S No.	Name of the Minor Track	MOOC Course by UGC	Course Code	Semester	Credits
1	CBA 402 - Cloud Computing	Cloud Computing	4739	IV	4
2	CBB 102 - Introduction to Data Analytics	Desecrate Data Analytics	5726	I	3
3	CBC 402 - Information and Network Security	Computer Network and Internet Protocol	4759	IV	4

All the aforesaid points have been approved by all the board members present in the meeting.

[Handwritten signatures and initials]

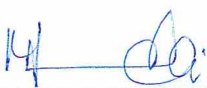
BOARD OF STUDIES (Computer Science & Engineering)

MINUTES OF THE MEETING

Signature of Members:


Dr. Ashok Kumar Shrivastava
(Member)

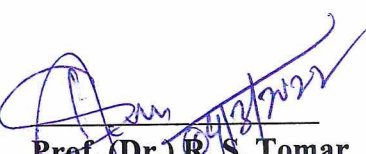

Dr. Subhrendu Guha Neogi
(Member)


Dr. Venkatadri M.
(Member)


Dr. Anirban Mitra
External Member

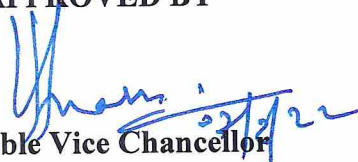

Prof. (Dr.) Sanjay Kumar Gupta
External Member


Maj Gen (Dr) S C Jain
Chairman- BOS


Prof. (Dr.) R. S. Tomar
Dean Academics
AUMP, Gwalior


Prof. (Dr.) M.P. Kaushik
Hon'ble Pro Vice Chancellor
AUMP, Gwalior

APPROVED BY


Hon'ble Vice Chancellor
AUMP, Gwalior



AMITY UNIVERSITY

MADHYA PRADESH

(Established by Ritnand Balved Education Foundation)

Date: 23/02/2017

BOARD OF STUDIES (Electronics & Communication Engineering)

MINUTES OF THE MEETING

(04 Pages Only)

1. A meeting of board of studies of Department of Electronics & Communication, Amity School of Engineering & Technology, Amity University Madhya Pradesh was held on 23rd February 2017 at AUMP, under the Chairmanship of Prof. (Dr.) Anil Vashisht, Director (ASET). The following members attended the meeting:-
 - (a) **Chairman:** Prof. (Dr.) Anil Vashisht, Director (ASET)
 - (b) **Member**
 - i) Dr. Aditya Trivedi, Professor, ABV-IIITM, Gwalior, External Member
 - ii) Dr. Sarita Bhadoria, Professor, MITS, Gwalior, External Member
 - iii) Dr. Raghavendra Sharma, Professor & Head ECE, Member
 - iv) Dr. Manish Gupta, Associate Professor, ECE, Member
 - v) Mr. Narendra Kumar Garg, Assistant Professor, ECE, Member
2. The agenda of the meeting included the following:
 - (a) Review of existing syllabus and modification if any.
 - (b) Discussion on trends and technologies in ECE and consideration of its inclusion in syllabus.
 - (c) Any other point with due permission of the Chairperson.

3. Discussions/Comments:

a. (i) Discussion: on International Conference..

- (ii) Comments:
- (i) Conference must be organized at ASET level or jointly organized by more than one Dept. with different tracks.
 - (ii) Plan for next year i.e. 2018 with association of renowned societies like IEEE/springer/ACM etc..

b. (i) Discussion: on Placement

- (ii) Comments:
- (i) There were problem in the placement of ECE branch because in India the major companies are service oriented.
 - (ii) Industry oriented courses may be include in the curriculum.
 - (iii) Invite the Industry persons for Expert talk.
 - (iv) Target for at least 20% good placement for maintaining the brand value.
 - (v) Motivate students for GATE Exam.

c. (i) Discussion: on Research/Project/Patent

- (ii) Comments:
- (i) To generate the innovative idea for Project/Patent, there must be industry partner.
 - (ii) For that you need to interact the companies in NCR region.
 - (iii) Approach funding agencies like DST, MPDTE etc.

4. Recommendations:

B. Tech Program:

- i. The credits of the Subject Java Programming BTE-305 are revised from 4 to 3 credits but the syllabus will remain same. Being an interdisciplinary subject it can be covered in stipulated time.(Annexure:1)
- ii. The subject code BTE 405 operating systems and BTE 423 operating system lab is removed from the syllabus because these are interdisciplinary courses and not so important from placement point of view for ECE students. (Annexure:2)
- iii. The subject code BTE- 424, Electronics Workshop Lab is renamed as new subject BTE 423 Electronics Workshop Lab without any change in syllabus due to deletion of the subject code BTE 423 operating system lab. (Annexure:3)
Old Subject: BTE 424 Electronics Workshop Lab
New Subject: BTE 423 Electronics Workshop Lab
- iv. The syllabus of the subject code BTE 602, Digital Signal Processing is revised; Module 1 of old syllabus is already covered in the subject Signals & Systems, BTE 404 and Module 3 is not elaborated. The new syllabus is proposed with better elaboration of the topics. (Annexure:4)
- v. The subject code BTE 623 MATLAB Lab is shifted to V Semester with code BTE 524 and reduced credits from 2 to 1 and no change in syllabus. This course is prerequisite to the subject BTE 621 Digital Signal Processing Lab which is also taught in VI semester. (Annexure:5)
Old Subject: BTE 623 MATLAB Lab
New Subject: BTE 524 MATLAB Lab

M. Tech Program:

There is no change in the scheme and syllabus of the course.

- vi. All the aforesaid points have been approved by all the board members present in the meeting.

CBCS: There is no change in the scheme and syllabus of the course.

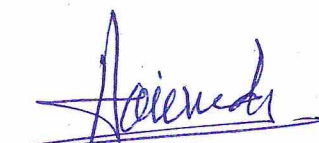
5: Summary of changes is given below:-

Current Syllabus B.Tech (ECE)					Proposed Changes/Modificati ons (addition/deletion in the Syllabus)	New Course Code B.Tech (ECE)	No. of Credits
Sr. No.	Course Title	Module of the syllabus	Old Course Code	No. of Credits			
1	Java Programming	All	BTE-305	4	No Change in syllabus	BTE-305	3
2	Operating Systems	All	BTE-405	3	Remove the subject		0
3	Operating Systems Lab	All	BTE-423	1	Remove the subject		0
4	Electronics Workshop Lab	All	BTE-424	2	Rename the subject	BTE-423	2
5	MATLAB Lab	All	BTE-623	2	Shift to V Sem	BTE-524	1
Total Credits =12					Total Credits=06		

The total number of credits after revision for B. Tech works out to 06 credits as against 12 credits, and the credits for M.Tech remains same.

Signature of Members:


Dr. Anil Vashisht

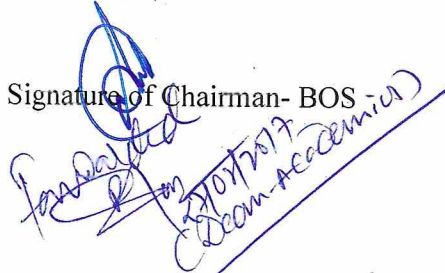

Dr. Aditya Trivedi

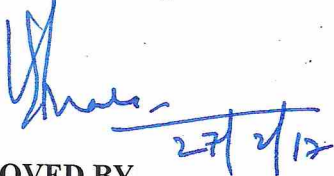
ABSENT
Dr. Sarita Bhadoria


Dr. Raghavendra Sharma


Dr. Manish Gupta


Mr. Narendra Kr. Garg

Signature of Chairman- BOS

27/07/17
Dean-Academic


27/7/17
APPROVED BY
Hon'ble Vice Chancellor
AUMP, Gwalior

Mr. Nandhu
25/02/17
Prof. (Dr.) M. Kausalya
Prin-VC, AUMP



AMITY UNIVERSITY

MADHYA PRADESH

(Established by Ritnand Balved Education Foundation)

MEETING OF BOARD OF STUDIES (BOS)
(Electronics & Communication Engineering)
Amity School of Engineering & Technology
23rd February, 2017

Remarks & Suggestions by BOS Members

Data structure and algorithm may be included
in curriculum in future.

Industrial people may be called for giving
talks to the benefits of students and faculties.

Signature of Members:

Dr. Anil Vashisht

Dr. Aditya Trivedi

ABSENT

Dr. Sarita Bhadoria

Dr. Raghavendra Sharma

Dr. Manish Gupta

Mr. Narendra Kr. Garg



AMITY UNIVERSITY

MADHYA PRADESH

(Established by Ritmand Balved Education Foundation)

Date: 05/01/2018

BOARD OF STUDIES (Electronics & Communication Engineering)

MINUTES OF THE MEETING

(05 Pages Only)

1. A meeting of board of studies of Department of Electronics & Communication, Amity School of Engineering & Technology, Amity University Madhya Pradesh was held on 5th January 2018 at AUMP, under the Chairmanship of Maj Gen (Dr) S C Jain VSM **(Retd), Director (ASET). The following members attended the meeting:-
 - (a) **Chairman:** Maj Gen (Dr) S C Jain VSM **(Retd), Director (ASET)
 - (b) **Member**
 - i) Dr. Aditya Trivedi, Professor, ABV-IIITM, Gwalior, External Member
 - ii) Dr. Raghavendra Sharma, Professor & Head ECE, Member
 - iii) Mrs. Rinkoo Bhatia, Assistant Professor, ECE, Member
 - iv) Dr. Vivek Singh Kushwah, Assistant Professor, ECE, Member
2. The agenda of the meeting included the following:
 - (a) Review of existing syllabus and modification if any.
 - (b) Discussion on trends and technologies in ECE and consideration of its inclusion in syllabus.
 - (c) Any other point with due permission of the Chairperson.

3. Discussions/Comments:

a. (i) Discussion: on Admissions

(ii) Comments: (1) To improve the visibility of the Department, Conferences and Workshops to be organized.

2) Collaboration to be done with Industry for workshops specifically in the fields of VLSI and Communication which are current trends.

b. (i) Discussion:

On Student Projects

(ii) Comments:

1) Students to be motivated to develop projects pertaining to societal benefits

2) Project selection to be done such that students to get motivated for Entrepreneurship

3) Industry Tie-ups to be done for student projects so that students can do their projects in Industry

c. (i) Discussion:

On Placements

(ii) Comments:

1) Experts from Industry to be invited for delivering talks and that a rapport is build for Placements

2) Atleast 20% students to be placed in very good Companies should be the target.

3) Student group to be formed to find Placement Opportunities for ECE students.

4. Recommendations:

B. Tech Program:

- i. Industrial Visit is added as one additional module in BTE-303 of III Semester, BTE-503 of V Semester and BTE-701 of VII semester respectively. This addition is for better exposure about Industry to the students.(Annexure-1)
- ii. The two subjects Digital Circuits & Systems-I (BTE-401) of 4 credits and Digital Circuits & Systems-II (BTE-501) of 4 credits are merged and new subject with the name Digital Circuits & Systems (BTE-401) of 4 credits is proposed in IV semester. (Annexure-2)
- iii. The two subjects Digital Circuits & Systems Lab -I (BTE-420) of 1 credit and Digital Circuits & Systems Lab-II (BTE-520) of 1 credit are merged and new subject with the name Digital Circuits & Systems Lab (BTE-420) of 1 credit is proposed in IV semester. (Annexure-3)
- iv. The subject Data Structures of 3 credits (BTE-501) along with Lab of 01 credit (BTE-520) is added as it is important from placement point of view for ECE students.(Annexure-4)
- v. The syllabus of the subject code BTE 601, VLSI Design is revised; Basic information about VLSI is missing hence introduced in Module 1 and some new topics are added in other modules. The new syllabus is proposed with better elaboration of the topics. (Annexure-5)
- vi. The subject VHDL Programming (BTE-811) along with VHDL Programming Lab (BTE-830) is added in basket of electives in VIII semester. (Annexure-6)

M. Tech Program:

There is no change in the scheme and syllabus of the course.

CBCS:

- vii. **Consumer Electronics** is added and the syllabus for all 6 semesters is designed to make it interesting for students of other branches.(Annexure-7)
- viii. The credits and syllabus of old CBCS subjects are modified. (Annexure-8)

All the aforesaid points have been approved by all the board members present in the meeting.

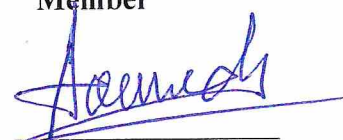
5. Summary of changes is given below:-

Current Syllabus B.Tech (ECE)					Proposed Changes/Modifications (addition/deletion in the Syllabus)	New Course Code B.Tech (ECE)	No. of Credits
Sr. No.	Course Title	Module of the syllabus	Old Course Code	No. of Credits			
1					Additional module of Industrial visit is added in III, V and VII semester without any change in syllabus and credits	BTE-303, BTE-503, BTE-701	
2	Digital Circuits & Systems-I and Digital Circuits & Systems-II are merged	All modules	BTE-401 & BTE-501	4 & 4	Digital Circuits & Systems	BTE-401	4
3	Digital Circuits & Systems Lab-I and Digital Circuits & Systems Lab-II are merged	All modules	BTE-420 & BTE-520	1 & 1	Digital Circuits & Systems Lab	BTE-420	1
4					Data Structures is added	BTE-501	3
5					Data Structures Lab is added	BTE-520	1
6	VLSI Design	All	BTE-601	4	Few modules are rearranged	BTE-601	4
7					VHDL Programming is added in elective list of VIII sem	BTE-811	3
8					VHDL Programming Lab is added in elective list of VIII sem	BTE-830	1
9					Consumer Electronics is added in CBCS		3
Total Credits =14					Total Credits=13		

The total number of credits after revision for B. Tech works out to 13 credits as against 14 credits, and the credits for M. Tech. remains same.

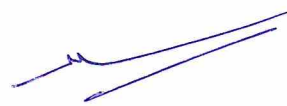
Signature of Members:


Mrs. Rinkoo Bhatia
Member


Dr. Aditya Trivedi
External Member


Prof.(Dr.) M.P. Kaushik
Hon'ble Pro Vice Chancellor
AUMP, Gwalior


Dr. V S Kushwah
Member


Dr. Raghavendra Sharma
Member


Maj Gen (Dr) S C Jain
Chairman- BOS

APPROVED BY


Hon'ble Vice Chancellor
AUMP, Gwalior
12/3/18



AMITY UNIVERSITY

MADHYA PRADESH

(Established by Ritmand Balved Education Foundation)

Date: 30/01/2019

NOTE- SHEET

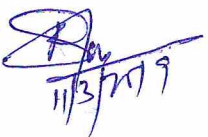
1. The Department of Electronics & Communication Engineering, ASET, AUMP, Board of Studies Meeting was held on **30 Jan 2019**.
2. The minutes of the meeting submitted for your kind perusal & approval please.


Prof. (Dr) Raghavendra Sharma
HoD(ECE)


Director-ASET

Dean (Academics)

Submit a copy (soft & hard) of BOS minutes & syllabus

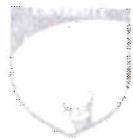

11/3/19

Hon'ble Pro Vice Chancellor

M. V. Singh
12/08/19

Hon'ble Vice Chancellor


U. Mas.
12/3/19



AMITY UNIVERSITY

MADHYA PRADESH

(Established by Ritnand Balved Education Foundation)

Date: 30/01/2019

BOARD OF STUDIES (Electronics & Communication Engineering)
MINUTES OF THE MEETING
(06 Pages Only)

1. A meeting of board of studies of Department of Electronics & Communication Engineering, Amity School of Engineering & Technology, Amity University Madhya Pradesh was held on 30th January 2019 at AUMP, under the Chairmanship of Maj Gen (Dr) S C Jain VSM ^{**}(Retd), Director (ASET). The following members attended the meeting:-
 - (a) **Chairman:** Maj Gen (Dr) S C Jain VSM ^{**}(Retd), Director (ASET)
 - (b) **Member**
 - i) Dr. Aditya Trivedi, Professor, ABV-IIITM, Gwalior, External Member
 - ii) Dr. Raghavendra Sharma, Professor & Head ECE, Member
 - iii) Mrs. Rinkoo Bhatia, Assistant Professor, ECE, Member
 - iv) Dr. Vivek Singh Kushwah, Assistant Professor, ECE, Member
2. The agenda of the meeting included the following:
 - (a) **B.Tech ECE 2018-22 Batch:** In continuation with the 1st year AICTE model curriculum approved for B.Tech ECE in the academic year 2018-19, 2nd year B.Tech ECE scheme and syllabus has been put forward for approval for 2018-22 batch.
 - (b) **B.Tech ECE 2019-23 Batch:** Introducing new curriculum with uniform course coding for B.Tech ECE as per AICTE Model curriculum from the academic year 2019-20 (First year), 2020-21 (Second year) for 2019-23 batch.
 - (c) Discussion on trends and technologies in ECE and consideration of its inclusion in syllabus.
 - (d) Any other point with due permission of the Chairperson.

(e) **Discussions/Comments:**

- a. (i) **Discussion:** The existing syllabus of the subjects offered by Department of ECE to I and II semester B.Tech. in CSE, ME and Civil and Syllabus of First year B.Tech. ECE was presented before the members of the Board of studies. The syllabus of all the subjects was reviewed.
- (ii) **Comments:** The existing syllabus is well aligned with the syllabus recommended by AICTE and few changes were recommended in some subjects. Uniform course coding has been adopted for common courses and value added courses.
- b. (i) **Discussion:** The syllabus of Second year ECE as per AICTE recommendation along with the syllabus of the subjects offered by ECE to other departments was presented to BOS members and reviewed.
- (ii) **Comments:** The syllabus recommended by AICTE has been adopted for Second year ECE and the subjects offered by ECE to other departments. Uniform course coding has been adopted for the common subjects and value added subjects of Second year.
- c. (i) **Discussion:** The syllabus of M. Tech, CBCS and Pre-PhD course work subjects was presented to BOS members and reviewed.
- (ii) **Comments:** The Syllabus of M. Tech., CBCS and Pre-PhD course work subjects is well aligned and needs no change. Uniform course coding has been adopted for Value added subjects of M. Tech. and CBCS subjects.



(f) **Recommendations:**

B. Tech Program

- i. As per the guidelines of AICTE 2018, Dept. of Electronics & Communication Engineering in ASET, AUMP, Gwalior has adopted the AICTE model curriculum from the academic year 2018-19 onwards. The BOS meeting had approved the first year ECE AICTE model curriculum and syllabus. Further in continuation, 2018-22 batch's second year B.Tech. in ECE **scheme and syllabus** put forward for the BOS member's kind approval. Uniform course coding has been adopted in all the courses except the Course code for Mathematics-III i.e. BTE-301 (remains same for 2nd year B.Tech ECE program for the academic year 2019-20) for batch-2018-22. **(Ref. Annexure-1)**
- ii. Uniform course coding has been recommended to all the courses B.Tech ECE programs from the academic year 2019-20 (First year), 2020-21 (Second year) for 2019-23 batch. The new curriculum as per the AICTE model curriculum with uniform course coding is put forward to the kind approval of BoS members. **(Ref. Annexure-2)**
- iii. Uniform Course coding has been adopted for value added courses for 2018-22 batch.
- iv. Uniform course coding has been adopted for value added courses (All semesters), Basic science courses (Physics, Chemistry, Maths) and courses offered to other Institutes by the department.
- v. Modified syllabus of Basic Electrical Engineering and Basic Electrical Engineering Lab was placed for first year. **(Ref Annexure -3).**
- vi. Industrial visit in BTE 303 and Electronics hardware project has been added in BTE-424 and both are compulsory.

M. Tech Program:

- i. There is no change in the scheme and syllabus of the course.
- ii. Uniform course coding has been adopted for value added courses (All semesters).

Pre Ph.D. Course:

Pre PhD course work subjects to be decided in accordance to the **Appendix-G** of URC dated February, 08, 2019.

CBCS:

- i. There is no change in the scheme and syllabus of the course.
- ii. Uniform course coding has been adopted for all courses offered by the department.
- iii. MOOC courses are included in two subjects (Embedded Systems, Wireless Communication) of semester-I.

S. No.	Name of Minor Track	Semester	Name of Course	Course -ID	Credits
1	Embedded Systems	I	Digital Circuits	noc19-ee51	3(12 week course)
2	Wireless Communication	I	Analog Electronic circuit	noc19-ee38	3(12 week course)

All the aforesaid points have been approved by all the board members present in the meeting.

(g) Summary of changes is given below: -

Codes:

(a) All codes are subject to change as per further alignment and higher directions.

(b) Codes and syllabus for the subjects offered outside ASET are being decided in consultation with the respective HOI's.

Current Syllabus					Proposed Changes/ Modifications			
Sr. No	Programme	Course Title	Old Course Code	No. of Credits	Addition/deletion in the Syllabus	New course title	New Course Code	No. of Credits
1	B. Tech ME Sem-I	Basic Electrical Engineering	BTM 103	4	Few modules Revised	No Change	ECE 101	3
2	B. Tech CE Sem-I	Basic Electrical Engineering	BTCE 103					
3	B. Tech CSE Sem- II	Basic Electrical Engineering	BTC 203					
4	B. Tech ECE Sem- II	Basic Electrical Engineering	BTE 203					
5	B.Tech ME I Sem	Basic Electrical Engineering Lab	BTM 121	1	Few experiments revised	No Change	ECE 121	1
6	B.Tech CE I Sem	Basic Electrical Engineering Lab	BTCE 121					
7	B.Tech CSE II Sem	Basic Electrical Engineering Lab	BTC 221					
8	B.Tech EC II Sem	Basic Electrical Engineering Lab	BTE 221					
9	BCA I Sem	Digital Electronics	BCA 104	4	Syllabus Revised	Digital Electronics and Logic Design	ECE 301	3
10	BCA I Sem	-	-	-	New Subject	Digital Electronics and Logic Design Lab	ECE 321	1

- Note:** 1. The Codes BTM 103, BTCE 103, BTC 203, BTE 203 are renamed as ECE 101.
2. The Codes BTM 121, BTCE 121, BTC 221, BTE 221 are renamed as ECE 121.

New Courses offered by Dept in III & IV Semester:

Sr. No.	Programme	Course Title	New Course Code	No. of Credits
1	B.Tech CSE III Sem	Digital Electronics and Logic Design	ECE 301	3
2	B.Tech CSE III Sem	Digital Electronics and Logic Design Lab	ECE 321	1
3	B.Tech CSE IV Sem	Analog Electronic Circuits	ECE 401	3
4	B.Tech CSE IV Sem	Analog Electronic Circuits Lab	ECE 421	1
5	B.Tech CE III Sem	Basic Electronics	ECE 302	2
6	B.Tech ME III Sem			
7	B.Tech CE III Sem	Basic Electronics Lab	ECE 322	1
8	B.Tech ME III Sem			
9	B.Tech CE IV Sem	Instrumentation & Sensor Technologies for Civil Engineering Applications	ECE 402	2
10	B.Tech CE IV Sem	Instrumentation & Sensor Technologies for Civil Engineering Applications Lab	ECE 422	1

BOARD OF STUDIES (B.Tech, ECE, Second Year)
MINUTES OF THE MEETING

Signature of Members:

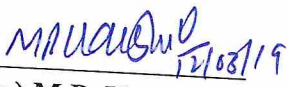

Dr. Vivek Singh Kushwah
Member

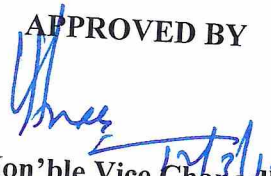

Mrs. Rinkoo Bhatia
Member


Dr. Raghavendra Sharma
Member


Maj Gen (Dr) S C Jain
Chairman- BOS


Dr. Aditya Trivedi
External Member


Prof. (Dr.) M.P. Kaushik
Hon'ble Pro Vice Chancellor
AUMP, Gwalior

APPROVED BY

Hon'ble Vice Chancellor
AUMP, Gwalior



AMITY UNIVERSITY

MADHYA PRADESH

(Established by Ritnand Balved Education Foundation)

Date: 05/03/2020

BOARD OF STUDIES (Electronics & Communication Engineering)

MINUTES OF THE MEETING

(05 Pages Only)

1. A meeting of board of studies of Department of Electronics & Communication Engineering, Amity School of Engineering & Technology, Amity University Madhya Pradesh was held on March 05, 2020 at AUMP, under the Chairmanship of Maj Gen (Dr) S C Jain VSM** (Retd), Director (ASET). The following members attended the meeting: -
 - (a) **Chairman:** Maj Gen (Dr) S C Jain VSM ** (Retd), Director (ASET)
 - (b) **Member**
 - i) Mr. Pankaj Mittal, General Manager, Surya Roshni Ltd, Gwalior, External Member
 - ii) Dr. Raghavendra Sharma, Professor & Head ECE, Member
 - iii) Dr. Vivek Singh Kushwah, Associate Professor, ECE, Member
 - iv) Mrs. Rinkoo Bhatia, Assistant Professor, ECE, Member
2. **The agenda of the meeting included the following:**
 - (a) Curriculum of First year BTech ECE Program for 2020-24 batch.
 - (b) Introducing Uniform Course codes for Pre-Ph.D. course work subjects and changing their credit structure.
 - (c) Discussion on trends and technologies in ECE and consideration of its inclusion in syllabus.
 - (d) Any other point with due permission of the Chairperson.
3. **Discussions/Comments:**
 - a. (i) Discussion: The Scheme and syllabus of the subjects to be offered by ECE Department to B. Tech. ECE for batch 2020 -2024 was presented before the members of the Board of studies. The Scheme and syllabus of all the subjects was reviewed.
 - (ii) Comments: The existing scheme and syllabus is well aligned, and few changes were recommended in few subjects.

- b. (i) Discussion: The syllabus of Programme B.Tech in ECE for batches 2017-2021, 2018-2022, 2019-2023 and along with the syllabus of the subjects offered by ECE to other departments was presented to BOS members and reviewed.
- (ii) Comments: The syllabus of the mentioned batches and the subjects offered by ECE to other departments is well aligned. No change is recommended for the batches 2017-2021, 2018-2022, 2019-2023 but few changes are recommended in few subjects offered by ECE to other department for 2020-24 batch.
- c. (i) Discussion: The syllabus of M. Tech, CBCS and Pre-PhD course work subjects was presented to BOS members and reviewed.
- (ii) Comments: The Syllabus of M. Tech., CBCS course work subjects is well aligned and needs no change. Uniform course coding is adopted for Pre-PhD course work subjects and credit structure has been reviewed.

4. Recommendations:

B. Tech Program

- a. The Scheme and syllabus of the subjects to be offered by ECE Department to B. Tech. ECE for batch 2020 -2024 was presented before the members of the Board of studies. The BOS members approved the ECE curriculum and syllabus. (Refer Annexure-1)
- b. The modified syllabus of the subject ECE 407 (offered to Civil Engineering) was presented before the members of the Board of studies. The BOS members approved the syllabus. (Refer Annexure-2)
- c. The modified syllabus of the subject ECE 401 was presented before the members of the Board of studies. The BOS members approved the syllabus. (Refer Annexure-3)
- d. The subject ECE 101 (Basic Electrical Engineering) and ECE 121 (Basic Electrical Engineering Lab) will be included in B Tech II semester of all branches (ECE, CSE, ME, CE and Bio-Tech). The BOS members approved the changes.
- e. The subject ECE 306 (Digital Electronics & Logic Design) and ECE 326 (Digital Electronics & Logic Design Lab) is deleted form BCA I Semester and New Subjects ECE 106 (Digital Electronics) and ECE 126 (Digital Electronics Lab) is added. The BOS members approved the changes. (Ref Annexure-4)

M. Tech Program:

There is no change in the scheme and syllabus of the course. (Ref Annexure-5)

Pre Ph.D. Course:

There is a change in the scheme and syllabus of the courses. (Ref Annexure -6)

- PhDEE 103: Advance Microwave Engineering - (Credits: 03)
 PhDEE 105: Satellite Communication - (Credits: 03)
 PhDEE 106: Advance Information Theory and Coding - (Credits: 03)
 PhDEE 107: Computer Communication and Networks - (Credits: 03)
 PhDEE 108: Antenna Theory and Design - (Credits: 03)
 PhDEE 109: Low Power VLSI Design - (Credits: 03)

CBCS:

There is no change in the scheme and syllabus of the course.

All the aforesaid points have been approved by all the board members present in the meeting.

5. Summary of changes is given below:-

Current Syllabus					Proposed Changes/ Modifications			
Sr. No	Program	Course Title	Old Course Code	No. of Credits	Addition/ deletion in the Syllabus	New Course Title	New Course Code	No. of Credits
1	PhD	Advance Microwave Engineering	PhDEE 103	3	No Change	No Change	PEC 101	4
2	PhD	Satellite Communication	PhDEE 105	3			PEC 102	4
3	PhD	Advance Information Theory and Coding	PhDEE 106	3			PEC 103	4
4	PhD	Computer Communication and Networks	PhDEE 107	3			PEC 104	4
5	PhD	Antenna Theory and Design	PhDEE 108	3			PEC 105	4
6	PhD	Low Power VLSI Design	PhDEE 109	3			PEC 106	4
7	B Tech (ME & Civil)	Basic Electrical Engineering	ECE 101	3	Shifted from Sem I to II	No Change	No Change	3
8	B Tech (ME & Civil)	Basic Electrical Engineering Lab	ECE 121	1	Shifted from Sem I to II	No Change	No Change	1
9	BCA	Digital Electronics & Logic Design	ECE 306	3	Subject deleted from Sem I	-	-	-
10	BCA	Digital Electronics & Logic Design Lab	ECE 326	1	Subject deleted from Sem I	-	-	-
11	BCA	-	-	-	New subject added in Semester I	Digital Electronics	ECE 106	3
12	BCA	-	-	-	New subject added in Semester I	Digital Electronics Lab	ECE 126	1

13	B Tech (ECE)	MATLAB and SIMULINK Lab	ECE 325	2	Shifted from Sem III to IV	No Change	No Change	1
14	B Tech (ECE)	Electronics Workshop Lab	ECE 425	2	No Change	No Change	ECE 425	1
15	B Tech (ECE)	Probability Theory and Stochastic Processes	ECE 602	3	Subject deleted	-	-	-
16	B Tech (ECE)	Speech and Audio Processing	ECE 807	3	Elective shifted from Sem VIII to VI with changed code	No Change	ECE 607	3
17	B Tech (ECE)	Speech and Audio Processing Lab	ECE 827	1	Elective shifted from Sem VIII to VI with changed code	No Change	ECE 627	1
18	B Tech (ECE)	Analog and Digital Communication	ECE 401	3	Few modules are revised, and syllabus is aligned	No Change	No Change	3
19	B Tech (ECE)	Instrumentation & Sensor Technologies for Civil Engineering Applications	ECE 407	2	Few modules are revised as syllabus is aligned as per CIVIL requirements	No Change	No Change	2

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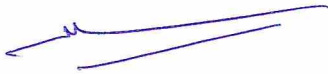
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BOARD OF STUDIES (ECE)
MINUTES OF THE MEETING

Signature of Members:


Dr Vivek Singh Kushwah
Member


Mrs Rinkoo Bhatia
Member


Dr Raghavendra Sharma
Member


Maj Gen (Dr) S C Jain
Chairman- BOS


Mr. Pankaj Mittal
External Member


Prof (Dr) R S Tomar
Dean (Academics)
AUMP, Gwalior


Prof (Dr) M P Kaushik
Hon'ble Pro Vice Chancellor
AUMP, Gwalior


APPROVED BY
12/3/2020
Hon'ble Vice Chancellor
AUMP, Gwalior



AMITY UNIVERSITY

MADHYA PRADESH

(Established by Ritmand Balved Education Foundation)

Date: 25/02/2021

BOARD OF STUDIES (Electronics & Communication Engineering)
MINUTES OF THE MEETING
(04 Pages Only)

1. A meeting of board of studies of Department of Electronics & Communication Engineering, Amity School of Engineering & Technology, Amity University Madhya Pradesh was held on 25 February 2021 at AUMP, under the Chairmanship of Maj Gen (Dr) S C Jain VSM ** (Retd), Director (ASET). The following members attended the meeting:-
 - (a) **Chairman:** Maj Gen (Dr) S C Jain VSM **(Retd), Director (ASET)
 - (b) **Member**
 - i) Prof (Dr) Parthasarathi Mangipudi, Professor, Amity University Uttar Pradesh, Noida, External Member
 - ii) Mr. Pankaj Mittal, General Manager, Surya Roshni Ltd, Gwalior, External Member
 - iii) Prof (Dr) Raghavendra Sharma, Professor & Head ECE, Member
 - iv) Dr. Vivek Singh Kushwah, Associate Professor, ECE, Member
 - v) Mrs. Rinkoo Bhatia, Assistant Professor, ECE, Member
2. The agenda of the meeting included the following:
 - (a) Curriculum of the First year B.Tech ECE Program for 2021-25 batch.
 - (b) Discussion on Trends and Technologies in ECE and consideration of its inclusion in syllabus.
 - (c) Any other point with due permission of the Chairperson.

3. Discussions/Comments:

- a. (i) Discussion: The Scheme and syllabus of the subjects to be offered by ECE Department to B. Tech. ECE for batch 2021 -2025 was presented before the members of the Board of studies. The Scheme and syllabus of all the subjects was reviewed.
(ii) Comments: The existing scheme and syllabus is well aligned and few changes were recommended in few subjects.
- b. (i) Discussion: The syllabus of programme B.Tech in ECE for batches 2018-2022, 2019-2023, 2020-2024 and along with the syllabus of the subjects offered by ECE to other departments was presented to BOS members and reviewed.
(ii) Comments: The syllabus of the mentioned batches and the subjects offered by ECE to other departments is well aligned. No change is recommended for the batches 2018-2022, 2019-2023, 2020-2022 however few changes are recommended in syllabus of some subjects offered by ECE to other departments.
- c. (i) Discussion: The syllabus of M. Tech, CBCS and Pre-PhD course work subjects was presented to BOS members and reviewed.
(ii) Comments: The Syllabus of M. Tech., CBCS and Pre-PhD course work subjects is well aligned and needs no change.

4. Recommendations:

B. Tech Program

- a. The Scheme and syllabus of the subjects to be offered by ECE Department to B. Tech. ECE for batch 2021 -2025 was presented before the members of the Board of studies. The BOS members approved the ECE curriculum and syllabus. **(Refer Annexure-1)**
- b. The modified syllabus of the subject ECE307 (offered to Civil and Mechanical Engineering) was presented before the members of Board of Studies. The BOS members approved the syllabus. **(Refer Annexure-2)**
- c. The modified syllabus of the subject ECE407 (offered to Civil Engineering) was presented before the members of Board of Studies. The BOS members approved the syllabus. **(Refer Annexure-3)**

M. Tech Program:

- d. There is no change in the scheme and syllabus of the course. **(Refer Annexure-4)**

Pre Ph.D. Course:

- e. There is no change in the scheme and syllabus of the course. (Refer Annexure-5)

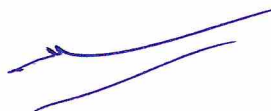
CBCS:

- f. There is no change in the scheme and syllabus of the course.

All the aforesaid points have been approved by all the board members present in the meeting.

5. Summary of changes is given below: -

Current Syllabus					Proposed Changes/Modifications			
Sr. No.	Course Title	Module of the syllabus	Old Course Code	No. of Credits	Addition/deletion in the Syllabus	New Course Title	New Course Code	No. of Credits
1.	Basic Electronics	II,III & IV	ECE 307	2	Deletion of Topics - Voltage Divider Bias Configuration, Topologies, Integrator, Differentiator, Logical ICs	No Change	No Change	No Change
2.	Instrumentation & Sensor Technologies for Civil Engineering Applications	II & III	ECE 407	2	Deletion of Sensor Installation & operation and Addition of Actuators	No Change	No Change	No Change



BOARD OF STUDIES (ECE)
MINUTES OF THE MEETING

Signature of Members:


Dr Vivek Singh Kushwah
Member

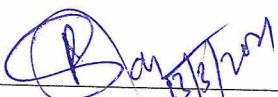

Mrs Rinkoo Bhatia
Member


Prof (Dr) Raghavendra Sharma
Member


Maj Gen (Dr) S C Jain
Chairman- BOS

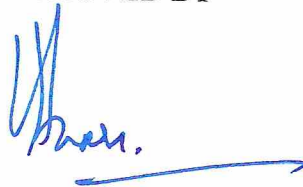

Prof (Dr) Partha Sarathi M
External Member

ABSENT
Mr Pankaj Mittal
External Member


Prof (Dr) R S Tomar
Dean (Academics)
AUMP, Gwalior


Prof (Dr) M P Kaushik
Hon'ble Pro Vice Chancellor
AUMP, Gwalior

APPROVED BY



Hon'ble Vice Chancellor
AUMP, Gwalior



AMITY UNIVERSITY

MADHYA PRADESH

[Established by Ritnand Balved Education Foundation]

Date: 24/01/2022

BOARD OF STUDIES (Electronics & Communication Engineering)

MINUTES OF THE MEETING

(04 Pages Only)

1. A meeting of board of studies of Department of Electronics & Communication Engineering, Amity School of Engineering & Technology, Amity University Madhya Pradesh was held on 24 January, 2022 at AUMP, under the Chairmanship of Maj Gen (Dr) S C Jain VSM ** (Retd), Director (ASET). The following members attended the meeting: -
 - (a) **Chairman:** Maj Gen (Dr) S C Jain VSM **(Retd), Director (ASET)
 - (b) **Member:**
 - i) Prof (Dr) Parthasarathi Mangipudi, Professor, Amity University Uttar Pradesh, Noida, External Member
 - ii) Mr. Pankaj Mittal, General Manager, Surya Roshni Ltd, Gwalior, External Member
 - iii) Prof (Dr) Raghavendra Sharma, Professor & Head ECE, Member
 - iv) Dr. Vivek Singh Kushwah, Associate Professor, ECE, Member
 - v) Mrs. Rinkoo Bhatia, Assistant Professor, ECE, Member
2. The agenda of the meeting included the following:
 - (a) Curriculum of the First year B. Tech ECE Program for 2022-26 batch.
 - (b) Discussion on Trends and Technologies in ECE and consideration of its inclusion in syllabus.
 - (c) Any other point with due permission of the Chairperson.

3. Discussions/Comments:

- a. (i) Discussion: The Scheme and syllabus of the subjects to be offered by ECE Department to B. Tech. ECE for batch 2022 -2026 was presented before the members of the Board of studies. The Scheme and syllabus of all the subjects was reviewed.
(ii) Comments: The existing scheme and syllabus is well aligned, and few changes were recommended in few subjects.
- b. (i) Discussion: The syllabus of programme B. Tech in ECE for batches 2019-2023, 2020-2024, 2021-2025 and along with the syllabus of the subjects offered by ECE to other departments was presented to BOS members and reviewed.
(ii) Comments: The syllabus of the mentioned batches and the subjects offered by ECE to other departments is well aligned. No change is recommended for the batches 2019-2023, 2020-2024, and 2021-2025.
- c. (i) Discussion: The syllabus of M. Tech, CBCS and Pre-PhD course work subjects was presented to BOS members and reviewed.
(ii) Comments: The Syllabus of M. Tech., CBCS and Pre-PhD course work subjects is well aligned and needs no change.

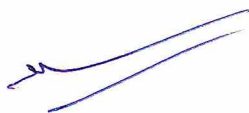
4. Recommendations:

B. Tech Program

- a. The Scheme and syllabus of the subjects to be offered by ECE Department to B. Tech. ECE for batch 2022 -2026 was presented before the members of the Board of studies. The BOS members approved the ECE curriculum and syllabus. **(Refer Annexure-1)**
- b. The modified syllabus of the lab ECE 721 was presented before the members of Board of Studies. The BOS members approved the syllabus. **(Refer Annexure-2)**
- c. The modified syllabus of the subject ECE707 was presented before the members of Board of Studies. The BOS members approved the syllabus. **(Refer Annexure-3)**
- d. The modified syllabus of the lab ECE 521 was presented before the members of Board of Studies. The BOS members approved the syllabus. **(Refer Annexure-4)**

M. Tech Program:

- e. There is no change in the scheme and syllabus of the course. **(Refer Annexure-5)**



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Pre Ph.D. Course:

- f. There is no change in the scheme and syllabus of the course. (Refer Annexure-6)

CBCS:

- g. There is no change in the scheme and syllabus of the course.
- h. The following course of SWAYAM is recommended to be given as CBCS “Embedded Systems” in the Batch 2022-2026.

S No.	Name of Minor Track	Semester/ CBCS Course Code/ Course Name	Name of course from SWAYAM	Duration	Credits
1	Embedded Systems	I/CBG102 Digital Electronics	Digital Electronic Circuits	12 Weeks	3

More than 70 % consistency/ similarity exist between the syllabus of course offered in the CBCS and MOOC course.

All the aforesaid points have been approved by all the board members present in the meeting.

5. Summary of changes is given below: -

Current Syllabus					Proposed Changes/Modifications			
Sr. No.	Course Title	Module of the syllabus	Old Course Code	No. of Credits	Addition/deletion in the Syllabus	New Course Title	New Course Code	No. of Credits
1.	Fiber Optic Communication Lab	NA	ECE 721	1	Minor Modification in Experiments	No Change	No Change	No Change
2.	Mobile Communication	I, II, III & IV, V	ECE 707	3	Restructuring of Module, I & II, III & IV Addition of 4G, LTE communication in Module V	No Change	No Change	No Change
3	Electromagnetic Waves Lab	NA	ECE 521	1	Minor Modification in Experiments	No Change	No Change	No Change

BOARD OF STUDIES (ECE)
MINUTES OF THE MEETING

Signature of Members:



Dr Vivek Singh Kushwah
Member



Mrs Rinkoo Bhatia
Member



Prof (Dr) Raghavendra Sharma
Member

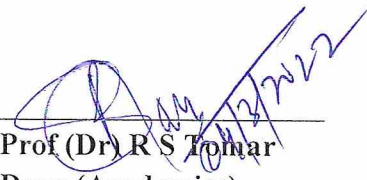


Maj Gen (Dr) S C Jain
Chairman- BOS

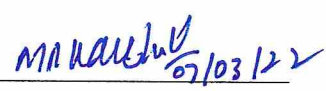


Prof (Dr) Partha Sarathi M
External Member

ABSENT
Mr Pankaj Mittal
External Member

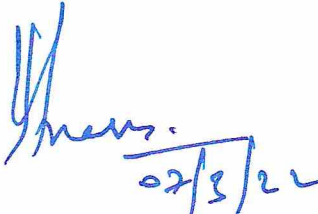


Prof (Dr) R S Tomar
Dean (Academics)
AUMP, Gwalior



Prof (Dr) M P Kaushik
Hon'ble Pro Vice Chancellor
AUMP, Gwalior

APPROVED BY



Hon'ble Vice Chancellor
AUMP, Gwalior



AMITY UNIVERSITY

MADHYA PRADESH

(Established by Ritnand Balved Education Foundation)

Date: 22/02/2017

BOARD OF STUDIES (Civil Engineering)

MINUTES OF THE MEETING

(04 Pages Only)

1. A meeting of board of studies of Department of Civil Engineering, Amity School of Engineering & Technology, Amity University Madhya Pradesh was held on 22nd February 2017 at AUMP, under the Chairmanship of Prof. (Dr.) Anil Vashisht, Director (ASET). The following members attended the meeting:-
 - (a) **Chairman:** Prof. (Dr.) Anil Vashisht, Director (ASET)
 - (b) **Member**
 - i) Dr. M. K. Trivedi, Professor, MITS, Gwalior, External Member
 - ii) Dr. Vijay Rode, Professor, SGSITS, Indore, External Member
 - iii) Mr. Mohan Kantharia, Assistant Professor & Head CE, Member
 - iv) Mr. Parag Agrawal, Assistant Professor CE, Member
 - v) Mr. Ankesh Birtharia, Assistant Professor CE, Member
 - vi) Miss Rashmi Singh, Assistant Professor CE, Member
2. The agenda of the meeting included the following:
 - (a) Review of existing syllabus of M.Tech, B.Tech and CBCS.
 - (b) Discussion on trends and technologies in CE and consideration of its inclusion in syllabus.
 - (c) Any other point with due permission of the Chairperson.

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3. Discussions/Comments:

a. (i) Discussion: EDM., Total Station.

(ii) Comments: More focus should be done on total station and GPS.

b. (i) Discussion: Design of ^{specific} big structures.

(ii) Comments: lengthy designs of structure should be shifted to tutorials class. and proper marking scheme should be done for that

c. (i) Discussion: Diagnostic lab.

(ii) Comments: Diagnostic lab for material (concrete & mortar)

4. Recommendations:

B. Tech Program:

- Revision of the list of experiments of Computer Application in Civil Engineering Lab (BTCE-620) as per the software Auto cadd and Staad Pro. (Annexure:1)
- The credits of the Civil Engineering Lab (BTCE-321) are revised from 2 to 1 credits. (Annexure:2)

M. Tech Program:

- Modify the syllabus of Advanced RCC Design (MTCE-302)
- Modify the syllabus of High Rise Building Analysis (MTCE-303)

CBCS:

- Revise the syllabus of Construction Engineering (CE-4903)

4. Summary of changes is given below:-

Current Syllabus B.Tech (CE), M.Tech(CE) and CBCS					Proposed Changes/Modification s (addition/deletion in the Syllabus)	New Course Code B.Tech (ECE)	No. of Credits
Sr. No.	Course Title	Module of the syllabus	Old Course Code	No. of Credits			
1	Computer Application in Civil engineering lab (BTCE- 620)	Lab Experime nts	BTcE-620	1	Annexure-1	BTce-620	1
2	Civil engineering Drawing lab (BTCE-321)	Experime nt list	BTCE- 321	2	Annexure-II	BTCE-321	1
			Total credits	03			02
3	Advanced RCC (MTCE- 302)	5	MTCE- 302	4	Annexure-III	MTCE-302	4
4	High Rise Building (MTCE-303)	5	MTCE- 303	4	Annexure-IV	MTCE-303	4
5	(CBCE) Surveying (CE-4903)	3	CE-4903	3	Annexure-V	CE-4903	3
Total Credits =14					Total Credits=13		

The total number of credits after revision for B. Tech works out to 02 credits as against 03 credits, and the credits for M.Tech and CBCS remains same.

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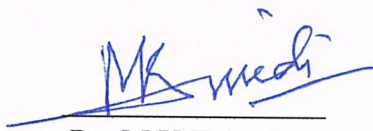
Pooja

Shruti

Signature of Members:



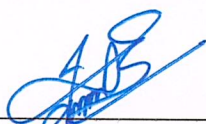
Dr. Anil Vashisht



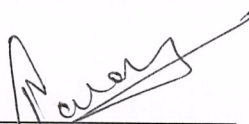
Dr. M.K. Trivedi

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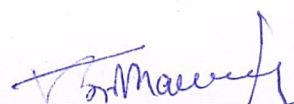
Dr. Vijay Rode



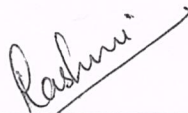
Mr. Mohan Kantharia



Mr. Parag Agrawal



Mr. Ankesh Birtharia



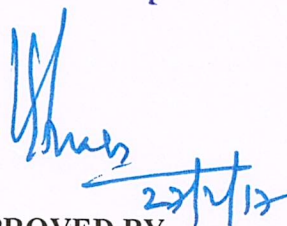
Miss Rashmi Singh



Signature of Chairman- BOS

Forwarded
27/02/2017
Dean - Academics

MAHAQUL 27/02/17
Prof. (Dr.) MA Kaushek
Pro-VC, AUMP



APPROVED BY
Hon'ble Vice Chancellor
AUMP, Gwalior



AMITY UNIVERSITY

MADHYA PRADESH

(Established by Ritmand Balved Education Foundation)

MEETING OF BOARD OF STUDIES (BOS)
(Civil Engineering)

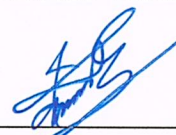
Amity School of Engineering & Technology

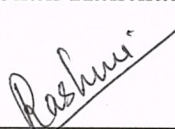
Remarks & Suggestions by BOS Members

ASCE journals should be subscribed for PG students
and also for UG students
Department need general Civil Engg. software that can
cover water resource, pavement/road designs
with the induction of new faculties department is
getting strength day by day

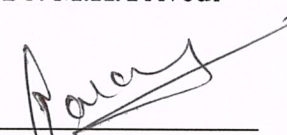
Signature of Members:


Dr. Anil Vashisht


Mr. Mohan Kantharia

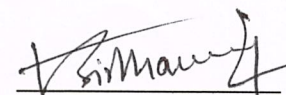

Miss Rashmi Singh


Dr. M.K. Trivedi


Mr. Parag Agrawal

ABSENT

Dr. Vijay Rode


Mr. Ankesh Birtharia

THE UNIVERSITY OF CHICAGO

DEPARTMENT OF CHEMISTRY

LABORATORY OF ORGANIC CHEMISTRY

REPORT OF RESEARCH

ON THE REACTION OF

ALCOHOLS WITH

ACIDIC CATALYSTS

BY

ROBERT H. BAKER

AND

JOHN E. HARRIS

CHICAGO, ILLINOIS

1955

Submitted to the

Faculty of the University of Chicago

in partial fulfillment of the

requirements for the degree of

Doctor of Philosophy

by

ROBERT H. BAKER

and

JOHN E. HARRIS

CHICAGO, ILLINOIS

1955

RECEIVED

Jan 11

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AMITY UNIVERSITY

MADHYA PRADESH

(Established by Ritnand Balved Education Foundation)

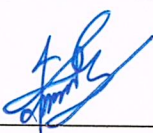
MEETING OF BOARD OF STUDIES (BOS) (Civil Engineering) Amity School of Engineering & Technology

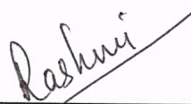
Remarks & Suggestions by BOS Members

More focus should be given to tutorial classes

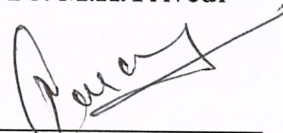
Signature of Members:


Dr. Anil Vashisht

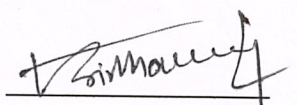

Mr. Mohan Kantharia


Miss Rashmi Singh


Dr. M.K. Trivedi


Mr. Parag Agrawal

ABSENT
Dr. Vijay Rode


Mr. Ankesh Birtharia



AMITY UNIVERSITY

MADHYA PRADESH

(Established by Ritnand Balved Education Foundation)

AMITY SCHOOL OF ENGINEERING AND TECHNOLOGY			
Department of Civil Engineering			
Board of Studies for session 2017-18			
Total Credits			
S. No.	Semester	Previous Credits	New Credits
1	I	26	25
2	II	26	25
3	III	31	30
4	IV	27	27
5	V	29	29
6	VI	25	25
7	VII	32	32
8	VIII	24	24
Total Credits		220	217

Signature of Members:

Dr. Anil Vashisht

Dr. M.K. Trivedi

ABSENT

Dr. Vijay Rode

Mr. Mohan Kantharia

Mr. Parag Agrawal

Mr. Ankesh Birtharia

Miss Rashmi Singh

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COMPUTER APPLICATIONS LAB

Course Code: BTCE 620

Credit Units: 01

Course Objective:

To familiarize and give hands on training to students in the following areas of Civil Engineering Application software.

Course Contents:

Computer applications in civil engineering by using two dimensional and three dimensional modeling through auto Cadd and Stadd Pro.

1. Drafting and documentation.
2. Surveying – terrain mapping, computation of areas & volumes.
3. Structural Analysis and Design.
4. Water resources
5. Geotechnical Engineering
6. Road/Railway system
7. Environmental Engineering
8. Estimation and costing
9. Project management

Examination Scheme:

IA				EE	
A	PR	LR	V	PR	V
5	10	10	5	35	35

Note: IA –Internal Assessment, EE- External Exam, PR- Performance, LR – Lab Record, V – Viva.

Rashini

Pavani

M. S. Sridhar

am

V. R. Manjunath

New

BTCE 620 (BOS-17)

The list of experiments is reviewed and revised modified. The current list of experiments is below.

Practical 1 – Introduction of Staad Pro and its applications.

Practical 2 – Study of various commands for modelling and analysis of a beam

Practical 3 – Modelling and analysis of continuous beams for different loading conditions.

Practical 4 - Modelling of frame structure for different loading conditions.

Practical 5 – Modelling and analysis of frame structure for different loading conditions.

Practical 6 – Seismic Analysis of a frame structure.

Practical 7 – Wind Analysis of a frame structure.

Practical 8 – Design of beams according to Indian Standards.

Practical 9 - Design of columns according to Indian Standards.

Practical 10 – Introduction of different software used in various fields of Civil Engineering.

Practical 11 – Introduction of Auto cad used in various types of building planning.

Rashmi

Ravi

M. Nishi

SG

V. Simant

Justification for Changes in syllabus of BTCE 620 computer application in civil engineering

1. It is not feasible for student to learn and practice 7 to 8 software in a semester as old syllabus consists

of practical on various software.

2. In lab we have only Stadd Pro and Auto Cad software .

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Simran

CIVIL ENGINEERING DRAWING LAB

Course Code: BTCE 321

2 → 1
Credit Units: 01

Course Contents:

Lab

1. Panelled doors, glazed windows and ventilators in wood.
2. Steel and aluminium windows.
3. Steel roof trusses.
4. Reinforced concrete staircase.
5. Residential buildings with flat and pitched roof – RC and tiled.
6. Public buildings like office, dispensary, post office, bank etc.
7. Industrial buildings.

Examination Scheme:

IA				EE	
A	PR	LR	V	PR	V
5	10	10	5	35	35

Note: IA –Internal Assessment, EE- External Exam, PR- Performance, LR – Lab Record, V – Viva.

Text & References:

- National Building Code of India
- Local Building Bye-laws
- Callender, John Hancock, Time Saver Standards for Architectural design Data, Tata McGraw Hill.
- Chiara, Callender, John Hancock, Time Saver Standards for Building Type, McGraw Hill
- Chiara, Joseph De, Time Saver Standards for Site Planning, McGraw Hill
- Ching, Francis D K, Architectural Graphics. John Wiley

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Ravi

theory

BUILDING DESIGN AND DRAWING

Course Code: BTCE 302

Credit Units: 04

Course Objective:

The objective of the course is to develop the capability for carrying out independent design. Information in the form of sketch and images to be illustrated as a part of discussion.

Course Contents:

PART A: PLANNING

Module I: Function, Structure and Appearance

Evolution of architectural styles. Roman, Greek, Medieval and Modern architecture. Examples.

Module II: Creative principles

Design methods. Pragmatic, iconic, canonic and rational design methods. Elements of composition. Point, line, texture and colour etc. Organisation of elements. Proportion, scale, rhythm balance and unity. Architectural examples. Design procedure, brief analysis, synthesis and communication.

Module III: Functional factors

Lighting, ventilation, thermal and acoustics factors and their effects on architectural form.

Module IV: Spaces

Space planning of buildings such as residential, public and commercial. Design process. Activity areas and linkages. Proximity matrix. Adjacency diagram. Form development with respect to site conditions and functional requirements. Preparation of drawings. Elementary perspective and rendering.

PART B: DRAWING

Planning, designing from given requirements of areas and specifications and preparation of sketch design and working drawings for:

1. Residential building- flat and pitched roof, economic domestic units, cottages, bungalows and building flats.
2. Public building – small public utility shelters, dispensaries, banks, schools, offices, libraries, hostels, restaurants, commercial complexes, factories etc.
3. Preparation of site plans and service plans as per Building Rules
4. Septic Tank and Soak Pit – detailed drawings.
5. Plumbing, water supply and drainage for buildings.

Examination Scheme:

Components	A	CT	S/V/Q/ HA	EE
Weightage (%)	5	15	10	70

CT: Class Test, HA: Home Assignment, S/V/Q: Seminar/Viva/Quiz, EE: End Semester Examination; Att: Attendance

Text & References:

- SP 7:2005, National Building Code of India
- Local Building Bye-laws
- Callender, John Hancock, Time Saver Standards for Architectural Design Data, McGraw Hill
- Chiara, Callender, John Hancock, Time Saver Standards for Building Type, McGraw Hill
- Chiara, Joseph De, Time Saver Standards for Site Planning, McGraw Hill
- Scott, Robert Gillan, Design Fundamentals, Mc-Graw Hill.
- Tessie Agan M.S., The House, Its Plan & Use, Oxford & IBH Publishing Co.
- IS 5533: 1969, Recommendation for Dimensions of Spaces for Human Activities. B.I.S
- IS 4963: 1987, Recommendation for Buildings and facilities for the Physically Handicapped. B.I.S
- Shaw and Kale, Building Drawing, Tata Mc Graw Hill Publishers
- Balagopal T S Prabhu, Building Drawing and Detailing, Spades Publishers

Rashmi

Praveen

MS. Nishi

SP

Srinivas

Justification for reducing credits of Building Design and Drawing lab

(BTCE302)

1. Now theory and lab are in the same semester (previously they were in separate semester)
2. Some drawing portion is common in both, hence one credit in lab can be reduced .

ADVANCED REINFORCED CONCRETE DESIGN

OLD

Course Code: MTCE 302

Credit Units: 04

Module-I

Earthquake and wind effects on structures, loads on structures, reinforced concrete design of flat slabs, grid floors, deep beams, design of building's load bearing and framed structures, design of foundations, seismic analysis.

Module-II

Design of ground and elevated water tanks, design of bridge decks.

Module-III

Pre-stressed concrete: analysis and design of sections under flexure using limit state approach, anchorage zone and end block design, composite construction, introduction to statistically indeterminate pre-stressed concrete structures.

Module-IV

Silos and bunkers, Janseen's and Airy's theory, rectangular bunkers with sloping bottoms and with high side walls, battery of bunkers.

Module-V

Ductile detailing of RCC frames. Design of beam-column joints;
Design of deep beam. Design of shear walls.

Examination Scheme:

Components	A	CT	S/V/Q/HA	EE
Weightage (%)	5	15	10	70

CT: Class Test, HA: Home Assignment, S/V/Q: Seminar/Viva/Quiz, EE: End Semester Examination;
A: Attendance

Reference Books:

1. Jaikrishna, Chandrasekaran, Elements of earthquake engineering.
2. Shah and Karve, Text book of reinforced concrete
3. Punamia, RCC designs
4. IS-456, -875, -1893, -1984
5. Krishna Raju, Prestressed concrete.
6. Varghese, Advanced RC Designs, PHI
7. Everard, Theory and problems of RC design (Shaum's Outline S), TMH
8. R. Park and T. Pauley, Reinforced concrete structures, John Wiley and sons
9. A. K. Jain, Reinforced Concrete: Limit State design, NemChand and Bros. 1999.
10. J. Krishna and OP Jain, Plain and Reinforced Concrete, Vol. I I, Roorkee, Nem Chand and Bros.
11. H. Nilson, D. Darwin and C. W. Dolar, Design of Concrete structures, Tata McGraw Hill
12. T. Paulay and M.J.N. Priestley, Seismic Design of Reinforced Concrete and Masonry Buildings, John Wiley & Sons Inc

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Pauley
Shah
Jaikrishna

ADVANCED REINFORCED CONCRETE DESIGN (new)

Course Code: MTCE 302

Credit Units: 04

Module:1 Plastic Section Theory for Reinforced Concrete including interaction of flexure Shear-Axial effects, Upper bound and lower bound plastic theorems, Application of plastic analysis to frames – instantaneous centre of rotation

Module:2 Introduction of flat slab, component of flat slab construction, Indian code recommendation, direct design method, equivalent frame method, shear in flat slab, slab reinforcement, openings in flat slab, Introduction of circular slab

Module:3 Introduction of yield line theory, yield line patterns, moment capacity along yield line, ultimate load on slabs, Analysis by virtual work and equilibrium method, Redistribution of moments, moment curvature analysis, Recommendations of IS 456:2000.

Module:4 Introduction to Pre-stressed concrete and behaviour for simple elements, design of section under flexure using limit state, Introduction of Deep beam, IS code method of design of Deep beam.

Examination Scheme:

Components	A	CT	S/V/Q/HA	EE
Weightage (%)	5	15	10	70

CT: Class Test, HA: Home Assignment, S/V/Q: Seminar/Viva/Quiz, EE: End Semester Examination; Attendance

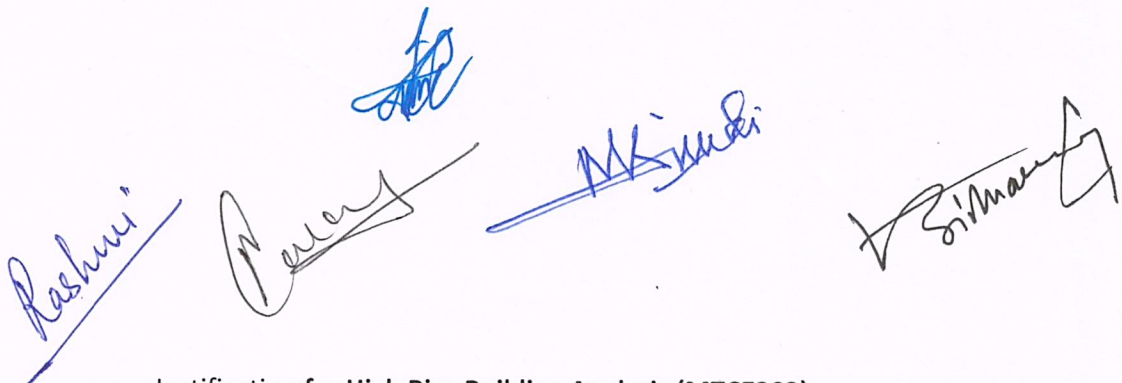
A:

Reference Books:

1. Jaikrishna, Chandrasekaran, Elements of earthquake engineering.
2. Shah and Karve, Text book of reinforced concrete
3. Punamia, RCC designs
4. IS-456, -875, -1893, -1984
5. Krishna Raju, Prestressed concrete.
6. Varghese, Advanced RC Designs, PHI
7. Everard, Theory and problems of RC design (Shaum's Outline S), TMH
8. R. Park and T. Pauley, Reinforced concrete structures, John Wiley and sons
9. A. K. Jain, Reinforced Concrete: Limit State design, NemChand and Bros. 1999.
10. J. Krishna and OP Jain, Plain and Reinforced Concrete, Vol. I I, Roorkee, Nem Chand and Bros.
11. H. Nilson, D. Darwin and C. W. Dolar, Design of Concrete structures, Tata McGraw Hill
12. T. Paulay and M.J.N. Priestley, Seismic Design of Reinforced Concrete and Masonry Buildings, John Wiley & Sons Inc
13. Reinforced Concrete: Mechanics and Design, 6th Ed., McGregor & White
14. Reinforced Concrete: A Fundamental Approach, 6th Ed., Edward Nawy
15. Design of Prestressed Concrete, 2nd Ed., Arthur H. Nilso
16. Darwin & Dolan, "Design of Concrete Structures", 14th Ed., Nilson

Justification for new syllabus for Advanced Concrete Design(MTCE302)

Current Syllabus Module	Proposed syllabus Module	Added	Deleted
M-1(Deleted)			It is already being taught in MTCE 104
	M-1(New)	Referred from IIT Roorkee.	
M-2 (Deleted)			It is covered at B.tech. Level.
	M-2(New)	It is taken from M-1 of old syllabus but covered in detail.	
M-3			
	M-3(New)	M-3 and M-5 are clubbed	
M-4 (Deleted)			It is covered at B.tech. Level.
	M-4 (New)	Referred from IIT Roorkee.	
M-5 (Deleted)			Design of Deep Beam is covered in M-3(New) and underline content is covered in MTCE-303 in M-4



Justification for High Rise Building Analysis (MTCE303)

Current Syllabus	Proposed syllabus	Added	Deleted(Justification)
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INDIAN INSTITUTE OF TECHNOLOGY ROORKEE

NAME OF DEPTT/CENTRE : **Department of Civil Engineering**

1. Subject Code : **CEN-543** Course Title : **Advanced Concrete Design**

2. Contact Hours : **L: 3 T: 0 P: 2**

3. Examination Duration (Hrs) : **Theory : 3 Practical : 0**

4. Relative Weight : **CWS : 15 PRS: 25 MTE: 20 ETE: 40 PRE: 0**

5. Credits : **04**

6. Semester: **Autumn**

7. Subject Area : **PCC**

8. Pre-requisite: **Nil**

9. Objective: To give a consistent and sound theoretical background to the force and stress distributions in reinforced and pre-stressed concrete. To introduce the concepts of yield line analysis, strut-tie models and other state of art analysis techniques and to connect these with the extant design ideologies in the building codes. To study advanced concepts of creep/rheology & crack widths in reinforced and prestressed concrete and creating numerical models of these. To develop a clear theoretical understanding of the underlying reasons behind codal details as ductile detailing, reinforcement placement etc.

10. Details of Course:

S. No.	Contents	Contact Hours
1.	Plastic Section Theory for Reinforced Concrete including interaction of flexure-Shear-Axial effects	5
2.	Upper bound and lower bound plastic theorems	2
3.	Application of plastic analysis to frames – instantaneous centre of rotations	4
4.	Introduction to Pushover Analysis	3
5.	Introduction to Strut-Tie Models	2
6.	Strut-Tie Models for Deep Beams, Beam-Column Joints& Shear walls	5
7.	Introduction to Yield line analysis and application for slabs, raft foundations etc.	4
8.	Introduction to Pre-stressed concrete and behaviour for simple elements	8
9.	Modelling of creep/shrinkage and long term effects for RCC and prestressed concrete	5
10.	Calculation of crack widths and crack control designs	4
Total		42

11. Suggested Books:

S. No.	Name of Authors/Books/Publishers	Year of Publication/ Reprint
1.	Reinforced Concrete: Mechanics and Design, 6 th Ed., McGregor & White	2011
2.	Reinforced Concrete: A Fundamental Approach, 6 th Ed., Edward Nawy	2008
3.	Design of Prestressed Concrete, 2 nd Ed., Arthur H. Nilson	1987
4.	Darwin & Dolan, "Design of Concrete Structures", 14 th Ed., Nilson,	2009
5.	Prestressed Concrete: A Fundamental Approach, 5 th Ed., Edward Nawy	2005
6.	J Schlaich, K Schaefer, and M. Jennewin, "Toward a Consistent Design of Structural Concrete", PCI Journal V. 32, No. 2, pp. 72-150.	1987
7.	Kennedy & Goodchild, "Practical Yield Line Design", The Concrete Centre, TCC/03/3.	2004

Rashmi

P. Singh

SK

MS

V. Srinivas

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HIGH RISE BUILDING ANALYSIS

Course Code: MTCE 303

Credit Units: 04

Module I:

Analysis of tall building frames, Lateral load analysis, multi bay frames, gravity loads, settlement of foundation.

Module II:

Analysis of shear walls - plane shear walls, infilled frames, coupled frames, frames with shear walls.

Module III:

Principle of three dimensional analysis of tall buildings; perforated cores, pure torsion in thin tubes, bending and warping of perforated cores.

Module IV:

Analysis of floor system in tall buildings, Vierendal girders, diagrid floors.

Module V:

Elastic and inelastic stability of frames and shear walls. Analysis of thermal stresses. Criteria for design of Chimneys, T.V. Towers and other Tall Structure.

Modeling of tall structures, case studies.

Examination Scheme:

Components	A	CT	S/V/Q/HA	EE
Weightage (%)	5	15	10	70

CT: Class Test, HA: Home Assignment, S/V/Q: Seminar/Viva/Quiz, EE: End Semester Examination;
A: Attendance

Reference Books:

1. Coull, Smith, Design of tall buildings
2. Taranath, Design of tall buildings
3. B S Smith & A Coull, Tall Building Structures: - John Wiley & Sons.
4. W. Schueller, High Rise Building Structures: John Wiley & Sons.

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HIGH RISE BUILDING ANALYSIS (new)

Course Code: MTCE 303

Credit Units: 04

Module:1

Structural systems for multi-storey buildings, gravity and lateral loads on buildings, analysis of multi-storey frames. Behaviour of framed tube, tube-in-tube systems, and bundled tube systems

Module:2

Importance of symmetry and regularity in plan, and regularity in elevation. Analysis for torsion in buildings

Module:3

Design of buildings with shear walls and coupled shear walls

Module:4

Design and detailing of various members and beam-column joints for ductility. The capacity design principle. Performance based design philosophy. Design of floor slabs, raft and pile foundations .Application of MS-Excel, ETABS

Examination Scheme:

Components	A	CT	S/V/Q/HA	EE
Weightage (%)	5	15	10	70

CT: Class Test, HA: Home Assignment, S/V/Q: Seminar/Viva/Quiz, EE: End Semester Examination; A: Attendance

Reference Books:

1. U.H.Varyani, "Structural Design of Multi-storeyed Buildings", 2nd Ed., South Asian Publishers, New Delhi.2002
2. V.L. Shah & S.R.Karve, "Illustrated Design of Reinforced Concrete Buildings", (GF+3storeyed), Structures Publications, Pune.2013
3. Design of Multi Storeyed Buildings, Vol. 1 & 2, CPWD Publications. 1976
4. Bungle S. Taranath, "Structural Analysis and Design of Tall Buildings", Mc-Graw Hill.1988
5. Bryan S. Smith and Alex Coull, "Tall Building Structures", Wiley India. 1991
6. Wolfgang Schueller, "High Rise Building Structures", Wiley.
7. Coull, Smith, Design of tall buildings
8. Taranath, Design of tall buildings
9. B S Smith & A Coull, Tall Building Structures: - John Wiley & Sons.
10. W. Schueller, High Rise Building Structures: John Wiley & Sons.

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Pooja

Shruti

Shruti

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Justification for High Rise Building Analysis (MTCE303)

Current Syllabus Module	Proposed syllabus Module	Added	Deleted(Justification)
M-1			
	M-1(New)	Referred from IIT Roorkee.	
M-2			
	M-2(New)	Referred from IIT Roorkee.	
M-3 (Deleted)			Most of the part covered in M-1 and M-2
	M-3(New)	Referred from IIT Roorkee.	
M-4 (Deleted)			Not much related to context of syllabus.
	M-4 (New)	Referred from IIT Roorkee.	
M-5 (Deleted)			Shear wall is covered in M-2 and Modelling of tall structures is covered in M-4 (New) and other topics are covered already at B.tech. level.

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INDIAN INSTITUTE OF TECHNOLOGY ROORKEE

NAME OF DEPTT/CENTRE : **Department of Civil Engineering**

1. Subject Code : **CEN-643** Course Title : **Analysis and Design of High-Rise Buildings**

2. Contact Hours : **L: 3 T: 0 P: 2**

3. Examination Duration (Hrs) : **Theory : 3 Practical : 0**

4. Relative Weight : **CWS : 15 PRS: 25 MTE: 20 ETE: 40 PRE: 0**

5. Credits : **4** 6. Semester: **Spring** 7. Subject Area : **PEC**

8. Pre-requisite: **Nil**

9. Objective: To introduce the analysis and design of tall buildings subjected to different loading conditions and detailing of various components.

10. Details of Course:

S. No.	Contents	Contact Hours
1.	Structural systems for multi-storey buildings, gravity and lateral loads on buildings, analysis of multi-storey frames. Behaviour of framed tube, tube-in-tube systems, and bundled tube systems	6
2.	Importance of symmetry and regularity in plan, and regularity in elevation. Analysis for torsion in buildings	6
3.	Design of buildings with shear walls and coupled shear walls	6
4.	Design and detailing of various members and beam-column joints for ductility. The capacity design principle. Performance based design philosophy	6
5.	Design of floor slabs, raft and pile foundations	9
6.	Application of MS-Excel, ETABS and SAFE software	9
Total		42

11. Suggested Books:

S. No.	Name of Authors/Books/Publishers	Year of Publication/ Reprint
1.	U.H.Varyani, "Structural Design of Multi-storeyed Buildings", 2 nd Ed., South Asian Publishers, New Delhi.	2002
2.	V.L. Shah & S.R.Karve, "Illustrated Design of Reinforced Concrete Buildings", (GF+3storeyed), Structures Publications, Pune.	2013
3.	Design of Multi Storeyed Buildings, Vol. 1 & 2, CPWD Publications.	1976
4.	Bungale S. Taranath, "Structural Analysis and Design of Tall Buildings", Mc-Graw Hill.	1988
5.	Bryan S. Smith and Alex Coull, "Tall Building Structures", Wiley India.	1991
6.	Wolfgang Schueller, "High Rise Building Structures", Wiley.	1986

Rashmi

Anand

Simran
AK Singh

old

SURVEYING

Course Code: CE 41303 (4903)

Credit Units: 03

Course Objective:

Surveying is the basic element of mapping areas for civil engineering construction. Methods of surveying including leveling, and leveling methods, contours, estimation of volumes etc are covered.

Course Contents:

Module I: Classification & Principles of Surveying:- Introduction - classification of surveys - plane surveying - geodetic surveying - topographic surveying - reconnaissance - principle of working from whole to part - provision of control - conventional signs - chain survey - instruments - principles of chain survey - field book - plotting - tie line and check line - chaining and ranging - obstacles - chaining on sloping ground - errors in chain survey - uses of cross staff and optical square.

Module II: Compass Surveying:- Compass survey - prismatic compass - surveyor's compass - whole circle and reduced bearing- true and magnetic bearing - dip and declination - local attraction - traversing - plotting - error of closure - graphical and analytical adjustments

Module III: Levelling:- Levelling - definition of level surfaces - mean sea level - reduced level - bench marks - levelling instruments - temporary and permanent adjustments - fly leveling - booking - reduction of levels - corrections for refraction and curvature - reciprocal leveling - longitudinal levelling and cross sectioning - contour survey - definition - characteristics of contour - uses of contour - methods of contouring - direct and indirect interpolation - plotting - areas and volumes - trapezoidal rule - Simpson's rule - area from latitude and departure - uses of planimeter - volumes - trapezoidal and prismoidal formula.

Module IV: Plane Table Surveying:- plane table survey - instruments and accessories - different methods - orientation - advantages and disadvantages of plane tabling - two point problem - three point problem - errors in plane tabling - minor instruments - hand levels - clinometer - Ceylon ghat tracer - hypsometer - pantagraph - edigraph - box sextant - telescopic alidade

Module V: Theodolite:- Theodolite surveying - study of theodolite - temporary and permanent adjustments - measurement of horizontal angles - method of repetition and reiteration - measurement of vertical angles - theodolite traverse - calculation of co ordinates - corrections - traverse table - omitted measurements - tachemetric surveying - stadia system - fixed and movable hair methods - staff held vertical and normal - instrument constants - analytic lens - tangential system - direct reading tachemeter - subtense bar - trigonometric leveling - various methods- E.D.M - total station.

Examination Scheme:

Components	A	CT	S/V/Q	HA	EE
Weightage (%)	5	10	5	5	70

CT: Class Test, HA: Home Assignment, S/V/Q: Seminar/Viva/Quiz, EE: End Semester Examination; Att: Attendance

Text & References:

- S.K Duggal, Surveying Vol 1 and II, 2nd ed., Tata - McGraw Hill, New Delhi (2004).
- Arora K.R., Surveying Vol I & II, Standard Book House, New Delhi (2008)
- Punmia, B.C., Ashok Kr. Jain, Arun Kr. Jain, Surveying Vol I & II, Laxmi Publications, New Delhi (2008)

SURVEYING(new)

Course Code: CE (4903)

Credit Units: 03

Course Objective:

Surveying is the basic element of mapping areas for civil engineering construction. Methods of surveying including leveling, and leveling methods, contours, estimation of volumes etc are covered.

Course Contents:

Module I: Survey Classification and Chain Survey:-

Introduction - classification of surveys plane surveying geodetic surveying topographic surveying - reconnaissance - principle of working from whole to part - provision of control .conventional signs. Minor - instruments - principles of chain survey - field book - plotting , chaining and ranging - obstacles - chaining on sloping ground - errors in chain survey

Module II Compass and Plane Table Surveying:- Compass survey - prismatic compass - surveyor's compass - whole circle and reduced bearing- true and magnetic bearing - dip and declination – included angle ,local attraction. Plane table survey accessories used , method of radiation and intersection.

Module III: Leveling:- definition of level surfaces - mean sea level - reduced level - bench marks - levelling instruments - temporary adjustments - fly leveling - booking - reduction of levels –HI method, and Rise and fall method,

Module IV:- Contour Survey, Area and Volume calculations - definition - characteristics of contour - uses of contour - methods of contouring - Areas and Volumes computations - trapezoidal rule - Simpson's rule - - volumes - trapezoidal and prismoidal formula. uses of planimeter

Module V:-Study Of Theodolite and Modern Survey Equipment:- Theodolite surveying - study of theodolite - temporary and permanent adjustments -measurement of horizontal angles - method of repetition and reiteration - measurement of vertical angles –tacheometric surveying - instrument constants ,. E.D.M – total station.

Examination Scheme:

Components	A	CT	S/V/Q	HA	EE
Weightage (%)	5	10	5	5	70

CT: Class Test, HA: Home Assignment, S/V/Q: Seminar/Viva/Quiz, EE: End Semester Examination; Att: Attendance

Text & References:

- Punmia, B.C., Ashok Kr. Jain, Arun Kr. Jain, Surveying Vol I & II, Laxmi Publications, New Delhi (2008)
- S.K Duggal, Surveying Vol I and II, 2nd ed., Tata - McGraw Hill, New Delhi (2004).
- Arora K.R., Surveying Vol I &II, Standard Book House, New Delhi (2008)

Rashmi
Ashok
Arora
V. Sharma

Justification for change in surveying (CBCS 4903):-

- (1) syllabus should be according to the minor track students , some students are from non technical back ground hence syllabus content is diluted as per this requirement.
- (2) as practical are not in the syllabus but subject is more practical oriented hence elementary knowledge of the surveying practical/instruments is emphasized. With the help of instrument the theory will be demonstrated.

Rashmi

P. Aravind

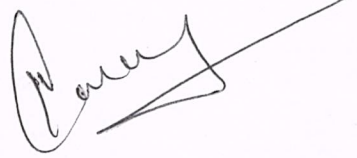
P. Aravind

P. Aravind

P. Aravind

P. Aravind

Semester	Course Name (Vacancies Available)	Course code	Subject	Credit
1	Construction Engineering (30)	CE4901	Building Materials	3
2		CE4902	Building Drawings	3
3		CE4903	Surveying	3
4		CE4904	Building Design Principles	3
5		CE4905	Construction Techniques and Planning	3
6		CE4906	Construction Project Management	3
			Total Credits	18


Rashmi

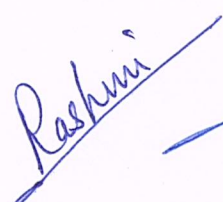
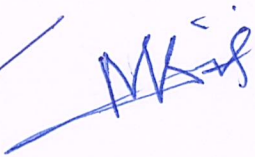


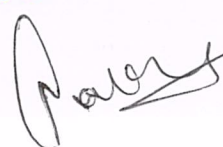
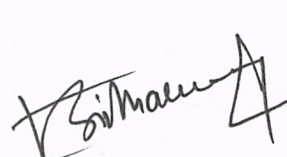

1. AMITY SCHOOL OF ENGINEERING & TECHNOLOGY

Minor Tracks

Semester	Course Name (Vacancies Available)	Course code	Subject	Credit
I	Embedded Systems (30)	ES4101	Digital Electronics	3
II		ES4102	Microprocessor Systems	3
III		ES4103	Microcontrollers	3
IV		ES4104	Embedded Systems	3
V		ES4105	Embedded C	3
VI		ES4106	Project (Embedded System)	3
			Total Credits	18

Semester	Course Name (Vacancies Available)	Course code	Subject	Credit
I	Artificial Intelligence (30)	AI4201	Introduction to Artificial Intelligence	3
II		AI4202	Artificial Neural Networks	3
III		AI4203	Fuzzy Logic	3
IV		AI4204	Genetic Algorithm	3
V		AI4205	Soft Computing	3
VI		AI4206	Project (Artificial Intelligence)	3
			Total Credits	18

Semester	Course Name (Vacancies Available)	Course code	Subjects	Credit
I	Wireless Communication (30)	WC4301	Basic Electronics	3
II		WC4302	Communication Systems	3
III		WC4303	Wireless Communication	3
IV		WC4304	Radar & Satellite Communication	3
V		WC4305	Microwave Engineering	3
VI		WC4306	Antenna and Wave Propagation	3
			Total Credits	18

Semester	Course Name (Vacancies Available)	Course code	Subject	Credit
I	Network Security (30)	NS4401	Introduction to Computer Network	3
II		NS4402	TCP/IP	3
III		NS4403	Network Management	3
IV		NS4404	Wireless and Mobile Network	3
V		NS4405	Cryptography and Network Security	3
VI		NS4406	Projects (Network Security)	3
			Total Credits	18

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Semester	Course Name (Vacancies Available)	Course code	Subject	Credit
I	Cloud Computing (30)	CC4501	Computer Network	3
II		CC4502	TCP/IP	3
III		CC4503	Storage and Computer Virtualization	3
IV		CC4504	Network Virtualization	3
V		CC4505	Cloud Computing	3
VI		CC4506	Information Storage and Management	3
			Total Credits	18

Semester	Course Name (Vacancies Available)	Course code	Subjects	Credit
I	Renewable Energy (30)	RE4601	Renewable Energy System-I	3
II		RE4602	Energy Conversion System	3
III		RE4603	Renewable Energy System-II	3
IV		RE4604	Solar Energy and Applications	3
V		RE4605	Energy Audit	3
VI		RE4606	Renewal Energy Performance Measurement	3
			Total Credits	18

Rashmi



Semester	Course Name (Vacancies Available)	Course code	Subjects	Credit
I	Nanotechnology (30)	NT4701	Basics of Nanotechnology	3
II		NT4702	Properties of Nanomaterials	3
III		NT4703	Graphene Electronics	3
IV		NT4704	Composites and Non-composites	3
V		NT4705	Nanoparticles and their applications	3
VI		NT4706	Synthesis and characterization of Nanomaterials	3
			Total Credits	18

Semester	Course Name (Vacancies Available)	Course code	Subjects	Credit
I	Instrumentation Engineering (30)	IE4801	Instrumentation and Measurement Techniques	3
II		IE4802	Principles of Sensors	3
III		IE4803	Biomedical Instrumentation	3
IV		IE4804	Industrial Instrumentation	3
V		IE4805	Environmental Instrumentation	3
VI		IE4806	Instrumental Analysis	3
			Total Credits	18

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Semester	Course Name (Vacancies Available)	Course code	Subjects	Credit
I	Signal Processing (30)	SP4901	Signals & Systems	3
II		SP4902	Digital Signal Processing-I	3
III		SP4903	Digital Signal Processing-II	3
IV		SP4904	Digital Speech and Audio Signal Processing	3
V		SP4905	Digital Image Processing	3
VI		SP4906	Project (Signal Processing)	3
				18

Semester	Course Name (Vacancies Available)	Course code	Subjects	Credit
I	Robotics (30)	RT41001	Elements of Robotics Systems	3
II		RT41002	Hydraulic and Pneumatic Controls	3
III		RT41003	Automatic Control System	3
IV		RT41004	Microprocessor and Microcontroller	3
V		RT41005	Artificial Intelligence	3
VI		RT41006	Project (Robotics)	3
			Total Credits	18

Rashmi

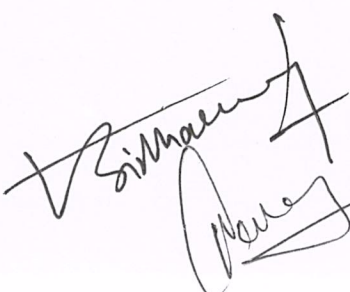
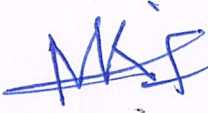
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Semester	Course Name (Vacancies Available)	Course code	Subject	Credit
I	Data Analytics (30)	DA41101	Optimization Techniques	3
II		DA41102	Basic Statistics	3
III		DA41103	Database Management System	3
IV		DA41104	Data Mining	3
V		DA41105	Introduction to Financial Modeling	3
VI		DA41106	Statistical Quality Control	3
			Total Credits	18

Semester	Course Name (Vacancies Available)	Course code	Subjects	Credit
I	Mechanical Engineering (30)	ME41201	Thermal Engineering	3
II		ME41202	Material Science	3
III		ME41203	Manufacturing Processes	3
IV		ME41204	Design of Machine Elements	3
V		ME41205	Manufacturing Systems Engineering	3
VI		ME41206	Automobile Engineering	3
			Total Credits	18



Semester	Course Name (Vacancies Available)	Course code	Subject	Credit
1	Construction Engineering (30)	CE4901	Building Materials	3
2		CE4902	Building Drawings	3
3		CE4903	Surveying	3
4		CE4904	Building Design Principles	3
5		CE4905	Construction Techniques and Planning	3
6		CE4906	Construction Project Management	3
			Total Credits	18







Bachelor of Technology (Civil Engineering)

Programme Code: BTCE

Duration – 4 Years Full Time



**Programme Structure
and
Curriculum & Scheme of Examination**

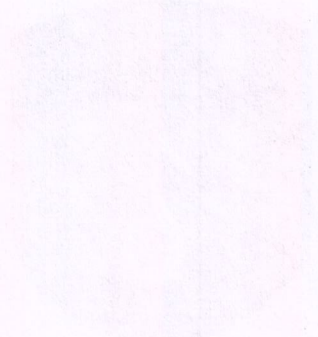
2017-18

**AMITY UNIVERSITY
MADHYA PRADESH**

Department of Education

Division of Higher Education

Division of Higher Education



Department of Education

in

Department of Education

Department of Education

AMITY UNIVERSITY

WARRINGTON

PREAMBLE

Amity University aims to achieve academic excellence by providing multi-faceted education to students and encourage them to reach the pinnacle of success. The University has designed a system that would provide rigorous academic programme with necessary skills to enable them to excel in their careers.

This booklet contains the Programme Structure, the Detailed Curriculum and the Scheme of Examination. The Programme Structure includes the courses (Core and Elective), arranged semester wise. The importance of each course is defined in terms of credits attached to it. The credit units attached to each course has been further defined in terms of contact hours i.e. Lecture Hours (L), Tutorial Hours (T), Practical Hours (P). Towards earning credits in terms of contact hours, 1 Lecture and 1 Tutorial per week are rated as 1 credit each and 2 Practical hours per week are rated as 1 credit. Thus, for example, an L-T-P structure of 3-0-0 will have 3 credits, 3-1-0 will have 4 credits, and 3-1-2 will have 5 credits.

The Curriculum and Scheme of Examination of each course includes the course objectives, course contents, scheme of examination and the list of text and references. The scheme of examination defines the various components of evaluation and the weightage attached to each component. The different codes used for the components of evaluation and the weightage attached to them are:

Components	Codes	Weightage (%)
Case Discussion/ Presentation/ Analysis	C	05 - 10
Home Assignment	H	05 - 10
Project	P	05 - 10
Seminar	S	05 - 10
Viva	V	05 - 10
Quiz	Q	05 - 10
Class Test	CT	10 - 15
Attendance	A	05
End Semester Examination	EE	70

It is hoped that it will help the students study in a planned and a structured manner and promote effective learning. Wishing you an intellectually stimulating stay at Amity University.

22-february 2017

The first part of the report deals with the general situation of the country. It is a very interesting and informative study of the country's development and its potential for the future.

The second part of the report deals with the specific details of the country's development. It is a very detailed and thorough study of the country's development and its potential for the future.

The third part of the report deals with the specific details of the country's development. It is a very detailed and thorough study of the country's development and its potential for the future.

Year	Population	GDP	Exports	Imports
1980	10.0	100.0	10.0	10.0
1981	10.5	105.0	10.5	10.5
1982	11.0	110.0	11.0	11.0
1983	11.5	115.0	11.5	11.5
1984	12.0	120.0	12.0	12.0
1985	12.5	125.0	12.5	12.5
1986	13.0	130.0	13.0	13.0
1987	13.5	135.0	13.5	13.5
1988	14.0	140.0	14.0	14.0
1989	14.5	145.0	14.5	14.5
1990	15.0	150.0	15.0	15.0

The fourth part of the report deals with the specific details of the country's development. It is a very detailed and thorough study of the country's development and its potential for the future.

The fifth part of the report deals with the specific details of the country's development. It is a very detailed and thorough study of the country's development and its potential for the future.

PROGRAMME STRUCTURE- B.Tech(Civil)

FIRST SEMESTER

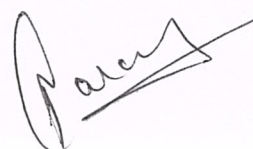
Course Code	Course Title	Lecture (L) Hours Per Week	Tutorial (T) Hours Per Week	Practical (P) Hours Per Week	Total Credits
BTCE 101	Applied Mathematics - I	3	-	-	3
BTCE 102	Applied Physics - I – Fields & Waves	2	1	-	3
BTCE 103	Elements of Mechanical Engineering	2	-	-	2
BTCE 104	Introduction to Computers & Programming in C	2	1	-	3
BTCE 105	Electrical Science	2	1	-	3
BTCE 106	Environmental Studies-I	2	-	-	2
BTCE 120	Applied Physics Lab - I	-	-	2	1
BTCE 121	Elements of Mechanical Engineering Lab	-	-	2	1
BTCE 122	Programming in C Lab	-	-	2	1
BTCE 123	Electrical Science Lab	-	-	2	1
BTCE 124	Engineering Graphics Lab	-	-	2	1
BTCE 141	English Language Usage Essentials	1	-	-	1
BTCE 143	Behavioural Sciences – I (Understanding Self for Effectiveness)	1	-	-	1
BTCE 144 BTCE 145	Foreign Language - I French German	2	-	-	2
	TOTAL				25

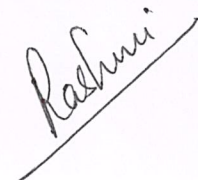
SECOND SEMESTER

BTCE 201	Applied Mathematics - II	3	1	-	3
BTCE 202	Applied Physics - II – Modern Physics	2	1	-	3
BTCE 203	Applied Chemistry	2	1	-	3
BTCE 204	Object Oriented Programming in C++	2	1	-	3
BTCE 205	Engineering Mechanics	2	1	-	3
BTCE 206	Environmental Studies II	2	-	-	2
BTCE 220	Applied Physics Lab - II	-	-	2	1
BTCE 221	Applied Chemistry Lab	-	-	2	1
BTCE 222	Object Oriented Programming in C++ Lab	-	-	2	1
BTCE 223	Engineering Mechanics Lab	-	-	2	1
BTCE 241	Introduction To Communication Skills	1	-	-	1
BTCE 243	Behavioural Science – II (Individual, Society and Nation)	1	-	-	1
BTCE 244 BTCE 245	Foreign Language - II French German	2	-	-	2
	TOTAL				25

TERM PAPER DURING SUMMER BREAK







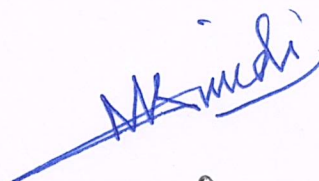
THIRD SEMESTER

BTCE 301	Applied Mathematics - III	3	1	-	4
BTCE 302	Building Design & Drawing	3	1	-	4
BTCE 303	Mechanics of Solids	2	1	-	3
BTCE 304	Mechanics of Fluids	3	1	-	4
BTCE 305	Building Technology	3	-	-	3
BTCE 306	Geo Informatics-I	3	-	-	3
BTCE 320	Mechanics of Solids & Fluids Lab	-	-	2	1
BTCE 321	Civil Engineering Drawing Lab	-	-	2	1
BTCE 322	Surveying Practical - I	-	-	2	1
BTCE 341	Effective Written Communication	1	-	-	1
BTCE 343	Behavioural Science – III (Problem Solving and Creative thinking)	1	-	-	1
BTCE 344	Foreign Language – III	2	-	-	2
BTCE 345	French				
	German				
BTCE 330	Term Paper (Evaluation)	-	-	-	2
	TOTAL				30

FOURTH SEMESTER

BTCE 401	Numerical Analysis & Programming	3	-	-	3
BTCE 402	Structural Analysis - I	3	1	-	4
BTCE 403	Concrete Technology	3	-	-	3
BTCE 404	Geo Informatics-II	3	-	-	3
BTCE 405	Construction Management & Quantity Surveying	3	-	-	3
BTCE 406	Transportation Engineering - I	3	1	-	4
BTCE 420	Numerical Analysis Lab (Programming Lab)	-	-	2	1
BTCE 421	Concrete Technology Lab	-	-	2	1
BTCE 422	Surveying Practical - II	-	-	2	1
BTCE 441	Professional Communication For Recruitment And Employability	1	-	-	1
BTCE 443	Behavioural Science – IV (Value & Ethics for personal & Professional Development)	1	-	-	1
BTCE 444	Foreign Language – IV	2	-	-	2
BTCE 445	French				
	German				
	TOTAL				27

INDUSTRIAL PRACTICAL TRAINING DURING SUMMER BREAK (6-8 WEEKS)




FIFTH SEMESTER

BTCE 501	Structural Analysis - II	3	-	-	3
BTCE 502	Principles of Structural Design	3	1	-	4
BTCE 503	Geotechnical Engineering - I	3	-	-	3
BTCE 504	Transportation Engineering - II	3	-	-	3
BTCE 505	Hydraulic Machines	3	-	-	3
BTCE 506	Hydro Systems	3	-	-	3
BTCE 520	Highway Engineering Lab	-	-	2	1
BTCE 521	Hydraulic Machines Lab	-	-	2	1
BTCE 541	Receptive And Expressive Communication Skills	1	-	-	1
BTCE 543	Behavioural Science – V (Group Dynamic and Team Building)	1	-	-	1
BTCE 544	Foreign Language – V	2	-	-	2
BTCE 545	French				
BTCE 545	German				
BTCE 550	Industrial Practical Training (Evaluation)	-	-	-	4
	TOTAL				29

SIXTH SEMESTER

BTCE 601	Environmental Engineering - I	3	-	-	3
BTCE 602	Structural Concrete Design	3	-	-	3
BTCE 603	Geotechnical Engineering – II	3	1	-	4
BTCE 604	Computer Application in Civil Engineering	3	-	-	3
BTCE 605	Engineering Geology	3	-	-	3
BTCE 606	Irrigation Engineering	3	-	-	3
BTCE 620	Computer Applications Lab	-	-	2	1
BTCE 621	Geotechnical Engineering Lab	-	-	2	1
BTCE 641	Social Communication	1	-	-	1
BTCE 643	Behavioural Science – VI (Stress and Coping Strategies)	1	-	-	1
BTCE 644	Foreign Language – VI	2	-	-	2
BTCE 645	French				
BTCE 645	German				
	TOTAL				25

SUMMER TRAINING (6- 8 WEEKS)

AK Mehta

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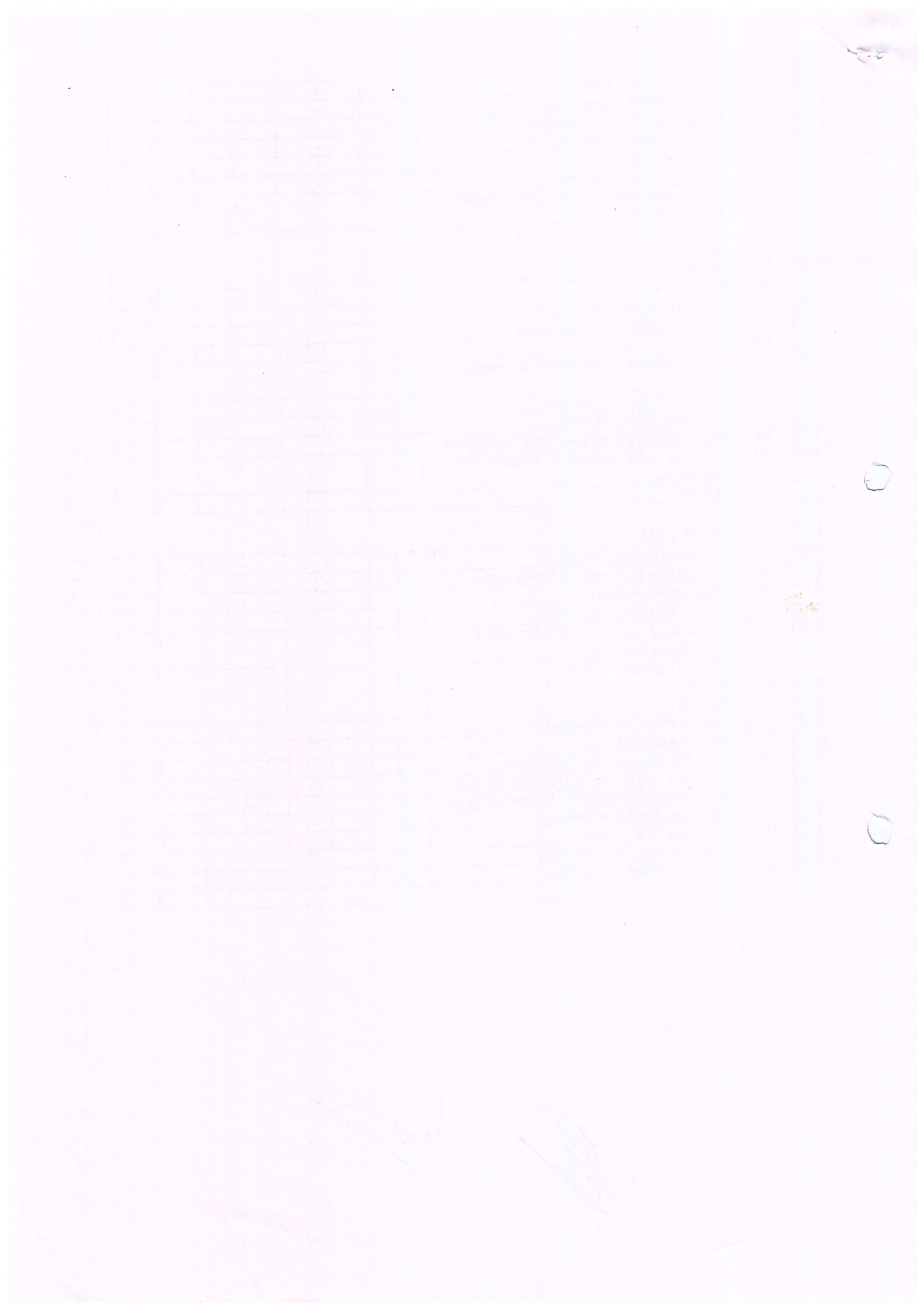
V Simran
Rashmi

SEVENTH SEMESTER

BTCE 701	Structural Steel Design	3	1	-	4
BTCE 702	Environmental Engineering – II	3	-	-	3
BTCE 703	Design of Hydraulic structures	3	-	-	3
BTCE 720	Environmental Engineering Lab	-	-	2	1
BTCE 721	Structural Detailing Lab	-	-	2	1
BTCE 741	Workplace Communication	1	-	-	1
BTCE 743	Behavioural Science – VII (Career Planning and Development)	1	-	-	1
BTCE 744	Foreign Language – VI I	2	-	-	2
BTCE 745	French				
BTCE 745	German				
BTCE 760	Project	-	-	-	06
BTCE 750	Industrial Training (Evaluation)	-	-	-	6
ELECTIVE-I (Any one from the Elective list)					
BTCE 704	Prestressed Concrete	3	1	-	4
BTCE 705	Remote Sensing & Geographic Information Systems	4	-	-	4
BTCE 706	Advanced Structural Analysis	3	1	-	4
BTCE 707	Hydrology & Flood Control	3	1	-	4
BTCE 708	Environmental Pollution Control Engineering	4	-	-	4
BTCE 709	Computer Aided Analysis & Design in Civil Engineering	3	-	2	4
	TOTAL				32

EIGHTH SEMESTER

BTCE 801	Advanced Concrete Design	3	1	-	4
BTCE 802	Engineering Economics & Management	3	-	-	3
BTCE 860	Project (Dissertation)	-	-	-	9
BTCE 841	Cross Cultural Communication	1	-	-	1
BTCE 843	Behavioural Science – VIII (Personal & Professional Excellence)	1	-	-	1
BTCE 844	Foreign Language – VIII	2	-	-	2
BTCE 845	French				
BTCE 845	German				
ELECTIVE-I (Any one from the Elective list)					
BTCE 803	Finite Element Method	3	1	-	4
BTCE 804	Traffic Engineering & Management	3	1	-	4
BTCE 805	Computer Application in Hydro Engineering	3	-	2	4
BTCE 806	Water Resources Systems Planning & Design	3	1	-	4
BTCE 807	Functional Design of Buildings	3	1	-	4
BTCE 808	Advanced Steel Design	3	1	-	4
BTCE 809	Architecture & Town Planning	3	-	2	4
BTCE 810	Industrial Waste Engineering	4	-	-	4
	TOTAL				24



**Minor Tracks for
Civil Engineering
(Choice based Credit system)
Programme Code :CE-4901-CE-4906**

Duration – 6 semester



**Programme Structure
and
Curriculum & Scheme of Examination**

2017-18

**AMITY UNIVERSITY
MADHYA PRADESH**

CONSTRUCTION ENGINEERING
(for CBCS)

CE4901: BUILDING MATERIALS

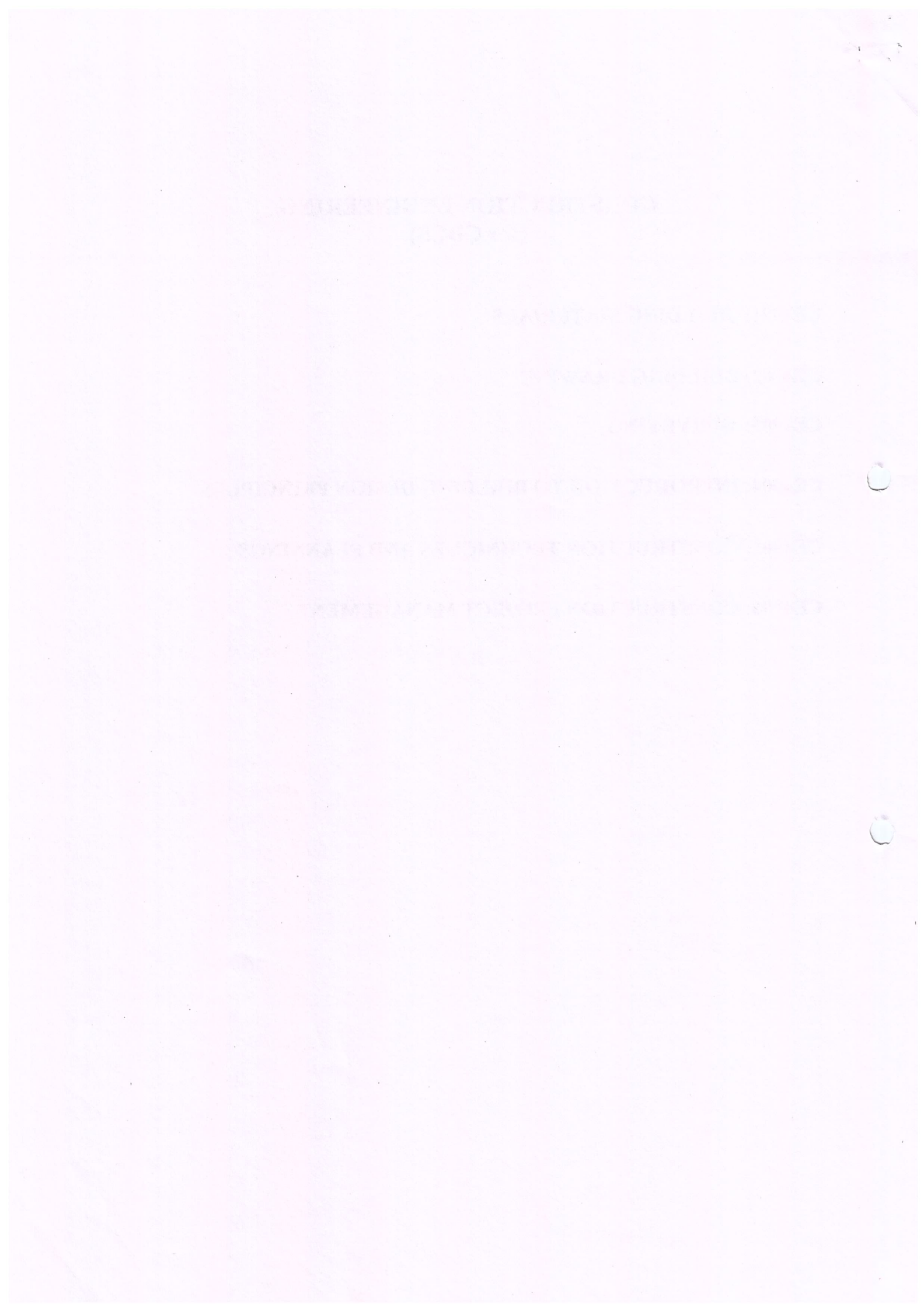
CE4902: BUILDING DRAWING

CE4903: SURVEYING

CE4904: INTRODUCTION TO BUILDING DESIGN PRINCIPLES

CE4905: CONSTRUCTION TECHNIQUES AND PLANNINGS

CE4906: CONSTRUCTION PROJECT MANAGEMENT



BUILDING MATERIALS

Course Code: CE 4901

Credit Units: 03

Course Objective:

The course covers building material and testing, cement and its application, cement concrete and other building materials.

Course Contents:

Module I: Stones:- Building stones - Classification of rocks - Quarrying - Dressing - Properties and uses and tests of common type of stones

Module II: Bricks:- Bricks - Manufacture - IS classifications – Properties, uses and testing - Types of bricks

Module III: Timber:- Timber – Types - Defects - Seasoning - Decay - Preservation - Plywood, fibre board, particle board - Tests of Timber.

Module IV: Cement, Lime & Mortar:- Cement - Ingredients - Manufacture - Types of cement - Properties and testing - Uses; Mortar - Sand - Properties - Types of mortar and uses. Lime - Classification - Manufacture, properties and uses

Module V: Cement Concrete:- Concrete - Properties of fresh concrete and tests - Proportioning of concrete mixes - Properties of hardened concrete and tests – Recent developments in concrete.

Module VI: Other Building Materials:- Properties and uses of materials like Glass, Plastic, AC Sheets, Fibre Sheets Aluminum, Steel & Bitumen.

Examination Scheme:

Components	A	CT	S/V/Q	HA	EE
Weightage (%)	5	10	5	5	70

CT: Class Test, HA: Home Assignment, S/V/Q: Seminar/Viva/Quiz, EE: End Semester Examination; Att: Attendance

Text & References:

- Punamia V.B.C. Reinforced concrete design, Laxmi Publication New Delhi
- Reddy C.S., Basic Structural Analysis, Tata McGraw Hill
- Negi L.S. & Jangid R.S, Structural Analysis, Tata McGraw Hill

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AK mehta

Simranj

Rashmi

Amr

Pavani

BUILDING DRAWING

Course Code: CE 4902

Credit Units: 03

Course Objective:

The student is given an introduction to basics of building designing and its applications

Course Contents:

Module I: General:- Different scales and symbols used in civil engineering drawing, Plan , Elevation & Sections.

Module II: Components of Building:- Drawing of different components of building and their specifications – Foundation, Column, Beam, Slab, Floors, Doors, Windows & Trusses.

Module III:

Structures:- Introduction to different types of civil engineering structures and their specifications

Module IV: Building Design:- General principles of building design, building byelaws.

Module V: Drawings:- Drawing of Residential Buildings.

Examination Scheme:

Components	A	CT	S/V/Q	HA	EE
Weightage (%)	5	10	5	5	70

CT: Class Test, HA: Home Assignment, S/V/Q: Seminar/Viva/Quiz, EE: End Semester Examination; Att: Attendance

Text & References:

- National Building Code of India
- Local Building Bye-laws
- Callender, John Hancock, Time Saver Standards for Architectural design Data, Tata McGraw Hill.
- Chiara, Callender, John Hancock, Time Saver Standards for Building Type, McGraw Hill
- Chiara, Joseph De, Time Saver Standards for Site Planning, McGraw Hill
- Ching, Francis D K, Architectural Graphics. John Wiley

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M. K. Nandi

Simran

Rashmi

Paras

SURVEYING(new)

Course Code: CE -4903

Credit Units: 03

Course Objective:

Surveying is the basic element of mapping areas for civil engineering construction. Methods of surveying including leveling, and leveling methods, contours, estimation of volumes etc are covered.

Course Contents:

Module I: Survey Classification and Chain Survey:-

Introduction - classification of surveys plane surveying geodetic surveying topographic surveying - reconnaissance - principle of working from whole to part - provision of control .conventional signs. Minor - instruments - principles of chain survey - field book - plotting , chaining and ranging - obstacles - chaining on sloping ground - errors in chain survey

Module II Compass and Plane Table Surveying:- Compass survey - prismatic compass - surveyor's compass - whole circle and reduced bearing- true and magnetic bearing - dip and declination – included angle ,local attraction. Plane table survey accessories used , method of radiation and intersection.

Module III: Leveling: - definition of level surfaces - mean sea level - reduced level - bench marks - levelling instruments - temporary adjustments - fly leveling - booking - reduction of levels –HI method, and Rise and fall method,

Module IV:- Contour Survey, Area and Volume calculations - definition - characteristics of contour - uses of contour - methods of contouring - Areas and Volumes computations - trapezoidal rule - Simpson's rule - - volumes - trapezoidal and prismoidal formula. uses of planimeter

Module V:-Study Of Theodolite and Modern Survey Equipment:- Theodolite surveying - study of theodolite - temporary and permanent adjustments -measurement of horizontal angles - method of repetition and reiteration - measurement of vertical angles –tacheometric surveying - instrument constants , E.D.M – total station.

Examination Scheme:

Components	A	CT	S/V/Q	HA	EE
Weightage (%)	5	10	5	5	70

CT: Class Test, HA: Home Assignment, S/V/Q: Seminar/Viva/Quiz, EE: End Semester Examination; Att: Attendance

Text & References:

- Punmia, B.C., Ashok Kr. Jain, Arun Kr. Jain, Surveying Vol I & II, Laxmi Publications, New Delhi (2008)
- S.K Duggal, Surveying Vol I and II, 2nd ed., Tata - McGraw Hill, New Delhi (2004).
- Arora K.R., Surveying Vol I & II, Standard Book House, New Delhi (2008)

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INTRODUCTION TO BUILDING DESIGN PRINCIPLES

Course Code: CE 4904

Credit Units: 03

Course Objective:

The student is given an introduction to basics of building designing and its applications

Course Contents:

Module I: System of forces equilibrium of forces and moment

System of forces, Equilibrium of forces calculation and moments

Module II: Parallel forces inclined forces resultant, component of forces

Types of force, calculation of forces, components of forces

Module III: Centre of gravity, Moment of inertia

Calculation of center of gravity, moment of inertia its uses, forces on building components

Module IV: Support Reactions, Shear force and bending moment

Calculation of Support reactions and bending moments and shear force diagram

Module V: Indeterminate structures, Rigid Supports fix end moments

Types of indeterminate structures, determinate structure rigid supports fix ends moments

Examination Scheme:

Components	A	CT	S/V/Q	HA	EE
Weightage (%)	5	10	5	5	70

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- Reddy C.S., Basic Structural Analysis, Tata McGraw Hill
- Negi L.S. & Jangid R.S, Structural Analysis, Tata McGraw Hill

STATE OF NEW YORK

IN SENATE

January 10, 1907

REPORT

OF THE

COMMISSIONERS OF THE LAND OFFICE

IN RESPONSE TO A RESOLUTION

PASSED BY THE SENATE

APRIL 10, 1906

AND BY THE ASSEMBLY

APRIL 10, 1906

AND BY THE COMMISSIONERS

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APRIL 10, 1906

AND BY THE ASSEMBLY

CONSTRUCTION TECHNIQUES AND PLANNINGS

Course Code: CE 4905

Credit Units: 03

Course Objective:

The course covers building materials and its equipments and uses, selection of construction equipments and its uses.

Course Contents:

Module I: Construction equipments and its uses

Different types of construction equipments and its uses

Module II: Construction equipments and its working procedure

Criteria for the selection of different construction equipments, working procedures and its maintenance

Module III: Construction planning, scheduling, bar charts

Steps in construction planning, scheduling procedure, Preparation of job layout – labour schedule – material schedule – equipment schedule

Module IV: PERT and CPM

Network techniques – introduction – Bar charts – use of CPM and PERT for planning – time estimates – critical path – updating – crashing – resource smoothing – resource leveling – computer applications

Module V: Indeterminate structures, Rigid Supports fix end moments

Types of indeterminate structures, determinate structure rigid supports fix ends moments

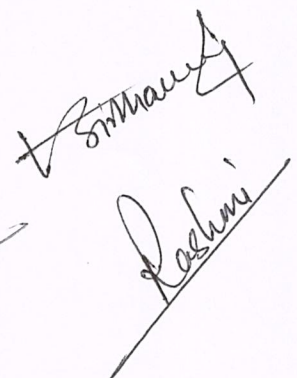
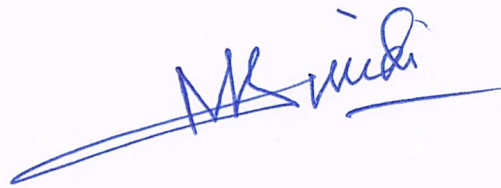
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Text & References:

- Andrew Baldwin, David Bordoli, hand book for construction planning and scheduling
- Dutta B.N., Estimation & Costing in Civil Engg, UBSPD, 1992.
- Peurifoy R.L., & Ledbetter W.B., Construction Planning Equipment & Methods
- I.S 1200 (1968), Methods of Measurement of Building & Civil Engg. Works



CONSTRUCTION PROJECT MANAGEMENT

Course Code: CE 4906

Credit Units: 03

Course Objective:

The main objective of this course is to train the student in construction management field

Course Contents:

Module I: Estimate

Types of estimate ,detailed estimate study, how to prepare estimates of brickwork, Rcc work, Steel work

Module II: Method of valuation

Project Implementation – Tender – earnest money deposit – security deposit – contract – contract documents – measurements – completion certificate – inspection and quality control – standardization – organisations at national and international level (BIS & ISO) – role of certification

Module III: Analysis of Rates

Preparation of specification for common materials of construction and items of work as per IS - analysis of rates and preparation of abstract of estimate

Module IV: Construction Project Management

Preparation of specification for common materials of construction and items of work as per IS - analysis of rates and preparation of abstract of estimate

Introduction to valuation of real properties: Depreciation – Sinking fund – methods of valuation

Examination Scheme:

Components	A	CT	S/V/Q	HA	EE
Weightage (%)	5	10	8	7	70

CT: Class Test, HA: Home Assignment, S/V/Q: Seminar/Viva/Quiz, EE: End Semester Examination; Att: Attendance

Text & References:

- Vazirani V.N. & Chandola S.P., Heavy Construction, 1978.
- Rangwala, Valuation of Real Properties, Charotar, 1978.
- Peurifoy R.L., & Ledbetter W.B., Construction Planning Equipment & Methods,
- Dutta B.N., Estimation & Costing in Civil Engg, UBSPD, 1992.
- Chakrabarthi, Estimation, Costing, Specification in Civil Engg,
- Shah N.A., Quantity Surveying & Specification in Civil Engg.,
- Mahajan S.P., Civil Estimating & Costing, Sathyaprakasham, 1988.

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STATE OF NEW YORK

IN SENATE

1901

REPORT OF THE

COMMISSIONERS OF THE LAND OFFICE

IN RESPONSE TO A RESOLUTION PASSED BY THE SENATE

AT ITS SESSION ON JANUARY 10, 1901

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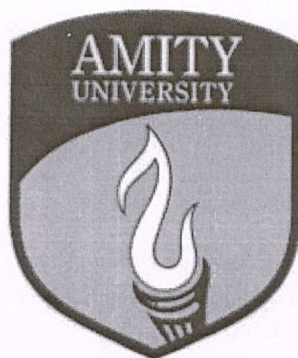
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**Master of Technology
CIVIL ENGINEERING
(with specialization in structural Engineering)
Programme Code: MTCE**

Duration – 2 years full Time



**Programme Structure
And
Curriculum & Scheme of Examination
2017-2018**

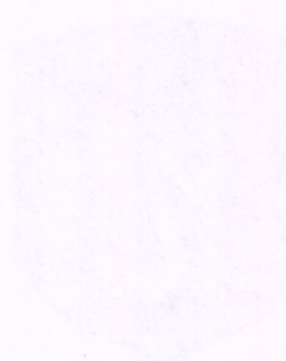
**AMITY UNIVERSITY
MADHYA PRADESH**

1

THE UNIVERSITY OF CHICAGO

DEPARTMENT OF THE HISTORY OF ARTS

1972-1973



OFFICE OF THE DEAN

100 EAST 57TH STREET

CHICAGO, ILLINOIS 60637

PREAMBLE

Amity University aims to achieve academic excellence by providing multi-faceted education to students and encourage them to reach the pinnacle of success. The University has designed a system that would provide rigorous academic programme with necessary skills to enable them to excel in their careers.

This booklet contains the Programme Structure, the Detailed Curriculum and the Scheme of Examination. The Programme Structure includes the courses (Core and Elective), arranged semester wise. The importance of each course is defined in terms of credits attached to it. The credit units attached to each course has been further defined in terms of contact hours i.e. Lecture Hours (L), Tutorial Hours (T), Practical Hours (P). Towards earning credits in terms of contact hours, 1 Lecture and 1 Tutorial per week are rated as 1 credit each and 2 Practical hours per week are rated as 1 credit. Thus, for example, an L-T-P structure of 3-0-0 will have 3 credits, 3-1-0 will have 4 credits, and 3-1-2 will have 5 credits.

The Curriculum and Scheme of Examination of each course includes the course objectives, course contents, scheme of examination and the list of text and references. The scheme of examination defines the various components of evaluation and the weightage attached to each component. The different codes used for the components of evaluation and the weightage attached to them are:

<u>Components</u>	<u>Codes</u>	<u>Weightage (%)</u>
Case Discussion/ Presentation/ Analysis	C	05 - 10
Home Assignment	H	05 - 10
Project	P	05 - 10
Seminar	S	05 - 10
Viva	V	05 - 10
Quiz	Q	05 - 10
Class Test	CT	10 - 15
Attendance	A	05
End Semester Examination	EE	70

It is hoped that it will help the students study in a planned and a structured manner and promote effective learning. Wishing you an intellectually stimulating stay at Amity University.

22-February -2017

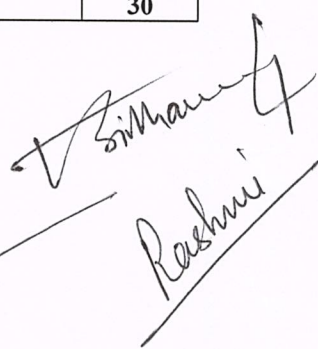
PROGRAMME STRUCTURE
M.TECH. in CIVIL ENGINEERING (Structure)

FIRST SEMESTER

Course Code	Course Title	Lecture (L) Hours Per Week	Tutorial (T) Hours Per Week	Practical (P) Hours Per Week	Total Credits
MTCE 101	Numerical Analysis and Computer Programming	3	1	-	4
MTCE 102	Concrete Technology	3	1	-	4
MTCE 103	Advanced Structural analysis	3	1	-	4
MTCE 104	Elective-I (Select any one) Structural Dynamics and Earthquake Resistant Building	3	1	-	4
MTCE 105	Bridge Engineering				
MTCE 106	Advanced elasticity and plasticity				
MTCE 120	Numerical Analysis Lab	-	-	4	2
MTCE 121	Concrete Lab	-	-	4	2
MTCE 122	Auto Cad Lab	-	-	4	2
MTCE 141	Cs I-Advanced Communication	1	-	-	1
MTCE 143	Behavioral Science – I (Self Development for Interpersonal Skills)	1	-	-	1
MTCE 144	Foreign Language – I French	2	-	-	2
MTCE 145	German				
MTCE 130	Term Paper (Review Paper)	-	-	-	4
	TOTAL				30

SECOND SEMESTER

MTCE 201	Optimization Techniques	3	1	-	4
MTCE 202	Advanced Foundation Engineering	3	1	-	4
MTCE 203	Finite Element Method	3	1	-	4
MTCE 204	Elective - II (Select any one) Advanced Steel Structure	3	1	-	4
MTCE 205	Design of Pre-Stressed Structures				
MTCE 206	Experimental Stress Analysis				
MTCE 220	Structural Engineering lab	-	-	4	2
MTCE 221	Foundation /Soil Testing Lab.	-	-	4	2
MTCE 222	Finite Element Method Lab.	-	-	4	2
MTCE 241	Cs II- Communication For Employment	1	-	-	1
MTCE 243	Behavioral Science – II (Conflict Resolution and Management)	1	-	-	1
MTCE 244	Foreign Language – II French	2	-	-	2
MTCE 245	German				
MTCE 260	Seminar	-	-	-	4
	TOTAL				30




3

THIRD SEMESTER

MTCE 301	Research Methodology	3	1	-	4
MTCE 302	Advanced RCC design	3	1	-	4
MTCE 303	High rise Buildings analysis	3	1	-	4
MTCE 304	Elective – III (Select any one)	3	1	-	4
MTCE 305	Analysis of Plate and shells				
MTCE 306	Reliability Based Civil Engineering Design				
	Evaluation and Retrofitting of Building				
MTCE 320	Building Design Project Lab using Primavera	-	-	4	2
MTCE 321	Advanced RCC Lab	-	-	4	2
MTCE 322	Structural Material Testing Lab-II	-	-	4	2
MTCE 341	Cs III- Professional Communication Skills	1	-	-	1
MTCE 343	Behavioral Science – III (Professional Competencies & Career Development)	1	-	-	1
MTCE 344	Foreign Language – III	2	-	-	2
MTCE 345	French				
	German				
MTCE 360	Project	-	-	-	6
MTCE 361	Summer Project (Evaluation)	-	-	-	4
	TOTAL				36

FOURTH SEMESTER

MTCE 450	Progress Report Comprehensive Viva Dissertation and Thesis	-	-	-	30
	TOTAL				30

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AMITY UNIVERSITY

MADHYA PRADESH

(Established by Ritnand Balved Education Foundation)

Date: 16/01/2018

BOARD OF STUDIES (Civil Engineering)

MINUTES OF THE MEETING

1. A meeting of board of studies of Department of Civil Engineering, Amity School of Engineering & Technology, Amity University Madhya Pradesh was held on 16 January 2018 at AUMP, under the Chairmanship of Maj Gen (Dr) S C Jain VSM **(Retd), Director (ASET). The following members attended the meeting:-

(a) **Chairman:** Maj Gen (Dr) S C Jain VSM **(Retd), Director (ASET)

(b) **Member**

i) Dr. Manoj Kumar Trivedi, Professor, MITS , Gwalior, External Member

ii) Mr. Mohan Kantharia Asst.Professor & Head Civil Engg., Member

iii) Ms. Pooja Shrivastava, Assistant Professor, Civil Engg., Member

iv) Mr. Shashank Gupta , Assistant Professor, Civil Engg., Member

2. The agenda of the meeting included the following:

(a) Review of existing syllabus and modification if any.

(b) Discussion on trends and technologies in CE and consideration of its inclusion in syllabus.

(c) Any other point with due permission of the Chairperson.

16/1/18

3. Discussions/Comments:

a. (i) Discussion: Diagnostic lab setup

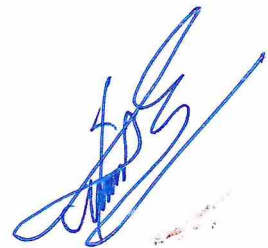
(ii) Comments: for Material testing concrete and mortar, diagnostic lab should be setup.

b. (i) Discussion: M.tech in CTM/ Transportation

(ii) Comments: M.tech courses in these specialization can be started because these specialization are in demand.

c. (i) Discussion: UG and PG Journals

(ii) Comments: ASCE and ACI journals should be subscribed for PG and UG students.



3. Discussions/Comments:

a. (i) Discussion: Diagnostic lab setup

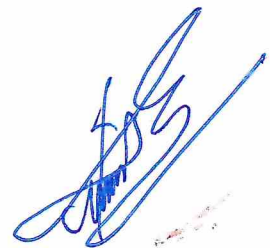
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c. (i) Discussion: UG and PG Journals

(ii) Comments: ASCE and ACI Journals should be subscribed for PG and UG students.



1. Recommendations:

B. Tech Program:

1. Industrial visit is added as one additional module every year curriculum. In third semester (BTCE-305) one day local industry visit. In fifth semester (BTCE-503) industrial visit will be of maximum two working days. In seventh semester (BTCE-702) Industrial visit will be of maximum three working days respectively. This addition is for better exposure about industry to the students. (**Annexure -I**)
2. The subject Building Design and Drawing (BTCE-302) is revised according to the present need of the subject, some part which is of architecture from part A is removed, and the part B drawing is already covered in the BDD Lab , hence removed. Now new course will be of 3 credits in place of 4 credits presently. Syllabi of some other institution for the same subject are also referred for modification.(**Annexure-II**)

M. Tech Program:

3. There is no **change** is proposed in current syllabus of M.Tech. program.

CBCS Course:

4. Currently we are running one course in CBCS with name **Construction Engineering**. The credits of semester IV, V, and VI have been revised. In place of 3 credits in each semester, semester(IV) credits 4, semester(V) credits 4 and semester (VI) credits 1 are proposed in these semesters. Total credits of CBCS remains 18.
5. All the aforesaid points have been approved by all the board members present in the meeting.

5. Summary of Changes is given below:-

Current Syllabus B.Tech (CE)					Proposed Changes/Modifications (addition/deletion in the Syllabus)	New Course Code B.Tech (CE)	No. of Cre dits
Sr. No.	Course Title	Module of the syllabus	Old Course Code	No. of Credit s			
1	Building Technology Geotechnical Engg Environment al Engg.	(Presently These courses having IV modules in the old syllabus)	BTCE-305	3	Additional module (V) of Industrial visit is added in III, V and VII Semester (without any change in syllabus) (List of probable industries is attached)	BTCE-305	3
			BTCE-503	3		BTCE-503	3
			BTCE-702	3		BTCE-702	3
2	Building Design and Drawing	Module I. Function of architecture Module II. Creative principles Module III: Functional Factors Module IV:spaces Planning of residential and public building Perspective drawing Part B: Drawing	BTCE-302	4	Revised syllabus 1. Some part of module I is added in Vth module . Module I (added) Building elements to make understanding of basics of building drawing. 2. some part of this module is added in module V and Module 2 (Building Bye Laws) is added as required in civil engineering Module III: building Services contents is same as old syllabus . Module 4 : design and drawing of building , residential and public buildings This is totally covered in drawing Lab separately in subject BTCE-321. Module 5: Perspective	BTCE-302	3

					drawing : (newly added) Contains some part of module I and Module II and Module IV of old syllabus)		
3	CBCS (construction Engineering)		CE4904 CE4905 CE4906	3 3 3	Vi semester Syllabus slightly shuffled to 4 th and 5 th semester Project (in sixth semester)		4 4 1
Total Credits =22					Total Credits=21		

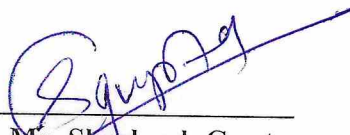
The total number of credits after revision for B. Tech works out to **21credits** as against **22 credits**, and the credits for **M.Tech** remains same.



Signature of BOS Members:



Ms. Pooja Shrivastava
Member



Mr. Shashank Gupta
Member



Mr. Mohan Kantharia
Member



Dr. Manoj Kumar Trivedi
External



Maj Gen (Dr) S C Jain
Chairman-BOS



Prof.(Dr.) M.P.Kaushik
Hon'ble Pro vice Chancellor
AUMP

APPROVED BY



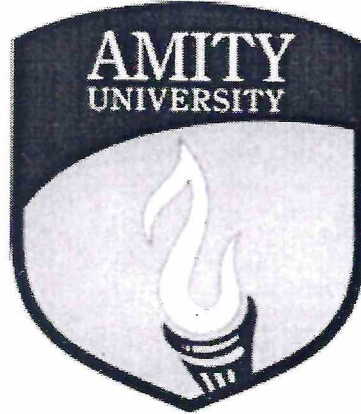
Hon'ble Vice Chancellor
AUMP, Gwalior

12/3/18

**Bachelor of Technology
(Civil Engineering)**

Programme Code: BTCE

Duration – 4 Years Full Time



**Programme Structure
&
Curriculum & Scheme of Examination**

**2018-19
(As per AICTE)**

[Handwritten Signature]
14-5-18

**AMITY UNIVERSITY
MADHYA PRADESH**

PREAMBLE

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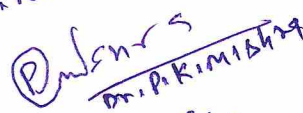
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Quiz	Q	05 - 10
Class Test	CT	10 - 15
Attendance	A	05
End Semester Examination	EE	70

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May, 2018

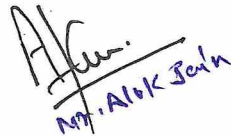

Mrs. Seema S. Jain

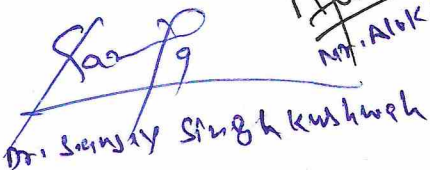

Dr. Rachana Kethel


Dr. P. K. Mishra

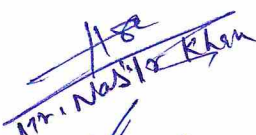

Dr. Rachana


Dr. Raghavendra Sharma


Mr. Alok Jain


Dr. Suresh Singh Kushwah


Mr. H. K. Soni


Mr. Nishu Khan


Mr. Mohan Kotharia


Nisha

PROGRAM OUTCOMES

PO1. Engineering Knowledge: Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems.

PO2. Problem Analysis: Identify, formulate, review research literature, and analyze complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences.

PO3. Design/Development of Solutions :Design solutions for complex engineering problems and design system components or processes that meet the specified needs with appropriate consideration for the public health and safety, and the cultural, societal, and environmental considerations.

PO4. Conduct Investigations of Complex Problems :Use research-based knowledge and research methods including design of experiments, analysis and interpretation of data, and synthesis of the information to provide valid conclusions.

PO5. Modern Tool Usage: Create, select, and apply appropriate techniques, resources, and modern engineering and IT tools including prediction and modelling to complex engineering activities with an understanding of the limitations.

PO6. The Engineer and Society: Apply reasoning informed by the contextual knowledge to assess societal, health, safety, legal and cultural issues and the consequent responsibilities relevant to the professional engineering practice.

PO7. Environment and Sustainability: Understand the impact of the professional engineering solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development.

PO8. Ethics: Apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering practice.

PO9. Individual and Team Work: Function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings.

PO10. Communication: Communicate effectively on complex engineering activities with the engineering community and with society at large, such as, being able to comprehend and write effective reports and design documentation, make effective presentations, and give and receive clear instructions.

PO11. Life-long Learning: Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change.

PO12. Project Management and Finance: Demonstrate knowledge and understanding of the engineering and management principles and apply these to one's own work, as a member and leader in a team, to manage projects

PROGRAM SPECIFIC OUTCOMES

PSO1. Apply principles of mechanics and basic sciences to analyze civil engineering structures

PSO2. Survey, map, measure and analyze data for sustainable infrastructure planning.

PSO3. Characterize and evaluate materials for adoptability in civil engineering projects.

PSO4. Analyze and design concrete & steel structures, earthen embankments, irrigation structures, water supply, waste treatment systems and transport systems.

PSO5. Apply best management practices for construction and maintenance of infrastructure facilities.

PSO6. Predict and forecast societal needs, floods, droughts, pollution and travel demand.

PSO7. Work and lead in multi-disciplinary projects and demonstrate social responsibility and professional ethics.

PSO8. Engage in research and life-long learning to adapt to changing environment.

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PROGRAMME STRUCTURE

FIRST SEMESTER						
Course Code	Course Title	Lecture (L) Hours Per week	Tutorial (T) Hours Per week	Practical (P) Hours Per week	Total Credits	Hours
BTCE-101	Mathematics – I (Calculus and Linear Algebra)	3	1	-	4	40
BTCE-102	Chemistry – I (Concepts in Chemistry for Engineering)	3	1	-	4	40
BTCE-103	Basic Electrical Engineering	3	1	-	4	40
BTCE-104	Engineering Graphics & Design	1	-	-	1	10
BTCE-120	Chemistry - I Lab	-	-	3	1.5	30
BTCE-121	Basic Electrical Engineering Lab	-	-	2	1	20
BTCE-122	Engineering Graphics & Design Lab	-	-	4	2	40
BTCE-141	Communication Skill-I (English Language Usage Essentials)	1	-	-	1	10
BTCE-142	Environmental Studies - I	2	-	-	2	20
BTCE-143	Behavioural Science - I	1	-	-	1	10
BTCE-144	French - I	2	-	-	2	20
CBCS		3	-	-	3	30
TOTAL CREDITS (Including CBCS)					26.5	
Total Hrs Including CBCS per week					31	
Total Hrs in the Semester					310	

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SECOND SEMESTER						
Course Code	Course Title	Lecture (L) Hours Per week	Tutorial (T) Hours Per week	Practical (P) Hours Per week	Total Credits	Hours
BTCE-201	Mathematics – II (Ordinary Differential Equations And Complex Variable)	3	1	-	4	40
BTCE-202	Physics (Mechanics)	3	1	-	4	40
BTCE-203	Programming for Problem Solving	3	-	-	3	30
BTCE-204	Workshop/ Manufacturing Practices	1	-	-	1	10
BTCE-220	Physics (Mechanics) Lab	-	-	3	1.5	30
BTCE-221	Programming for Problem Solving Lab	-	-	4	2	40
BTCE-222	Workshop/ Manufacturing Practices Lab	-	-	4	2	40
BTCE-241	Communication Skill-II (Introduction to Communication Skill)	1	-	-	1	10
BTCE-242	Environmental Studies - II	2	-	-	2	20
BTCE-243	Behavioural Science - II	1	-	-	1	10
BTCE-244	French - II	2	-	-	2	20
CBCS		3	-	-	3	30
TOTAL CREDITS (Including CBCS)					26.5	
Total Hrs Including CBCS					32	
Total Hrs in the Semester					320	

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MODEL CURRICULAM

1st YEAR

(AICTE)

MATHEMATICS-I (CALCULUS AND LINEAR ALGEBRA)**Course Code: BTCE-101****Credit Units: 04****Total Hours: 40****Course Objective:**

The objective of this course is to familiarize the prospective engineers with techniques in calculus, multivariate analysis and linear algebra. It aims to equip the students with standard concepts and tools at an intermediate to advanced level that will serve them well towards tackling more advanced level of mathematics and applications that they would find useful in their disciplines.

Module 1: Calculus (9 Hours)

Evolutes and involutes; Evaluation of definite and improper integrals; Beta and Gamma functions and their properties; Applications of definite integrals to evaluate surface areas and volumes of revolutions, Rolle's Theorem, Mean value theorems, Taylor's and Maclaurin theorems with remainders; indeterminate forms and L'Hospital's rule; Maxima and minima.

Module 2: Sequences and series (7 Hours)

Convergence of sequence and series, tests for convergence; Power series, Taylor's series, series for exponential, trigonometric and logarithm functions; Fourier series: Half range sine and cosine series, Parseval's theorem.

Module 3: Multivariable Calculus (Differentiation) (9 Hours)

Limit, continuity and partial derivatives, directional derivatives, total derivative; Tangent plane and normal line; Maxima, minima and saddle points; Jacobians and transformations of coordinates Method of Lagrange multipliers; Gradient, curl and divergence.

Module 4: Matrices and Vector Space (8 Hours)

Inverse and rank of a matrix, rank-nullity theorem; System of linear equations; Symmetric, skew-symmetric and orthogonal matrices; Determinants; Eigenvalues and eigenvectors; Diagonalization of matrices; Cayley-Hamilton Theorem, and Orthogonal transformation, Vector Space, linear dependence of vectors, basis, dimension; Linear transformations (maps), range and kernel of a linear map, rank and nullity, Inverse of a linear transformation, rank- nullity theorem, composition of linear maps, Matrix associated with a linear map. Inner product spaces, Gram-Schmidt orthogonalization.

Module 5: Multivariable Calculus (Integration) (7 Hours)

Multiple Integration: Double integrals (Cartesian), change of order of integration in double integrals, Change of variables (Cartesian to polar), Applications: areas and volumes, Center of mass and Gravity (constant and variable densities); Triple integrals (Cartesian), orthogonal curvilinear coordinates, Simple applications involving cubes, sphere and rectangular parallelepipeds; Scalar line integrals, vector line integrals, scalar surface integrals, vector surface integrals, Theorems of Green, Gauss and Stokes.

Course Outcomes

- To apply differential and integral calculus to notions of curvature and to improper integrals. Apart from some other applications they will have a basic understanding of Beta and Gamma functions.
- The fallouts of Rolle's Theorem that is fundamental to application of analysis to Engineering problems.
- The tool of power series and Fourier series for learning advanced Engineering Mathematics.
- To deal with functions of several variables that are essential in most branches of engineering.
- The essential tool of matrices and linear algebra in a comprehensive manner.
- The mathematical tools needed in evaluating multiple integrals and their usage.

CHEMISTRY-1 (CONCEPTS IN CHEMISTRY FOR ENGINEERING)**Course Code: BTCE -102****Credit Units:04
Total Hours: 40****Course Objective:**

Technology is being increasingly based on the electronic, atomic and molecular level modifications. The course will have a strong emphasis on the concepts that will aid in quantification of several concepts in chemistry that have been introduced at the 10+2 levels in schools. Quantum theory is more than 100 years old and to understand phenomena at nanometer levels, one has to base the description of all chemical processes at molecular levels. The course will emphasize on learning microscopic chemistry in terms of atomic and molecular orbitals and intermolecular forces. Principles of different spectroscopic techniques will be introduced and some applications will be considered. Bulk properties and processes will be analysed using thermodynamic considerations. There will also be outlines of periodic properties, stereochemistry, chemical reactions and synthesis. The chemistry laboratory course will consist of experiments illustrating the principles of chemistry that have been learnt so far, as well as others relevant to the study of science and engineering.

Module 1: Atomic and molecular structure (12 hours)

Schrodinger equation. Particle in a box solutions and their applications for conjugated molecules and nanoparticles. Forms of the hydrogen atom wave functions and the plots of these functions to explore their spatial variations. Molecular orbitals of diatomic molecules and plots of the multicentre orbitals. Equations for atomic and molecular orbitals. Energy level diagrams of diatomics. Pi-molecular orbitals of butadiene and benzene and aromaticity. Crystal field theory and the energy level diagrams for transition metal ions and their magnetic properties. Band structure of solids and the role of doping on band structures.

Module 2: Spectroscopic techniques and applications (8 hours)

Principles of spectroscopy and selection rules. Electronic spectroscopy. Fluorescence and its applications in medicine. Vibrational and rotational spectroscopy of diatomic molecules. Applications. Nuclear magnetic resonance and magnetic resonance imaging, surface characterisation techniques. Diffraction and scattering.

Module 3: Intermolecular forces and potential energy surfaces (4 hours)

Ionic, dipolar and van Der Waals interactions. Equations of state of real gases and critical phenomena. Potential energy surfaces of H_3 , H_2F and HCN and trajectories on these surfaces.

Module 4: Use of free energy in chemical equilibria (6 hours)

Thermodynamic functions: energy, entropy and free energy. Estimations of entropy and free energies. Free energy and emf. Cell potentials, the Nernst equation and applications. Acid base, oxidation reduction and solubility equilibria. Water chemistry. Corrosion. Use of free energy considerations in metallurgy through Ellingham diagrams.

Module 5: Periodic properties (4 hours)

Effective nuclear charge, penetration of orbitals, variations of s, p, d and f orbital energies of atoms in the periodic table, electronic configurations, atomic and ionic sizes, ionization energies, electron affinity and electronegativity, polarizability, oxidation states, coordination numbers and geometries, hard soft acids and bases, molecular geometries.

Module 6: Stereochemistry (4 hours)

Representations of 3 dimensional structures, structural isomers and stereoisomers, configurations and symmetry and chirality, enantiomers, diastereomers, optical activity, absolute configurations and conformational analysis. Isomerism in transitional metal compounds.

Module 7: Organic reactions and synthesis of a drug molecule (2 hours)

Introduction to reactions involving substitution, addition, elimination, oxidation, reduction, cyclization and ring openings. Synthesis of a commonly used drug molecule.

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BASIC ELECTRICAL ENGINEERING

Course Code: BTCE - 103

Credit Units: 04

Total Hours: 40

Course Objective:

The objective of the course is to provide a brief knowledge of Electrical Engineering to students of all disciplines. This Course includes some theorems related to electrical, some law's related to flow of current, voltages, basic knowledge of Transformer, basic knowledge of electromagnetism, basic knowledge of electrical network.

Module 1: DC Circuits (8 hours)

Electrical circuit elements (R, L and C), voltage and current sources, Kirchhoff's current and voltage laws, analysis of simple circuits with dc excitation. Superposition, Thevenin's and Norton's Theorems. Time-domain analysis of first-order RL and RC circuits.

Module 2: AC Circuits (8 hours)

Representation of sinusoidal waveforms, peak and R.M.S. values, phasor representation, real power, reactive power, apparent power, power factor. Analysis of single-phase ac circuits consisting of R, L, C, RL, RC, RLC combinations (series and parallel), resonance. Three- phase balanced circuits, voltage and current relations in star and delta connections.

Module 3: Transformers (6 hours)

Magnetic materials, BH characteristics, ideal and practical transformer; equivalent circuit, losses in transformers, regulation and efficiency. Auto-transformer and three-phase transformer connections.

Module 4: Electrical Machines (8 hours)

Generation of rotating magnetic fields, Construction and working of a three-phase induction motor, Significance of torque-slip characteristic. Loss components and efficiency, starting and speed control of induction motor. Single-phase induction motor. Construction, working, torque-speed characteristic and speed control of separately excited dc motor. Construction and working of synchronous generators.

Module 5: Power Converters (5 hours)

DC-DC buck and boost converters, duty ratio control. Single-phase and three-phase voltage source inverters; sinusoidal modulation.

Module 6: Electrical Installations (5 hours)

Components of LT Switchgear: Switch Fuse Unit (SFU), MCB, ELCB, MCCB, Types of Wires and Cables, Earthing. Types of Batteries, Important Characteristics for Batteries. Elementary calculations for energy consumption, power factor improvement and battery backup.

Course Outcomes:

- To understand and analyze basic electric and magnetic circuits.
- To study the working principles of electrical machines and power converters.
- To introduce the components of low voltage electrical installations.

Examination Scheme:

Components	A	CT	S/V/Q/HA	EE
Weightage (%)	5	15	10	70

CT: Class Test, HA: Home Assignment, S/V/Q: Seminar/Viva/Quiz, EE: End Semester Examination; A: Attendance

Text & References:

- D. P. Kothari and I. J. Nagrath, "Basic Electrical Engineering", Tata McGraw Hill, 2010.
- D. C. Kulshreshtha, "Basic Electrical Engineering", McGraw Hill, 2009.
- L. S. Bobrow, "Fundamentals of Electrical Engineering", Oxford University Press, 2011.
- E. Hughes, "Electrical and Electronics Technology", Pearson, 2010.
- V. D. Toro, "Electrical Engineering Fundamentals", Prentice Hall India, 1989.

CHEMISTRY LABORATORY**Course Code: BTCE 120****Credit Units: 1.5****Total Hours: 30****List of experiments/demonstrations:**

1. Determination of surface tension of a given liquid. (2 Hours)
2. Determination of viscosity of a given liquid. (2 Hours)
3. Thin layer chromatography. (1 Hour)
4. Ion exchange column for removal of hardness of water. (2 Hours)
5. Determination of chloride content of water. (1 Hour)
6. Colligative properties using freezing point depression. (2 Hours)
7. Determination of the rate constant of a reaction. (2 Hours)
8. Determination of cell constant and conductance of solutions. (2 Hours)
9. Potentiometry - determination of redox potentials and emfs. (2 Hours)
10. Synthesis of a polymer/drug. (1 Hour)
11. Saponification/acid value of an oil. (2 Hours)
12. Chemical analysis of a salt. (1 Hour)
13. Lattice structures and packing of spheres (1 Hour)
14. Models of potential energy surfaces. (1 Hour)
15. Chemical oscillations- Iodine clock reaction. (1 Hour)
16. Determination of the partition coefficient of a substance between two immiscible liquids. (3 Hours)
17. Adsorption of acetic acid by charcoal. (2 Hours)
18. Use of the capillary viscosimeters to demonstrate the isoelectric point as the pH of minimum viscosity for gelatin sols and/or coagulation of the white part of the egg. (2 Hours)

Laboratory Outcomes:

- The chemistry laboratory course will consist of experiments illustrating the principles of chemistry relevant to the study of science and engineering. The students will learn to:
- Estimate rate constants of reactions from concentration of reactants/products as a function of time
- Measure molecular/system properties such as surface tension, viscosity, conductance of solutions, redox potentials, chloride content of water, etc
- Synthesize a small drug molecule and analyse a salt sample

Examination Scheme:

Components	A	CT	S/V/Q/HA	EE
Weightage (%)	5	15	10	70

CT: Class Test, HA: Home Assignment, S/V/Q: Seminar/Viva/Quiz, EE: End Semester Examination; A: Attendance

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ENGINEERING GRAPHICS & DESIGN LABORATORY

Course Code: BTCE 122

Credit Units: 02

Total Hours: 40

List of experiments/demonstrations:

Module 1: Introduction to Engineering Drawing (4 Hours)

Principles of Engineering Graphics and their significance, usage of Drawing instruments, lettering, Conic sections including the Rectangular Hyperbola (General method only); Cycloid, Epicycloid, Hypocycloid and Involute; Scales – Plain, Diagonal and Vernier Scales

Module 2: Orthographic Projections (4 Hours)

Principles of Orthographic Projections-Conventions - Projections of Points and lines inclined to both planes; Projections of planes inclined Planes - Auxiliary Planes

Module 3: Projections of Regular Solids (4 Hours)

Those inclined to both the Planes- Auxiliary Views; Draw simple annotation, dimensioning and scale. Floor plans that include: windows, doors, and fixtures such as WC, bath, sink, shower, etc.

Module 4: Sections and Sectional Views of Right Angular Solids (4 Hours)

Prism, Cylinder, Pyramid, Cone – Auxiliary Views; Development of surfaces of Right Regular Solids - Prism, Pyramid, Cylinder and Cone; Draw the sectional orthographic views of geometrical solids, objects from industry and dwellings (foundation to slab only)

Module 5: Isometric Projections (4 Hours)

Principles of Isometric projection – Isometric Scale, Isometric Views, Conventions; Isometric Views of lines, Planes, Simple and compound Solids; Conversion of Isometric Views to Orthographic Views and Vice-versa, Conventions

Module 6: Overview of Computer Graphics (4 Hours)

Listing the computer technologies that impact on graphical communication, Demonstrating knowledge of the theory of CAD software [such as: The Menu System, Toolbars (Standard, Object Properties, Draw, Modify and Dimension), Drawing Area (Background, Crosshairs, Coordinate System), Dialog boxes and windows, Shortcut menus (Button Bars), The Command Line (where applicable), The Status Bar, Different methods of zoom as used in CAD, Select and erase objects.; Isometric Views of lines, Planes, Simple and compound Solids

Module 7: Customization & CAD Drawing (4 Hours)

consisting of set up of the drawing page and the printer, including scale settings, Setting up of units and drawing limits; ISO and ANSI standards for coordinate dimensioning and tolerancing; Orthographic constraints, Snap to objects manually and automatically; Producing drawings by using various coordinate input entry methods to draw straight lines, Applying various ways of drawing circles

Module 8: Annotations, layering & other functions (6 Hours)

Applying dimensions to objects, applying annotations to drawings; Setting up and use of Layers, layers to create drawings, Create, edit and use customized layers; Changing line lengths through modifying existing lines (extend/lengthen); Printing documents to paper using the print command; orthographic projection techniques; Drawing sectional views of composite right regular geometric solids and project the true shape of the sectioned surface; Drawing annotation, Computer-aided design (CAD) software modeling of parts and assemblies. Parametric and non-parametric solid, surface, and wireframe models. Part editing and two-dimensional documentation of models. Planar projection theory, including sketching of perspective, isometric, multiview, auxiliary, and section views. Spatial visualization exercises. Dimensioning guidelines, tolerancing techniques; dimensioning and scale multi views of dwelling

Module 9: Demonstration of a simple team design project (6 hours)

Geometry and topology of engineered components: creation of engineering models and their presentation in standard 2D blueprint form and as 3D wire-frame and shaded solids; meshed topologies for engineering analysis and tool-path generation for component manufacture; geometric dimensioning and tolerancing; Use of solid-modeling software for creating associative models at the component and assembly levels; floor plans that include: windows, doors, and fixtures such as WC, bath, sink, shower, etc. Applying colour coding according to building drawing practice; Drawing sectional elevation showing foundation to ceiling; Introduction to Building Information Modelling (BIM)

14

COMMUNICATION SKILLS-I (ENGLISH LANGUAGE USAGE ESSENTIALS)

Course Code: BTCE-141

Credit Units: 01

Total Hours: 10

Course Objective The course is intended to familiarize students with the basics of English language and help them to learn to identify language structures for correct English usage.

Module I: Essentials of English Grammar (4 Hours)

- Common Errors, Parts of Speech, Collocations, Relative Pronoun, Subject-Verb Agreement, Articles, Punctuation, Sentence Structure- 'Wh' Questions

Module II: Written English Communication (2 Hours)

- Paragraph Writing, Essay Writing

Module III: Spoken English Communication (2 Hours)

- Introduction to Phonetics, Syllable-Consonant and Vowel Sounds, Stress and Intonation

Module IV: Prose (2 Hours)

- "Friends, Romans, countrymen, lend me your ears" Speech by Marc Anthony in Julius Caesar

Learning Outcomes:

- The students should be able to :
- Identify Common Errors and Rectify Them
- Develop and Expand Writing Skills Through Controlled and Guided Activities
- To Develop Coherence, Cohesion and Competence in Oral Discourse through Intelligible Pronunciation

Examination Scheme:				
Components (Drop down)	CIE	Mid Sem	Attendance	ESE
Weightage (%)	30%	15%	5%	50%

CIE: Continuous Internal Evaluation, Mid Sem, Attendance, ESE: End Semester Examination

Text & References:

Text:

- Rosenblum, M. How to Build Better Vocabulary, London: Bloomsbury Publication
- Verma, Shalini. Word Power made Handy, S. Chand Publications
- High School English Grammar & Composition by Wren & Martin

References:

- K.K.Sinha, Business Communication, Galgotia Publishing Company
- Additional Reading: Newspapers and Journals

Module VI: End-of-Semester Appraisal

- Viva - Voce based on personal journal
- Assessment of Behavioral change as a result of training
- Exit Level Rating by Self and Observer

Course Outcome:

Through this course,

- The knowledge of self will be utilized by students to resolve their personal, interpersonal and life problems
- Rather than extrinsic locus of control, students will acquire an intrinsic approach towards life
- The heightened awareness of self, attitudes and emotions will help students to work towards removal of obstacles created by self-limitations and enhance their full potential in their education and career.

Examination Scheme:

Components	SAP	A	Mid Term Test (CT)	VIVA	Journal for Success (JOS)
Weightage (%)	20	05	20	30	25

Suggested Readings:

- Organizational Behaviour, Davis, K.
- Hoover, Judhith D. Effective Small Group and Team Communication, 2002, Harcourt College Publishers
- Dick, Mc Cann & Margerison, Charles: Team Management, 1992 Edition, viva books
- Bates, A. P. and Julian, J.: Sociology - Understanding Social Behaviour
- Dressler, David and Cans, Donald: The Study of Human Interaction
- Lapiere, Richard. T – Social Change
- Lindzey, G. and Borgatta, E: Sociometric Measurement in the Handbook of Social Psychology, Addison – Welsley, US.
- Rose, G.: Oxford Textbook of Public Health, Vol.4, 1985.
- LaFasto and Larson: When Teams Work Best, 2001, Response Books (Sage), New Delhi
- J William Pfeiffer (ed.) Theories and Models in Applied Behavioural Science, Vol 2, Group (1996); Pfeiffer & Company
- Smither Robert D.; The Psychology of Work and Human Performance, 1994, Harper Collins College Publishers

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FRENCH-I (FRANÇAIS POUR LA TECHNOLOGIE –I)**Course Code: BTCE-144****Credit Units: 02**
Total Hours: 20**Course Objective:**

To enable the students to take position as a foreigner speaking French and establish contacts and speak about self.
To provide an understanding of the basics of French lexicology, grammar and phonetics
To familiarize the students

- with the manners and socio-cultural aspects
- with the transparent words in science and specialties
- with formal and informal language

Course Contents: pp. 1 to 28: Unité 1

This course is structured based on the text book Tech French: French for Science and Technology and prepares the Students for A1 / A2 of DELF.

Unité 1: Premiers pas en France**Actes de Communication : (12 Hours)**

Saluer - accueillir, identifier, nommer quelqu'un

Se présenter, présenter quelqu'un - nom, âge, nationalité, profession, spécialisation, ville, pays

Aborder une personne - prise de contact, politesse, famille

Présenter des renseignements personnels - remplir un formulaire, adresse, numéro de téléphone

Demander des nouvelles - comprendre et poser des questions

Parler de soi - de ses activités, de ses loisirs, exprimer ses goûts

Grammaire : (8 Hours)

Articles indéfinis et définis

Accord - masculin et féminin

Pronoms personnels sujets, toniques, on, c'est/il est + profession

Verbes au présent : du 1^{er} groupe -er (habiter), être, avoir, faire, savoir, aller

Formes : négation, interrogation

Prépositions de lieu

Adjectifs possessifs - un seul possesseur et plusieurs possesseurs

Partitif – faire/ jouer + à/ de...

Course Outcomes:

- To understand basic French. Able to read, write basic French
- To express basic day to day activities in French

Examination Scheme:

Components	Internal exam				End semester	Grand total
	Mid-Sem	Viva-Voce	Attendance	TOTAL		
Weightage (%)	15	30	5	50	50	100

Text & References:**Text:**

- **Le livre à suivre:** Le Gargasson, Ingrid, Shariva Naik et Claire Chaize. Tech French: French for Science and Technology. Delhi: Goyal Publishers & Distributors Pvt. Ltd., 2011.

References:

Girardeau, Bruno et Nelly Mous. Réussir le DELF A1. Paris: Didier, 2010.

Suggested Text/Reference Books

1. G.B. Thomas and R.L. Finney, Calculus and Analytic geometry, 9th Edition, Pearson, Reprint, 2002.
2. Erwin kreyszig, Advanced Engineering Mathematics, 9th Edition, John Wiley & Sons, 2006.
3. W. E. Boyce and R. C. DiPrima, Elementary Differential Equations and Boundary Value Problems, 9th Edn., Wiley India, 2009.
4. S. L. Ross, Differential Equations, 3rd Ed., Wiley India, 1984.
5. E. A. Coddington, an Introduction to Ordinary Differential Equations, Prentice Hall India, 1995.
6. E. L. Ince, Ordinary Differential Equations, Dover Publications, 1958.
7. J. W. Brown and R. V. Churchill, Complex Variables and Applications, 7th Ed., Mc-Graw Hill, 2004.
8. N.P. Bali and Manish Goyal, A text book of Engineering Mathematics, Laxmi Publications, Reprint, 2008.
9. B.S. Grewal, Higher Engineering Mathematics, Khanna Publishers, 36th Edition, 2010.

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Text & References:

References:

- Engineering Mechanics, 2nd ed. — MK Harbola
- Introduction to Mechanics — MK Verma
- An Introduction to Mechanics — D Kleppner & R Kolenkow
- Principles of Mechanics — JL Synge & BA Griffiths
- Mechanics — JP Den Hartog
- Engineering Mechanics - Dynamics, 7th ed. - JL Meriam
- Mechanical Vibrations — JP Den Hartog
- Theory of Vibrations with Applications — WT Thomson

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Examination Scheme:

Components	A	CT	S/V/Q/HA	EE
Weightage (%)	5	15	10	70

CT: Class Test, HA: Home Assignment, S/V/Q: Seminar/Viva/Quiz, EE: End Semester Examination; A: Attendance

Text & References:

- Byron Gottfried, Schaum's Outline of Programming with C, McGraw-Hill
- E. Balaguruswamy, Programming in ANSI C, Tata McGraw-Hill
- Brian W. Kernighan and Dennis M. Ritchie, The C Programming Language, Prentice Hall of India

Handwritten signatures and initials:

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PHYSICS (MECHANICS) LAB**Course Code: BTCE- 220****Credit Units: 1.5
Total Hours: 30****Course Objectives**

To develop experimental skills, analysis/interpretation of data, and synthesis of the information to provide valid conclusions towards theoretical concepts of applied mechanics.

List of Experiments

1. To determine the frequency of an electrically maintained tuning fork by Melde's method. (2 hours)
2. To determine the frequency of AC mains using sonometer. (2 hours)
3. To determine the acceleration due to gravity ("g") using Kater's reversible pendulum. (2 hours)
4. To determine the value of acceleration due to gravity ("g") in the laboratory using bar pendulum. (2 hours)
5. To determine the moment of inertia of a flywheel about its own axis of rotation. (2 hours)
6. To determine the density of material of the given wire with the help of sonometer. (2 hours)
7. Determination of Modulus of rigidity ' η ' of rod by Searle's method. (3 hours)
8. Measurement of Young's modulus by bending of beam method. (3 hours)
9. To determine the coefficient of viscosity of a liquid by poiseuille's method. (3 hours)
10. To determine the rigidity modulus of the suspension wire using torsion pendulum. (3 hours)
11. To determine the surface tension of a liquid (water) by Jaeger's method. (3 hours)
12. To determine the surface tension of a liquid (water) by Searle's apparatus. (3 hours)

Course Outcomes:

Upon completion of the experiments students will develop understanding to:

- Elasticity and modulus of elasticity.
- concept of resonance and its application :
- C.G. and its importance in different engineering problems

Examination Scheme:

Components	A	CT	S/V/Q/HA	EE
Weightage (%)	5	15	10	70

CT: Class Test, HA: Home Assignment, S/V/Q: Seminar/Viva/Quiz, EE: End Semester Examination; A: Attendance

Prachin

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WORKSHOP/MANUFACTURING PRACTICES LAB**Course Code: BTCE 222****Credit Units: 02****Total Hours: 40****List of experiments/demonstrations:**

1. Machine shop (4 hours)
2. Fitting shop (4 hours)
3. Carpentry (4 hours)
4. Electrical & Electronics (6 hours)
5. Welding shop (8 hours) (Arc welding 4 hrs + gas welding 4 hrs)
6. Casting (4 hours)
7. Smithy (4 hours)
8. Plastic moulding & Glass Cutting (6 hours)

Examinations could involve the actual fabrication of simple components, utilizing one or more of the techniques covered above.

Laboratory Outcomes:

- Upon completion of this laboratory course, students will be able to fabricate components with their own hands.
- They will also get practical knowledge of the dimensional accuracies and dimensional tolerances possible with different manufacturing processes.
- By assembling different components, they will be able to produce small devices of their interest.

Examination Scheme:

Components	A	CT	S/V/Q/HA	EE
Weightage (%)	5	15	10	70

CT: Class Test, HA: Home Assignment, S/V/Q: Seminar/Viva/Quiz, EE: End Semester Examination; A: Attendance

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ENVIRONMENTAL STUDIES-II**Course Code: BTCE-242****Credit Units: 02****Total Hours: 20****Course Objectives –**

- To understand various types of environmental pollution.
- To educate masses, in general and students, in particular about the issues related to degradation of environment and also social issues related to environment.
- To understand sustainable development.
- To understand environmental assets, local flora and fauna through field surveys.

Module I: Environmental Pollution (7 Hours)

Definition, causes, effects and control measures of: Air pollution, Water pollution, Soil pollution, Marine pollution, Noise pollution, Thermal pollution, Nuclear pollution, Solid waste management: Causes, effects and control measures of urban and industrial wastes. Role of an individual in prevention of pollution. Pollution case studies. Disaster management: floods, earthquake, cyclone and landslides.

Module II: Social Issues and the Environment (7 Hours)

From unsustainable to sustainable development, Urban problems and related to energy, Water conservation, rain water harvesting, watershed management, Resettlement and rehabilitation of people; its problems and concerns Case studies. Environmental ethics: Issues and possible solutions Climate change, Global warming, Acid rain, Ozone layer depletion, Nuclear Accidents and Holocaust case studies. Fireworks/Crackers – Introduction, ill effects on environment and humans.

Wasteland reclamation, Consumerism and waste-products, Environmental Protection Act, Air (Prevention and Control of Pollution) Act, Water (Prevention and control of Pollution) Act, Wildlife Protection Act, Forest Conservation Act Issues involved in enforcement of environmental legislation Public awareness

Module III: Human Population and the Environment (5 Hours)

Population growth, variation among nations, Population explosion – Family Welfare Programmes Environment and human health, Human Rights, Value Education, HIV / AIDS, Women and Child Welfare, Role of Information Technology in Environment and Human Health, Case Studies

Module IV: Field Work (1 Hour)

Visit to a local area to document environmental assets-river / forest/ grassland/ hill/ mountain. Visit to a local polluted site – Urban / Rural / Industrial / Agricultural. Study of common plants, insects, birds. Study of simple ecosystems-pond, river, hill slopes, etc (Field work equal to 5 lecture hours)

Learning Outcomes – Upon course completion, students will be able to:

Explain various types of environmental pollutions. Understand role of individual in abatement of environmental pollution. Explain methods to mitigate disasters. Learn various environmental protection laws. Learn role of IT in environment and human health

Examination Scheme:

Components	CT	HA	S/V/Q	A	ESE
Weightage (%)	15	10	20	5	50

CT: Class Test, HA: Home Assignment, S/V/Q: Seminar/Viva/Quiz, EE: End Semester Examination; A: Attendance

Text & References:

- Agarwal, K.C. 2001 Environmental Biology, Nidi Publ. Ltd. Bikaner.
- Bharucha Erach, The Biodiversity of India, Mapin Publishing Pvt. Ltd., Ahmedabad 380 013, India, Email:mapin@icenet.net (R)
- De A.K., Environmental Chemistry, Wiley Eastern Ltd. Down to Earth, Centre for Science and Environment (R)
- Trivedi R. K. and P.K. Goel, Introduction to air pollution, Techno-Science Publication (TB)

Course Outcomes:

Through this course,

- Students will get aware of their personality through the use of various tests, and utilize this information to apply in everyday life events.
- The knowledge of socialization process will help students identify the source of their behavior patterns and help them change destructive and problematic behaviors.
- Students will learn to appreciate the diversity in human nature and bring it to their benefit at a workplace situation.
- Students will learn about the societal and national identities, and be able to shape their goals in accordance with such knowledge.

Examination Scheme:

Components	SAP	A	Mid Term Test (CT)	VIVA	Journal for Success (JOS)
Weightage (%)	20	05	20	30	25

Suggested Readings:

- Davis, K. Organizational Behaviour,
- Bates, A. P. and Julian, J.: Sociology - Understanding Social Behaviour
- Dressler, David and Cans, Donald: The Study of Human Interaction
- Lapiere, Richard. T – Social Change
- Lindzey, G. and Borgatta, E: Sociometric Measurement in the Handbook of Social Psychology, Addison – Welsley, US.
- Rose, G.: Oxford Textbook of Public Health, Vol.4, 1985.
- Robbins O.B.Stephen;. Organizational Behaviour

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AMITY UNIVERSITY MADHYA PRADESH

(Established by Ritnand Balved Education Foundation)

Date: 11/03/2019

NOTE- SHEET

1. The Department of Civil Engineering, ASET, AUMP, Board of Studies Meeting was held on **11 Mar 2019**.
2. The minutes of the meeting submitted for your kind perusal & approval please.

Mr. Mohan Kantharia
HoD(Civil)

Director-ASET

Dean (Academics)

Submit a copy (soft & hard) of BOS minutes & Syllabus

Hon'ble Pro Vice Chancellor

MAUDUSW
12/03/19

Hon'ble Vice Chancellor

W. S.
12/3/19



AMITY UNIVERSITY

MADHYA PRADESH

(Established by Ritmand Balved Education Foundation)

Date: 05/02/2019

BOARD OF STUDIES (Civil Engineering)

MINUTES OF THE MEETING

(04 Pages Only)

1. Board of studies (BoS) meeting has been held by the Department of Civil Engineering, Amity School of Engineering & Technology, Amity University Madhya Pradesh was held on 5th Feb 2019 at AUMP, under the Chairmanship of Maj Gen (Dr) S C Jain VSM **(Retd), Director (ASET). The following members attended the meeting: -

(a) **Chairman:** Maj Gen (Dr) S C Jain VSM **(Retd), Director (ASET)

(b) **Member**

- i) Dr. Manoj Kumar Trivedi, Professor & Head, Department of Civil Engineering MITS Gwalior, External Member
- ii) Mr. Mohan Kantharia Asst. Prof & Head Civil Engineering, Amity University Madhya Pradesh, Gwalior, Member.
- iii) Dr. Ripunjoy Gogoi, Asst. Professor Civil Engineering, Amity University Madhya Pradesh, Gwalior, Member.

2. The agenda of the meeting included the following points:

(a) **B.Tech CE 2018-22 Batch:** In continuation with the 1st year AICTE model curriculum approved for B.Tech CE in the academic year 2018-19 , 2nd year B.Tech CE scheme and syllabus has been put forward for approval for 2018-22 batch.

(b) **B.Tech CE 2019-23 Batch:** Introducing new curriculum with uniform course coding for B.Tech CE as per AICTE Model curriculum from the academic year 2019-20,(First year), 2020-21(Second year) for 2019-23 batch.

(c) Discussion on trends and technologies in Civil Engineering and consideration of their inclusion in syllabus.

(d) Any other point with due permission of the Chairperson.

3. Discussions/Comments:

a. (i) **Discussion:** The existing syllabus of the subjects offered by Civil Engineering to I and II semester B.Tech. was presented before the members of the Board of Studies. The syllabus of all the courses has been reviewed.

(ii) **Comments:** The existing syllabus is well aligned with the syllabus recommended by AICTE and few changes were recommended in some subjects. Uniform course coding has been adopted for common courses and value-added courses.

b. (i) **Discussion:** The syllabus of Second year CE as per AICTE recommendation was presented to BOS members and reviewed.

(ii) **Comments:** The syllabus recommended by AICTE has been adopted for Second year CE. Uniform course coding has been adopted for the common subjects and value added subjects of Second year.

c. (i) **Discussion:** The syllabus of M. Tech, CBCS and Pre-PhD course work subjects was presented to BOS members and reviewed.

(ii) **Comments:** The Syllabus of M. Tech., CBCS and Pre-PhD course work subjects is well aligned and needs no change. Uniform course coding has been adopted for Value added subjects of M. Tech. and CBCS subjects.

4. Recommendations:

B. Tech Program:

- i. **CE 2018-22 Batch:** As per the guidelines of AICTE 2018, Dept. of Civil Engineering in ASET, AUMP, Gwalior has adapted the AICTE model curriculum from the academic year 2018-19 onwards. The BOS meeting had approved the first year CE AICTE model curriculum and syllabus. Further in continuation, 2018-22 batch's second year B.Tech CE **scheme and syllabus** put forward for the BOS member's kind approval. Uniform course coding adopted in all the courses except the course code for Mathematics-III i.e. BTCE-301 (remains same for 2nd year B.Tech CE program for the academic year 2019-20) for batch-2018-22. **(Ref. Annexure-1)**
- ii. Uniform course coding has been recommended to all the courses B.Tech CE programs from the academic year 2019-20(first year), 2020-21 (Second year) for 2019-23 batch. The new

curriculum as per the AICTE model curriculum with uniform course coding is put forward to the kind approval of BoS members.

(Ref. Annexure -2)

- iii. Uniform course coding has been adopted for value added courses for 2018-22 batch
- iv. Uniform course coding has been adopted for value added courses for (All semesters), Basic science courses (Physics, Chemistry, Maths).
- v. Industrial visits have been added in course BTCE 305. Civil Engineering projects have been added in BTCE-422. Both courses are compulsory courses.

M. Tech Program:

- i. There is no change in the scheme and syllabus of the course.
- ii. Uniform course coding has been adopted for value added courses (All semesters).

Pre Ph.D.-Course:

Pre PhD course work subjects to be decided in accordance to the Appendix-G of URC dated February, 08, 2019.

CBCS:

- i. There is no change in the scheme and syllabus of the course.
- ii. Uniform course coding has been adopted for all courses offered by the department.
- iii. MOOC course is included in one course of Construction Engineering as per the UGC guidelines in semester-I.

S. N.	Name of minor track	MOOC course by UGC	Course code	Semester	Credits
1	Construction Engineering	Concrete Technology	noc19-ce20	I	3

All the aforesaid points have been approved by all the board members present in the meeting.

5.Summary of changes are given below: -

Codes:

- (a) All codes are subject to change as per further alignment and higher directions.
- (b) Codes and syllabus for the subjects offered outside ASET are being decided in consultation with the respective HOI's.

BOARD OF STUDIES (B.Tech, Civil Engineering , Second Year)
MINUTES OF THE MEETING

Signature of Members:



Dr. Ripunjoy Gogoi



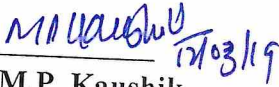
Mr. Mohan Kantharia



Prof. (Dr.) Manoj Kumar Trivedi
External Member

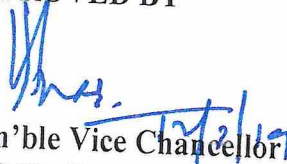


Maj Gen (Dr) S C Jain
Chairman- BOS



Prof. (Dr.) M.P. Kaushik
Hon'ble Pro Vice Chancellor
AUMP, Gwalior

APPROVED BY



Hon'ble Vice Chancellor
AUMP, Gwalior

**Bachelor of Technology
(Civil Engineering)**

CE

CURRICULUM

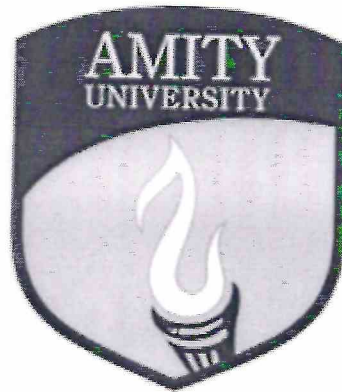
**1st and 2nd YEAR
(2018-22 Batch)**

(AICTE)

**Bachelor of Technology
(Civil Engineering)**

Programme Code: BTCE

Duration – 4 Years Full Time



**Programme Structure
&
Curriculum & Scheme of Examination**

**2018-22
(As per AICTE)**

**AMITY UNIVERSITY
MADHYA PRADESH**

PREAMBLE

Amity University aims to achieve academic excellence by providing multi-faceted education to students and encourage them to reach the pinnacle of success. The University has designed a system that would provide rigorous academic programme with necessary skills to enable them to excel in their careers.

This booklet contains the Programme Structure, the Detailed Curriculum and the Scheme of Examination. The Programme Structure includes the courses (Core and Elective), arranged semester wise. The importance of each course is defined in terms of credits attached to it. The credit units attached to each course has been further defined in terms of contact hours i.e. Lecture Hours (L), Tutorial Hours (T), Practical Hours (P). Towards earning credits in terms of contact hours, 1 Lecture and 1 Tutorial per week are rated as 1 credit each and 2 Practical hours per week are rated as 1 credit. Thus, for example, an L-T-P structure of 3-0-0 will have 3 credits, 3-1-0 will have 4 credits, and 3-1-2 will have 5 credits.

The Curriculum and Scheme of Examination of each course includes the course objectives, course contents, scheme of examination and the list of text and references. The scheme of examination defines the various components of evaluation and the weightage attached to each component. The different codes used for the components of evaluation and the weightage attached to them are:

<u>Components</u>	<u>Codes</u>	<u>Weightage (%)</u>
Case Discussion/ Presentation/ Analysis	C	05 - 10
Home Assignment	H	05 - 10
Project	P	05 - 10
Seminar	S	05 - 10
Viva	V	05 - 10
Quiz	Q	05 - 10
Class Test	CT	10 - 15
Attendance	A	05
End Semester Examination	EE	70

It is hoped that it will help the students study in a planned and a structured manner and promote effective learning. Wishing you an intellectually stimulating stay at Amity University.

Marh, 2019

PROGRAM OUTCOMES

- PO1. Engineering Knowledge:** Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems.
- PO2. Problem Analysis:** Identify, formulate, review research literature, and analyze complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences.
- PO3. Design/Development of Solutions:** Design solutions for complex engineering problems and design system components or processes that meet the specified needs with appropriate consideration for the public health and safety, and the cultural, societal, and environmental considerations.
- PO4. Conduct Investigations of Complex Problems:** Use research-based knowledge and research methods including design of experiments, analysis and interpretation of data, and synthesis of the information to provide valid conclusions.
- PO5. Modern Tool Usage:** Create, select, and apply appropriate techniques, resources, and modern engineering and IT tools including prediction and modelling to complex engineering activities with an understanding of the limitations.
- PO6. The Engineer and Society:** Apply reasoning informed by the contextual knowledge to assess societal, health, safety, legal and cultural issues and the consequent responsibilities relevant to the professional engineering practice.
- PO7. Environment and Sustainability:** Understand the impact of the professional engineering solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development.
- PO8. Ethics:** Apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering practice.
- PO9. Individual and Team Work:** Function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings.
- PO10. Communication:** Communicate effectively on complex engineering activities with the engineering community and with society at large, such as, being able to comprehend and write effective reports and design documentation, make effective presentations, and give and receive clear instructions.
- PO11. Life-long Learning:** Recognize the need for and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change.
- PO12. Project Management and Finance:** Demonstrate knowledge and understanding of the engineering and management principles and apply these to one's own work, as a member and leader in a team, to manage projects

PROGRAM SPECIFIC OUTCOMES

- PSO1.** Apply principles of mechanics and basic sciences to analyze civil engineering structures
- PSO2.** Survey, map, measure and analyze data for sustainable infrastructure planning.
- PSO3.** Characterize and evaluate materials for adoptability in civil engineering projects.
- PSO4.** Analyze and design concrete & steel structures, earthen embankments, irrigation structures, water supply, waste treatment systems and transport systems.
- PSO5.** Apply best management practices for construction and maintenance of infrastructure facilities.
- PSO6.** Predict and forecast societal needs, floods, droughts, pollution and travel demand.
- PSO7.** Work and lead in multi-disciplinary projects and demonstrate social responsibility and professional ethics.
- PSO8.** Engage in research and life-long learning to adapt to changing environment.

PROGRAMME STRUCTURE

FIRST SEMESTER						
Course Code	Course Title	Lecture (L) Hours Per week	Tutorial (T) Hours Per week	Practical (P) Hours Per week	Total Credits	Hours
BTCE-101	Mathematics – I (Calculus and Linear Algebra)	3	1	-	4	40
BTCE-102	Chemistry – I (Concepts in Chemistry for Engineering)	3	1	-	4	40
BTCE-103	Basic Electrical Engineering	3	1	-	4	40
BTCE-104	Engineering Graphics & Design	1	-	-	1	10
BTCE-120	Chemistry - I Lab	-	-	4	2	40
BTCE-121	Basic Electrical Engineering Lab	-	-	2	1	20
BTCE-122	Engineering Graphics & Design Lab	-	-	4	2	40
BTCE-141	Communication Skill-I (English Language Usage Essentials)	1	-	-	1	10
BTCE-142	Environmental Studies - I	2	-	-	2	20
BTCE-143	Behavioural Science - I	1	-	-	1	10
BTCE-144	French	2	-	-	2	20
CBCS		3	-	-	3	30
TOTAL CREDITS (Including CBCS)					27	
Total Hrs Including CBCS per week					32	
Total Hrs in the Semester					320	



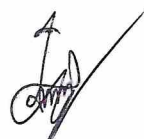
SECOND SEMESTER						
Course Code	Course Title	Lecture (L) Hours Per week	Tutorial (T) Hours Per week	Practical (P) Hours Per week	Total Credits	Hours
BTCE-201	Mathematics – II (Ordinary Differential Equations and Complex Variable)	3	1	-	4	40
BTCE-202	Physics (Mechanics)	3	1	-	4	40
BTCE-203	Programming for Problem Solving	3	-	-	3	30
BTCE-204	Workshop/ Manufacturing Practices	1	-	-	1	10
BTCE-220	Physics (Mechanics) Lab	-	-	4	2	40
BTCE-221	Programming for Problem Solving Lab	-	-	4	2	40
BTCE-222	Workshop/ Manufacturing Practices Lab	-	-	4	2	40
BTCE-241	Communication Skill-II (Introduction to Communication Skill)	1	-	-	1	10
BTCE-242	Environmental Studies - II	2	-	-	2	20
BTCE-243	Behavioural Science - II	1	-	-	1	10
BTCE-244	French - II	2	-	-	2	20
CBCS		3	-	-	3	30
TOTAL CREDITS (Including CBCS)					27	
Total Hrs Including CBCS					33	
Total Hrs in the Semester					330	



Annexure-1
PROGRAMME STRUCTURE

THIRD SEMESTER

Course Code	Course Title	Lecture (L) Hours Per week	Tutorial (T) Hours Per week	Practical (P) Hours Per week	Total Credits	Hours
BTCE 301	Applied Mathematics-III (Ordinary differential equations and complex variables)	3	-	-	3	30
BTCE 302	Computer-Aided Civil Engineering Drawing	2	-	-	2	20
BTCE 303	Engineering Mechanics	3	1	-	4	40
BTCE 304	Energy Science & Engineering	1	1	-	2	20
BTCE 305	Basic Civil Engineering	2	-	-	2	20
BME 104	Mechanical Engineering	2	-	-	2	20
ECE 302	Basic Electronics	2	-	-	2	20
BIOC 301	Biology for Engineers	2	-	-	2	20
BIOC 302	Life Science	2	-	-	2	20
BTCE 322	Computer-aided Civil Engineering Drawing Lab	-	-	2	1	20
ECE 322	Basic Electronics Lab	-	-	2	1	20
BCU 341	Communication Skill-III	1	-	-	1	10
BSU 343	Behavioural Science III	1	-	-	1	10
FLU 344	French	2	-	-	2	20
BTCE 360	Term paper Evaluation				2	
	CBCS	3	-	-	3	30
TOTAL CREDITS (Including CBCS)					32	
Total Hrs. including CBCS					32	
Total Hrs in the Semester					320	



FOURTH SEMESTER

Course Code	Course Title	Lecture (L) Hours Per week	Tutorial (T) Hours Per week	Practical (P) Hours Per week	Total Credits	Hours
BTCE 401	Materials, Testing & Evaluation	2	-	-	2	20
BTCE 402	Engineering Geology	2	-	-	2	20
BTCE 403	Surveying	1	1	-	2	20
BTCE 404	Fluid Mechanics	2	-	-	2	20
BTCE 405	Solid Mechanics	2	-	-	2	20
BTCE 406	Disaster Preparedness & Planning	1	1	-	2	20
BTCE 407	Civil Engineering - Societal & Global Impact	1	1	-	2	20
ECE 402	Instrumentation & Sensor Technologies for Civil Engineering Applications	2	-	-	2	20
BTCE 421	Materials Testing and Evaluation Lab			2	1	20
BTCE 422	Engineering Geology Lab	-	-	2	1	20
BTCE 423	Surveying lab	-	-	2	1	20
BTCE 424	Fluid Mechanics Lab	-	-	2	1	20
ECE 422	Instrumentation & Sensor Technologies for Civil Engineering Applications Lab	-	-	2	1	20
BCU 441	Communication Skill-IV	1	-	-	1	10
BSU 443	Behavioural Science IV	1	-	-	1	10
FLU 444	French	2			2	20
CBCS		4	-	-	4	40
TOTAL CREDITS (Including CBCS)					29	
Total Hrs. including CBCS					34	
Total Hrs in the Semester					340	

PRACTICAL TRAINING: 6 – 8 WEEKS


**Bachelor of Technology
(Civil Engineering)**

Programme Code: BTCE

**Duration – 4 Years Full Time
(2018-22)**

OVERALL CREDIT

Sr. No.	Semester	No. of Credits	No. of Hours
1	I	27	32
2	II	27	33
3	III	32	32
4	IV	29	34
1st and 2nd Year Total Credits		115	131

**Bachelor of Technology
(Civil Engineering)**

CE

CURRICULUM

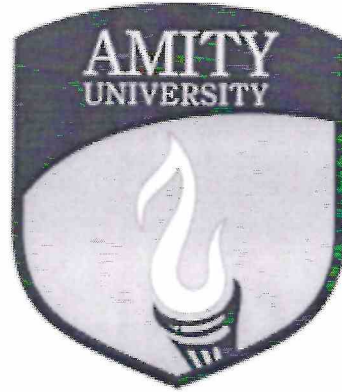
**1st & 2nd YEAR
(2019-23 Batch)**

(AICTE)

**Bachelor of Technology
(Civil Engineering)**

Programme Code: BTCE

Duration – 4 Years Full Time



**Programme Structure
&
Curriculum & Scheme of Examination**

**2019-23
(As per AICTE)**

**AMITY UNIVERSITY
MADHYA PRADESH**

PREAMBLE

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The Curriculum and Scheme of Examination of each course includes the course objectives, course contents, scheme of examination and the list of text and references. The scheme of examination defines the various components of evaluation and the weightage attached to each component. The different codes used for the components of evaluation and the weightage attached to them are:

<u>Components</u>	<u>Codes</u>	<u>Weightage (%)</u>
Case Discussion/ Presentation/ Analysis	C	05 - 10
Home Assignment	H	05 - 10
Project	P	05 - 10
Seminar	S	05 - 10
Viva	V	05 - 10
Quiz	Q	05 - 10
Class Test	CT	10 - 15
Attendance	A	05
End Semester Examination	EE	70

It is hoped that it will help the students study in a planned and a structured manner and promote effective learning. Wishing you an intellectually stimulating stay at Amity University.

March, 2019

PROGRAM OUTCOMES

PO1. Engineering Knowledge: Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems.

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PO4. Conduct Investigations of Complex Problems :Use research-based knowledge and research methods including design of experiments, analysis and interpretation of data, and synthesis of the information to provide valid conclusions.

PO5. Modern Tool Usage: Create, select, and apply appropriate techniques, resources, and modern engineering and IT tools including prediction and modelling to complex engineering activities with an understanding of the limitations.

PO6. The Engineer and Society: Apply reasoning informed by the contextual knowledge to assess societal, health, safety, legal and cultural issues and the consequent responsibilities relevant to the professional engineering practice.

PO7. Environment and Sustainability: Understand the impact of the professional engineering solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development.

PO8. Ethics: Apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering practice.

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PO10. Communication: Communicate effectively on complex engineering activities with the engineering community and with society at large, such as, being able to comprehend and write effective reports and design documentation, make effective presentations, and give and receive clear instructions.

PO11. Life-long Learning: Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change.

PO12. Project Management and Finance: Demonstrate knowledge and understanding of the engineering and management principles and apply these to one's own work, as a member and leader in a team, to manage projects

PROGRAM SPECIFIC OUTCOMES

PSO1. Apply principles of mechanics and basic sciences to analyze civil engineering structures

PSO2. Survey, map, measure and analyze data for sustainable infrastructure planning.

PSO3. Characterize and evaluate materials for adoptability in civil engineering projects.

PSO4. Analyze and design concrete & steel structures, earthen embankments, irrigation structures, water supply, waste treatment systems and transport systems.

PSO5. Apply best management practices for construction and maintenance of infrastructure facilities.

PSO6. Predict and forecast societal needs, floods, droughts, pollution and travel demand.

PSO7. Work and lead in multi-disciplinary projects and demonstrate social responsibility and professional ethics.

PSO8. Engage in research and life-long learning to adapt to changing environment.

FIRST SEMESTER						
Course Code	Course Title	Lecture (L) Hours Per week	Tutorial (T) Hours Per week	Practical (P) Hours Per week	Total Credits	Hours
MAT-101	Applied Mathematics – I (Calculus and Linear Algebra)	3	1	-	4	40
CHE101	Applied Chemistry I	3	1	-	4	40
ECE 101	Basic Electrical Engineering	3		-	3	30
BME 101	Engineering Graphics & Design	1	-	-	1	10
CHE121	Applied Chemistry Lab I	-	-	2	1	20
ECE 121	Basic Electrical Engineering Lab	-	-	2	1	20
BME 121	Engineering Graphics & Design Lab	-	-	4	2	40
BCU-141	Communication Skill-I	1	-	-	1	10
EVS-142	Environmental Studies - I	2	-	-	2	20
BSU-143	Behavioural Science - I	1	-	-	1	10
FLU-144	French	2	-	-	2	20
CBCS		3	-	-	3	30
TOTAL CREDITS (Including CBCS)					25	
Total Hrs Including CBCS per week					29	
Total Hrs in the Semester					290	



SECOND SEMESTER						
Course Code	Course Title	Lecture (L) Hours Per week	Tutorial (T) Hours Per week	Practical (P) Hours Per week	Total Credits	Hours
MAT-201	Mathematics – II (Ordinary & Partial Differential Equations and Transform)	3	1	-	4	40
PHY-101	Applied Physics-1	3	1	-	4	40
BTC 101	Programming for Problem Solving	3	-	-	3	30
BME 102	Workshop/ Manufacturing Practices	1	-	-	1	10
PHY-121	Applied Physics lab-1	-	-	2	1	20
BTC 121	Programming for Problem Solving Lab	-	-	4	2	40
BME 122	Workshop/ Manufacturing Practices Lab	-	-	4	2	40
BCU-241	Communication Skill-II	1	-	-	1	10
EVS-242	Environmental Studies - II	2	-	-	2	20
BSU-243	Behavioural Science - II	1	-	-	1	10
FLU-244	French	2	-	-	2	20
CBCS		3	-	-	3	30
TOTAL CREDITS (Including CBCS)					26	
Total Hrs Including CBCS					31	
Total Hrs in the Semester					310	



Annexure-1
PROGRAMME STRUCTURE

THIRD SEMESTER

Course Code	Course Title	Lecture (L) Hours Per week	Tutorial (T) Hours Per week	Practical (P) Hours Per week	Total Credits	Hours
MAT-301	Applied Mathematics- III (Probability, Statistics and Numerical Methods)	3	-	-	3	30
BTCE 302	Computer-Aided Civil Engineering Drawing	2	-	-	2	20
BTCE 303	Engineering Mechanics	3	1	-	4	40
BTCE 304	Energy Science & Engineering	1	1	-	2	20
BTCE 305	Basic Civil Engineering	2	-	-	2	20
BME 104	Mechanical Engineering	2	-	-	2	20
ECE 302	Basic Electronics	2	-	-	2	20
BIOC 301	Biology for Engineers	2	-	-	2	20
BIOC 302	Life Science	2	-	-	2	20
BTCE 322	Computer-aided Civil Engineering Drawing Lab	-	-	2	1	20
ECE 322	Basic Electronics Lab	-	-	2	1	20
BCU 341	Communication Skill-III	1	-	-	1	10
BSU 343	Behavioural Science III	1	-	-	1	10
FLU 344	French	2	-	-	2	20
BTCE 330	Term paper Evaluation				2	
CBCS		3	-	-	3	30
TOTAL CREDITS (Including CBCS)					32	
Total Hrs. including CBCS					32	
Total Hrs in the Semester					320	



FOURTH SEMESTER

Course Code	Course Title	Lecture (L) Hours Per week	Tutorial (T) Hours Per week	Practical (P) Hours Per week	Total Credits	Hours
BTCE 401	Materials, Testing & Evaluation	2	-	-	2	20
BTCE 402	Engineering Geology	2	-	-	2	20
BTCE 403	Surveying	1	1	-	2	20
BTCE 404	Fluid Mechanics	2	-	-	2	20
BTCE 405	Solid Mechanics	2	-	-	2	20
BTCE 406	Disaster Preparedness & Planning	1	1	-	2	20
BTCE 407	Civil Engineering - Societal & Global Impact	1	1	-	2	20
ECE 402	Instrumentation & Sensor Technologies for Civil Engineering Applications	2	-	-	2	20
BTCE 421	Materials Testing and Evaluation Lab			2	1	20
BTCE 422	Engineering Geology Lab	-	-	2	1	20
BTCE 423	Surveying lab	-	-	2	1	20
BTCE 424	Fluid Mechanics Lab	-	-	2	1	20
ECE 422	Instrumentation & Sensor Technologies for Civil Engineering Applications Lab	-	-	2	1	20
BCU 441	Communication Skill-IV	1	-	-	1	10
BSU 443	Behavioural Science IV	1	-	-	1	10
FLU 444	French	2			2	20
CBCS		4	-	-	4	40
TOTAL CREDITS (Including CBCS)					29	
Total Hrs. including CBCS					34	
Total Hrs in the Semester					340	

PRACTICAL TRAINING: 6 – 8 WEEKS


**Bachelor of Technology
(Civil Engineering)**

Programme Code: BTCE

**Duration – 4 Years Full Time
(2019-23)**

OVERALL CREDIT

Sr. No.	Semester	No. of Credits	No. of Hours
1	I	25	29
2	II	26	31
3	III	32	32
4	IV	29	34
1st and 2nd Year Total Credits		112	126



PROPOSED POLICY CHANGES IF ANY RELATED TO RESEARCH / GUIDELINES FOR REGISTRATION

The policy/Agenda issues discussed by URC are as numerated in succeeding paragraphs.

Research Subjects.

1. Ref Para 13(a) & (e) of Ordinance No. 12(Amended).
 - (a) The credit assigned to the Ph.D. course work shall be a minimum of 12 credits and a maximum of 16 credits.
 - (e) Each candidate will be required to take Course Units of minimum 12 credits, including compulsory paper on Research Methodology and specific Courses prescribed by the SRC and approved by DRC.
2. CoE proposed that the proposed topic of research ideally be short listed during SRC and the same be forwarded for tentative approval of Hon Vice Chancellor.
3. The candidates should plan and formulate the synopsis on the approved topics.
4. The point was agreed to and approved by URC.

Question Papers for Ph D Course Work Examination.

5. Ref Para 5(b)(i) and (iii) of Ordinance No. 12(Amended) pertaining to Ph D where in the SRC shall perform the following functions:-
 - (I) Invite the candidate for scrutinizing his research proposal to ensure that the proposal is suitable.
 - (II) Ascertain the availability of facilities required for the proposed research.
 - (III) Prescribe the Course Units to be taken by the candidate, subject to a minimum of two, or in exceptional cases, recommend exemption from the requirement with justification.
6. Hon Vice Chancellor restricted that at least one paper offered to the student shall pertain to the direction of research proposed by the student. The distribution of course work be as follows: -

(a) Paper-I	Research Methodology
(b) Paper-II	Review of Literature
(c) Paper-III	Broad study of Subject
(d) Paper-IV	Research area specific Subject

Minimum Acceptable Standards of Research Publications.

7. It was unanimously decided that UGC norms shall be the accepted norms for Minimum acceptable standards of Research Publications at AUMP and Ph D scholar must publish at least one (1) research paper in refereed journal and make two paper presentations in conferences/seminars before the submission of the dissertation/thesis for adjudication and produce evidence for the same in the form of presentation certificates and/or reprints.

REVIEW AND RECOMMENDATIONS IF ANY AREAS / THEMES/ TOPICS FOR RESEARCH

Nil Point

Member Secretary

Chairman – Hon Vice Chancellor



AMITY UNIVERSITY

MADHYA PRADESH

(Established by Ritmand Balved Education Foundation)

Date: 05 / 03 /2020

BOARD OF STUDIES (Civil Engineering)

MINUTES OF THE MEETING

(06 Pages Only)

1. A meeting of Board of Studies (BoS) of Department of Civil Engineering, Amity School of Engineering & Technology, Amity University Madhya Pradesh was held on 05/03/ 2020 at AUMP, under the Chairmanship of Maj Gen (Dr) S C Jain VSM** (Retd), Director (ASET). The following members attended the meeting:-

(a) **Chairman:** Maj Gen (Dr) S C Jain VSM** (Retd), Director (ASET)

(b) **Member:**

- i) Dr. Manoj Kumar Trivedi, Professor & Head, Department of Civil Engineering MITS Gwalior, External Member
- ii) Dr. V.K. Gupta, Associate Professor and Head of Civil Engineering, Amity University Madhya Pradesh, Gwalior, Member.
- iii) Mr. Mohan Kantharia Asst. Professor, Civil Engineering, Amity University Madhya Pradesh, Gwalior, Member.
- iv) Dr. Ripunjoy Gogoi Asst. Professor, Civil Engineering, Amity University Madhya Pradesh, Gwalior, Member.

2. **The agenda of the meeting included the following:**

- (a) Curriculum of first year B.Tech CE Program for 2020-24 Batch.
- (b) Introducing uniform Course code for Pre-PhD course work subjects and changing their credit structure.
- (c) Discussion on trends and technologies in CE and consideration of its inclusion in syllabus.
- (d) Any other point with due permission of the Chairperson.

3. **Discussions/Comments:**

- a. (i) Discussion: The syllabus of the subjects offered by B.Tech (Civil Engineering) 2020-24 Batch was presented before the members of the Board of Studies. The scheme and syllabus of the courses have been reviewed.
- (ii) Comments: The existing Scheme and syllabus is well aligned, and few changes were recommended in few subjects.

- 2
- b. (i) Discussion: The syllabus of M. Tech, CBCS and Pre PhD course work subjects was presented to BOS members and reviewed.
- (ii) Comments: The syllabus of M. Tech., CBCS subjects is well aligned and need no change. Uniform course coding is adopted for Pre-PhD course work subjects and credits structure has been reviewed.

4. Recommendations:

B. Tech. Program

- (a) The Scheme and syllabus of the subjects to be offered by Civil Engineering Department to B. Tech. CE for batch 2020-24 was presented before the members of the board of studies. The BOS members approved the CE curriculum and syllabus (Refer Annex.-1).
- i) The subject "Basic Civil Engineering and Applied Mechanics" (CIV 101) with credits 2, has been introduced in B.Tech program in first semester.
- ii) Subjects, Energy Science & Engineering (CIV 304) and Basic Civil Engineering (CIV 305) have been merged and a new subject, Civil Engineering & Energy Science (CIV 308) of credit 4, has been introduced. Similarly, Subjects, Biology for Engineers (CIV306) and Life Science (CIV 307) are merged and a new subject, Life Science/Biology for Engineers (CIV 309) of credit 3 has been introduced. The credit of Computer Aided Civil Engineering Drawing (CIV302) is increased by 1 (From Credit 2 to 3)
- iii) Subject Disaster Preparedness & Planning (CIV 406) has been shifted to elective subject in VIIth Semester with code CIV 406 of credits 3. The available credits have been equally distributed in the Solid Mechanics (CIV 405) and Fluid Mechanics (CIV 404).
- iv) The subject Mechanics of Material (CIV 501) has been removed from Vth Semester due to repetition of contents in Solid Mechanic of Material (CIV 405). The available credits have been equally adjusted in the subjects which are; Structural Engineering (CIV 503), Geotechnical Engineering (CIV 504) and Transportation Engineering (CIV 507).
- v) The subject, Earthquake Resistant Design of Buildings (CIV 806) along Non-Destructive Testing Lab (CIV 826) has been included in the electives of 8th Semester.
- vi) At least one Industrial visit has been incorporated in the subjects, Building Technology (CIV 305), Material Testing & Evaluation (CIV 401), Hydrology & Water Resources Engineering (CIV 505), Geometric Design of Highways (CIV 602) and Design of Concrete Structures (CIV 701).

M. Tech Program:

There is no change in the scheme and syllabus of the course. (Refer Annexure-2)

Pre Ph.D. Course:

There is a change in the scheme and syllabus of the courses. (Refer Annexure-3)

PhDECE 102: Optimization Techniques- (Credits: 3)

PhDECE 103: Foundation Engineering- (Credits: 3)

CBCS:

There is no change in the scheme and syllabus of the course.

All the aforesaid points have been approved by all the board members present in the meeting.

5. Summary of the changes is given below: -

A. Summary of the changes for B.Tech. CE:

Currents syllabus				Proposed Syllabus /Modification		
Sr. No.	Course Title	Old Course Code	No. of Credits	Changes/Modifications (addition/deletion in the Syllabus)	New Course Code	No. of Credits
1				Basic Civil Engineering and Applied Mechanics	CIV 101	2
2	Energy Science and Engineering	CIV 304	2	Civil Engineering and Energy Science (merged)	CIV 308	4
	Basic Civil Engineering	CIV 305	2			
3	Biology for Engineering	CIV 306	2	Life Science/ Biology for Engineering (merged)	CIV 309	3
	Life Science	CIV 307	2			
4	Computer Aided Civil Engineering Drawing	CIV 302	2	No Change	No Change	3
5	Disaster Preparedness and Planning	CIV 406	2	Shifted to VII Semester (Elective)	No Change	3
6	Fluid Mechanics	CIV 404	2	No Change	No Change	3
7	Solid Mechanics	CIV 405	2	No Change	No Change	3
8	Mechanics of Materials	CIV 501	3	Removed from syllabus (due to repetition of contents in CIV 405 Solid Mechanics)	-	-
9	Structural Engineering	CIV 503	3	No Change	No Change	4
10	Geotechnical Engineering	CIV 504	2	No Change	No Change	3
11	Transportation Engineering	CIV 507	2	No Change	No Change	3
12	-	-	-	Earthquake Resistant Design of Buildings (New subject)	CIV 806	3
13	-	-	-	Non-Destructive Testing Lab (New Lab)	CIV 826	1

B. Summary of the changes is given below (PhD):

Current Syllabus					Proposed Changes/Modification			
Sr. No.	Programme	Course Title	Old Course Code	No. of Credits	Addition/ Deletion in the Syllabus	New Course Title	New Course Code	No of Credits
Optional (Discipline Specific Subject)								
i) Existing								
(1)	PhD (Civil)	Optimization Techniques	PhDEC E102	3	No Change	No Change	PCE 101	4
(2)	PhD (Civil)	Foundation Engineering	PhDEC E103	3	No Change	No Change	PCE 102	4
ii) New Subjects Introduced								
(3)	PhD (Civil)	--	--	--	New Subject	Smart Materials & Techniques	PCE 103	4
(4)	PhD (Civil)	--	--	--	New Subject	Earthquake Resistant Design of Structure	PCE 104	4
(5)	PhD (Civil)	--	--	--	New Subject	Structural Health Monitoring	PCE 105	4
(6)	PhD (Civil)	--	--	--	New Subject	Advance Geotechnical Engineering	PCE 106	4
(7)	PhD (Civil)	--	--	--	New Subject	Finite Element Method	PCE 107	4

5

BOARD OF STUDIES (B.Tech. CE)
MINUTES OF THE MEETING

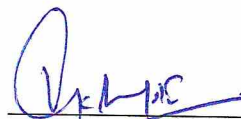
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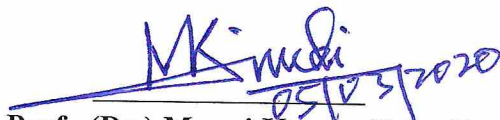
Mr. Mohan Kantharia
(Member)



Dr. Ripunjoy Gogoi
(Member)



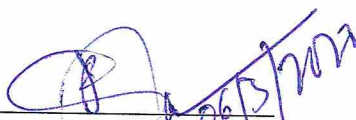
Dr. V. K. Gupta
(Member)



Prof. (Dr.) Manoj Kumar Trivedi
External Member



Maj Gen (Dr) S C Jain
Chairman- BOS



Prof. (Dr.) R. S. Tomar
Dean Academics
AUMP, Gwalior



Prof. (Dr.) M.P. Kaushik
Hon'ble Pro Vice Chancellor
AUMP, Gwalior



APPROVED BY



Hon'ble Vice Chancellor
AUMP, Gwalior



AMITY UNIVERSITY

MADHYA PRADESH

(Established by Ritnand Balved Education Foundation)

MEETING OF BOARD OF STUDIES (BOS)

(Civil Engineering)

Amity School of Engineering & Technology

March 2020

Remarks & Suggestions by BOS Members

**Bachelor of Technology
(Civil Engineering)**

CIV

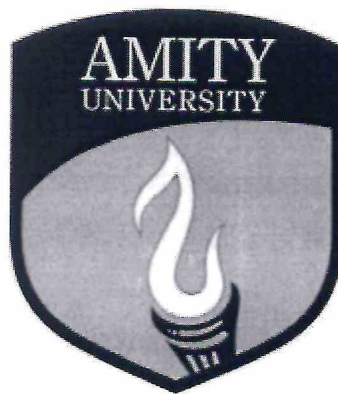
**AICTE MODEL
CURRICULUM**

(2020-24 Batch)

**Bachelor of Technology
(Civil Engineering)**

Programme Code: CIV

Duration – 4 Years Full Time



**Programme Structure
&
Curriculum & Scheme of Examination**

**2020-24
(Based on AICTE)**

**AMITY UNIVERSITY
MADHYA PRADESH**

PREAMBLE

Amity University aims to achieve academic excellence by providing multi-faceted education to students and encourage them to reach the pinnacle of success. The University has designed a system that would provide rigorous academic programme with necessary skills to enable them to excel in their careers.

This booklet contains the Programme Structure, the Detailed Curriculum and the Scheme of Examination. The Programme Structure includes the courses (Core and Elective), arranged semester wise. The importance of each course is defined in terms of credits attached to it. The credit units attached to each course has been further defined in terms of contact hours i.e. Lecture Hours (L), Tutorial Hours (T), Practical Hours (P). Towards earning credits in terms of contact hours, 1 Lecture and 1 Tutorial per week are rated as 1 credit each and 2 Practical hours per week are rated as 1 credit. Thus, for example, an L-T-P structure of 3-0-0 will have 3 credits, 3-1-0 will have 4 credits, and 3-1-2 will have 5 credits.

The Curriculum and Scheme of Examination of each course includes the course objectives, course contents, scheme of examination and the list of text and references. The different codes used for the components of evaluation are given below:-

Components

Case Discussion/ Presentation/ Analysis
Home Assignment
Project
Seminar
Viva
Quiz
Class Test
Attendance
End Semester Examination

Codes

C
H
P
S
V
Q
CT
A
ESE

It is hoped that it will help the students study in a planned and a structured manner and promote effective learning. Wishing you an intellectually stimulating stay at Amity University.

2020

Reganor

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PROGRAM OUTCOMES

PO1. Engineering Knowledge: Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems.

PO2. Problem Analysis: Identify, formulate, review research literature, and analyze complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences.

PO3. Design/Development of Solutions: Design solutions for complex engineering problems and design system components or processes that meet the specified needs with appropriate consideration for the public health and safety, and the cultural, societal, and environmental considerations.

PO4. Conduct Investigations of Complex Problems: Use research-based knowledge and research methods including design of experiments, analysis and interpretation of data, and synthesis of the information to provide valid conclusions.

PO5. Modern Tool Usage: Create, select, and apply appropriate techniques, resources, and modern engineering and IT tools including prediction and modelling to complex engineering activities with an understanding of the limitations.

PO6. The Engineer and Society: Apply reasoning informed by the contextual knowledge to assess societal, health, safety, legal and cultural issues and the consequent responsibilities relevant to the professional engineering practice.

PO7. Environment and Sustainability: Understand the impact of the professional engineering solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development.

PO8. Ethics: Apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering practice.

PO9. Individual and Team Work: Function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings.

PO10. Communication: Communicate effectively on complex engineering activities with the engineering community and with society at large, such as, being able to comprehend and write effective reports and design documentation, make effective presentations, and give and receive clear instructions.

PO11. Life-long Learning: Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change.

PO12. Project Management and Finance: Demonstrate knowledge and understanding of the engineering and management principles and apply these to one's own work, as a member and leader in a team, to manage projects



PROGRAM SPECIFIC OUTCOMES

- PSO1.** Apply principles of mechanics and basic sciences to analyze civil engineering structures
- PSO2.** Survey, map, measure and analyze data for sustainable infrastructure planning.
- PSO3.** Characterize and evaluate materials for adoptability in civil engineering projects.
- PSO4.** Analyze and design concrete & steel structures, earthen embankments, irrigation structures, water supply, waste treatment systems and transport systems.
- PSO5.** Apply best management practices for construction and maintenance of infrastructure facilities.
- PSO6.** Predict and forecast societal needs, floods, droughts, pollution and travel demand.
- PSO7.** Work and lead in multi-disciplinary projects and demonstrate social responsibility and professional ethics.
- PSO8.** Engage in research and life-long learning to adapt to changing environment.

R. Zogor

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PROGRAMME STRUCTURE

FIRST SEMESTER						
Course Code	Course Title	Lecture (L) Hours Per week	Tutorial (T) Hours Per week	Practical (P) Hours Per week	Total Credits	Hours
MAT101	Applied Mathematics – I (Calculus and Linear Algebra)	3	1	-	4	40
CHE101	Applied Chemistry	3	1	-	4	40
CSE104	Programming for Problem Solving	3	-	-	3	30
BME101	Engineering Graphics & Design	1	-	-	1	10
CIV101	Basic Civil Engineering & Applied Mechanics	2	-	-	2	20
CHE121	Applied Chemistry Lab	-	-	2	1	20
CSE124	Programming for Problem Solving Lab	-	-	4	2	40
BME121	Engineering Graphics & Design Lab	-	-	4	2	40
BCU141	Communication Skills – I	1			1	10
EVS142	Environmental Studies – I	2	-	-	2	20
BSU143	Behavioural Science – I	1	-	-	1	10
FLU144	French -I	2	-	-	2	20
CBCS		3	-	-	3	30
TOTAL CREDITS (Including CBCS)					28	
Total Hours Including CBCS per week						33
Total Hours in the Semester						330

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SECOND SEMESTER						
Course Code	Course Title	Lecture (L) Hours Per week	Tutorial (T) Hours Per week	Practical (P) Hours Per week	Total Credits	Hours
MAT201	Applied Mathematics-II (Ordinary & Partial Differential Equations and Transform)	3	1	-	4	40
PHY101	Applied Physics – I	3	1	-	4	40
ECE101	Basic Electrical Engineering	3	-	-	3	30
CSE204	Object Oriented Programming Using C++	2	1	-	3	30
BME102	Workshop/ Manufacturing Practices	1	-	-	1	10
PHY121	Applied Physics Lab – I	-	-	2	1	20
ECE121	Basic Electrical Engineering Lab	-	-	2	1	20
CSE224	Object Oriented Programming Using C++ Lab	-	-	2	1	20
BME122	Workshop/ Manufacturing Practices Lab	-	-	4	2	40
BCU241	Communication Skills – II	1	-	-	1	10
EVS242	Environmental Studies – II	2	-	-	2	20
BSU243	Behavioural Science – II	1	-	-	1	10
FLU244	French -II	2	-	-	2	20
CBCS		3	-	-	3	30
TOTAL CREDITS (Including CBCS)					29	
Total Hours Including CBCS per week					34	
Total Hours in the Semester					340	
TERM PAPER DURING SUMMER BREAK						

R. Gogoi

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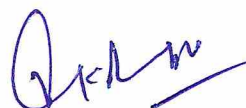
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THIRD SEMESTER						
Course Code	Course Title	Lecture (L) Hours Per week	Tutorial (T) Hours Per week	Practical (P) Hours Per week	Total Credits	Hours
MAT 301	Applied Mathematics- III (Probability, Statistics and Numerical Methods)	3	-	-	3	30
CIV 302	Computer-Aided Civil Engineering Drawing	3	-	-	3	30
CIV 303	Engineering Mechanics	3	1	-	4	40
CIV 308	Civil Engineering and Energy Science	3	1	-	4	40
CIV 309	Life Science/Biology for Engineering	3	-	-	3	30
BME 104	Mechanical Engineering	2	-	-	2	20
ECE 307	Basic Electronics	2	-	-	2	20
CIV 322	Computer-aided Civil Engineering Drawing Lab	-	-	2	1	20
ECE 327	Basic Electronics Lab	-	-	2	1	20
BCU 341	Communication Skills – III	1	-	-	1	10
BSU 343	Behavioural Science – III	1	-	-	1	10
FLU 344	French – III	2	-	-	2	20
NTP 330	Term paper (Evaluation)	-	-	-	2	
CBCS		3	-	-	3	30
TOTAL CREDITS (Including CBCS)					32	
Total Hours. including CBCS					32	
Total Hours in the Semester					320	

FOURTH SEMESTER						
Course Code	Course Title	Lecture (L) Hours Per week	Tutorial (T) Hours Per week	Practical (P) Hours Per week	Total Credits	Hours
CIV 401	Materials, Testing & Evaluation	2	-	-	2	20
CIV 402	Engineering Geology	2	-	-	2	20
CIV 403	Surveying	1	1	-	2	20
CIV 404	Fluid Mechanics	3	-	-	3	30
CIV 405	Solid Mechanics	3	-	-	3	30
CIV 407	Civil Engineering - Societal & Global Impact	1	1	-	2	20
ECE 407	Instrumentation & Sensor Technologies for Civil Engineering Applications	2	-	-	2	20
CIV 421	Materials Testing and Evaluation Lab	-	-	2	1	20
CIV 422	Engineering Geology Lab	-	-	2	1	20
CIV 423	Surveying lab	-	-	2	1	20
CIV 424	Fluid Mechanics Lab	-	-	2	1	20
ECE 427	Instrumentation & Sensor Technologies for Civil Engineering Applications Lab	-	-	2	1	20
BCU 441	Communication Skills – IV	1	-	-	1	10
BSU 443	Behavioural Science – IV	1	-	-	1	10
FLU 444	French – IV	2	-	-	2	20
CBCS		3	1	-	4	40
TOTAL CREDITS (Including CBCS)					29	
Total Hours including CBCS					34	
Total Hours in the Semester					340	
INDUSTRIAL PRACTICAL TRAINING – I: 6 – 8 WEEKS						

FIFTH SEMESTER						
Course Code	Course Title	Lecture (L) Hours Per week	Tutorial (T) Hours Per week	Practical (P) Hours Per week	Total Credits	Hours
CIV 502	Hydraulic Engineering	2	-	-	2	20
CIV 503	Structural Engineering	3	1	-	4	40
CIV 504	Geotechnical Engineering	3	-	-	3	30
CIV 505	Hydrology & Water Resources Engineering	3	-	-	3	30
CIV 506	Environmental Engineering – I	3	-	-	3	30
CIV 507	Transportation Engineering	3	-	-	3	30
CIV 522	Hydraulic Engineering Lab	-	-	2	1	20
CIV 524	Geotechnical Engineering Lab	-	-	2	1	20
CIV 527	Transportation Engineering Lab	-	-	2	1	20
BCU 541	Communication Skills – V	1	-	-	1	10
BSU 543	Behavioural Science – V	1	-	-	1	10
FLU 544	French – V	2	-	-	2	20
NPT 550	Industrial Practical Training I (Evaluation)	-	-	-	3	-
CBCS		3	1	-	4	40
TOTAL CREDIT (Including CBCS)					32	
Total Hours including CBCS					32	
Total hours in semester					320	





SIXTH SEMESTER						
Course Code	Course Title	Lecture (L) Hours Per week	Tutorial (T) Hours Per week	Practical (P) Hours Per week	Total Credits	Hours
CIV 601	Construction Engineering & Management	2	1	-	3	30
CIV 602	Geometric Design of Highways	3	-	-	3	30
CIV 603	Environmental Engineering – II	3	-	-	3	30
CIV 604	Estimating and Costing	2	-	-	2	20
CIV 622	Geometric Design of Highways Lab	-	-	2	1	20
CIV 623	Environmental Engineering – II Lab	-	-	2	1	20
CIV 624	Estimating and Costing Lab	-	-	2	1	20
ELECTIVES (Any one from following with Practical)					4	50
CIV 605	River Engineering	3	-	-	-	-
CIV 606	Open Channel Flow	3	-	-	-	-
CIV 607	Solid and Hazardous Waste Management	3	-	-	-	-
CIV 625	River Engineering Lab	-	-	2	-	-
CIV 626	Open Channel Flow Lab	-	-	2	-	-
CIV 627	Solid and Hazardous Waste Management Lab	-	-	2	-	-
BCH 620	Engineering Economics	2	1		3	30
BCU 641	Communication Skills – VI	1	-	-	1	10
BSU 643	Behavioural Science – VI	1	-	-	1	10
FLU 644	French – VI	2	-	-	2	20
NMP 660	Minor Project	-	-	-	2	-
CBCS		-	-	-	1	-
TOTAL CREDIT (Including CBCS)					28	
Total Hours per week					29	
Total hours in semester					290	
INDUSTRIAL PRACTICAL TRAINING II: 6-8 WEEKS						





SEVENTH SEMESTER						
Course Code	Course Title	Lecture (L) Hours Per week	Tutorial (T) Hours Per week	Practical (P) Hours Per week	Total Credits	Hours
CIV 701	Design of Concrete Structures	3	1		4	40
ELECTIVES (Any one from each category)						
A. (With Practical)					4	50
CIV 702	Surface Hydrology	3	-	-	-	-
CIV 703	Water Resources Field Methods	3	-	-	-	-
CIV 704	Environmental Fluid Mechanics	3	-	-	-	-
CIV 722	Surface Hydrology Lab	-	-	2	-	-
CIV 723	Water Resources Field Methods Lab	-	-	2	-	-
CIV 724	Environmental Fluid Mechanics Lab	-	-	2	-	-
ELECTIVES (Any one from each category)						
B. (Without Practical)					3	30
CIV 705	Concrete Technology	3	-	-	-	-
CIV 706	Pres-stressed Concrete	3	-	-	-	-
CIV 707	Masonry Structures	3	-	-	-	-
CIV 406	Disaster Preparedness & Planning	3	-	-	-	-
BCU 741	Communication Skills – VII	1	-	-	1	10
BSU 743	Behavioural Science – VII	1	-	-	1	10
FLU 744	French – VII	2	-	-	2	20
NPT 750	Industrial Practical Training–II (Evaluation)	-	-	-	5	-
NMP 760	Major Project – I	-	-	-	6	-
TOTAL CREDIT					26	
Total hours per week					16	
Total hours in semester					160	

EIGHTH SEMESTER						
Course Code	Course Title	Lecture (L) Hours Per week	Tutorial (T) Hours Per week	Practical (P) Hours Per week	Total Credits	Hours
CIV 801	Design of Steel Structures	3	1	-	4	40
CIV 802	Airport Planning and Design	3	-	-	3	30
ELECTIVES (Any one from following with Practical)					4	50
CIV 803	Foundation Engineering	3	-	-	-	-
CIV 804	Structural Geology	3	-	-	-	-
CIV 805	Rock Mechanics	3	-	-	-	-
CIV 806	Earthquake Resistant Design of buildings	3	-	-	-	-
CIV 823	Foundation Engineering Lab	-	-	2	1	-
CIV 824	Structural Geology Lab	-	-	2	1	-
CIV 825	Rock Mechanics Lab	-	-	2	1	-
CIV 826	Non-Destructive testing Lab	-	-	2	1	-
BCU 841	Communication Skills – VIII	1	-	-	1	10
BSU 843	Behavioural Science – VIII	1	-	-	1	10
FLU 844	French – VIII	2	-	-	2	20
NMP 860	Major Project – II	-	-	-	9	-
TOTAL CREDIT					24	
Total hours per week					16	
Total hours in semester					160	





**Bachelor of Technology
(Civil Engineering)**

Programme Code: CIV

**Duration – 4 Years Full Time
(2020-24)**

OVERALL CREDIT

Sr. No.	Semester	No. of Credits	No. of Hours
1	I	28	33
2	II	29	34
3	III	32	32
4	IV	29	34
5	V	32	32
6	VI	28	29
7	VII	26	16
8	VIII	24	16
Total Credits		228	226

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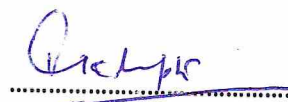
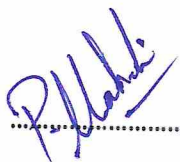
MOOC Courses for the Department of Civil Engineering

The following course of SWAYAM is recommended to be given as CBCS "Strength of Materials" in the Batch 2020-2024: -

S No.	Name of Minor Track	Semester/ CBCS Course Code/ Course Name	Name of course from SWAYAM	Duration	Credits
1	Strength of Materials	III / CIV303 Engineering Mechanics	Mechanics Of Materials	12 Weeks	3

More than 70 % consistency/ similarity exist between the syllabus of course offered in the CBCS and MOOC course.

Signatures :



BASIC CIVIL ENGINEERING & APPLIED MECHANICS

Course Code: CIV 101

Credit Units: 02

Total Hours: 20

Course Objectives:

- To understand the utility of various types of building materials.
- To understand the location, construction detail and suitability of various building elements.
- To determine the location of object on ground surface.
- To understand the effects of system of forces on rigid body in static conditions.
- Introduction to smart city and its component.

Course contents:

Module I: Building Materials: (4 Hours)

Stones, bricks, cement, timber - types, properties, test & uses, Introduction of concrete properties & Laboratory tests on concrete, curing of concrete and mortar Materials.

Module II: Surveying & Positioning: (4 Hours)

Introduction to surveying, Survey stations, Measurement of distances; conventional and EDM methods, Measurement of directions by different methods, Measurement of elevations by different methods, reciprocal levelling.

Module III: Smart City: (4 Hours)

Elements of smart city, Role of experts of various discipline of engineering in the development of smart city. Concept of green buildings, including rainwater harvesting, non-conventional sources of energy, Smart transportation and drainage system.

Module IV: Forces and Equilibrium: (4 Hours)

Graphical and Analytical Treatment of Concurrent and non-concurrent coplanar forces, free body Diagram, Force Diagram and Bow's notations, Application of Equilibrium Concepts: Analysis of plane Trusses, method of joints, method of Sections.

Module V: Centre of Gravity and moment of Inertia: (4 Hours)

Centroid and Centre of Gravity, Moment of Inertia of Composite section. Support Reactions, Shear force and bending moment diagram for cantilever & simply supported beam with concentrated, distributed load and Couple.

Course Outcomes:

Upon completion of the course, the students will be able to:

- Explain concepts and terminologies of building materials, surveying and mechanics.
- Apply various methods for surveying and mechanics.
- Determine the location, area and volume of objects on ground surface.
- Solve the problems of surveying and mechanics by using various methods.
- Analyse the effects of system of forces on rigid bodies in static conditions.



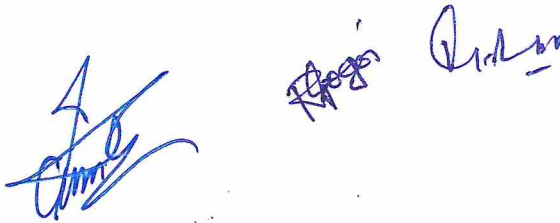
Examination Scheme:

Components	A	CT	S/V/Q/HA	EE
Weightage (%)	5	15	10	70

CT: Class Test, HA: Home Assignment, S/V/Q: Seminar/Viva/Quiz, EE: End Semester Examination;
A: Attendance

Text & References:

- Surveying, Vol. – 1, Punmia B.C., Laxmi Publications, 17th edition, 2016
- Building Material, B. C. Punmia, Laxmi Publications, 2016
- A textbook of Engineering Mechanics, D. S. Kumar, Katsons Publications, 2013
- Basic Civil Engineering, S. Ramamrutam & R. Narayan, Dhanpat Rai Pub., 3rd edition, 2013
- Applied Mechanics, Prasad I.B., Khanna Publication 17th edition, 1996
- Surveying, Duggal, Tata McGraw Hill New Delhi, 4th edition, 2013
- Engineering Mechanics - Statics & Dynamics, R.C. Hibbler, Pearson Publications, 14th edition, 2015
- Engineering Mechanics - statics dynamics, A. Boresi & Schmidt, Cengage learning, 1st edition, 2008.
- Applied Mechanics, R.K. Rajput, Laxmi Publications, 3rd edition, 2016



CIVIL ENGINEERING & ENERGY SCIENCE

Course Code: CIV 308

Credit Units: 04

Total Horus : 40

Course Objective:

- To give an understanding to the students of the vast breadth and numerous areas of engagement available in the overall field of Civil Engineering.
- To motivate the student to pursue a career in one of the many areas of Civil Engineering with deep interest and keenness.
- To provide an introduction to energy systems and renewable energy resources, with a scientific examination of the energy field and an emphasis on alternative energy sources and their technology and application.

The class will explore society's present needs and future energy demands, examine conventional energy sources and systems, including fossil fuels and nuclear energy, and then focus on alternatives, renewable energy sources such as solar, biomass (conversions), wind power, waves and tidal, geothermal, ocean thermal, hydro and nuclear.

Course Contents:

Module I: Introduction :(8 Hours)

What is Civil Engineering/ Infrastructure? Basics of Engineering and Civil Engineering; Broad disciplines of Civil Engineering; Importance of Civil Engineering, Possible scopes for a career. Early constructions and developments over time; Ancient monuments & Modern marvels; Development of various materials of construction and methods of construction; Works of Eminent civil engineers. Introduction to Energy Science: Scientific principles and historical interpretation to place energy use in the context of pressing societal, environmental and climate issues

Module II: Energy Sources :(8 Hours)

Overview of energy systems, sources, transformations, efficiency, and storage. Fossil fuels (coal, oil, oil-bearing shale and sands, coal gasification) - past, present & future, Remedies & alternatives for fossil fuels - biomass, wind, solar, nuclear, wave, tidal and hydrogen; Sustainability and environmental trade-offs of different energy systems; possibilities for energy storage or regeneration (Ex. Pumped storage hydro power projects, superconductor-based energy storages, high efficiency batteries)

Module III: Energy & Environment :(8 Hours)

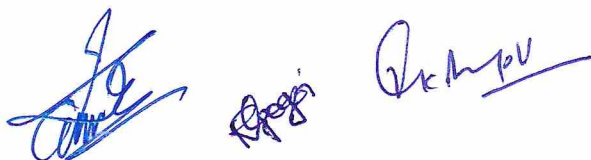
Energy efficiency and conservation; introduction to clean energy technologies and its importance in sustainable development; Carbon footprint, energy consumption and sustainability; introduction to the economics of energy;; How future energy use can be influenced by economic, environmental, trade, and research policy

Module IV: Civil Engineering Projects connected with the Energy Sources:(8 Hours)

Coal mining technologies, Oil exploration offshore platforms, Underground and under-sea oil pipelines, solar chimney project, wave energy caissons, coastal installations for tidal power, wind mill towers; hydro power stations above-ground and underground along with associated dams, tunnels, penstocks, etc.; Nuclear reactor; Spent Nuclear fuel storage and disposal systems

Module V: Engineering for Energy conservation: (8 Hours)

Concept of Green Building and Green Architecture; Green building concepts; LEED ratings. Energy Audit of Facilities and optimization of energy consumption: Aesthetics in Civil Engineering, Examples of great architecture, fundamentals of architectural design & town planning; Building Systems (HVAC, Acoustics, Lighting, etc.); LEED ratings; Development of Smart cities.



Course Outcomes:

- List and generally explain the main sources of energy and their primary applications nationally and internationally
- Have basic understanding of the energy sources and scientific concepts/principles behind them
- Describe the challenges and problems associated with the use of various energy sources, including fossil fuels, with regard to future supply and the impact on the environment.
- List and describe the primary renewable energy resources and technologies.
- To quantify energy demands and make comparisons among energy uses, resources, and technologies.
- Collect and organize information on renewable energy technologies as a basis for further analysis and evaluation.
- Understand the Engineering involved in projects utilising these sources

Examination Scheme:

Components	A	CT	S/V/Q/HA	EE
Weightage (%)	5	15	10	70

CT: Class Test, HA: Home Assignment, S/V/Q: Seminar/Viva/Quiz, EE: End Semester Examination; Att: Attendance

Text & References :

- Patil, B.S.(1974), Legal Aspects of Building and Engineering Contract
- The National Building Code, BIS, (2017)
- RERA Act, (2017)
- Meena Rao (2006), Fundamental concepts in Law of Contract, 3rd Edn. Professional Offset
- Chandiramani, Neelima (2000), The Law of Contract: An Outline, 2nd Edn. Avinash Publications Mumbai
- Boyle, Godfrey (2004), Renewable Energy (2nd edition). Oxford University Press
- Boyle, Godfrey, Bob Everett, and Janet Ramage (Eds.) (2004), Energy Systems and Sustainability: Power for a Sustainable Future. Oxford University Press
- Schaeffer, John (2007), Real Goods Solar Living Sourcebook: The Complete Guide to Renewable Energy Technologies and Sustainable Living, Gaian
- Jean-Philippe; Zaccour, Georges (Eds.), (2005), Energy and Environment Set: Mathematics of Decision Making, Loulou, Richard; Waaub, XVIII,
- Ristinen, Robert A. Kraushaar, Jack J. AKraushaar, Jack P. Ristinen, Robert A. (2006) Energy and the Environment, 2nd Edition, John Wiley
- UNDP (2000), Energy and the Challenge of Sustainability, World Energy assessment
- E H Thorndike (1976), Energy & Environment: A Primer for Scientists and Engineers, Addison-Wesley Publishing Company
- Related papers published in international journals



COMPUTER-AIDED CIVIL ENGINEERING DRAWING**Course Code: CIV 302****Credit Units: 03****Total Hours: 30****Course Objective:**

The students will be able to

- Develop Parametric design and the conventions of formal engineering drawing including elements of buildings, building bye-laws, perspective drawing etc
- Produce and interpret 2D & 3D drawings
- Communicate a design idea/concept graphically/ visually

Course Contents:**Module I: Basics of Auto Cad (2-D) and Auto Cad (3-D): (6 Hours)**

Two-dimensional drafting work to be handled in detail on Auto Cad. Complete Drafting, Editing and modification work to be done and presentations be made. Basic commands and usage of 3d Auto Cad drawing. Drafting basic geometrical forms and combinations of the same in three dimensions and their editing.

Module II: Elements of Building Drawing: (6 Hours)

Symbols and sing Conventions used for materils, plumbing, rebar drawing, electrical fittings. Masonry Bonds details, one brick wall and one and half brick wall, wall connections, . RCC beam, column, footings, foundation plan, load wearing wall.

Module III: Building Drawing: (6 Hours)

Detail drawing of single story building Plan, Elevation, Sectional Elevation. Standard fittings, drawings of different types of buildings. .

Module IV: Building Bye-laws: (6 Hours)

Building Planning – Provisions of National Building Code, open area, setbacks, FAR terminology, principles of planning, orientation. site selection, types of drawings. Types of buildings. Classification of structure, Load bearing structure, Framed structure, Composite structure.

Module V: Perspective Drawing: (6 Hours)

Elements of perspective drawing involving simple problems, one point and two point perspectives.

Course Outcomes:

The course should enable the students to

- Develop graphical skills for communicating concepts, ideas and designs of engineering products graphically/ visually as well as understand another person's designs, and to get exposure to national standards relating to technical drawings using Computer Aided Design and Drafting practice
- Develop Parametric design and the conventions of formal engineering drawing
- Produce and interpret 2D & 3D drawings
- Examine a design critically and with understanding of CAD - The student learn to interpret drawings, and to produce designs using a combination of 2D and 3D software.
- Do a detailed study of an engineering artefact
- Develop drawings for conventional structures using practical norms.

Examination Scheme:

Components	A	CT	S/V/Q/ HA	EE
Weightage (%)	5	15	10	70

CT: Class Test, HA: Home Assignment, S/V/Q: Seminar/Viva/Quiz, EE: End Semester Examination; Att: Attendance

Text & References:

- Building Drawing Shah M. G. Kale C. M, Tata McGraw-Hill Education
- Planning & Designing of Building Sane Y. S, Allies Book Stall
- Architectural Design Ernest Pickering, J. Wiley & Sons
- National Building Code-2005

- Malik & Meo; Building Design and Drawing
- Gurucharan Singh & Jgdish Singh Building Planning, Design and Scheduling
- Balagopal T S Prabhu, Building Drawing and Detailing, Spades Publishers.
- V.B. Sikka : Civil Engineering Drawing

LIFE SCIENCE/BIOLOGY FOR ENGINEERS

Course Code: CIV 309

Credits Units: 03

Total Hours: 30

Course Objectives:

- To gain knowledge of the subject biology, its importance, to provide basic knowledge about plant physiology, ecology, ecosystems, population ecology, environmental management, protection Acts & elementary principles of biostatistical methods & tools.
- To understand cellularity in structural development, classification of species, the metabolism processes Elementary principles of genetics, Structures of DNA and RNA, Molecular genetics, Biostatistics, Biotechnology.

Course Content:

Module I: Unicellularity and Multicellularity: (5 Hours)

What is Life sciences/Biology? Classification per se is not what biology is all about (The underlying criterion, such as morphological, biochemical or ecological be highlighted). Hierarchy of life forms at phenomenological level. Classification based on (a) cellularity- Unicellular or multicellular (b) ultrastructure- prokaryotes or eucaryotes. (c) energy and Carbon utilization -Autotrophs, heterotrophs, lithotropes (d) Ammonia excretion – aminotelic, uricotelic, ureotelic (e) Habitats- aquatic or terrestrial.

Module II: Why We Need to Study Biology: (5 Hours)

To convey that Biology is as important a scientific discipline as Mathematics, Physics and Chemistry. Bring out the fundamental differences between science and engineering. Mention the most exciting aspect of biology as an independent scientific discipline. Discuss how biological observations of 18th Century that lead to major discoveries.

Module III: Molecules of Life & Molecular Genetics: (5 Hours)

Molecules of life, Discuss monomeric units and polymeric structures. Discuss about sugars, starch and cellulose. Amino acids and proteins, Lipids. Nucleotides and DNA/RNA structure & concept of gene.

Module IV: Plant Diversity: (5 Hours)

Unicellular and multicellular organisms, prokaryotes and eukaryotes, Autotrophs, heterotrophs, Hierarchy of life forms, Classification, General account and importance of Virus, Bacteria, Fungi, Lichens, Bryophytes, pteridophytes, Gymnosperms, Angiosperms.

Module V: Concepts of Recessiveness and Dominance: (5 Hours)

Principles of Genetics in biology are like Newton's laws to Physical Sciences. Mendel's laws, Meiosis and Mitosis (be taught as a part of genetics. Emphasis to be give not to the mechanics of cell division nor the phases but how genetic material passes from parent to offspring).

Module VI: Ecology, Ecosystems & Population Ecology: (5 hours)

Components, types, flow of matter and energy in an ecosystem; Ecosystem structure- Biotic and a-biotic factors, food chain, food web, ecological pyramids.

Population characteristics, ecotypes; Population genetics- Environmental Management, Policies and legal aspects- Environment Protection Acts, International Treaties; Environmental Impact Assessment

Course outcome:

After completion of this course students will be able to understand

- The significance of biological sciences
- Develop an understanding of the different life forms from microbes to higher plants and their importance in human life.
- Develop an understanding of the ecosystems, community ecology, ecosystem structure etc.
- Develop an insight into the various environmental management covering principles environment protection Acts. Environmental Impact Assessment

- Cellular structures of living forms.
- Classification of biology and biomolecule
- About DNA and biological structure
- About the species
- Exploring Molecular Genetics

Examination Scheme:

Components	A	CT	S/V/Q/HA	EE
Weightage (%)	5	15	10	70

CT: Class Test, HA: Home Assignment, S/V/Q: Seminar/Viva/Quiz, EE: End Semester Examination; Att: Attendance

Text & References:

- Biology: A global approach: Campbell, N. A.; Reece, J. B.; Urry, Lisa; Cain, M, L.; Wasserman, S. A.; Minorsky, P. V.; Jackson, R. B. Pearson Education Ltd.
- Agarwal, K.C. 2001 Environmental Biology, Nidi Publ. Ltd. Bikaner.
- Cunningham, W.P. Cooper, T.H. Gorhani, E & Hepworth, M.T.2001, Environmental Encyclopedia,Jaico Publ.House,Mumabai, 1196p
- Jadhav, H & Bhosale, V.M. 1995. Environmental Protection and Laws. Himalaya Pub. House,Delhi 284 p. Mckinney, M.L. &School, R.M. 1996.Environmental Science Systems &Solutions, Web enhanced edn. 639p
- Outlines of Biochemistry, Conn, E.E; Stumpf, P.K; Bruening, G; Doi, R.H. John Wiley and Sons
- Principles of Biochemistry (V Edition), By Nelson, D. L.; and Cox, M. M.W.H. Freeman and Company
- Molecular Genetics (Second edition), Stent, G. S.; and Calender, R. W.H. Freeman and company, Distributed by Satish Kumar Jain for CBS Publisher
- Microbiology, Prescott, L.M J.P. Harley and C.A. Klein 1995. 2nd edition Wm, C. Brown Publishers



DISASTER PREPAREDNESS & PLANNING MANAGEMENT**Course Code: CIV 406****Credit Units: 03****Total Hours: 30****Course Objectives:**

The objectives of the course are

- To Understand basic concepts in Disaster Management
- To Understand Definitions and Terminologies used in Disaster Management
- To Understand Types and Categories of Disasters
- To Understand the Challenges posed by Disasters
- To understand Impacts of Disasters Key Skills

Course Contents:**Module I: Introduction: (6 Hours)**

Concepts and definitions: disaster, hazard, vulnerability, risks- severity, frequency and details, capacity, impact, prevention, mitigation).

Module II: Disasters: (6 Hours)

Disasters classification; natural disasters (floods, draught, cyclones, volcanoes, earthquakes, tsunami, landslides, coastal erosion, soil erosion, forest fires etc.); manmade disasters (industrial pollution, artificial flooding in urban areas, nuclear radiation, chemical spills, transportation accidents, terrorist strikes, etc.); hazard and vulnerability profile of India, mountain and coastal areas, ecological fragility.

Module III: Disaster Impacts: (6 Hours)

Disaster impacts (environmental, physical, social, ecological, economic, political, etc.); health, psycho-social issues; demographic aspects (gender, age, special needs); hazard locations; global and national disaster trends; climate change and urban disasters.

Module IV: Disaster Risk Reduction (DRR): (6 Hours)

Disaster management cycle – its phases; prevention, mitigation, preparedness, relief and recovery; structural and non-structural measures; risk analysis, vulnerability and capacity assessment; early warning systems, Post-disaster environmental response (water, sanitation, food safety, waste management, disease control, security, communications); Roles and responsibilities of government, community, local institutions, DRR programmes in India and the activities of National Disaster Management Authority.

Module V: Disasters, Environment and Development: (6 Hours)

Factors affecting vulnerability such as impact of developmental projects and environmental modifications (including of dams, land- use changes, urbanization etc.), sustainable and environmental friendly recovery; reconstruction and development methods.

Course Outcomes:

Upon completion of the course, the students will be able to:

- Understanding about the basic concepts of Disaster Management with preparedness as a Civil Engineer.
- Understand the risk to property, lives, and livestock, etc. and understanding of the social responsibility as an engineer towards preparedness as well as mitigating the damages
- Apply the Disaster Concepts to Management
- Analyze Relationship between Development and Disasters
- Understand Categories of Disasters and realization of the responsibilities to society

Examination Scheme:

Components	A	CT	S/V/Q/HA	EE
Weightage (%)	5	15	10	70

CT: Class Test, HA: Home Assignment, S/V/Q: Seminar/Viva/Quiz, EE: End Semester Examination; Att: Attendance

Text & References:

- Pradeep Sahni, 2004, Disaster Risk Reduction in South Asia, Prentice Hall.
- Singh B.K., 2008, Handbook of Disaster Management: Techniques & Guidelines, Rajat Publication.

- Ghosh G.K., 2006, Disaster Management, APH Publishing Corporation
- Disaster Medical Systems Guidelines. Emergency Medical Services Authority, State of California, EMSA no.214, June 2003
- Inter Agency Standing Committee (IASC) (Feb. 2007). IASC Guidelines on Mental Health and Psychosocial Support in Emergency Settings. Geneva: IASC
- <http://ndma.gov.in/> (Home page of National Disaster Management Authority)
- <http://www.ndmindia.nic.in/> (National Disaster management in India, Ministry of Home Affairs).



FLUID MECHANICS**Course Code: CIV 404****Credit Units: 03****Total Hours: 30****Course Objectives:**

- The course will help students to understand the various properties, types and characteristics of fluid. It will help students to design pipes, pipe bents, pipe surface design etc.

Course Contents:**Module I: Basic Concepts and Definitions: (6 Hours)**

Distinction between a fluid and a solid; Density, Specific weight, Specific gravity, Kinematic and dynamic viscosity; variation of viscosity with temperature, Newton law of viscosity; vapour pressure, boiling point, cavitation; surface tension, capillarity, Bulk modulus of elasticity, compressibility.

Module II: Fluid Statics: (6 Hours)

Fluid Pressure: Pressure at a point, Pascals law, pressure variation with temperature, density and altitude. Piezometer, U-Tube Manometer, Single Column Manometer, U-Tube Differential Manometer, Micromanometers. pressure gauges, Hydrostatic pressure and force: horizontal, vertical and inclined surfaces. Buoyancy and stability of floating bodies.

Module III: Fluid Kinematics: (6 Hours)

Classification of fluid flow: steady and unsteady flow; uniform and non-uniform flow; laminar and turbulent flow; rotational and irrotational flow; compressible and incompressible flow; ideal and real fluid flow; one, two and three dimensional flows; Stream line, path line, streak line and stream tube; stream function, velocity potential function. One-, two- and three -dimensional continuity equations in Cartesian coordinates

Module IV: Fluid Dynamics: (6 Hours)

Surface and body forces; Equations of motion - Euler's equation; Bernoulli's equation – derivation; Energy Principle; Practical applications of Bernoulli's equation: venturimeter, orifice meter and pitot tube; Momentum principle; Forces exerted by fluid flow on pipe bend; Vortex Flow – Free and Forced; Dimensional Analysis and Dynamic Similitude - Definitions of Reynolds Number, Froude Number, Mach Number, Weber Number and Euler Number; Buckingham's π -Theorem. Notches and Weirs.

Module V: Fluid Dynamics: (6 Hours)

Boundary layer theory, drag and lift force, drag on a sphere, rough and smooth boundaries, concept of mixing length, boundary layer distribution for various shapes and for various Reynold's number.

Course Outcomes:

- Students should understand the properties of fluids, pressure measurement devices, hydraulic forces on surfaces, buoyancy and flotation in fluids, kinematics and static behavior of fluids, dimension and model analysis, laminar and turbulent flow, flow through pipes and orifices, boundary layer theory.

Examination Scheme:

Components	A	CT	S/V/Q/HA	EE
Weightage (%)	5	15	10	70

CT: Class Test, HA: Home Assignment, S/V/Q: Seminar/Viva/Quiz, EE: End Semester Examination; Att: Attendance

Text & References:

- R.K. Bansal, "Fluid Mechanics & Hydraulic Machines", Laxmi Publications (P) Ltd., 2002.
- Gupta, S. C., Fluid Mechanics and Hydraulic Machines, Pearson Education, 2007
- D.S. Kumar, "Fluid Mechanics and Fluid Power Engineering", S.K. Kataria & Sons, 2000.
- F. M. White, Introduction to Fluid Mechanics, McGraw Hill
- I.H. Shames, "Mechanics of Fluids", Tata McGraw Hill
- Douglas, J. F., Gasiorek, J.M. and Swaffield, J., Fluid Mechanics, Pearson Education, 4/e, 2006
- V.L. Streeter and E.B. Wylie, "Fluid Mechanics", Tata McGraw Hill Massey B S, Mechanics of Fluids, Van Nostrand Reinhold Co

SOLID MECHANICS**Course Code: CIV 405****Credit Units: 03****Total Hours: 30****Course Objectives:**

- To student will understand simples stresses and strains, compound stresses and strains, bending moments and shear strains, flexural stresses etc.

Module I: Simple Stresses and Strains: (6 Hours)

Concept of stress and strain, St. Venant's principle, stress and strain diagram, Elasticity and plasticity – Types of stresses and strains, Hooke's law-stress – strain diagram for mild steel – Working stress – Factor of safety – Lateral strain, Poisson's ratio and volumetric strain – Elastic moduli and the relationship between them – Bars of varying section – composite bars – Temperature stresses. Strain Energy – Resilience-Gradual, sudden, impact and shock loadings – simple applications.

Module II: Compound Stresses and Strains: (6 Hours)

Two-dimensional system, stress at a point on a plane, principal stresses and principal planes, Mohr circle of stress, ellipse of stress and their applications. Two-dimensional stress-strain system, principal strains and principal axis of strain, circle of strain and ellipse of strain. Relationship between elastic constants.

Module III: Bending moment and Shear Force Diagrams: (6 Hours)

Bending moment (BM) and shear force (SF) diagrams. BM and SF diagrams for cantilevers simply supported and fixed beams with or without overhangs. Calculation of maximum BM and SF and the point of contra flexure under concentrated loads, uniformly distributed loads over the whole span or part of span, combination of concentrated loads (two or three) and uniformly distributed loads, uniformly varying loads, application of moments.

Module IV: Flexural Stresses-Theory of simple bending: (6 Hours)

Assumptions – Derivation of bending equation: $M/I = f/y = E/R$ - Neutral axis – Determination of bending stresses – Section modulus of rectangular and circular sections (Solid and Hollow), I, T, Angle and Channel sections – Design of simple beam sections.

Module V: Shear Stresses- Derivation of formula: (3 Hours)

Shear stress distribution across various beam sections like rectangular, circular, triangular, I, T angle sections. Relationship between moment, slope and deflection, Moment area method, Macaulay's method. Use of these methods to calculate slope and deflection for determinant beams.

Module 6: Torsion: (3 Hours)

Derivation of torsion equation and its assumptions. Applications of the equation of the hollow and solid circular shafts, torsional rigidity, Combined torsion and bending of circular shafts, principal stress and maximum shear stresses under combined loading of bending and torsion.. Derivation of formulae and calculations of hoop stress, longitudinal stress in a cylinder, and sphere subjected to internal pressures.

Course Outcomes:

Students will understand the following.

- Simple Stresses and Strains
- Compound Stresses and Strains
- Bending moment and Shear Force Diagrams
- They will develop skills to problem solving in solid mechanics.

Examination Scheme:

Components	A	CT	S/V/Q/HA	EE
Weightage (%)	5	15	10	70

CT: Class Test, HA: Home Assignment, S/V/Q: Seminar/Viva/Quiz, EE: End Semester Examination; Att: Attendance

Text & References:

- Jindal U.C., "Strength of Materials", Galgotia Publication, New Delhi, 1998.
- Ryder G.H., "Strength of Materials", Macmillan, Delhi, 2003.
- R.K. Bansal, "Strength of Materials", Laxmi Publication, New Delhi, 2001.
- Sadhu Singh, "Strength of Materials", Khanna Publishers, New Delhi, 2000.
- Timoshenko S.P., "Elements of Strength of Materials", East-West affiliated, New Delhi, 2000.
- Hibbler R.C., "Mechanics of Materials", Prentice Hall, New Delhi, 1994.
- Popov Eger P., "Engg. Mechanics of solids", Prentice Hall, New Delhi, 1998.
- Fenner, Roger. T, "Mechanics of Solids", U.K. B.C. Publication, New Delhi, 1990.
- Srinath L.S. et.al., "Strength of Materials", McMillan, New Delhi, 2001



STRUCTURAL ENGINEERING**Course Code: CIV 503****Credit Units: 04****Total Hours: 40****Course Objectives:**

- This course aims at providing students with a solid background on principles of structural engineering design.

Course Content:**Module I: Introduction Concepts of Energy Principles: (8 Hours)**

Introduction- concepts of energy principles, safety, sustainable development in performance; what makes a structure; principles of stability, equilibrium; what is a structural engineer, role of engineer, architect, user, builder; what are the functions' what do the engineers design, first principles of process of design

Module II: Different Types of Loads on Structures: (8 Hours)

Planning and Design Process; Materials, Loads, and Design Safety; Behaviour and Properties of Concrete and Steel; Wind and Earthquake Loads.

Module III: Structural Design Criteria: (8 Hours)

Materials and Structural Design Criteria: Introduction to the analysis and design of structural systems. Analyses of determinate and indeterminate trusses, beams, and frames, and design philosophies for structural engineering. Laboratory experiments dealing with the analysis of determinate and indeterminate structures.

Module IV: Different Types of Structural Elements: (8 Hours)

Design of Structural Elements; Concrete Elements, Steel Elements, Structural Joints; Theories and concepts of both concrete and steel design and analysis both at the element and system levels. Approximate Analysis Methods as a Basis for Design; Design of AICTE Model Curriculum for Undergraduate degree in Civil Engineering (Engineering & Technology) 135 | Page Reinforced Concrete Beams for Flexure; Design of Reinforced Concrete Beams for Shear; Bond, Anchorage, and Serviceability; Reinforced Concrete Columns; Reinforced Concrete Slabs; Introduction to Steel Design; Tension Members and Connections; Bending Members; Structural Systems.

Module V: Prestress Concrete Design: (8 Hours)

System Design Concepts; Special Topics that may be Covered as Part of the Design Project Discussions; Cable Structures; Prestressed Concrete Bridges; Constructability and Structural Control; Fire Protection.

Course Outcome:

- The students will be able to apply their knowledge of structural mechanics in addressing design problems of structural engineering.

Examination Scheme:

Components	A	CT	S/V/Q/HA	EE
Weightage (%)	5	15	10	70

CT: Class Test, HA: Home Assignment, S/V/Q: Seminar/Viva/Quiz, EE: End Semester Examination; Att: Attendance

Text & References:

- Nilson, A. H. Design of Concrete Structures. 13th edition. McGraw Hill, 2004
- McCormac, J.C., Nelson, J.K. Jr., Structural Steel Design. 3rd edition. Prentice Hall, N.J., 2003.
- Galambos, T.V., Lin, F.J., Johnston, B.G., Basic Steel Design with LRFD, Prentice Hall, 1996
- Segui, W. T., LRFD Steel Design, 2nd Ed., PWS Publishing, Boston.
- Salmon, C.G. and Johnson, J.E., Steel Structures: Design and Behavior, 3rd Edition, Harper & Row, Publishers, New York, 1990.
- MacGregor, J. G., Reinforced Concrete: Mechanics and Design, 3rd Edition, Prentice Hall, New Jersey, 1997.

GEOTECHNICAL ENGINEERING**Course Code: CIV 504****Credit Units: 03****Total Hours: 30****Course Objectives:**

- The student has basic knowledge about soil and different types of soil based on Indian classification and different soil property.

Course Content**Module I: Introduction–Types of Soils, Their Formation and Deposition: (5 Hours)**

Introduction–Types of soils, their formation and deposition, Definitions: soil mechanics, soil engineering, rock mechanics, geotechnical engineering. Scope of soil engineering. Comparison and difference between soil and rock. Basic Definitions and Relationships–Soil as three-phase system in terms of weight, volume, voids ratio, porosity. Definitions: moisture content, unit weights, degree of saturation, voids ratio, porosity, specific gravity, mass specific gravity.

Module II: Different Soil Properties and Relations: (5 Hours)

Plasticity Characteristics of Soil - Introduction to definitions of: plasticity of soil, consistency limits-liquid limit, plastic limit, shrinkage limit, plasticity, liquidity and consistency indices, flow & toughness indices, definitions of activity and sensitivity. Determination of: liquid limit, plastic limit and shrinkage limit. Use of consistency limits. Classification of Soils-Introduction of soil classification: particle size classification, textural classification, unified soil classification system, Indian standard soil classification system.

Module III: Determination of Coefficient of Permeability: (5 Hours)

Permeability of Soil - Darcy's law, validity of Darcy's law. Determination of coefficient of permeability: Laboratory method: constant-head method, falling-head method. Field method: pumping- in test, pumping- out test. Permeability aspects: permeability of stratified soils, factors affecting permeability of soil. Seepage Analysis- Introduction, stream and potential functions, characteristics of flow nets.

Module IV: Stresses Coming on Soil Specimen: (5 Hours)

Effective Stress Principle - Introduction, effective stress principle, nature of effective stress, effect of water table. Fluctuations of effective stress, effective stress in soils saturated by capillary action, seepage pressure, quick sand condition.

Module V: Compaction of Soil: (5 Hours)

Compaction of Soil-Introduction, theory of compaction, laboratory determination of optimum moisture content and maximum dry density. Compaction in field, compaction specifications and field control.

Module VI: Consolidation of Soil: (5 Hours)

Consolidation of Soil - Introduction, comparison between compaction and consolidation, initial, primary & secondary consolidation, spring analogy for primary consolidation, interpretation of consolidation test results, Terzaghi's theory of consolidation, final settlement of soil deposits, computation of consolidation settlement and secondary consolidation. Introduction, stresses due to point load, line load, strip load, uniformly loaded circular area, rectangular loaded area. Influence factors, Isobars, Boussinesq's equation, Newmark's Influence Chart.

Course Outcome:

- Specify a strategy for site investigation to identify the soil deposits and determine the depth and spatial extent within the ground.

Examination Scheme:

Components	A	CT	S/V/Q/HA	EE
Weightage (%)	5	15	10	70

CT: Class Test, HA: Home Assignment, S/V/Q: Seminar/Viva/Quiz, EE: End Semester Examination; Att: Attendance

Text & References:

- Soil Mechanics by Craig R.F., Chapman & Hall
- Fundamentals of Soil Engineering by Taylor, John Wiley & Sons
- An Introduction to Geotechnical Engineering, by Holtz R.D. and Kovacs, W.D., Prentice Hall, NJ 4.
- Principles of Geotechnical Engineering, by Braja M. Das, Cengage Learning
- Principles of Foundation Engineering, by Braja M. Das, Cengage Learning

EARTHQUAKE RESISTANT DESIGN OF BUILDINGS

Course code: CIV 806

Credit Units: 03

Total Hours: 30

Course Objective:

This course is introduced to foresee the potential consequences of strong earthquakes on urban areas and civil infrastructure. Design, construct and maintain structures to perform at earthquake exposure up to the expectations and in compliance with building codes.

Course Contents:

Module-I: Seismology: (6 Hours)

Internal structure of earth, Causes of earthquakes, Seismic waves, Magnitude, Intensity and Energy released, Characteristics of Earthquakes.

Module-II : Single Degree of Freedom of Structure: (6 Hours)

Response of Structure to Earthquake motion, Modeling of structures, Dynamics of single degree of freedom system.

Module-III : Multi-Degree of Freedom of Structure: (6 Hours)

Dynamics of multi degree of freedom system, Idealization of structures, seismic response.

Module-IV: Earthquake Resistant Design of Buildings: (6 Hours)

Introduction to earthquake resistant design, Equivalent lateral force method, Response spectrum method, Time history method, Introduction to earthquake resistant brick and masonry buildings.

Module-V: Design Standards and Machine Foundation: (6 Hours)

Reinforced Concrete framed buildings, Code provisions. Introduction to machine foundation & its design. Degrees of freedom of a block foundation.

Course Outcomes:

- The basics of the subject will help in the development of innovative technique of Seismic analysis and design of structures.
- It will open the new area of project in sensors based Structural Control system.

Examination Scheme:

Components	A	CT	S/V/Q/HA	EE
Weightage (%)	5	15	10	70

CT: Class Test, HA: Home Assignment, S/V/Q: Seminar/Viva/Quiz, EE: End Semester Examination; Att: Attendance

Text & References:

- Introduction to Structural Dynamics - J.M. Biggs
- Elements of Earthquake Engineering - Jai Krishna an A.R. Chandrasekaran
- IS: 1983 - 1984 Criterion for Earthquake Resistant Design.
- Structural Dynamics - Theory & computation - Mario Paz.
- Dynamics of Structures Theory and Applications to Earthquake Engineering - Anil K. Chopra.
- Earthquake Resistant of Design of structures, Agarwal and Srikhande.
- Earthquake Resistant of Design of structures, S.K.Duggal

TRANSPORTATION ENGINEERING**Course Code: CIV 507****Credit Units: 03****Total Hours: 30****Course Objectives:**

- Student will get knowledge on various types of highway properties and alignment different types of pavement design and classification of highway and planning of highway design.

Course Contents:**Module I: Highway Planning: (6 Hours)**

Highway development and planning-Classification of roads, road development in India, Current road projects in India; highway alignment and project preparation.

Module II: Geometric Properties of Highway: (6 Hours)

Geometric design of highways:- Introduction; highway cross section elements; sight distance, design of horizontal alignment; design of vertical alignment; design of intersections, problems

Module III: Traffic Engineering & Control: (6 Hours)

Traffic engineering & control- Traffic Characteristics, traffic engineering studies, traffic flow and capacity, traffic regulation and control; design of road intersections; design of parking facilities; highway lighting; problems

Module IV: Pavement Design: (6 Hours)

Pavement materials- Materials used in Highway Construction- Soils, Stone aggregates, bituminous binders, bituminous paving mixes; Portland cement and cement concrete: desirable properties, tests, requirements for different types of pavements. Problems

Module V: Flexible and IRC Guidelines: (6 Hours)

Design of pavements- Introduction; flexible pavements, factors affecting design and performance; stresses in flexible pavements; design of flexible pavements as per IRC; rigid pavements- components and functions; factors affecting design and performance of CC pavements; stresses in rigid pavements; design of concrete pavements as per IRC; problems.

Course Outcome:

- Carry out surveys involved in planning and highway alignment → design the geometric elements of highways and expressways

Examination Scheme:

Components	A	CT	S/V/Q/HA	EE
Weightage (%)	5	15	10	70

CT: Class Test, HA: Home Assignment, S/V/Q: Seminar/Viva/Quiz, EE: End Semester Examination; Att: Attendance

Text & References:

- Khanna, S.K., Justo, C.E.G and Veeraragavan, A, 'Highway Engineering', Revised 10th Edition, Nem Chand & Bros, 2017
- Kadiyalai, L.R., ' Traffic Engineering and Transport Planning', Khanna Publishers.
- Partha Chakraborty, ' Principles Of Transportation Engineering, PHI Learning,

NON-DESTRUCTIVE TESTING LAB

Course Code: CIV 826

Credit Units: 01

Total Hours: 10

Course Objective:

This course is deal with the various methods of evaluation of health of existing structures. The various techniques of structural health monitoring will also cover in the NDT lab.

Course Contents:

NOTE: Student will have to perform minimum 3 tests on concrete & two tests on structural steel

1. Non Destructive Testing of reinforced cement concrete (6 Hours)
 - (a) Strength assessment using rebound hammer
 - (b) Quality assessment using ultrasonic puls velocity test
 - (c) Strength assessment using pull out method
 - (d) Assessment of corrosion of reinforcing bars using half cell potentiometer
 - (e) To determine thickness of concrete cover, diameter & spacing of reinforcing bars using rebar scanner.
2. Testing of structural steel (4 Hours)
 - (a) Testing for corrosion of structural steel
 - (b) Assessment of thickness of pipes/tubes/structural steel
 - (c) Test for welding performance with Di-penetration test, ultrasonic test & magnetic particle test.

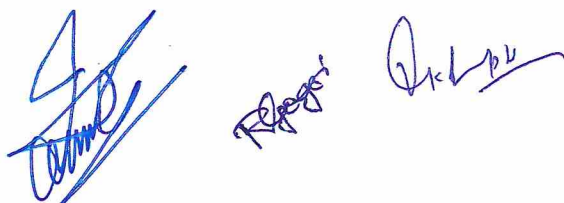
Laboratory Outcomes:

- The basics of the subject will help in the development of innovative technique of rehabilitation of structures.
- It will open the new area for the projects based on “sensors and long terms structural health monitoring”.

Examination Scheme:

Components	A	CT	S/V/Q/HA	EE
Weightage (%)	5	15	10	70

CT: Class Test, HA: Home Assignment, S/V/Q: Seminar/Viva/Quiz, EE: End Semester Examination; Att: Attendance



**Master of Technology
Civil Engineering
(Specialization in Structural Engineering)**

Programme Code: CEM

Duration – 2 Years Full Time



**Programme Structure
And
Curriculum & Scheme of Examination**

**2019-21
(Based on AICTE)**

**AMITY UNIVERSITY
MADHYA PRADESH**

PREAMBLE

Amity University aims to achieve academic excellence by providing multi-faceted education to students and encourage them to reach the pinnacle of success. The University has designed a system that would provide rigorous academic programme with necessary skills to enable them to excel in their careers.

This booklet contains the Programme Structure, the Detailed Curriculum and the Scheme of Examination. The Programme Structure includes the courses (Core and Elective), arranged semester wise. The importance of each course is defined in terms of credits attached to it. The credit units attached to each course has been further defined in terms of contact hours i.e. Lecture Hours (L), Tutorial Hours (T), Practical Hours (P). Towards earning credits in terms of contact hours, 1 Lecture and 1 Tutorial per week are rated as 1 credit each and 2 Practical hours per week are rated as 1 credit. Thus, for example, an L-T-P structure of 3-0-0 will have 3 credits, 3-1-0 will have 4 credits, and 3-1-2 will have 5 credits.

The Curriculum and Scheme of Examination of each course includes the course objectives, course contents, scheme of examination and the list of text and references. The scheme of examination defines the various components of evaluation and the weightage attached to each component. The different codes used for the components of evaluation and the weightage attached to them are:

<u>Components</u>	<u>Codes</u>	<u>Weightage (%)</u>
Case Discussion/ Presentation/ Analysis	C	05 - 10
Home Assignment	H	05 - 10
Project	P	05 - 10
Seminar	S	05 - 10
Viva	V	05 - 10
Quiz	Q	05 - 10
Class Test	CT	10 - 15
Attendance	A	05
End Semester Examination	EE	70

It is hoped that it will help the students study in a planned and a structured manner and promote effective learning. Wishing you an intellectually stimulating stay at Amity University.

16 January 2019



PROGRAMME STRUCTURE
M.TECH. CIVIL ENGINEERING (Structural Engineering)

FIRST SEMESTER						
Course Code	Course Title	Lecture (L) Hours Per Week	Tutorial (T) Hours Per Week	Practical (P) Hours Per Week	Total Credits	Total Hours
CEM 101	Numerical Analysis and Computer Programming	3	1	-	4	40
CEM 102	Concrete Technology	3	1	-	4	40
CEM 103	Advanced Structural Analysis	3	1	-	4	40
CEM 121	Numerical Analysis and Computer Programming Lab	-	-	4	2	40
CEM 122	Concrete Technology Lab	-	-	4	2	40
CEM 123	Advanced Structural Analysis Lab	-	-	4	2	40
ELECTIVES (Any one from each category)					4	40
CEM 104	Structural Dynamics And Earthquake Resistant Building	3	1	-	-	-
CEM 105	Bridge Engineering	3	1	-	-	-
CEM 106	Advanced Elasticity And Plasticity	3	1	-	-	-
BCP 141	Advanced Communication – I	1	-	-	1	10
BSP 143	Behavioral Science – I	1	-	-	1	10
FLP 144	French – I	2	-	-	2	20
MTP 130	Term Paper	-	-	-	3	-
TOTAL CREDITS					29	
Total Hrs per Week						32
Total Hrs in the Semester						320



THIRD SEMESTER						
Course Code	Course Title	Lecture (L) Hours Per Week	Tutorial (T) Hours Per Week	Practical (P) Hours Per Week	Total Credits	Total Hours
CEM 301	Research Methodology	3	1	-	4	40
CEM 302	Advanced RCC Design	3	1	-	4	40
CEM 303	High Rise Buildings Analysis	3	1	-	4	40
CEM 322	Advanced RCC Design Lab	-	-	4	2	40
CEM 324	Building Design Project Lab Using Software	-	-	4	2	40
CEM 325	Structural Material Testing Lab-II	-	-	4	2	40
ELECTIVES (Any one from each category)					4	40
CEM 306	Analysis of Plates And Shells	3	1	-	-	-
CEM 307	Reliability Based Civil Engineering Design	3	1	-	-	-
CEM 308	Evaluation and Retrofitting of Buildings	3	1	-	-	-
BCP 341	Advanced Communication – III	1	-	-	1	10
BSP 343	Behavioral Science – III	1	-	-	1	10
FLP 344	French– III	2	-	-	2	20
MSP 350	Summer Internship Programme (SIP)	-	-	-	6	-
MMP 360	Minor Project II	-	-	-	4	-
TOTAL CREDITS					36	
Total Hrs per Week					32	
Total Hrs in the Semester					320	

FOURTH SEMESTER						
Course Code	Course Title	Lecture (L) Hours Per Week	Tutorial (T) Hours Per Week	Practical (P) Hours Per Week	Total Credits	Total Hours
MMP 460	Dissertation (20-22 weeks)	-	-	-	30	-
TOTAL CREDITS					30	-
Total Hrs per Week					-	
Total Hrs in the Semester					-	

Master of Technology
(Civil Engineering)

Programme Code: CEM

Duration – 2 Years Full Time
(2019-21)

OVERALL CREDIT

Sr. No.	Semester	No. of Credits	No. of Hours
1	I	29	32
2	II	30	32
3	III	36	32
4	IV	30	-
Total Credits		125	96



OPTIMIZATION TECHNIQUES**Course Code PCE 101****Credit Units: 04****Total Hours: 40****Course Objective:**

To study the optimization methodologies applied to civil engineering

Course content:**Module I: Linear Programming: (8 Hours)**

Solution of LPP by simplex Method, Duality and its solution, Transportation Problem: Initial Solution, Test for Optimality, Unbalanced Transportation Problem, Degeneracy, Alternative Optimal Solutions, Prohibited Transportation, Maximization Transportation Problem Routs, *Assignment Problem*: Introduction, solution by Hungarian Method, Multiple Optimal Solution, Unbalanced Assignment Problem, Maximization Case in Assignment Problem, Restriction on Assignments.

Module II: Game Theory: (8 hours)

Introduction, Two-Person Zero Sum Games, Pure Strategies: Games with Saddle Point, Mixed Strategies: Games without saddle point, Principle of Dominance, Solution Methods for games without saddle point – Algebraic Method, Arithmetic Method, Matrix Method, Graphical Method.

Module III: Queuing Theory: (8 Hours)

Features of Queuing System, Solution of Queuing Models { (MM/1): (∞ /FCFS)} Single server, Exponential Service- Unlimited Queue.

Module IV: Simulation: (8 Hours)

Process of simulation, Monte Carlo Simulation, Simulation of an Inventory system, Simulation of Queuing System, Applications of Simulation

Module V: Sequencing: (8 Hours)

Gantt charts, Algorithm for solving sequencing problems: Johnson's Rule, Processing n jobs through 2 machines, processing n jobs through 3 machines, Processing 2 jobs through 'k' machines, Maintenance crew scheduling

Course Outcome:

On completion of this course students will have sufficient knowledge on various optimization techniques like linear programming, non-linear programming, geometric and dynamic programming and they will also in a position to design various structural elements for minimum weight.

Examination Scheme:

Components	A	CT	S/V/Q/HA	EE
Weightage (%)	5	15	10	70

CT: Class Test, HA: Home Assignment, S/V/Q: Seminar/Viva/Quiz, EE: End Semester Examination;
A: Attendance

Text & Reference:

- S.S. Rao, Optimization: Theory and applications, Wiley Eastern Ltd
- G.V. Reklaitis, Engg. Optimization Methods & applications
- London N.P. Linear Programming, Tata McGraw-Hill
- Sharma J.K. 1997, Operations Research: Theory & Appplicatinos, Mac Millan India Ltd.
- Grobner D.F. & Shannon P.W., Essential of Business Statistics: A Decision Making Approach, MacMillan College Publishing Co.

FOUNDATION ENGINEERING

Course Code: PCE 102

Credit Units: 04

Total Hours: 40

Course Objective:

To Understand the bearing capacity of shallow and deep foundation, to estimate the settlement of structures subjected to external loads, testing to design of foundation resting on soils.

Course Content:

Module I: Soil Explorations: (8 Hours)

Soil Exploration: Introduction, Methods of exploration, Direct Methods and techniques of exploration, Methods of boring types of samples, Disturbance of soil sample, Soil samplers and sampling techniques, Ground water observations, Boring records, Spacing and depth of bore holes, Indirect methods of soil exploration, Penetration tests, Geophysical methods, Dynamics methods, Sequence of exploration programs

Module II: Shallow foundations: (8 Hours)

Shallow Foundations: Introduction, General Requirements, Depth of foundation, Bearing capacity, Eccentric Inclined loads, Bearing capacity of stratified soils, Settlement of footings, Settlement of footings from constitutive laws, Settlement and tilt of eccentrically loaded footings, Allowable settlement, Plate bearing test, Standard penetration test Effect of water table, shallow foundation classification, Modulus of sub-grade reaction, Beams on elastic foundation, Raft foundation.

Module III: Deep Foundations: (8 Hours)

Pile Foundation: Introduction, Uses of piles, Types of piles, pile drivers, Bearing capacity of piles, Static analysis, Pile load test, Dynamic methods, Other methods, 24 Negative skin friction, Pile group, Ultimate bearing capacity of pile groups, Settlement of pile group, Influence of pile cap. Laterally loaded piles, Ultimate resistance, Elastic methods, Pile groups under lateral load, batter pile under lateral load, Batter pile groups under inclined loads, pile under dynamic loads.

Module IV: Cofferdams: (8 Hours)

Cofferdams: Introduction, types of Cofferdams, Design data for cellular cofferdam, Stability analysis of cofferdam, Interlock stresses.

Module V: Machine Foundations: (8 Hours)

Introduction, Criteria for satisfactory action of a machine foundation, Definitions, Degrees of freedom of a block foundation, Analysis of block foundation, Theory of linear weightless spring, Equivalent soil springs, Vertical vibration, Rocking vibration, Vibration in shear, Simultaneous rocking sliding and vertical vibrations for a foundation, Indian standard on design and construction of foundations for reciprocating machines, Foundations for impact type machines, Indian Standard on design and construction of foundations for impact type machines, Analysis of block foundation based on elastic half space theory.

Course Outcomes:

- Students should be in position to design foundation for varieties of the structures resting on soils.



PhD CE 2020-24

Examination Scheme:

Components	A	CT	S/V/Q/HA	EE
Weightage (%)	5	15	10	70

CT: Class Test, HA: Home Assignment, S/V/Q: Seminar/Viva/Quiz, EE: End Semester Examination;
A: Attendance

Text & References:

- Bowles, Foundation: Analysis and Design, McGraw Hill Book CO. Inc.
- Peck , R.B. , W.E. Hanson and T.H. Thornburn, Foundation Engineering, Wiley , New York



SMART MATERIALS AND TECHNIQUES

Course Code: PCE 103**Credits Units: 04****Total Hours: 40****Course Objectives:**

To make the students to gain the knowledge on strain measuring techniques, smart materials and signal processing and control systems.

Course Contents:**Module-I: Introduction to smart materials and sensing systems: (8 Hours)**

Introduction to Intelligent buildings - Basic concepts – Intelligent building automation - Building automation system - Cost analysis of intelligent buildings – Introduction to smart materials. Instrumented Structures Functions and Response– Sensing systems – Self-diagnosis – Signal processing consideration – Actuation systems and effectors.

Module-II: Actuator techniques: (8 Hours)

Actuator and actuator materials – Piezoelectric and Electrostrictive Material – Magnetostrictive Material – Shape Memory Alloys – Electrorheological Fluids– Electromagnetic actuation – Role of actuators and Actuator Materials.

Module- III: Nano-materials for "green" systems: (8 Hours)

Green materials, including biomaterials, biopolymers, bioplastics, and composites Nanotech Materials for Truly Sustainable Construction: Windows, Skylights, and Lighting. Paints, Roofs, Walls, and Cooling. Multifunctional Gas Sensors, Biomimetic Sensors, Optical Interference Sensors Thermo-, light-, and stimulus-responsive smart materials Nanomaterials. Polymer Membranes- Coatings-Adhesives, Non - Weathering Materials-Flooring and Facade Materials- Glazed Brick, Photo Catalytic Cement, Acid Etched Copper And Composite Fiber.

Module-IV: Building Systems: (8 Hours)

Lighting – day lighting; ventilation – natural ventilation; indoor air quality; heating/cooling – geothermal; passive and active systems for energy production and conservation; water conservation – grey water reuse, water saving plumbing fixtures.

Module-V: Building Electronics: (8 Hours)

Introduction - Microprocessor based control - Programmable logic controller – Communication principles - Telephone systems - Communal aerial broadcasting - Satellite communication – Fibre optic system.

Course Outcomes:

- Able to explain the functions and response of instrumented structures and measurement of strain using electrical strain gauges.
- Able to know the various smart materials such as sensors and actuators.
- Able to know about the control systems for smart structures.

Examination Scheme:

Components	A	CT	S/V/Q/HA	EE
Weightage (%)	5	15	10	70

CT: Class Test, HA: Home Assignment, S/V/Q: Seminar/Viva/Quiz, EE: End Semester Examination; A: Attendance

Text & References:

- Brain Culshaw – Smart Structure and Materials Artech House – Borton. London-1996. 2. Srinivasan ,A.V and Michael McFarland . D, “Smart Structures – Analysis and Design, Cambridge University Press, 2001.
- Yoseph Bar Cohen, “Smart Structures and Materials”, The International Society for Optical Engineering2003.
- L. S. Srinath, “Experimental Stress Analysis”, Tata McGraw Hill, 2004.
- J. W. Dally & W. F. Riley,”Experimental Stress Analysis”, Tata McGraw Hill Company



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EARTHQUAKE RESISTANT DESIGN OF STRUCTURE

Course Code: PCE 104

Credit Units: 04

Total Hours: 40

Course Objective:

This course is introduced to foresee the potential consequences of strong earthquakes on urban areas and civil infrastructure. Design, construct and maintain structures to perform at earthquake exposure up to the expectations and in compliance with building codes.

Course Content:

Module I: Seismology: (8 Hours)

Internal structure of earth causes of earthquakes, Seismic waves, Magnitude, Intensity and Energy released, Characteristics of Earthquakes.

Module II: Single Degree of Freedom: (8 Hours)

Response of Structure to Earthquake motion, Modeling of structures, Dynamics of single degree of freedom system,

Module III: Multi-Degree of Freedom: (8 Hours)

Dynamics of multi degree of freedom system, Idealization of structures, seismic response

Module IV: Methods of Seismic Analysis: (8 Hours)

Introduction to earthquake resistant design, Equivalent lateral force method, Response spectrum method, Time history method, Introduction to earthquake resistant brick and masonry buildings.

Module V: Building Control System: (8 Hours)

Structural control system : Base Isolation, Passive Control, Active control, Semi- Active control and Hybrid System.

Course Outcomes:

- The basics of the subject will help in the development of innovative technique of Seismic analysis and design of structures.
- It will open the new research area of “sensors based Structural Control system”.

Examination Scheme:

Components	A	CT	S/V/Q/HA	EE
Weightage (%)	5	15	10	70

CT: Class Test, HA: Home Assignment, S/V/Q: Seminar/Viva/Quiz, EE: End Semester Examination; A: Attendance

Text & References:

- Introduction to Structural Dynamics - J.M. Biggs
- Elements of Earthquake Engineering - Jai Krishna and A.R. Chandrasekaran
- IS: 1983 - 1984 Criterion for Earthquake Resistant Design.
- Structural Dynamics - Theory & computation - Mario Paz.
- Dynamics of Structures Theory and Applications to Earthquake Engineering - Anil K. Chopra.
- Earthquake Resistant of Design of structures, Agarwal and Srikhande.
- Earthquake Resistant of Design of structures, S.K.Duggal

STRUCTURAL HEALTH MONITORING

Course Code: PCE 105

Credit Units: 04

Total Hours: 40

Course Objective:

This course is deal with the various methods of evaluation of health of existing structures. The various techniques of structural health monitoring will also be covered in this subject.

Course Content:**Module-I: Maintenance: Repair and rehabilitation: (8 Hours)**

Facts of maintenance, importance of maintenance. Various aspects of inspection, assessment procedure for evaluating damaged structure, causes of deterioration. Repair Strategies: Causes of distress in concrete structures, construction and design failures, condition assessment and distress-diagnostic techniques, assessment procedure for inspection and evaluating a damaged structure.

Module-II: Serviceability and Durability of Concrete: (8 Hours)

Quality assurance for concrete construction, concrete properties – strength, permeability, thermal properties and cracking. effects due to climate, temperature, chemicals, corrosion.

Module-III: Materials and Techniques for Repair: (8 Hours)

Special concretes and mortar, concrete chemicals, special elements for accelerated strength gain, expansive cement, polymer concrete, sulphur infiltrated concrete, ferro-cement, fibre reinforced concrete, bacterial concrete, rust eliminators and polymers coating for rebars during repair, foamed concrete, mortar and dry pack, vacuum concrete, gunite and shotcrete, epoxy injection, mortar repair for cracks, shoring and underpinning.

Module-IV: Repair, Rehabilitation and Retrofitting Techniques: (8 Hours)

Repairs to overcome low member strength, deflection, cracking, chemical disruption, weathering corrosion, wear, fire, leakage and marine exposure. Repair of structure: Common types of repairs repair in concrete structures, repairs in under water structures. Strengthening of Structures: Strengthening Methods, retrofitting, Jacketing.

Module-V: Health Monitoring and Demolition Techniques: (8 Hours)

Long term health monitoring techniques, engineered demolition techniques for dilapidated structures, use of sensors for building instrumentation.

Course Outcomes:

- The basics of the subject will help in the development of innovative technique of rehabilitation of structures.
- It will open the new research area of “sensors based long terms structural health monitoring”.

Examination Scheme:

Components	A	CT	S/V/Q/HA	EE
Weightage (%)	5	15	10	70

CT: Class Test, HA: Home Assignment, S/V/Q: Seminar/Viva/Quiz, EE: End Semester Examination; A: Attendance

Texts & References:

- Concrete Technology by A.R. Santakumar, Oxford University press
- Defects and Deterioration in Buildings, E F & N Spon, London
- Non-Destructive Evaluation of Concrete Structures by Bungey - Surrey University
- Maintenance and Repair of Civil Structures, B.L. Gupta and Amit Gupta, Standard Publications.
- Concrete Repair and Maintenance Illustrated, RS Means Company Inc W. H. Ranso, (1981)
- Building Failures : Diagnosis and Avoidance, EF & N Spon, London, B .
- Mehta, P.K and Montevic. P.J., Concrete- Microstructure, Properties and Materials, ICI, 1997.,
- Jackson, N., Civil Engineering Materials, ELBS, 1983.

ADVANCED GEOTECHNICAL ENGINEERING

Course code PCE 106

Credit Units: 04

Total Hours: 40

Course Objectives:

To understand the physical and engineering properties of soil and its behavior under external loads and for different site conditions. To determine the bearing capacity of shallow and deep foundations, to estimate settlements of structures subjected to external loads, leading to design of foundations resting on soils.

Course Contents:**Module-I: Soil Structures and its Properties: (8 Hours)**

Structure and composition of soil & clay minerals, effect of clay minerals on engineering properties, mechanics of expansive soil.

Module-II: Concept of Plain Stress and Strain in Soil Mechanics: (8 Hours)

Plane stress and plane strain problems as applied to geotechnical engineering. Concentrated and distributed line loads: Boussinesq's equation and Westergaard's solution. Vertical pressure line and strip loads and loaded circular and rectangular areas. Limitations of elastic formulae for soils.

Module-III: Concept of Elastic and Plastic State of Soil: (8 Hours)

General states of plastic equilibrium. Dubrova's lateral earth pressure theories, Brinch-Hansens theory. Shear strength of cohesion less and cohesive soils, effective stress principle. Theory of consolidation, Time rate of consolidation, 3-D consolidation, immediate and ultimate settlements.

Module-IV: Site investigation & exploration: (8 Hours)

location, depth of bore holes and bore log chart. Shallow foundations, Bearing capacity theories, settlement. I.S. Code on structural safety of foundations Allowable total and differential settlements. Load Tests : Indian standard specification on Load Tests. Contact Pressure distribution.

Module-V: Pile Foundation: (8 Hours)

Type of Piles, Allowable load on pile load test, Dynamic Formula, Static Formula. Pile Groups in sand and clays-settlement and bearing capacity I.S.Codes of piles. Behavior of pile under lateral loading-Winkler's assumptions, and Theory of beam on elastic foundations. Batter pile-methods of analysis.

Course Outcomes:

Students will be able to understand the soil behavior under external loads, and procedures to measure relevant soil parameters. Students should be in a position to design foundations for varieties of structures resting on soil deposits and appreciate the importance of reliability based design in geotechnical engineering.

Examination Scheme:

Components	A	CT	S/V/Q/HA	EE
Weightage (%)	5	15	10	70

CT: Class Test, HA: Home Assignment, S/V/Q: Seminar/Viva/Quiz, EE: End Semester Examination; A: Attendance

Text & References

- Advanced Geotechnical Engg. – Alam Singh, pub. CBS Publishers and Distributors.
- Theoretical Soil Mechanics- M. E. Harr, pub. Tata McGraw-Hill.
- Theoretical Soil Mechanics -Jumikis, pub. R.E. Krieger Pub.
- Theoretical Soil Mechanics -Terzaghi, pub. John Wiley & Sons.
- Foundation Design and Construction – Tomilson, pub. Longman Group, UK.
- Foundation Analysis and Design - J. E. Bowles, pub. Tata McGraw-Hill.
- Analysis and Design of Sub structures - Swami Saran, pub. Oxford & Ibh Publications.
- Design Aid in Soil Mechanics and Foundation Engineering- Kaniraj, pub. McGraw-Hill Publications.
- Design of Foundation System – Kurian, pub. Alpha Science International.

STRUCTURAL HEALTH MONITORING

Course Code: PCE 105

Credit Units: 04

Total Hours: 40

Course Objective:

This course is deal with the various methods of evaluation of health of existing structures. The various techniques of structural health monitoring will also be covered in this subject.

Course Content:**Module-I: Maintenance: Repair and rehabilitation: (8 Hours)**

Facts of maintenance, importance of maintenance. Various aspects of inspection, assessment procedure for evaluating damaged structure, causes of deterioration. Repair Strategies: Causes of distress in concrete structures, construction and design failures, condition assessment and distress-diagnostic techniques, assessment procedure for inspection and evaluating a damaged structure.

Module-II: Serviceability and Durability of Concrete: (8 Hours)

Quality assurance for concrete construction, concrete properties – strength, permeability, thermal properties and cracking. effects due to climate, temperature, chemicals, corrosion.

Module-III: Materials and Techniques for Repair: (8 Hours)

Special concretes and mortar, concrete chemicals, special elements for accelerated strength gain, expansive cement, polymer concrete, sulphur infiltrated concrete, ferro-cement, fibre reinforced concrete, bacterial concrete, rust eliminators and polymers coating for rebars during repair, foamed concrete, mortar and dry pack, vacuum concrete, gunite and shotcrete, epoxy injection, mortar repair for cracks, shoring and underpinning.

Module-IV: Repair, Rehabilitation and Retrofitting Techniques: (8 Hours)

Repairs to overcome low member strength, deflection, cracking, chemical disruption, weathering corrosion, wear, fire, leakage and marine exposure. Repair of structure: Common types of repairs repair in concrete structures, repairs in under water structures. Strengthening of Structures: Strengthening Methods, retrofitting, Jacketing.

Module-V: Health Monitoring and Demolition Techniques: (8 Hours)

Long term health monitoring techniques, engineered demolition techniques for dilapidated structures, use of sensors for building instrumentation.

Course Outcomes:

- The basics of the subject will help in the development of innovative technique of rehabilitation of structures.
- It will open the new research area of “sensors based long terms structural health monitoring”.

Examination Scheme:

Components	A	CT	S/V/Q/HA	EE
Weightage (%)	5	15	10	70

CT: Class Test, HA: Home Assignment, S/V/Q: Seminar/Viva/Quiz, EE: End Semester Examination; A: Attendance

Texts & References:

- Concrete Technology by A.R. Santakumar, Oxford University press
- Defects and Deterioration in Buildings, E F & N Spon, London
- Non-Destructive Evaluation of Concrete Structures by Bungey - Surrey University
- Maintenance and Repair of Civil Structures, B.L. Gupta and Amit Gupta, Standard Publications.
- Concrete Repair and Maintenance Illustrated, RS Means Company Inc W. H. Ranso, (1981)
- Building Failures : Diagnosis and Avoidance, EF & N Spon, London, B .
- Mehta, P.K and Montevic. P.J., Concrete- Microstructure, Properties and Materials, ICI, 1997.,
- Jackson, N., Civil Engineering Materials, ELBS, 1983.

FINITE ELEMENT METHODS**Course Code PCE 107****Credit Units: 04****Total Hours: 40****Course Objective:**

This course is deal with the basic fundamental of FEM which enables the user to virtually test and predict the behavior of structures in addition to solving complex civil engineering problems.

Course Content:**Module-I: Calculus of variation: (8 Hours)**

Introduction to calculus of variations, Introduction to equilibrium equations in elasticity, Euler's Lagrange's equations, Principal of virtual work, virtual displacements, Principles of minimum potential energy, boundary value, initial value problems, Flexibility approach, Displacement approach, Different problems in structural analysis.

Module-II: FEM Procedure: (8 Hours),

Derivation of FEM equations by variation principle polynomials, Concept of shape functions, Derivation for linear simplex element, Need for integral forms, Interpolation polynomials in global and local coordinates. Weighted residual Methods: Concept of weighted residual method, Derivation of FEM equations by Galerkin's method, Solving cantilever beam problem by Galerkin's approach, Derivation of shape functions for CST triangular elements, Shape functions for rectangular elements, Shape functions for quadrilateral elements.

Module-III: Higher order Elements: (8 Hours)

Concept of iso-parametric elements, Concept of sub-parametric and super - parametric elements, Concept of Jacobin matrix. Numerical Integration: Numerical Integration, one point formula and two point formula for 2D formula, Different problems of numerical integration evaluation of element stiffness matrix, Automatic mesh generation schemes.

Module-IV: Shape Function and its Application: (8 Hours)

Pascal's triangle law for 2D shape functions polynomial, Pascal's triangle law for 3D shape function polynomials, Shape function for beam elements, Hermitian shape functions. Convergence: Convergence criteria, Compatibility requirements, Geometric isotropy invariance, Shape functions for iso-parametric elements, Special characteristics of stiffness matrix, Direct method for deriving shape functions using Lagrange's formula, Plane stress problems.

Module-V: Application of FEM in Structural Analysis: (8 Hours)

Analysis of Beam, Frames, Truss, and Plates subjected to various types of loads.

Examination Scheme:

Components	A	CT	S/V/Q/HA	EE
Weightage (%)	5	15	10	70

CT: Class Test, HA: Home Assignment, S/V/Q: Seminar/Viva/Quiz, EE: End Semester Examination; Att: Attendance

Course Outcomes:

- To understand the use of basic finite elements for structural applications using truss, beam, frame and plates.
- It will open the new research area of "Finite element based analysis and design of complicated structures.

Text & References:

- The Finite Element method -ZIENKIEWICZ.O.C.Tata McGraw Hill Pub. New Delhi, 2000
- Finite Element Methods by C R Alaval , PHI
- Finite Elements in Engineering:- Chandrupatta, et. AI. Prentice Hall of India Pvt. Ltd.,
- Finite element method with application in engineering by Chandrupatla & Belegundu, Pearson
- Publication. 5. Finite Element Method Basics concept & Applications by Alawala
- Fundamental of Finite element Analysis by Devid V. hutton
- Finite element Methods is fundamentals an application in engineering by Chen Z
- Reference:Concepts and Applications of Finite Element Analysis: COOK. D. Robert. Malus.S.David, Plesha
- E. Michel, John wilely & sons 3rd Edn. New York, 2000
- Finite Element Analysis -C.S. Krishnanmoorthy, Tata McGraw Hill Publishing Co. Ltd, New Delhi,



**Bachelor of Technology
(Civil Engineering)**

CIV

**AICTE MODEL
CURRICULUM**

(2019-23 Batch)

**Bachelor of Technology
(Civil Engineering)**

Programme Code: CIV

Duration – 4 Years Full Time



**Programme Structure
&
Curriculum & Scheme of Examination**

**2019-23
(Based on AICTE)**

**AMITY UNIVERSITY
MADHYA PRADESH**

PREAMBLE

Amity University aims to achieve academic excellence by providing multi-faceted education to students and encourage them to reach the pinnacle of success. The University has designed a system that would provide rigorous academic programme with necessary skills to enable them to excel in their careers.

This booklet contains the Programme Structure, the Detailed Curriculum and the Scheme of Examination. The Programme Structure includes the courses (Core and Elective), arranged semester wise. The importance of each course is defined in terms of credits attached to it. The credit units attached to each course has been further defined in terms of contact hours i.e. Lecture Hours (L), Tutorial Hours (T), Practical Hours (P). Towards earning credits in terms of contact hours, 1 Lecture and 1 Tutorial per week are rated as 1 credit each and 2 Practical hours per week are rated as 1 credit. Thus, for example, an L-T-P structure of 3-0-0 will have 3 credits, 3-1-0 will have 4 credits, and 3-1-2 will have 5 credits.

The Curriculum and Scheme of Examination of each course includes the course objectives, course contents, scheme of examination and the list of text and references. The different codes used for the components of evaluation are given below:-

Components

Case Discussion/ Presentation/ Analysis
Home Assignment
Project
Seminar
Viva
Quiz
Class Test
Attendance
End Semester Examination

Codes

C
H
P
S
V
Q
CT
A
ESE

It is hoped that it will help the students study in a planned and a structured manner and promote effective learning. Wishing you an intellectually stimulating stay at Amity University.

April, 2019

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PROGRAM OUTCOMES

PO1. Engineering Knowledge: Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems.

PO2. Problem Analysis: Identify, formulate, review research literature, and analyze complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences.

PO3. Design/Development of Solutions :Design solutions for complex engineering problems and design system components or processes that meet the specified needs with appropriate consideration for the public health and safety, and the cultural, societal, and environmental considerations.

PO4. Conduct Investigations of Complex Problems :Use research-based knowledge and research methods including design of experiments, analysis and interpretation of data, and synthesis of the information to provide valid conclusions.

PO5. Modern Tool Usage: Create, select, and apply appropriate techniques, resources, and modern engineering and IT tools including prediction and modelling to complex engineering activities with an understanding of the limitations.

PO6. The Engineer and Society: Apply reasoning informed by the contextual knowledge to assess societal, health, safety, legal and cultural issues and the consequent responsibilities relevant to the professional engineering practice.

PO7. Environment and Sustainability: Understand the impact of the professional engineering solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development.

PO8. Ethics: Apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering practice.

PO9. Individual and Team Work: Function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings.

PO10. Communication: Communicate effectively on complex engineering activities with the engineering community and with society at large, such as, being able to comprehend and write effective reports and design documentation, make effective presentations, and give and receive clear instructions.

PO11. Life-long Learning: Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change.

PO12. Project Management and Finance: Demonstrate knowledge and understanding of the engineering and management principles and apply these to one's own work, as a member and leader in a team, to manage projects

PROGRAM SPECIFIC OUTCOMES

PSO1. Apply principles of mechanics and basic sciences to analyze civil engineering structures

PSO2. Survey, map, measure and analyze data for sustainable infrastructure planning.

PSO3. Characterize and evaluate materials for adoptability in civil engineering projects.

PSO4. Analyze and design concrete & steel structures, earthen embankments, irrigation structures, water supply, waste treatment systems and transport systems.

PSO5. Apply best management practices for construction and maintenance of infrastructure facilities.

PSO6. Predict and forecast societal needs, floods, droughts, pollution and travel demand.

PSO7. Work and lead in multi-disciplinary projects and demonstrate social responsibility and professional ethics.

PSO8. Engage in research and life-long learning to adapt to changing environment.



FIRST SEMESTER						
Course Code	Course Title	Lecture (L) Hours Per week	Tutorial (T) Hours Per week	Practical (P) Hours Per week	Total Credits	Hours
MAT 101	Applied Mathematics – I (Calculus and Linear Algebra)	3	1	-	4	40
CHE 101	Applied Chemistry	3	1	-	4	40
ECE 101	Basic Electrical Engineering	3	-	-	3	30
BME 101	Engineering Graphics & Design	1	-	-	1	10
CHE 121	Applied Chemistry Lab	-	-	2	1	20
ECE 121	Basic Electrical Engineering Lab	-	-	2	1	20
BME 121	Engineering Graphics & Design Lab	-	-	4	2	40
BCU 141	Communication Skills – I	1	-	-	1	10
EVS 142	Environmental Studies – I	2	-	-	2	20
BSU 143	Behavioural Science – I	1	-	-	1	10
FLU 144	French – I	2	-	-	2	20
CBCS		3	-	-	3	30
TOTAL CREDITS (Including CBCS)					25	
Total Hours Including CBCS per week					29	
Total Hours in the Semester					290	

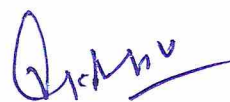




SECOND SEMESTER						
Course Code	Course Title	Lecture (L) Hours Per week	Tutorial (T) Hours Per week	Practical (P) Hours Per week	Total Credits	Hours
MAT 201	Applied Mathematics – II (Ordinary & Partial Differential Equations and Transform)	3	1	-	4	40
PHY 101	Applied Physics – I	3	1	-	4	40
CSE 104	Programming for Problem Solving	3	-	-	3	30
BME 102	Workshop/ Manufacturing Practices	1	-	-	1	10
PHY 121	Applied Physics Lab – I	-	-	2	1	20
CSE 124	Programming for Problem Solving Lab	-	-	4	2	40
BME 122	Workshop/ Manufacturing Practices Lab	-	-	4	2	40
BCU 241	Communication Skills – II	1	-	-	1	10
EVS 242	Environmental Studies – II	2	-	-	2	20
BSU 243	Behavioural Science – II	1	-	-	1	10
FLU 244	French – II	2	-	-	2	20
CBCS		3	-	-	3	30
TOTAL CREDITS (Including CBCS)					26	
Total Hours Including CBCS					31	
Total Hours in the Semester					310	
TERM PAPER DURING SUMMER BREAK						

THIRD SEMESTER						
Course Code	Course Title	Lecture (L) Hours Per week	Tutorial (T) Hours Per week	Practical (P) Hours Per week	Total Credits	Hours
MAT 301	Applied Mathematics- III (Probability, Statistics and Numerical Methods)	3	-	-	3	30
CIV 302	Computer-Aided Civil Engineering Drawing	2	-	-	2	20
CIV 303	Engineering Mechanics	3	1	-	4	40
CIV 304	Energy Science & Engineering	1	1	-	2	20
CIV 305	Basic Civil Engineering	2	-	-	2	20
BME 104	Mechanical Engineering	2	-	-	2	20
ECE 307	Basic Electronics	2	-	-	2	20
CIV 306	Biology for Engineers	2	-	-	2	20
CIV 307	Life Science	2	-	-	2	20
CIV 322	Computer-aided Civil Engineering Drawing Lab	-	-	2	1	20
ECE 327	Basic Electronics Lab	-	-	2	1	20
BCU 341	Communication Skills – III	1	-	-	1	10
BSU 343	Behavioural Science – III	1	-	-	1	10
FLU 344	French – III	2	-	-	2	20
NTP 330	Term paper (Evaluation)	-	-	-	2	
CBCS		3	-	-	3	30
TOTAL CREDITS (Including CBCS)					32	
Total Hours. including CBCS					32	
Total Hours in the Semester					320	





FOURTH SEMESTER						
Course Code	Course Title	Lecture (L) Hours Per week	Tutorial (T) Hours Per week	Practical (P) Hours Per week	Total Credits	Hours
CIV 401	Materials, Testing & Evaluation	2	-	-	2	20
CIV 402	Engineering Geology	2	-	-	2	20
CIV 403	Surveying	1	1	-	2	20
CIV 404	Fluid Mechanics	2	-	-	2	20
CIV 405	Solid Mechanics	2	-	-	2	20
CIV 406	Disaster Preparedness & Planning	1	1	-	2	20
CIV 407	Civil Engineering - Societal & Global Impact	1	1	-	2	20
ECE 407	Instrumentation & Sensor Technologies for Civil Engineering Applications	2	-	-	2	20
CIV 421	Materials Testing and Evaluation Lab	-	-	2	1	20
CIV 422	Engineering Geology Lab	-	-	2	1	20
CIV 423	Surveying lab	-	-	2	1	20
CIV 424	Fluid Mechanics Lab	-	-	2	1	20
ECE 427	Instrumentation & Sensor Technologies for Civil Engineering Applications Lab	-	-	2	1	20
BCU 441	Communication Skills – IV	1	-	-	1	10
BSU 443	Behavioural Science – IV	1	-	-	1	10
FLU 444	French – IV	2	-	-	2	20
CBCS		3	1	-	4	40
TOTAL CREDITS (Including CBCS)					29	
Total Hours including CBCS					34	
Total Hours in the Semester					340	
INDUSTRIAL PRACTICAL TRAINING – I: 6 – 8 WEEKS						





FIFTH SEMESTER						
Course Code	Course Title	Lecture (L) Hours Per week	Tutorial (T) Hours Per week	Practical (P) Hours Per week	Total Credits	Hours
CIV 501	Mechanics of Materials	3	-	-	3	30
CIV 502	Hydraulic Engineering	2	-	-	2	20
CIV 503	Structural Engineering	3	-	-	3	30
CIV 504	Geotechnical Engineering	2	-	-	2	20
CIV 505	Hydrology & Water Resources Engineering	3	-	-	3	30
CIV 506	Environmental Engineering – I	3	-	-	3	30
CIV 507	Transportation Engineering	2	-	-	2	20
CIV 522	Hydraulic Engineering Lab	-	-	2	1	20
CIV 524	Geotechnical Engineering Lab	-	-	2	1	20
CIV 527	Transportation Engineering Lab	-	-	2	1	20
BCU 541	Communication Skills – V	1	-	-	1	10
BSU 543	Behavioural Science – V	1	-	-	1	10
FLU 544	French – V	2	-	-	2	20
NPT 550	Industrial Practical Training I (Evaluation)	-	-	-	3	-
CBCS		3	1	-	4	40
TOTAL CREDIT (Including CBCS)					32	
Total Hours including CBCS					32	
Total hours in semester					320	





SIXTH SEMESTER						
Course Code	Course Title	Lecture (L) Hours Per week	Tutorial (T) Hours Per week	Practical (P) Hours Per week	Total Credits	Hours
CIV 601	Construction Engineering & Management	2	1	-	3	30
CIV 602	Geometric Design of Highways	3	-	-	3	30
CIV 603	Environmental Engineering – II	3	-	-	3	30
CIV 604	Estimating and Costing	2	-	-	2	20
CIV 622	Geometric Design of Highways Lab	-	-	2	1	20
CIV 623	Environmental Engineering – II Lab	-	-	2	1	20
CIV 624	Estimating and Costing Lab	-	-	2	1	20
ELECTIVES (Any one from following with Practical)					4	50
CIV 605	River Engineering	3	-	-	-	-
CIV 606	Open Channel Flow	3	-	-	-	-
CIV 607	Solid and Hazardous Waste Management	3	-	-	-	-
CIV 625	River Engineering Lab	-	-	2	-	-
CIV 626	Open Channel Flow Lab	-	-	2	-	-
CIV 627	Solid and Hazardous Waste Management Lab	-	-	2	-	-
BCH 620	Engineering Economics	2	1		3	30
BCU 641	Communication Skills – VI	1	-	-	1	10
BSU 643	Behavioural Science – VI	1	-	-	1	10
FLU 644	French – VI	2	-	-	2	20
NMP 660	Minor Project	-	-	-	2	-
CBCS		-	-	-	1	-
TOTAL CREDIT (Including CBCS)					28	
Total Hours per week					29	
Total hours in semester					290	
INDUSTRIAL PRACTICAL TRAINING II: 6-8 WEEKS						





SEVENTH SEMESTER						
Course Code	Course Title	Lecture (L) Hours Per week	Tutorial (T) Hours Per week	Practical (P) Hours Per week	Total Credits	Hours
CIV 701	Design of Concrete Structures	3	1		4	40
ELECTIVES (Any one from each category) A. (With Practical)					4	50
CIV 702	Surface Hydrology	3	-	-	-	-
CIV 703	Water Resources Field Methods	3	-	-	-	-
CIV 704	Environmental Fluid Mechanics	3	-	-	-	-
CIV 722	Surface Hydrology Lab	-	-	2	-	-
CIV 723	Water Resources Field Methods Lab	-	-	2	-	-
CIV 724	Environmental Fluid Mechanics Lab	-	-	2	-	-
ELECTIVES (Any one from each category) B. (Without Practical)					3	30
CIV 705	Concrete Technology	3	-	-	-	-
CIV 706	Pres-stressed Concrete	3	-	-	-	-
CIV 707	Masonry Structures	3	-	-	-	-
BCU 741	Communication Skills – VII	1	-	-	1	10
BSU 743	Behavioural Science – VII	1	-	-	1	10
FLU 744	French – VII	2	-	-	2	20
NPT 750	Industrial Practical Training–II (Evaluation)	-	-	-	5	-
NMP 760	Major Project – I	-	-	-	6	-
TOTAL CREDIT					26	
Total hours per week					16	
Total hours in semester					160	

EIGHTH SEMESTER						
Course Code	Course Title	Lecture (L) Hours Per week	Tutorial (T) Hours Per week	Practical (P) Hours Per week	Total Credits	Hours
CIV 801	Design of Steel Structures	3	1	-	4	40
CIV 802	Airport Planning and Design	3	-	-	3	30
ELECTIVES (Any one from following with Practical)					4	50
CIV 803	Foundation Engineering	3	-	-	-	-
CIV 804	Structural Geology	3	-	-	-	-
CIV 805	Rock Mechanics	3	-	-	-	-
CIV 823	Foundation Engineering Lab	-	-	2	-	-
CIV 824	Structural Geology Lab	-	-	2	-	-
CIV 825	Rock Mechanics Lab	-	-	2	-	-
BCU 841	Communication Skills – VIII	1	-	-	1	10
BSU 843	Behavioral Science – VIII	1	-	-	1	10
FLU 844	French – VIII	2	-	-	2	20
NMP 860	Major Project – II	-	-	-	9	-
TOTAL CREDIT					24	
Total hours per week					16	
Total hours in semester					160	





**Bachelor of Technology
(Civil Engineering)**

Programme Code: CIV

**Duration – 4 Years Full Time
(2019-23)**

OVERALL CREDIT

Sr. No.	Semester	No. of Credits	No. of Hours
1	I	25	29
2	II	26	31
3	III	32	32
4	IV	29	34
5	V	32	32
6	VI	28	29
7	VII	26	16
8	VIII	24	16
Total Credits		222	219

Dr. Jyoti

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ENERGY SCIENCE & ENGINEERING

Course Code: CIV 304

Credit Units : 02

Total Hours : 20

Course Objective:

The objective of this Course is to provide an introduction to energy systems and renewable energy resources, with a scientific examination of the energy field and an emphasis on alternative energy sources and their technology and application. The class will explore society's present needs and future energy demands, examine conventional energy sources and systems, including fossil fuels and nuclear energy, and then focus on alternatives, renewable energy sources such as solar, biomass (conversions), wind power, waves and tidal, geothermal, ocean thermal, hydro and nuclear. Energy conservation methods will be emphasized from Civil Engineering perspective. The knowledge acquired lays a good foundation for design of various civil engineering systems/ projects dealing with these energy generation paradigms in an efficient manner.

Course Contents:

Module I: Introduction to Energy Science: (4 Hours)

Scientific principles and historical interpretation to place energy use in the context of pressing societal, environmental and climate issues; Introduction to energy systems and resources; Introduction to Energy, sustainability & the environment.

Module II: Energy Sources: (4 Hours)

Overview of energy systems, sources, transformations, efficiency, and storage. Fossil fuels (coal, oil, oil-bearing shale and sands, coal gasification) - past, present & future, Remedies & alternatives for fossil fuels - biomass, wind, solar, nuclear, wave, tidal and hydrogen; Sustainability and environmental trade-offs of different energy systems; possibilities for energy storage or regeneration (Ex. Pumped storage hydro power projects, superconductor-based energy storages, high efficiency batteries).

Module III: Energy & Environment: (4 Hours)

Energy efficiency and conservation; introduction to clean energy technologies and its importance in sustainable development; Carbon footprint, energy consumption and sustainability; introduction to the economics of energy; How the economic system determines production and consumption; linkages between economic and environmental outcomes; How future energy use can be influenced by economic, environmental, trade, and research policy.

Module IV: Civil Engineering Projects connected with the Energy Sources: (4 Hours)

Coal mining technologies, Oil exploration offshore platforms, Underground and under-sea oil pipelines, solar chimney project, wave energy caissons, coastal installations for tidal power, wind mill towers; hydro power stations above-ground and underground along with associated dams, tunnels, penstocks, etc.; Nuclear reactor containment buildings and associated buildings, design and construction constraints and testing procedures for reactor containment buildings; Spent Nuclear fuel storage and disposal systems

Module V: Engineering for Energy conservation: (4 Hours)

Concept of Green Building and Green Architecture, Green building concepts (Green building encompasses everything from the choice of building materials to where a building is located, how it is designed and operated); LEED ratings; Identification of energy related enterprises that represent the breath of the industry and prioritizing these as candidates; Embodied energy analysis and use as a tool for measuring sustainability. Energy Audit of Facilities and optimization of energy consumption.



B.Tech. CE 2019-23 (Based on AICTE)

Course Outcomes:

- List and generally explain the main sources of energy and their primary applications nationally and internationally
- Have basic understanding of the energy sources and scientific concepts/principles behind them
- Describe the challenges and problems associated with the use of various energy sources, including fossil fuels, with regard to future supply and the impact on the environment.
- List and describe the primary renewable energy resources and technologies.
- To quantify energy demands and make comparisons among energy uses, resources, and technologies.
- Collect and organize information on renewable energy technologies as a basis for further analysis and evaluation.
- Understand the Engineering involved in projects utilising these sources

Examination Scheme:

Components	A	CT	S/V/Q/HA	EE
Weightage (%)	5	15	10	70

CT: Class Test, HA: Home Assignment, S/V/Q: Seminar/Viva/Quiz, EE: End Semester Examination; Att: Attendance

Text & References:

- Boyle, Godfrey (2004), Renewable Energy (2nd edition). Oxford University Press
- Boyle, Godfrey, Bob Everett, and Janet Ramage (Eds.) (2004), Energy Systems and Sustainability: Power for a Sustainable Future. Oxford University Press
- Schaeffer, John (2007), Real Goods Solar Living Sourcebook: The Complete Guide to Renewable Energy Technologies and Sustainable Living, Gaian
- Jean-Philippe; Zaccour, Georges (Eds.), (2005), Energy and Environment Set: Mathematics of Decision Making, Loulou, Richard; Waaub, XVIII,
- Ristinen, Robert A. Kraushaar, Jack J. AKraushaar, Jack P. Ristinen, Robert A. (2006) Energy and the Environment, 2nd Edition, John Wiley
- UNDP (2000), Energy and the Challenge of Sustainability, World Energy assessment
- E H Thorndike (1976), Energy & Environment: A Primer for Scientists and Engineers, Addison-Wesley Publishing Company
- Related papers published in international journals



BASIC CIVIL ENGINEERING

Course Code: CIV 305

Credit Units: 02

Total Hours: 20

Course Objective:

To give an understanding to the students of the vast breadth and numerous areas of engagement available in the overall field of Civil Engineering. To motivate the student to pursue a career in one of the many areas of Civil Engineering with deep interest and keenness. To expose the students to the various avenues available for doing creative and innovative work in this field by showcasing the many monuments and inspiring projects of public utility.

Course Contents:

Module-I: Basic Understanding: (4 Hours)

What is Civil Engineering/ Infrastructure? Basics of Engineering and Civil Engineering; Broad disciplines of Civil Engineering; Importance of Civil Engineering, Possible scopes for a career. Early constructions and developments over time; Ancient monuments & Modern marvels; Development of various materials of construction and methods of construction; Works of Eminent civil engineers.

Module-II: Fundamentals of Architecture & Town Planning: (4 Hours)

Aesthetics in Civil Engineering, Examples of great architecture, fundamentals of architectural design & town planning; Building Systems (HVAC, Acoustics, Lighting, etc.); LEED ratings; Development of Smart cities.

Module-III: Fundamentals of Building Materials: (4 Hours)

Stones, bricks, mortars, Plain, Reinforced & Prestressed Concrete, Construction Chemicals; Structural Steel, High Tensile Steel, Carbon Composites; Plastics in Construction; 3D printing; Recycling of Construction & Demolition wastes. Types of buildings; tall structures; various types of bridges; Water retaining structures; Other structural systems; Experimental Stress Analysis; Wind tunnel studies.

Module-IV: Environmental Engineering & Sustainability: (4 Hours)

Water treatment systems; Effluent treatment systems; Solid waste management; Sustainability in Construction; **Geotechnical Engineering:-**(Basics of soil mechanics, rock mechanics and geology; various types of foundations) **Hydraulics, Hydrology & Water Resources Engineering:** (Fundamentals of fluid flow, basics of water supply systems; Underground Structures)

Module-V: Surveying & Geometrics: (2 Hours)

Traditional surveying techniques, Total Stations, Development of Digital Terrain Models; GPS, LIDAR. **Traffic & Transportation Engineering:** (Development in India for different modes of transport; Developments and challenges in integrated transport development in India: road, rail, port and harbour and airport sector; PPP in transport sector; Intelligent Transport Systems; Urban Public and Freight Transportation; Road Safety under heterogeneous traffic; Sustainable and resilient pavement materials)

Module-VI: Repairs & Rehabilitation of Structures: (2 Hours)

Basics of corrosion phenomena and other structural distress mechanisms; some simple systems of rehabilitation of structures; Non- Destructive testing systems; Use of carbon fibre wrapping and carbon composites in repairs. Typical software used in Civil Engineering- Finite Element Method, Modelling; highlighting typical available software systems (SAP, STAAD, ABAQUS, MATLAB, ETAB, REVIT, AUTOCAD, PRIMAVERA)

Module-VII: Industrial Visit.

At least one day visit to local industry in the field of Civil Engineering.

Course Outcomes:

- Introduction to what constitutes Civil Engineering
- Identifying the various areas available to pursue and specialize within the overall field of Civil Engineering
- Highlighting the depth of engagement possible within each of these areas
- Exploration of the various possibilities of a career in this field
- Understanding the vast interfaces this field has with the society at large
- Providing inspiration for doing creative and innovative work
- Showcasing the many monuments, heritage structures, nationally important infrastructure, and impressive projects to serve as sources of inspiration
- Highlighting possibilities for taking up entrepreneurial activities in this field
- Providing a foundation for the student to launch off upon an inspired academic pursuit into this branch of engineering

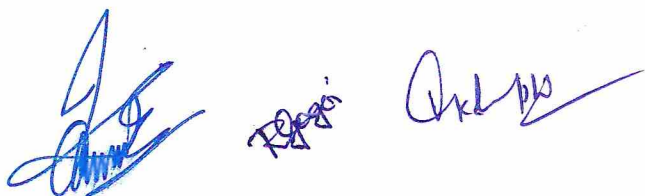
Examination Scheme:

Components	A	CT	S/V/Q/HA	EE
Weightage (%)	5	15	10	70

CT: Class Test, HA: Home Assignment, S/V/Q: Seminar/Viva/Quiz, EE: End Semester Examination; Att: Attendance

Text & References:

- Patil, B.S.(1974), Legal Aspects of Building and Engineering Contract
- The National Building Code, BIS, (2017)
- RERA Act, (2017)
- Meena Rao (2006), Fundamental concepts in Law of Contract, 3rd Edn. Professional Offset
- Chandiramani, Neelima (2000), The Law of Contract: An Outline, 2nd Edn. Avinash Publications Mumbai
- Avtarsingh (2002), Law of Contract, Eastern Book Co.
- Dutt (1994), Indian Contract Act, Eastern Law House
- Anson W.R.(1979), Law of Contract, Oxford University Press
- Kwatra G.K.(2005), The Arbitration & Conciliation of Law in India with case law on UNCITRAL Model Law on Arbitration, Indian Council of Arbitration
- Avtarsingh (2005), Law of Arbitration and Conciliation, Eastern Book Co.
- Wadhera (2004), Intellectual Property Rights, Universal Law Publishing Co.
- P. S. Narayan (2000), Intellectual Property Rights, Gogia Law Agency
- T. Ramappa (2010), Intellectual Property Rights Law in India, Asia Law House
- Bare text (2005), Right to Information Act
- O.P. Malhotra, Law of Industrial Disputes, N.M. Tripathi Publishers
- K.M. Desai(1946), The Industrial Employment (Standing Orders) Act
- Rustamji R.F., Introduction to the Law of Industrial Disputes, Asia Publishing House
- Vee, Charles & Skitmore, Martin (2003) Professional Ethics in the Construction Industry, Engineering Construction and Architectural management, Vol.10, Iss. 2, pp 117-127, MCB UP Ltd
- American Society of Civil Engineers (2011) ASCE Code of Ethics – Principles Study and Application
- Ethics in Engineering- M.W.Martin& R.Schinzinger, McGraw-Hill



B.Tech CE 2019-23 (Based on AICTE)
BIOLOGY FOR ENGINEERS

Course Code: CIV 306

Credit Units: 02

Total Hours: 20

Course Objectives

To gain knowledge of the subject biology, its importance, to provide basic knowledge about plant physiology, ecology, ecosystems, population ecology, environmental management, protection Acts & elementary principles of biostatistical methods & tools.

Course Contents:

Module I: Why we need to study biology? (5 Hours)

To convey that Biology is as important a scientific discipline as Mathematics, Physics and Chemistry. Bring out the fundamental differences between science and engineering. Mention the most exciting aspect of biology as an independent scientific discipline. Why we need to study biology? Discuss how biological observations of 18th Century that lead to major discoveries.

Module II: Plant Physiology: (3 Hours)

Transpiration; Mineral nutrition

Module III: Ecology, Ecosystems & Population Ecology: (6 Hours)

Components, types, flow of matter and energy in an ecosystem; Community ecology- Characteristics, frequency, life forms, and biological spectrum; Ecosystem structure- Biotic and a-biotic factors, food chain, food web, ecological pyramids.

Population characteristics, ecotypes; Population genetics- Concept of gene pool and genetic diversity in populations, polymorphism and heterogeneity;

Module IV: Environmental Management: (3 Hours)

Perspectives concerns and management strategies; Policies and legal aspects- Environment Protection Acts and modification, International Treaties; Environmental Impact Assessment- Case studies (International Airport, thermal power plant)

Module V: Introduction to Biostatistics: (3 Hours)

Terms used, types of data; Measures of Central Tendencies- Mean, Median, Mode, Normal and Skewed distributions; Analysis of Data- Hypothesis testing and ANNOVA (single factor)

Course outcome:

After completion of this course students will be able to understand

- The significance of biological sciences
- Develop an understanding of the ecosystems, community ecology, ecosystem structure etc.
- Understand the concept of population characteristics, ecotypes; population genetics.
- Develop an insight into the various environmental management covering principles environment protection Acts. Environmental Impact Assessment
- Understanding the concept of biostatistical analysis which will provide a foundation for laboratory & fieldworks.

Examination Scheme:

Components	A	CT	S/V/Q/HA	EE
Weightage (%)	5	15	10	70

CT: Class Test, HA: Home Assignment, S/V/Q: Seminar/Viva/Quiz, EE: End Semester Examination; Att: Attendance

Text & References:

- Biology: A global approach: Campbell, N. A.; Reece, J. B.; Urry, Lisa; Cain, M, L.; Wasserman, S. A.; Minorsky, P. V.; Jackson, R. B. Pearson Education Ltd.
- Agarwal, K.C. 2001 Environmental Biology, Nidi Publ. Ltd. Bikaner.
- Cunningham, W.P. Cooper, T.H. Gorhani, E & Hepworth, M.T.2001, Environmental Encyclopedia, Jaico Publ.House, Mumabai, 1196p
- Jadhav, H & Bhosale, V.M. 1995. Environmental Protection and Laws. Himalaya Pub. House, Delhi 284 p.
- Mckinney, M.L. & School, R.M. 1996. Environmental Science Systems & Solutions, Web enhanced edn. 639p



LIFE SCIENCE

Course Code: CIV 307

Credit Units: 02

Total Hours: 20

Course Objective:

To understand cellularity in structural development, classification of species, the metabolism processes Elementary principles of genetics, Structures of DNA and RNA, Molecular genetics, Biostatistics, Biotechnology.

Course Contents:

Module I: Unicellular or Multicellular: (5 Hours)

Classification per se is not what biology is all about (The underlying criterion, such as morphological, biochemical or ecological be highlighted). Hierarchy of life forms at phenomenological level. Classification based on (a) cellularity- Unicellular or multicellular (b) ultrastructure- prokaryotes or eucaryotes. (c) energy and Carbon utilization -Autotrophs, heterotrophs, lithotropes (d) Ammonia excretion – aminotelic, uricotelic, ureotelic (e) Habitats- aquatic or terrestrial.

Module II: Concepts of Recessiveness and Dominance: (5 Hours)

Principles of Genetics in biology are like Newton's laws to Physical Sciences. Mendel's laws, Concept of segregation and independent assortment. Concept of allele. Gene mapping, Gene interaction, Epistasis. Meiosis and Mitosis (be taught as a part of genetics. Emphasis to be give not to the mechanics of cell division nor the phases but how genetic material passes from parent to offspring). Concepts of recessiveness and dominance. Concept of mapping of phenotypes to genes. Single gene disorders in humans. Concept of complementation using human genetics.

Module III: Molecules of Life: (5 Hours)

All forms of life has the same building blocks (yet the manifestations are as diverse as one can imagine Molecules of life). Discuss monomeric units and polymeric structures. Discuss about sugars, starch and cellulose. Amino acids and proteins, Lipids. Nucleotides and DNA/RNA.

Module IV: Molecular Genetics: (2 Hours)

Structures of DNA and RNA; Concept of Gene, Gene regulation, e.g., Operon concept;

Module V: Basic Concepts of Biotechnology: (3 Hours)

Totipotency and Cell manipulation; Plant & Animal tissue culture- Methods and uses in agriculture, medicine and health; Recombinant DNA Technology- Techniques and applications;

Course Outcomes:

After completion of this course students will be able to understand

- Cellular structures of living forms.
- Classification of biology and biomolecule
- About metabolism and Enzymes
- About DNA and biological structure
- About the species
- Exploring Molecular Genetics
- Understand the basic principles & techniques of biotechnology.

Examination Scheme:

Components	A	CT	S/V/Q/HA	EE
Weightage (%)	5	15	10	70

CT: Class Test, HA: Home Assignment, S/V/Q: Seminar/Viva/Quiz, EE: End Semester Examination; Att: Attendance

Text & References:

- Biology: A global approach: Campbell, N. A.; Reece, J. B.; Urry, Lisa; Cain, M, L.; Wasserman, S. A.; Minorsky, P. V.; Jackson, R. B. Pearson Education Ltd
- Outlines of Biochemistry, Conn, E.E; Stumpf, P.K; Bruening, G; Doi, R.H. John Wiley and Sons
- Principles of Biochemistry (V Edition), By Nelson, D. L.; and Cox, M. M.W.H. Freeman and Company
- Molecular Genetics (Second edition), Stent, G. S.; and Calender, R. W.H. Freeman and company, Distributed by Satish Kumar Jain for CBS Publisher
- Microbiology, Prescott, L.M J.P. Harley and C.A. Klein 1995. 2nd edition Wm, C. Brown Publishers



MECHANICS OF MATERIALS (removed)

Course Code: CIV 501

Credit Units: 03

Total Hours: 30

Course Objectives:

The course is designed to provide and train students of mechanics of materials. The course will introduce students to various material properties, mechanics under different loading condition etc.

Course Contents:

The objective of this Course is to introduce to continuum mechanics and material modeling of engineering materials based on first energy principles.

Module I: Introduction to Stress and Strain: (8 Hours)

Deformation and Strain covering description of finite deformation, Infinitesimal deformation; Analysis of statically determinate trusses; Stability of dams, retaining walls and chimneys; Stress analysis of thin, thick and compound cylinder.

Module II: Failure Theories: (7 Hours)

Generalized state of stress and strain: Stress and strain tensor, Yield criteria and theories of failure; Tresca, Von-Mises, Hill criteria, Heigh-Westerguard's stress space.

Module III: Bending Moments Diagrams: (5 Hours)

Momentum Balance and Stresses covering Forces and Moments Transmitted by Slender Members, Shear Force and Bending Moment Diagrams, Momentum Balance, Stress States / Failure Criterion.

Module IV: Determinacy and Indeterminacy of Structures: (5 Hours)

Mechanics of Deformable Bodies covering Force-deformation Relationships and Static Indeterminacy, Uniaxial Loading and Material Properties, Trusses and Their Deformations, Statically Determinate and Indeterminate Trusses,

Module V: Pressure Vessels and Torsion: (5 Hours)

Force-Stress-Equilibrium covering Multiaxial Stress and Strain, Thin-walled Pressure Vessels, Stress and strain Transformations and Principal Stress, Failure of Materials. Statically Indeterminate Beams, Shear and Torsion, Torsion and Twisting.

Course Outcome:

- Understand the deformation and strains under different load action and response in terms of forces and moments
- Understand the behaviour under different loading actions

Examination Scheme:

Components	A	CT	S/V/Q/HA	EE
Weightage (%)	5	15	10	70

CT: Class Test, HA: Home Assignment, S/V/Q: Seminar/Viva/Quiz, EE: End Semester Examination; Att: Attendance

Text & References:

- Norris, C.H. and Wilber, J. B. and Utku, S. "Elementary Structural Analysis" Mc Graw Hill, Tokyo, Japan.
- Timoshenko, S. and Young, D. H., "Elements of Strength of Materials", DVNC, New York, USA. 3.
- Kazmi, S. M. A., "Solid Mechanics" TMH, Delhi, India.
- Hibbeler, R. C. Mechanics of Materials. 6th ed. East Rutherford, NJ: Pearson Prentice Hall, 2004

SOLID MECHANICS

Course Code: CIV 405

Credit Units: 02

Total Hours: 20

Course Objectives:

To student will understand simples stresses and strains, compound stresses and strains, bending moments and shear strains, flexural stresses etc.

Course Contents:

Module I: Simple Stresses and Strains: (4 Hours)

Concept of stress and strain, St. Venant's principle, stress and strain diagram, Elasticity and plasticity – Types of stresses and strains, Hooke's law-stress – strain diagram for mild steel – Working stress – Factor of safety – Lateral strain, Poisson's ratio and volumetric strain – Elastic moduli and the relationship between them – Bars of varying section – composite bars – Temperature stresses. Strain Energy – Resilience-Gradual, sudden, impact and shock loadings – simple applications.

Module II: Compound Stresses and Strains: (3 Hours)

Two-dimensional system, stress at a point on a plane, principal stresses and principal planes, Mohr circle of stress, ellipse of stress and their applications. Two-dimensional stress-strain system, principal strains and principal axis of strain, circle of strain and ellipse of strain. Relationship between elastic constants.

Module III: Bending moment and Shear Force Diagrams: (4 Hours)

Bending moment (BM) and shear force (SF) diagrams. BM and SF diagrams for cantilevers simply supported and fixed beams with or without overhangs. Calculation of maximum BM and SF and the point of contra flexure under concentrated loads, uniformly distributed loads over the whole span or part of span, combination of concentrated loads (two or three) and uniformly distributed loads, uniformly varying loads, application of moments.

Module IV: Flexural Stresses-Theory of simple bending: (3 Hours)

Assumptions – Derivation of bending equation: $M/I = f/y = E/R$ - Neutral axis – Determination of bending stresses – Section modulus of rectangular and circular sections (Solid and Hollow), I, T, Angle and Channel sections – Design of simple beam sections.

Module V: Shear Stresses- Derivation of formula: (3 Hours)

Shear stress distribution across various beam sections like rectangular, circular, triangular, I, T angle sections. Relationship between moment, slope and deflection, Moment area method, Macaulay's method. Use of these methods to calculate slope and deflection for determinant beams.

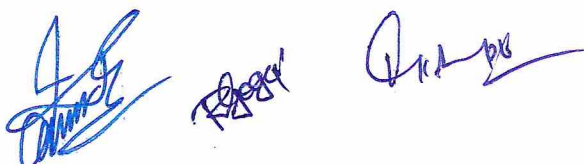
Module VI: Torsion: (3 Hours)

Derivation of torsion equation and its assumptions. Applications of the equation of the hollow and solid circular shafts, torsional rigidity, Combined torsion and bending of circular shafts, principal stress and maximum shear stresses under combined loading of bending and torsion. Derivation of formulae and calculations of hoop stress, longitudinal stress in a cylinder, and sphere subjected to internal pressures.

Course Outcomes:

Students will understand the following.

- Simple Stresses and Strains
- Compound Stresses and Strains
- Bending moment and Shear Force Diagrams
- They will develop skills to problem solving in solid mechanics.



B. Tech. CE 2019-23 (Based on AICTE)

Examination Scheme:

Components	A	CT	S/V/Q/HA	EE
Weightage (%)	5	15	10	70

CT: Class Test, HA: Home Assignment, S/V/Q: Seminar/Viva/Quiz, EE: End Semester Examination; Att: Attendance

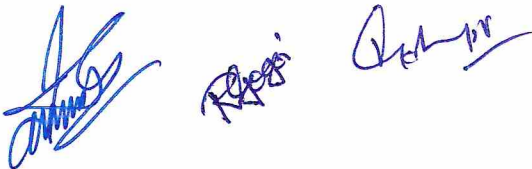
Text & References:

Text:

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References:

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- Hibbler R.C., "Mechanics of Materials", Prentice Hall, New Delhi, 1994.
- Popov Eger P., "Engg. Mechanics of solids", Prentice Hall, New Delhi, 1998.
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- Srinath L.S. et.al., "Strength of Materials", McMillan, New Delhi, 2001



STRUCTURAL ENGINEERING

Course Code: CIV 503

Credit Units: 03
Total Hours: 30

Course Objectives:

This course aims at providing students with a solid background on principles of structural engineering design.

Course Content:

Module I: Introduction Concepts of Energy Principles: (6 Hours)

Introduction- concepts of energy principles, safety, sustainable development in performance; what makes a structure; principles of stability, equilibrium; what is a structural engineer, role of engineer, architect, user, builder; what are the functions' what do the engineers design, first principles of process of design

Module II: Different Types of Loads on Structures: (6 Hours)

Planning and Design Process; Materials, Loads, and Design Safety; Behaviour and Properties of Concrete and Steel; Wind and Earthquake Loads.

Module III: Structural Design Criteria: (6 Hours)

Materials and Structural Design Criteria: Introduction to the analysis and design of structural systems. Analyses of determinate and indeterminate trusses, beams, and frames, and design philosophies for structural engineering. Laboratory experiments dealing with the analysis of determinate and indeterminate structures.

Module IV: Different Types of Structural Elements: (6 Hours)

Design of Structural Elements; Concrete Elements, Steel Elements, Structural Joints; Theories and concepts of both concrete and steel design and analysis both at the element and system levels. Approximate Analysis Methods as a Basis for Design; Design of AICTE Model Curriculum for Undergraduate degree in Civil Engineering (Engineering & Technology) 135 | Page Reinforced Concrete Beams for Flexure; Design of Reinforced Concrete Beams for Shear; Bond, Anchorage, and Serviceability; Reinforced Concrete Columns; Reinforced Concrete Slabs; Introduction to Steel Design; Tension Members and Connections; Bending Members; Structural Systems.

Module V: Prestress Concrete Design: (6 Hours)

System Design Concepts; Special Topics that may be Covered as Part of the Design Project Discussions; Cable Structures; Prestressed Concrete Bridges; Constructability and Structural Control; Fire Protection.

Course Outcome:

- The students will be able to apply their knowledge of structural mechanics in addressing design problems of structural engineering.

Examination Scheme:

Components	A	CT	S/V/Q/HA	EE
Weightage (%)	5	15	10	70

CT: Class Test, HA: Home Assignment, S/V/Q: Seminar/Viva/Quiz, EE: End Semester Examination; Att: Attendance

Text & References:

- Nilson, A. H. Design of Concrete Structures. 13th edition. McGraw Hill, 2004
- McCormac, J.C., Nelson, J.K. Jr., Structural Steel Design. 3rd edition. Prentice Hall, N.J., 2003.
- Galambos, T.V., Lin, F.J., Johnston, B.G., Basic Steel Design with LRFD, Prentice Hall, 1996
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- MacGregor, J. G., Reinforced Concrete: Mechanics and Design, 3rd Edition, Prentice Hall, New Jersey, 1997.



Date: 25/02/2021

BOARD OF STUDIES (Civil Engineering)

MINUTES OF THE MEETING

(03 Pages Only)

1. A meeting of Board of Studies (BoS) of Department of Civil Engineering, Amity School of Engineering & Technology, Amity University Madhya Pradesh was held on 25/02/2021 at AUMP, under the Chairmanship of Maj Gen (Dr) S C Jain VSM** (Retd), Director (ASET). The following members attended the meeting:-

(a) **Chairman:** Maj Gen (Dr) S C Jain VSM** (Retd), Director (ASET)

(b) **Member:**

- i) Dr. Manoj Kumar Trivedi, Professor & Head, Department of Civil Engineering MITS Gwalior, External Member
- ii) Dr. Madhuri Kumari, Professor, Department of Civil Engineering, AUUP Noida.
- iii) Dr. V.K. Gupta, Associate Professor and Head of Civil Engineering, Amity University Madhya Pradesh, Gwalior, Member.
- iv) Dr. Mohan Kantharia Asst. Professor, Civil Engineering, Amity University Madhya Pradesh, Gwalior, Member.
- v) Dr. Ripunjoy Gogoi Asst. Professor, Civil Engineering, Amity University Madhya Pradesh, Gwalior, Member.

2. **The agenda of the meeting included the following:**

- (a) Curriculum of First Year B. Tech Civil Engineering Program for 2021-25 Batch.
- (b) Discussion on trends and technologies in Civil Engineering and consideration of its inclusion in syllabus.
- (c) Any other point with due permission of the Chairperson.

3. **Discussions/Comments:**

- a. (i) Discussion: The syllabus of the subjects offered by B. Tech (Civil Engineering) 2021-25 Batch was presented before the members of the Board of Studies. The scheme and syllabus of the courses have been reviewed. The expert emphasized the need of inclusion of any subject related to Machine Learning (ML) along with basics of Python language in the Curriculum of B. Tech (Civil Engineering).

- (ii) Comments: The existing Scheme and syllabus is well aligned, and few changes were recommended in few subjects. The subject Machine Learning Techniques (CSA 401) along Machine Learning Techniques Lab (CSA 421) under CBCS course has been fulfilled the requirement of inclusion of the subjected related to machine learning & python.
- b. (i) Discussion: The syllabi of M. Tech (Civil Engineering), M. Tech (Structural Engineering), and CBCS subjects was presented to BoS members and reviewed.
- (ii) Comments: The syllabus of M. Tech (Civil Engineering) Course and CBCS subjects is well aligned and need no change.

4. Recommendations:

B. Tech. Program

The Scheme and syllabus of the subjects to be offered by Civil Engineering Department to B. Tech. CE for batch 2021-25 was presented before the members of the board of studies. The BOS members approved the CE curriculum and syllabus (Refer Annexure-1) with the following changes:

- The credits of subject Surveying (CIV 403) and Solid Mechanics (CIV 405) have been changed from 2 to 3 and 3 to 2, respectively.
- The name of the Laboratory of Environmental Engineering -II Lab (CIV 623) has been changed to Environmental Engineering Lab (CIV 623).

M. Tech Program:

- There is no change in the scheme and syllabus of the M. Tech (Civil) course. (Refer Annexure-2).
- Introducing a new course of M. Tech (Structural Engineering) in Civil Engineering Department. The Scheme & Syllabus for the proposed program is attached. (Annexure-3)

Pre -Ph.D. Course:

There is a no change in the scheme and syllabus of PhD.

CBCS:

There is no change in the scheme and syllabus of the course.

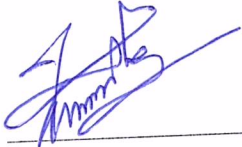
All the aforesaid points have been approved by all the board members present in the meeting.

5. Summary of the changes for B. Tech (Civil Engineering) is given below:

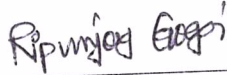
Currents syllabus				Proposed Syllabus /Modification		
Sr. No.	Course Title	Old Course Code	No. of Credits	Changes/Modifications (addition/deletion in the Syllabus)	New Course Code / Course Title	No. of Credits
1	Surveying	CIV 403	2	No Change	No Change	3
2	Solid Mechanics	CIV 405	3	No Change	No Change	2
3	Environmental Engineering -II Lab	CIV 623	1	No Change	Environmental Engineering Lab	1

BOARD OF STUDIES (B.Tech. CE)
MINUTES OF THE MEETING

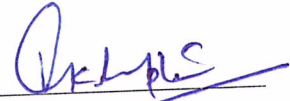
Signature of Members:



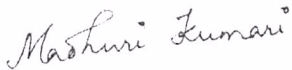
Dr. Mohan Kantharia
(Member)



Dr. Ripunjoy Gogoi
(Member)



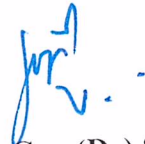
Dr. V. K. Gupta
(Member)



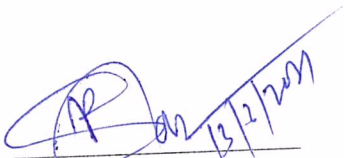
Prof. (Dr.) Madhuri Kumari
External Member

(Absent)

Prof. (Dr.) M. K. Trivedi



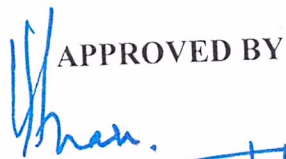
Maj Gen (Dr) S C Jain
Chairman- BOS



Prof. (Dr.) R. S. Tomar
Dean Academics
AUMP, Gwalior



Prof. (Dr.) M.P. Kaushik
Hon'ble Pro Vice Chancellor
AUMP, Gwalior



Hon'ble Vice Chancellor
AUMP, Gwalior



MAE BOS 2018
AMITY UNIVERSITY

MADHYA PRADESH

(Established by Ritand Balved Education Foundation)

NOTE- SHEET

Date: 31-08-18

1. AICTE syllabus has been adopted for first year Mechanical Engineering.
2. As per revised scheme of ME first semester, following subjects allocated **one credit**.
 - a. Engineering Graphics (BTM/BTCE-104)
 - b. Workshop/Manufacturing (BTC/BTCE/BTI-104)
3. It is proposed that End semester examinations of above subjects may be scheduled for **One hour** only.

This note sheet is submitted to you for your kind consideration and necessary approval, please.

HoD

ME, ASET

HoD
ASET, AUMP
"Recommended"
31/8

Pro-Vice Chancellor

MPDUG 31/8/18

Directed ASET: Pl discuss on phone. MAY

Hon'ble Vice Chancellor

As directed, all ~~ex~~
such exams will be
1 1/2 h only.

SoE

HoD MAE

Ex



AMITY UNIVERSITY

MADHYA PRADESH

(Established by Ritmand Balved Education Foundation)

Date: 09/03/2018

**BOARD OF STUDIES (MECHANICAL ENGINEERING AND MECHANICAL &
AUTOMATION ENGINEERING)**
MINUTES OF THE MEETING
(07 Pages Only)

1. A meeting of board of studies of Department of Mechanical & Automation Engineering, Amity School of Engineering & Technology, Amity University Madhya Pradesh was held on 9th March 2018 at AUMP, under the Chairmanship of Maj Gen (Dr) SC Jain, VSM** (Retd), Director (ASET). The following members attended the meeting:-

(a) **Chairman:** Maj Gen (Dr) SC Jain, VSM** (Retd), Director (ASET)

(b) **Member**

- i) Dr. Chaitanya Sharma, Associate Professor (ME), RJIT Gwalior.
- ii) Mr. Nasir Khan, Assistant Professor, MAE, ASET.
- iii) Dr. Abhishek Sharma, Assistant Professor, MAE, ASET.
- iv) Dr. Moon Banerjee, Assistant Professor, MAE, ASET.
- v) Mr. Nagendra Kumar Sharma, Assistant Professor, MAE, ASET.

2. The agenda of the meeting included the following:

- (a) Review of existing syllabus and modification if any.
- (b) Discussion on trends and technologies in MAE and consideration of its inclusion in syllabus.
- (c) Any other point with due permission of the Chairperson.

3. Discussions/Comments:

a. (i) Discussion: About Placements of MAE department

- (ii) Comments:
- 1) Aptitude & Reasoning should be the Part of Curriculum.
 - 2) Student Internship Programme should be arranged in Core Companies with focus on Placements.
 - 3) Expert from Industries should be Called for better Industry linkage.

b. (i) Discussion:

On Student Projects

(ii) Comments:

- 1) Student should be Motivated to solve Industrial Problems during their SIPs.
- 2) Student should be Motivated to do Project on Interdisciplinary so that overall knowledge of Stu could be enhanced.

c. (i) Discussion:

On Admission

(ii) Comments:

- 1) To improve the visibility of MAE department, Conferences & workshops to be arranged.
- 2) Young Talent of Greater Noida City is to be attracted by organizing Sports & Co-curricular activities in the university.
- 3) Projects made by MAE Students should be a part of Exhibition.

NGH

4. Recommendations:

B. Tech Program:

- i. The syllabus of the subject code BTM-303 (Mechanics of Solids), BTM 401 (Kinematics & Dynamics of machines) & BTM 602(Machine Design-II) are reshuffled within the modules and content is same (Refer Annexure-I).
- ii. The syllabus of the subject code BTM-305, Mechanics of Fluids is revised & Industrial visit has been added. (Refer Annexure-II).
- iii. The syllabus of the subject code BTM-402, Heat & Mass Transfer is revised. (Refer Annexure-III).
- iv. The syllabus of the subject code BTM-601, Management of Manufacturing Systems is revised. (Refer Annexure-IV).
- v. The syllabus of the subject code BTM-701, Industrial Engineering & Operation Research is revised & Industrial visit has been added. (Refer Annexure-V).
- vi. The syllabus of the subject code BTM-802, Refrigeration & Air Conditioning is revised. (Refer Annexure-VI).
- vii. Industrial visit has been added in subject BTM-501(Refer Annexure-VII).

M. Tech Program:

There is no change in the scheme and syllabus of the course.

CBCS:

- I. The syllabus of the subject code RT-4603, Automatic Control Systems is replaced by "Modern Material Handling System": as per old syllabus of CBCS no subject can give knowledge to the student about the application of robotics in the industry. The proposed syllabus is focusing on various material handling systems which are widely used in the industries like Automobiles, food processing chemicals, pharmaceuticals etc. Since the students have a subject "Project on Robotics" (MRB 600) so this subject will give the idea about the innovative projects (Refer Annexure-VIII).
- II. The credits of the Subject Microprocessor & Microcontroller & Artificial Intelligence are revised from 3 to 4 credits (Refer Annexure-IX).
- III. The credits of the Subject Project on Robotics are revised from 3 to 1 credit (Refer Annexure-X).

Ph. D:

There is no change in the scheme and syllabus of the course.

There is no change in the scheme and syllabus of the course.

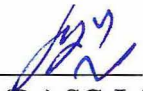
5. Summary of changes is given below:-

Current Syllabus B.Tech (MAE)					Proposed Changes/Modifications (addition/deletion in the Syllabus)	New Course Code B.Tech (MAE)	No. of Credits
Sr. No.	Course Title	Module of the syllabus	Old Course Code	No. of Credits			
1	Mechanics of Solids	All	BTM-303	3	Updated and systematically arranged entire syllabus(Refer Annexure-I)	BTM-303	3
2	Kinematics & Dynamics of Machines	All	BTM-401	3	Updated and systematically arranged entire syllabus (Refer Annexure-I)	BTM-401	3
3	Machine Design-II	All	BTM-602	3	Updated and systematically arranged entire syllabus (Refer Annexure-I)	BTM-602	3
4	Mechanics of Fluids	All	BTM-305	3	Addition in the Module III & IV and Industrial visit (Refer Annexure-II)	BTM-305	3
5	Heat & Mass Transfer	All	BTM-402	3	Addition in the Module I, III & IV (Refer Annexure-III)	BTM-402	3
6	Management of Manufacturing Systems	All	BTM-601	3	Deletion of the Module VI (Refer Annexure-IV)	BTM-601	3
7	Industrial Engineering & Operation Research	All	BTM-701	3	Modification in the Module VI & Additional module of Industrial visit (Refer Annexure-V)	BTM-701	3
8	Refrigeration & Air Conditioning	All	BTM-802	3	Addition in the Module I & III (Refer Annexure-VI)	BTM-802	3
9	Machine Design-I		BTM-501,	3	Additional module of Industrial visit is added in V Sem without any change in syllabus(Refer Annexure-VII)	BTM-501	3
Total Credits =24					Total Credits=24		

Current Syllabus CBCS (ROBOTICS)					Proposed Changes/Modifications (addition/deletion in the Syllabus)	New Course Code B.Tech (MAE)	No. of Credits
Sr. No.	Course Title	Modul e of the syllabu s	Old Course Code	No. of Credits			
1	Automatic Control System	All	RT 4603	3	Introducing New Paper MMHS in place of ACS (Refer Annexure-VIII)	RT 4603	3
2	Microprocessor & Microcontroller	All	RT 4604	3	Reallocation of credits (Refer Annexure-IX)	RT 4604	4
3	Artificial Intelligence	All	RT 4605	3	Reallocation of credits (Refer Annexure-IX)	RT 4605	4
4	Project on Robotics	All	RT 4606	3	Reallocation of credits (Refer Annexure-X)	RT 4606	1
Total Credits =12					Total Credits=12		

The total number of credits after revision for B. Tech, M.Tech, CBCS and Ph. D. remains same.

Signature of Members:


Maj Gen (Dr) SC Jain, VSM** (Retd)
Chairman- BOS


Dr. Chaitanya Sharma
External Member-BoS


Mr. Nasir Khan
Member- BoS


Dr. Abhishek Sharma
Member-BoS


Dr. Moon Banerjee
Member- BoS


Mr. Nagendra Kr. Sharma
Member-BoS


Prof.(Dr) M.P. Kaushik
Hon'ble Pro Vice Chancellor
AUMP, Gwalior


APPROVED BY
Hon'ble Vice Chancellor
AUMP, Gwalior



AMITY UNIVERSITY

MADHYA PRADESH

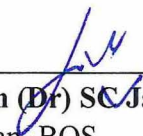
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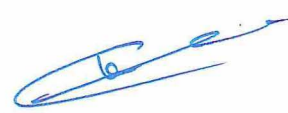
MEETING OF BOARD OF STUDIES (BOS)
(Mechanical & Automation Engineering)
Amity School of Engineering & Technology

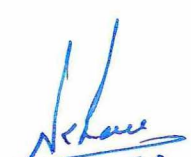
Remarks & Suggestions by BOS Members

- 1) The Student should Perform failure analysis of designed M/c Component using Software like FEM
- 2) Modern Material like Composites, Carbon nanotubes. Smart materials as well as topic on Corrosion, failure of materials should be included in Mat. science syllabus
- 3) There is a need of Re-structuring the entire syllabus of Manufacturing to include topics like rapid Prototype, additive manufacturing, hybrid Manufacturing etc. should be included.

Signature of Members:


Maj Gen (Dr) SC Jain, VSM** (Retd)
Chairman- BOS


Dr. Chaitanya Sharma
External Member-BoS


Mr. Nasir Khan
Member- BoS


Dr. Abhishek Sharma
Member-BoS


Dr. Moon Banerjee
Member- BoS


Mr. Nagendra Kr. Sharma
Member-BoS



AMITY UNIVERSITY

MADHYA PRADESH

(Established by Ritnand Balved Education Foundation)

MEETING OF BOARD OF STUDIES (BOS) (Mechanical & Automation Engineering) Amity School of Engineering & Technology

Remarks & Suggestions by BOS Members

- 4) The entire manufacturing can be divided into 4 subjects which should cover all major aspects in detail.
- 5) The subject listed in I sem Element of Mechanical Engg. should be withdrawn as student will study these topics in detail in subsequent semester.
- 6) It is felt that the separate syllabus should be designed keeping in view the future requirement of Mechanical Engg. and Mechanical & Automation Engg.

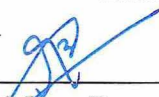
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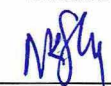

Maj Gen (Dr) SC Jain, VSM** (Retd)
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Dr. Chaitanya Sharma
External Member-BoS


Mr. Nasir Khan
Member- BoS


Dr. Abhishek Sharma
Member-BoS


Dr. Moon Banerjee
Member- BoS


Mr. Nagendra Kr. Sharma
Member-BoS

MECHANICS OF SOLIDS

Course Code: BTM 303

Credit Units: 03

Course Objective:

The objective of this course is to make the students understand the concept of stress and strain in different types of structure/machine under different loading conditions. The course also covers the simple and compound stresses due to forces, stresses and deflection in beams due to bending, torsion in circular section, strain energy, different theories of failure, stress in thin cylinder thick cylinder and spheres due to external and internal pressure.

Course Contents:

Module I: Simple stresses and strains

Concept of stress and strain; Hooke's law, Young's modulus, Poisson ratio, stress at a point, stress and strains in bars subjected to axial loading. Modulus of elasticity, stress produced in compound bars subject to axial loading. Temperature stress and strain calculations due to applications of axial loads and variation of temperature in single and compound walls.

Module II: Compound stress and strains

The two dimensional system; stress at a point on a plane, principal stresses and principal planes; Mohr's circle of stress. Graphical and Analytical methods for stresses on oblique section of body. Shear force and bending moment diagrams for cantilever, simply supported and overhanging beams.

Module III: Bending Stress

Theory of bending stresses in beams due to bending, assumptions in the simple bending theory, derivation of formula: its application to beams of rectangular, circular and channel sections, composite / flitched beams, bending and shear stresses in composite beams.

Module IV: Torsion

Derivation of torsion equation and its assumptions. Applications of the equation of the hollow and solid circular shafts torsional rigidity, combined torsion and bending of circular shafts principal stress and maximum shear stresses under combined loading of bending and torsion, analysis of close-coiled-helical springs.

Module V: Thin cylinders and spheres

Derivation of formulae and calculation of hoop stress, longitudinal stress in a cylinder and sphere subjected to internal pressure.

Module VI: Columns and struts

Columns and failure of columns, Euler's formulas; Rankine-Gordon's formula, Johnson's empirical formula for axially loaded columns and their applications.

Module VII: Slope and deflection

Relationship between moment, slope and deflection, Mohr's theorem; Moment area method; method of integration; Macaulay's method: Use of all these methods to calculate slope and deflection for the following:

- Cantilevers
- Simply supported beams with or without overhang
- Under concentrated loads, uniformly distributed loads or combination of concentrated and uniformly distributed loads

Examination Scheme:

Components	A	CT	S/V/Q	HA	EE
Weightage (%)	5	10	8	7	70

CT: Class Test, HA: Home Assignment, S/V/Q: Seminar/Viva/Quiz, EE: End Semester Examination; Att: Attendance

Text & References:

Text:

- Jindal U.C., "Strength of Materials", Galgotia Publication, New Delhi, 1998.
- Ryder G.H., "Strength of Materials", Macmillan, Delhi, 2003.
- R.K. Bansal, "Strength of Materials", Laxmi Publication, New Delhi, 2001.

References:

- Sadhu Singh, "Strength of Materials", Khanna Publishers, New Delhi, 2000.
- Timoshenko S.P., "Elements of Strength of Materials", East-West affiliated, New Delhi, 2000.
- Hibbler R.C., "Mechanics of Materials", Prentice Hall, New Delhi, 1994.
- Popov Eger P., "Engg. Mechanics of solids", Prentice Hall, New Delhi, 1998.
- Fenner, Roger. T, "Mechanics of Solids", U.K. B.C. Publication, New Delhi, 1990.
- Srinath L.S. et.al., "Strength of Materials", McMillan, New Delhi, 2001



KINEMATICS AND DYNAMICS OF MACHINES

Course Code: BTM 401

Credit Units: 03

Course Objective:

The objective of this course is to identify the alternatives to satisfy the needs of the customer and to quantify and evaluate the alternatives. It includes an introduction to the study of motion of constrained mechanism in machine systems. The objective is to develop the students understanding of basic machine design. Concepts, such as linkages, cams, sliders, crank and rocker, offset crank slider etc. The combination of several of these elements in machine drive trains and the resulting static and dynamic forces will also be studied. This course also includes study of forces, motion and inertia in machines, analysis of linkages, cams, rotor dynamics, reciprocal and rotational balancing.

Course Contents:

Module I: General Concepts, Velocity and Acceleration Analysis

Introduction to simple mechanisms, different types of kinematics pairs, Grubler's rule for degrees of freedom, Grashof's criterion for mobility determination, Inversions of 3R-P, 2R-2P chains, Kinematics analysis of planar mechanism. Instantaneous center method for analysis three center in line theorem, concept of rotating reference frame and its application for Coriolis's acceleration

Module II: Cams

Classification, Cams with uniform acceleration and retardation, SHM, Cycloidal motion, oscillating followers.

Module III: Gears

Geometry of tooth profiles, Law of gearing, involutes profile, interference, helical, spiral and worm gears, simple, compound gear trains. Epicyclic gear trains – Analysis by tabular and relative velocity method, fixing torque.

Module IV: Vibrations⁵

Vibration analysis of SDOF systems, natural, damped, forced vibrations, base-excited vibrations, transmissibility ratio.

Module V: Dynamic Analysis

Slider-crank mechanism, turning moment computation

Balancing: Static and dynamic balancing, balancing of revolving and reciprocating masses, single and multi-cylinder engines.

Module VI: Gyroscopes

Gyroscopic law, effect of gyroscopic couple on automobiles, ships, aircrafts.

Examination Scheme:

Components	A	CT	S/V/Q	HA	EE
Weightage (%)	5	10	8	7	70

CT: Class Test, HA: Home Assignment, S/V/Q: Seminar/Viva/Quiz, EE: End Semester Examination; Att: Attendance

Text & References:

- PL Ballaney, Theory of Machines,
- Hams Crone and Roggers, Theory of Machines
- Shigley, Theory of Machines
- J. Lal, Theory of Machines
- SS Rattan, Theory of Machines
- Ghosh and Mallick, Mechanisms and Machines, EWP publication.
- R.S. Khurmi, Theory of Machine, S. Chand.

MACHINE DESIGN - II

Course Code: BTM 602

Credit Units: 03

Course Objective:

The course aims at developing concepts as to how to analyze mechanical systems and select proper machine elements (bearing, gears, belts, chains). It prepares the students how to design machine element by specifying their type, geometry, material and how to integrate these elements to build a mechanical systems.

Course Contents:

Module I: Mechanical Drives

Selection of transmission, helical, bevel and worm gears, belt and chain drives.

Module II: Friction Clutches & Brakes

Common friction materials, shoe, band, cone and disc brake their characteristics and design, friction clutches.

Module III: Bearings and Lubrication

Types of sliding bearing, materials, type of lubrication, design of sliding bearing, selection and application of rolling bearing, seals.

Module IV

Design of spring, helical spring, Leaf spring

Module V: Engine parts

Piston, connecting rod and crankshaft.

Examination Scheme:

Components	A	CT	S/V/Q	HA	EE
Weightage (%)	5	10	8	7	70

CT: Class Test, HA: Home Assignment, S/V/Q: Seminar/Viva/Quiz, EE: End Semester Examination; Att: Attendance

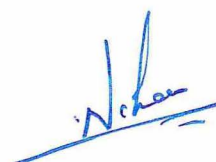
Text & References:

Text:

- Maleeve Hartman and O.P. Grover, "Machine Design", CBS Publication & Publishers.
- V.B Bhandari, "Machine Design", Tata McGraw Hill.
- P.C. Sharma and D.K Aggarwal., "Machine Design", S.K. Kataria & Sons.

References:

- Mahadevan, "Design Data Book", CBS Publication & Publisher



MECHANICS OF SOLIDS

Course Code: BTM 303

Credit Units: 03

Course Objective:

The objective of this course is to make the students understand the concept of stress and strain in different types of structure/machine under different loading conditions. The course also covers the simple and compound stresses due to forces, stresses and deflection in beams due to bending, torsion in circular section, strain energy, different theories of failure, stress in thin cylinder thick cylinder and spheres due to external and internal pressure.

Course Contents:

Module I: Simple stresses and strains

Stress and Strain- Tension and Compression -Thermal Stresses -pure shear -Young's modulus of elasticity, Poisson's ratio, Modulus of rigidity and Bulk modulus - Relation between elastic constants -Stress -strain diagrams for brittle and ductile materials-working stress Strain energy in tension and compression. Stress at a point, stress and strains in bars subjected to axial loading. Stress produced in compound bars subject to axial loading.

Module II: Compound stress and strains

Principal Stresses and Strains: Analysis of Biaxial state of stress with and without shear - Mohr's Circle. Shear Force And Bending Moment: Types of supports-Types of beams -Types of loads -articulated beams -Shear Force and Bending Moment diagrams.

Module III: Bending Stress

Theory of Simple Bending: Assumptions -Bending stresses in beams - Derivation of formula for Efficiency of various cross sections of beams (rectangular, circular and channel sections). Shear Stress Distribution: Flexural shear stress distribution in different cross sections of beams.

Module IV: Torsion

Torsion of Circular cross sections: Theory of pure torsion -transmission of Power in Solid and Hollow circular shafts-Combined bending and torsion.

Module V: Thin cylinders and spheres

Thin and Thick Cylinders: Thin and Thick Cylinders – spherical shells subjected to internal fluid pressure

Module VI: Columns and struts

Columns and struts: column and failure of columns, Euler's formulas.

Module VII: Slope and deflection

Deflection of Beams: Slope and deflection of beams- Double Integration method – Macaulay's method –strain energy method.

Examination Scheme:

Components	A	CT	S/V/Q	HA	EE
Weightage (%)	5	10	8	7	70

CT: Class Test, HA: Home Assignment, S/V/Q: Seminar/Viva/Quiz, EE: End Semester Examination; Att: Attendance

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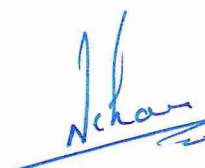
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- Fenner, Roger. T, "Mechanics of Solids", U.K. B.C. Publication, New Delhi, 1990.
- Srinath L.S. et.al., "Strength of Materials", McMillan, New Delhi, 2001





KINEMATICS AND DYNAMICS OF MACHINES

Course Code: BTM 401

Credit Units: 03

Course Objective:

The objective of this course is to identify the alternatives to satisfy the needs of the customer and to quantify and evaluate the alternatives. It includes an introduction to the study of motion of constrained mechanism in machine systems. The objective is to develop the students understanding of basic machine design. Concepts, such as linkages, cams, sliders, crank and rocker, offset crank slider etc. The combination of several of these elements in machine drive trains and the resulting static and dynamic forces will also be studied. This course also includes study of forces, motion and inertia in machines, analysis of linkages, cams, rotor dynamics, reciprocal and rotational balancing.

Course Contents:

Module I: General Concepts, Velocity and Acceleration Analysis

General Concepts, Velocity and Acceleration Analysis: Introduction to simple mechanisms. Different types of link, joint and kinematics pairs. Grubler's rule for degrees of freedom, Grashof's criterion for mobility determination. Inversions of 3R-P, 2R-2P chains. Kinematics analysis of planar mechanism. Oldham coupling. Universal coupling. Application of Kennedy's theorem.

Module II: Gears

Gears -geometry of tooth profiles, Law of gearing, interference. Helical, spiral and worm gears, simple, compound gear trains. Clutches,

Module III: Dynamic Analysis

Slider-crank mechanism, turning moment computation. Balancing: Static and dynamic balancing, balancing of revolving and reciprocating masses, single and multi-cylinder engine Gyroscopic law, effect of gyroscopic couple on automobiles, ships, aircrafts.

Module IV: Cams

Cam & Follower: Classification- types of CAM and Followers, Cams with uniform acceleration and retardation. SHM, Cycloidal motion. Design of CAM profile

Module V: Vibrations

Mechanical Vibrations: Free and forced vibrations, analysis and applications of discrete and continuous system of vibration.

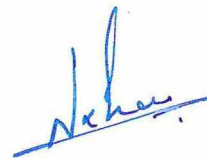
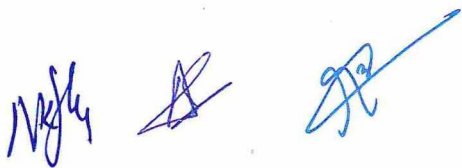
Examination Scheme:

Components	A	CT	S/V/Q	HA	EE
Weightage (%)	5	10	8	7	70

CT: Class Test, HA: Home Assignment, S/V/Q: Seminar/Viva/Quiz, EE: End Semester Examination; Att: Attendance

Text & References:

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- Hams Crone and Rogers, Theory of Machines
- Shigley, Theory of Machines
- J. Lal, Theory of Machines
- SS Rattan, Theory of Machines
- Ghosh and Mallick, Mechanisms and Machines, EWP publication.
- R.S. Khurmi, Theory of Machine, S. Chand.



MACHINE DESIGN - II

Course Code: BTM 602

Credit Units: 03

Course Objective:

The course aims at developing concepts as to how to analyze mechanical systems and select proper machine elements (bearing, gears, belts, chains). It prepares the students how to design machine element by specifying their type, geometry, material and how to integrate these elements to build a mechanical systems.

Course Contents:

Module I:

Introduction: Different theories of failure and design based on theories. Design for fatigue, design for creep and design for wear and corrosion.

Module II: Belt and Chain drives

Belt Drives: Types of Belt drives, Flat Belt drives, Velocity ratio, Creep of Belt, Length of open Belt, length of cross belt. Power transmission by belt, Maximum tension in the belt. Types of V belt and Pulleys, advantages and disadvantages of V belt over Flat Belt. Ratio of driving tensions for V belt, Rope drives. Chain drives, advantages and disadvantages of Chain drives.

Module III: Brakes and Clutches Brakes

Types, Design of shoe brakes, and Design of Band and Disc Brakes. Clutches: Types, Plate clutches –design for uniform pressure and wear.

Module IV: Bearings

Design of Bearings: Brief overview of bearings, Design of Fluid Film bearings and Rolling contact bearings. Types of sliding bearing. Materials, type of lubrication, design of sliding bearing. Selection and application of rolling bearing, seals.

Module V: - Gears

Design of Gears: Law of gearing -conjugate action and gear tooth profile-basics Analysis of forces on spur, helical, bevel and worm gears. Design procedure of various gears.

Module VI: - Engine Parts

Design of Engine parts: Design of cylinder and cylinder head, Design of Piston. Design of connecting rod. Design of crankshaft.

Examination Scheme:



Components	A	CT	S/V/Q	HA	EE
Weightage (%)	5	10	8	7	70

CT: Class Test, HA: Home Assignment, S/V/Q: Seminar/Viva/Quiz, EE: End Semester Examination; Att: Attendance

Text & References:

Text:

- Maleeve Hartman and O.P. Grover, "Machine Design", CBS Publication & Publishers.
- V.B Bhandari, "Machine Design", Tata McGraw Hill.
- P.C. Sharma and D.K Aggarwal., "Machine Design", S.K. Kataria & Sons.

References:

- Mahadevan, "Design Data Book", CBS Publication & Publisher



MECHANICS OF FLUIDS

Course Code: BTM 305

Credit Units: 03

Course Objective:

The objective of Fluid Mechanics subject is that students should understand the, properties of fluids, pressure measurement devices, hydraulic forces on surfaces, buoyancy and flotation in fluids, kinematics and static behaviour of fluids, dimension and model analysis, laminar and turbulent flow, flow through pipes and orifices, boundary layer theory.

Course Contents:

Module I: Fluid Properties and Fluid Statics

Newtonian and Non-Newtonian Fluids; Viscosity; Incompressible and compressible fluids, compressibility. Forces on plane surfaces, forces on curved surfaces, buoyant forces, and stability of floating bodies, metacentre and metacentre height.

Module II: Kinematics of Fluid Motion

Steady and unsteady flow; uniform and non-uniform flow; Laminar and turbulent flow; streamline, path line and streak line; continuity equation, irrotational and rotational flow, velocity potential and stream function, vortex flow, free and forced vortex.

Module III: Dynamics of Fluid Flow

Euler's equation of motion and its integration to yield Bernoulli's equation, its practical applications – Pilot tube, Venturi meter; steady flow momentum equation, force exerted on a pipe bend.

Module IV: Dimensional Analysis and Principles of Similarity

Buckingham π -Theorem and its applications, Geometric, Kinematics and Dynamic similarity; Dimensionless numbers-Reynolds, Froude, Euler, Mach, Weber Number and their significance.

Module V: Laminar and Turbulent Flow

Reynold's experiment, critical velocity, steady laminar flow through a circular tube, flow between parallel plates. Transition from laminar to turbulent flow, courses of turbulence, velocity distribution law near a solid boundary, velocity distribution in rough pipes, Hazen – Williams's formula.

Module VI: Analysis of Pipe Flow

Energy losses, minor losses in pipe lines, concept of equivalent length, flow between two reservoirs, and multiple pipe systems – in series and parallel, siphon.

Examination Scheme:

Components	A	CT	S/V/Q	HA	EE
Weightage (%)	5	10	8	7	70

CT: Class Test, HA: Home Assignment, S/V/Q: Seminar/Viva/Quiz, EE: End Semester Examination; Att: Attendance

Text & References:

Text:

- R.K. Bansal, "Fluid Mechanics & Hydraulic Machines", Laxmi Publications (P) Ltd., 2002.
- Gupta, S. C., Fluid Mechanics and Hydraulic Machines, Pearson Education, 2007
- D.S. Kumar, "Fluid Mechanics and Fluid Power Engineering", S.K. Kataria & Sons, 2000.

References:

- F. M. White, Introduction to Fluid Mechanics, McGraw Hill
- I.H. Shames, "Mechanics of Fluids", Tata McGraw Hill
- Douglas, J. F., Gasiorek, J.M. and Swaffield, J., Fluid Mechanics, Pearson Education, 4/e, 2006
- V.L. Streeter and E.B. Wylie, "Fluid Mechanics", Tata McGraw Hill
- Massey B S, Mechanics of Fluids, Van Nostrand Reinhold Co

MECHANICS OF FLUIDS

Course Code: **BTM 305**

Credit Units: 03

Course Objective:

The objective of Fluid Mechanics subject is that students should understand the, properties of fluids, pressure measurement devices, hydraulic forces on surfaces, buoyancy and flotation in fluids, kinematics and static behaviour of fluids, dimension and model analysis, laminar and turbulent flow, flow through pipes and orifices, boundary layer theory.

Course Contents:

Module I: Fluid Properties and Fluid Statics

Review of fluid properties, Newtonian and Non-Newtonian Fluids; Incompressible and compressible fluids, compressibility. Pressure at a point, manometers, Forces on plane surfaces, forces on curved surfaces, buoyant forces, and stability of floating bodies, metacentre and metacentre height.

Module II: Kinematics of Fluid Motion

Steady and unsteady flow; uniform and non-uniform flow; Laminar and turbulent flow; streamline, path line and streak line; continuity equation, irrotational and rotational flow, velocity potential and stream function, vortex flow, free and forced vortex.

Module III: Dynamics of Fluid Flow

Euler's equation of motion and its integration to yield Bernoulli's equation, its practical applications – Pitot tube, Venturi meter, **Orificemeter**; steady flow momentum equation, force exerted on a pipe bend.

Module IV: Dimensional Analysis and Principles of Similarity

Dimensional analysis, **Dimensional homogeneity**, Buckingham p-Theorem and its applications, Geometric, Kinematics and Dynamic similarity; Dimensionless numbers- Reynolds, Froude, Euler, Mach, Weber Number and their significance.

Module V: Laminar and Turbulent Flow

Reynold's experiment, critical velocity, steady laminar flow through a circular tube, flow between parallel plates. Transition from laminar to turbulent flow, causes of turbulence, velocity distribution law near a solid boundary, velocity distribution in rough pipes, Hazen – Williams's formula.

Module VI: Analysis of Pipe Flow

Energy losses, minor losses in pipe lines, concept of equivalent length, flow between two reservoirs, and multiple pipe systems – in series and parallel, siphon.

Module VII: Industrial Visit

At least one visit to local industry in the field of Mechanical Engineering.

Examination Scheme:

Components	A	CT	S/V/Q	HA	EE	
Weightage (%)		5	10	8	7	70

CT: Class Test, HA: Home Assignment, S/V/Q: Seminar/Viva/Quiz, EE: End Semester Examination; Att: Attendance
Module I: Viscosity Module I: Review of fluid properties ,
Pressure at a point, manometers.

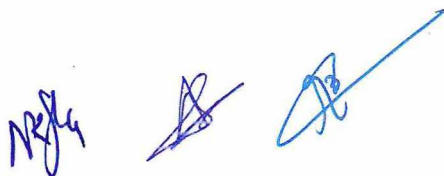
New topics added

Module III: Orificemeter.

Module IV: Dimensional analysis, Dimensional homogeneity

Justifications

1. These are the basic topics and taught by IIT Delhi and DTU.
2. Viscosity will be covered under the topic of fluid property need not to mention separately.



HEAT AND MASS TRANSFER

Course Code: BTM 402

Credit Units: 03

Course Objective:

The main objective of the course to understand the behaviour of thermal systems. To illustrate the development of the governing differential, algebraic and finite difference equations associated with thermal systems. To introduce the possible methods of solution to the governing equation. To investigate the influences of boundary and initial conditions and system parameters on the resulting steady or transient response of the system. To provide the basic tools those are used in thermal system design. To expose students to heat transfer applications in industry.

Course Contents:

Module I

One-dimensional steady-state conduction through homogeneous and composite plane walls, cylinders and spheres, critical thickness of insulation; heat transfer from fins of uniform cross section.

Module II

Concept of hydrodynamic and thermal boundary layers, momentum and energy equation for boundary layers on a flat plate application of dimensional analysis to free and forced convection; important dimensionless number.

Module III

Thermal radiation; Kirchhoff's law; Planck's distribution law, Wien's displacement law; Stefan-Boltzmann's relation, Configuration factors; radiant interchange between black and grey surfaces; radiation shielding solar radiation.

Module IV

Combined heat transfer analysis; overall heat transfer co-efficient; types of heat exchangers; LMTD methods of heat exchanger design; simple heat exchanger calculations.

Examination Scheme:

Components	A	CT	S/V/Q	HA	EE
Weightage (%)	5	10	8	7	70

CT: Class Test, HA: Home Assignment, S/V/Q: Seminar/Viva/Quiz, EE: End Semester Examination; Att: Attendance

Text & References:

- Incropera, F.P. and DeWitt, D.P. (2002). Fundamentals of Heat and Mass Transfer, John Wiley & Sons, New York, NY.
- Nag, P.K. (2002). Heat and Mass Transfer, TMH.
- John R. Howell & Richard O Buckius, Fundamentals of Engg. Thermodynamics, McGraw Hill International.
- Holman, J.P. (1997). Heat Transfer, 9th edition, McGraw-Hill.
- Mills, A.F. (1999). Basic Heat and Mass Transfer, Prentice-Hall.
- Thirumaleshwar, M. (2006). Fundamentals of Heat and Mass Transfer, Pearson education.
- Ghoshdastidar, P.S. (2004). Heat Transfer. Oxford University Press.
- Arora, Domkundwar, S. and Domkundwar, A. (1988). A Course in Heat & Mass Transfer, Dhanpat Rai & Co.

HEAT AND MASS TRANSFER

Course Code: BTM 402

Credit Units: 03

Course Objective:

The main objective of the course to understand the behaviour of thermal systems. To illustrate the development of the governing differential, algebraic and finite difference equations associated with thermal systems. To introduce the possible methods of solution to the governing equation. To investigate the influences of boundary and initial conditions and system parameters on the resulting steady or transient response of the system. To provide the basic tools those are used in thermal system design. To expose students to heat transfer applications in industry.

Course Contents:

Module I

Conduction, Fourier's law and general conduction equation, One-dimensional steady-state conduction through homogeneous and composite plane walls, cylinders and spheres, critical thickness of insulation; heat transfer from fins of uniform cross section, effectiveness and efficiency of fin.

Module II

Concept of hydrodynamic and thermal boundary layers, momentum and energy equation for boundary layers on a flat plate, application of dimensional analysis to free and forced convection; important dimensionless number.

Module III

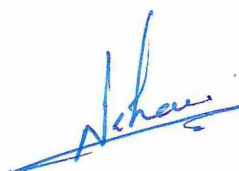
Thermal radiation; Electromagnetic spectrum, reflectivity, absorptivity, transmissivity, emissivity, emissive power, intensity of radiation, Stefan-Boltzmann's relation, Kirchhoff's law; Planck's distribution law, Wien's displacement law; Concept of black and gray body; radiant interchange between black and gray surfaces; Configuration factors radiation shielding solar radiation.

Module IV

Combined heat transfer analysis; overall heat transfer co-efficient; fouling factor; types of heat exchangers, LMTD methods of heat exchanger design; simple heat exchanger calculations.

Examination Scheme:

Components	A	CT	S/V/Q	HA	EE
Weightage (%)	5	10	8	7	70



CT: Class Test, HA: Home Assignment, S/V/Q: Seminar/Viva/Quiz, EE: End Semester Examination; Att: Attendance.

New Topics Covered

Module I: Conduction, Fourier's law and general conduction equation, effectiveness and efficiency of fin.

Module III: Electromagnetic spectrum, absorptivity, transmissivity, emissivity, emissive power, intensity of radiation

Module IV : Fouling factor,

Justification

These topics are not in AUMP syllabus but taught by IIT Delhi, DTU and also part of GATE syllabus.

Four handwritten signatures in blue ink are arranged horizontally. From left to right: the first signature is 'N. K. S.', the second is 'A. K.', the third is 'S. K.', and the fourth is 'N. Chandra'.

MANAGEMENT OF MANUFACTURING SYSTEMS

Course Code: BTM 601

Credit Units: 03

Course Objective:

The overall objective of this course is to provide high caliber engineering students with an in-depth understanding of strategic, tactical and operational issues relating to manufacturing industries worldwide. On completion of the course the students will be equipped with the state-of-the-art concepts, methods, techniques and tools to allow them to contribute towards the competitiveness of manufacturing organizations.

Course Contents:

Module I: Introduction

Production functions, Plant Organization: Principles of organization, Organization structure-line and staff Organization

Plant Location, Layout: Process layout product layout and combination layout – methods of layout, economics of layout.

Module II: Production Planning & Control

Types of products, demand, demand forecasting, marketing strategies, scheduling and control of scheduling, production control.

Module III: Work and method study

Definition and concepts, method study procedures, symbols, advantages, Flow process charts, Motion study, micro motion, SIMO charts, system concepts, classification, analysis techniques.

Module IV: Industrial maintenance

Types, organization for maintenance department, Breakdown and preventive maintenance.

Module V: Inventory control and replacement analysis

Introduction replacement policy and method adopted, EOQ.

Module VI: Management concepts

Development of management principles, scientific management, human relation aspects. Project Management – CPM and PERT.

Examination Scheme:

Components	A	CT	S/V/Q	HA	EE
Weightage (%)	5	10	8	7	70

CT: Class Test, HA: Home Assignment, S/V/Q: Seminar/Viva/Quiz, EE: End Semester Examination; Att: Attendance

Text & References:

Text:

- S.K. Sharma, "Industrial Engg. & Operation Management", S.K. Kataria & Sons.
- Dr. Ravi Shankar, "Industrial Engg. & Management", Galgotia Publications
- M. Mahajan, "Industrial Engg. & Production Management", Dhanpat Rai & Co.
- J Moore, Manufacturing Management, Prentice Hall
- Buffa, Modern production and operations management, E.S. Wiley eastern.

References:

- Joseph S. Martinich, "Production & Operation Management", John Wiley & Sons.

MANAGEMENT OF MANUFACTURING SYSTEMS

Course Code: **BTM 601**

Credit Units: 03

Course Objective:

The overall objective of this course is to provide high caliber engineering students with an in-depth understanding of strategic, tactical and operational issues relating to manufacturing industries worldwide. On completion of the course the students will be equipped with the state-of-the-art concepts, methods, techniques and tools to allow them to contribute towards the competitiveness of manufacturing organizations.

Course Contents:

Module-I

Introduction

Production functions, Plant Organization: Principles of organization, Organization structure-line and staff Organization, Plant Location layout, Process layout product layout and combination layout methods of layout, economics of layout.

Module- II

Production Planning & Control

Types of products, demand, demand forecasting, marketing strategies, scheduling and control of scheduling, production control.

Module –III

Work and method study

Definition and concepts, method study procedures, symbols, advantages, Flow process charts, Motion study, micro motion, SIMO charts, system concepts, classification, analysis techniques.

Module –IV

Industrial maintenance

Definition and concepts of Maintenance, Need of Maintenance Management, Maintenance Policies, Strategies and options in Maintenance management. Types, organization for maintenance department, Breakdown and preventive maintenance.

Module –V

Inventory control and replacement analysis

Purpose of Inventory – Cost related to inventors – Basic EOQ model, Introduction replacement policy and method adopted, ABC Analysis, MRP Analysis.



Examination Scheme:

Components	A	CT	S/V/Q	HA	EE	
Weightage (%)		5	10	8	7	70

CT: Class Test, HA: Home Assignment, S/V/Q: Seminar/Viva/Quiz, EE: End Semester Examination; Att: Attendance

Text & References:

Text:

- S.K. Sharma, "Industrial Engg. & Operation Management", S.K. Kataria & Sons.
- Dr. Ravi Shankar, "Industrial Engg. & Management", Galgotia Publications
- M. Mahajan, "Industrial Engg. & Production Management", Dhanpat Rai & Co.
- J Moore, Manufacturing Management, Prentice Hall
- Buffa, Modern production and operations management, E.S. Wiley eastern.

References:

- Joseph S. Martinich, "Production & Operation Management", John Wiley & Sons.

Justification:-

1. In BTM 601 of AUMP, the topics of Module-VI mentioned here, have already been covered in the paper code BTM-701.
2. The topics of Module-VI of BTM-601 have already been covered in the paper code BTM-701 of AUMP and teaches twice in both the subjects.
3. Some new topics has been introduced.
4. In view of the above it is suggested to exclude Module VI of BTM 601 to BTM-701.



OPERATIONS RESEARCH

Course Code: BTM 701

Credit Units: 03

Course Objective:

In a rapidly changing environment an understanding is sought which will facilitate the choice and the implementation of more effective solutions, which, typically, may involve complex interactions among people, materials and money. Organizations may seek a very wide range of operational improvements - for example, greater efficiency, better customer service, higher quality or lower cost. Whatever the business, engineering aim, Operation Research can offer the flexibility and adaptability to provide objective help. This course introduces students to the principles of operational research.

Course Contents:

Module I: Linear Programming

Formulation of problem. Graphical and simplex method for maximization and minimization. Duality theory and sensitivity analysis

Module II: Transportation Models

Stepping stone algorithm, MODI method and Vogel's Approximation Method (VAM) for selfing balanced, unbalanced transportation problems and problems of degeneracy and maximization.

Module III: Assignment Models

Assignment model for maximization and traveling salesman problems, Industrial Problems

Module IV: Queuing Theory

Basic structured, Terminology, classification. Birth and death process. Sequencing: Processing in jobs through machines with the same processing order. Processing of 2 jobs through machines with each having different processing order.

Module V: Network Models

Introduction to PERT and CPM. Fundamental concept of Network models and construction of network diagrams. PERT activity, time estimate. Critical path and project time duration. Probability of completing the project on or before specified time. Float of a activity.

Module VI: Games Theory

Zero Sum two person competitive games, Minimax and maximini principle Arithmetic, algebraic, matrix algebra method,. Solution by dominance, sub game, Graphical and linear programming method.

Examination Scheme:

Components	A	CT	S/V/Q	HA	EE
Weightage (%)	5	10	8	7	70

CT: Class Test, HA: Home Assignment, S/V/Q: Seminar/Viva/Quiz, EE: End Semester Examination; Att: Attendance

Text & References:

- HM Wagner, Principles of Operations Research, Prentice Hall
- Heizer, J. & Render B., Operations Management, Pearson Education (8/e), 2006
- PK Gupta and DS Hira, Operations Research, S. Chand & Co.
- Taha, Introduction to Operation Research
- F.S. Hiller and G.I. Libermann, Introduction to Operation Research, Holden Ray.

INDUSTRIAL ENGINEERING & OPERATION RESEARCH

Course Code: BTM 701

Credit Units: 03

Course Objectives: In a rapidly changing environment an understanding is sought which will facilitate the choice and the implementation of more effective solutions, which, typically, may involve complex interactions among people, materials and money. Organizations may seek a very wide range of operational improvements - for example, greater efficiency, better customer service, higher quality or lower cost. Whatever the business, engineering aim, Operation Research can offer the flexibility and adaptability to provide objective help. This course introduces students to the principles of operational research.

Module I: Linear Programming

Formulation of problem. Graphical and simplex method for maximization and minimization. Duality theory and sensitivity analysis

Module II: Transportation Models & Assignment Models

Stepping stone algorithm, MODI method and Vogel's Approximation Method (VAM) for selfing balanced, unbalanced transportation problems and problems of degeneracy and maximization. Assignment model for maximization and traveling salesman problems, Industrial Problems

Module III: Queuing Theory

Basic structured, Terminology, classification. Birth and death process. Sequencing: Processing in jobs through machines with the same processing order. Processing of 2 jobs through machines with each having different processing order.

Module IV: Network Models

Introduction to PERT and CPM. Fundamental concept of Network models and construction of network diagrams. PERT activity, time estimate. Critical path and project time duration. Probability of completing the project on or before specified time. Float of a activity.

Module V: Project Management

Gantt chart, milestone char. Network scheduling terminology. Path enumeration, Activity on node & activity on arc network precedence diagrams. Reliability: Concept of reliability, objectives, applications, area of use, use of reliability in industry.

Module VI: Games Theory

Zero Sum two person competitive games, Minimax and maximini principle Arithmetic, algebraic, matrix algebra method,. Solution by dominance, sub game, Graphical and linear programming method.



Module VII: Industrial Visit

At least one visit to local industry in the field of Mechanical Engineering.

Examination Scheme:

Components	A	CT	S/V/Q	HA	EE
Weightage (%)	5	10	8	7	70

CT: Class Test, HA: Home Assignment, S/V/Q: Seminar/Viva/Quiz, EE: End Semester Examination; Att: Attendance

Text & References:

Text:

- PK Gupta and DS Hira, Operations Research, S. Chand & Co.
- Vivek Kumar, Operations Research, Kataria Publications

References:

- HM Wagner, Principles of Operations Research, Prentice Hall
- Heizer, J. & Render B., Operations Management, Pearson Education (8/e), 2006
- Taha, Introduction to Operation Research
- F.S. Hiller and G.I. Libermann, Introduction to Operation Research, Holden Ray.
- Krajewski L J and Ritzman L P, "Operations Management", Pearson Education Asia, Sixth Edition (2004)
- Adam and Ebert "Production and Operation Management" Pearson Education Asia, Fifth Edition (2003)

Justification

1. It is required to introduce industrial engineering in B.Tech (MAE) because it finds its major applications in solving the industrial problem.
2. The industrial engineering is not being taught in AUUP Noida and AUMP, Gwalior.
3. Project Management and reliability is being added because this is the required part of industrial engineering.



REFRIGERATION AND AIR CONDITIONING

Course Code: BTM 802

Credit Units: 03

Course Objective:

The aim of this course is to provide the students with the understanding of the basic principles of Refrigeration and Air Conditioning such that they could build simple mathematical models representing the conditioned space and its components used to control environmental conditions. The application of thermodynamics, heat transfer, and fluid mechanics includes an understanding of refrigerants and refrigeration systems, psychometrics, human comfort and air quality, calculation of heating and cooling loads, and heat and mass transfer processes and associated R & AC components and systems.

Course Contents:

Module I: Refrigeration

Air refrigeration systems, air cycle refrigeration of aircraft, various compression refrigeration cycles, basic components of the plant.

Module II

Properties and choice of refrigerants, Eco-friendly refrigerants multiple compression and evaporation system, cascading.

Module III

Vapour absorption cycle, Electrolux system steam jet refrigeration, vortex tube, application of refrigeration systems cascading, vapour absorption cycle.

Module IV: Air-conditioning

Psychometric processes, applied psychometric, comfort air-conditioning, ventilation requirements, cooling and dehumidification system, estimation of cooling and heating loads, air handling, air distribution, duct design, industrial air conditioning.

Examination Scheme:

Components	A	CT	S/V/Q	HA	EE
Weightage (%)	5	10	8	7	70

CT: Class Test, HA: Home Assignment, S/V/Q: Seminar/Viva/Quiz, EE: End Semester Examination; Att: Attendance

Text & References:

- CP Arora, Refrigeration and Conditioning, Tata McGraw Hill
- Manohar Prasad, Refrigeration and Conditioning, Wiley Eastern Limited
- Jordan and Priester, Refrigeration and Conditioning, Prentice Hall of India
- WF Stoecker, Refrigeration and Conditioning, McGraw Hill.

REFRIGERATION AND AIR CONDITIONING

Course Code: **BTM 802**

Credit Units: 03

Course Objective:

The aim of this course is to provide the students with the understanding of the basic principles of Refrigeration and Air Conditioning such that they could build simple mathematical models representing the conditioned space and its components used to control environmental conditions. The application of thermodynamics, heat transfer, and fluid mechanics includes an understanding of refrigerants and refrigeration systems, psychometrics, human comfort and air quality, calculation of heating and cooling loads, and heat and mass transfer processes and associated R & AC components and systems.

Course Contents:

Module I: Refrigeration

Fundamental of refrigeration, Heat engine, heat pump and refrigerating machine, Coefficient of performance, Basic components of the plant, reversed Carnot cycle, Vapor compression refrigeration system, Effect of operating parameters, Air refrigeration systems, Air cycle refrigeration of aircraft.

Module II

Refrigerants, Types of refrigerants, Properties and choice of refrigerants, Eco-friendly refrigerants multiple compression and evaporation system, cascading.

Module III

Vapour absorption cycle, Electrolux system, Steam jet refrigeration, vortex tube, application of refrigeration systems cascading, vapour absorption cycle.

Module IV: Air-conditioning

Psychometric processes, applied psychometric, comfort air-conditioning, ventilation requirements, cooling and dehumidification system, estimation of cooling and heating loads, air handling, air distribution, duct design, industrial air conditioning.

Examination Scheme:

Components	A	CT	S/V/Q	HA	EE	
Weightage (%)		5	10	8	7	70

CT: Class Test, HA: Home Assignment, S/V/Q: Seminar/Viva/Quiz, EE: End Semester Examination; Att: Attendance.

Topics Added

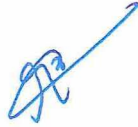


Module I: Fundamental of refrigeration, Heat engine, heat pump and refrigerating machine, Coefficient of performance, reversed Carnot cycle, Effect of operating parameters.

Module II: Refrigerants, Types of refrigerants.

Justifications

These topics are not taught in AUMP syllabus but this is important in concern with the GATE syllabus, which will help students. Also, taught in the NITs.



MACHINE DESIGN - I

Course Code: BTM 501

Credit Units: 03

Course Objective:

The objective of this course is to help students apply concepts learned in the mechanics, structure, material and manufacturing courses. This course offers working knowledge in the use of proper failure theories under steady and variable loading, design of mechanical elements, such as shaft, coupling, power screws, and detachable, permanent and welded connections.

Course Contents:

Module I: Variable stresses in Machine Parts

Fatigue and Endurance Limit, Factor of Safety for Fatigue Loading, Stress concentration, Notch sensitivity, Gerber Method, Goodman Method and Soderberg Method for combination of stresses.

Module II: Power Screws

Types of screw threads, Torque required to raise and lower the load, Efficiency of square threaded screw, overhauling and self locking screw, stresses in power screw, design of screw jack.

Module III: Cotter and Knuckle Joints

Types of cotter joints, design of socket and spigot joint, design of sleeve and cotter joint, design of jib and cotter joint, Design procedure of Knuckle joint.

Module IV: Riveted and Welded Joint

Types of Riveted joint, Lap joint, Butt Joint, Caulking and Fullering, Failure of Riveted joint, Strength of Riveted joint, Efficiency of Riveted joint. Advantages and Disadvantages of welded joint over Riveted joint, Strength of Fillet joint, strength of Butt joints.

Module V: Keys and Couplings

Types of Keys, Splines, Strength of Sunk Key, types of shaft coupling, Sleeve and muff coupling, Flange coupling, Flexible coupling, Oldham coupling, Universal coupling.

Module VI: Drives

Types of Belt drives, Flat Belt drives, Velocity ratio, Slip, Creep of Belt, Length of open Belt, length of cross belt, power transmission by belt, Maximum tension in the belt. Types of V belt and Pulleys, advantages and disadvantages of V belt over Flat Belt, Ratio of Driving tensions for V belt, Rope drives. Chain drives, advantages and disadvantages of Chain drives.

Examination Scheme:

Components	A	CT	S/V/Q	HA	EE
Weightage (%)	5	10	8	7	70

CT: Class Test, HA: Home Assignment, S/V/Q: Seminar/Viva/Quiz, EE: End Semester Examination; Att: Attendance

Text & References:

- J.E. Shigley, Mechanical Engineering Design.
- Sadhu Singh, Machine Design
- R.S. Khurmi & J.K. Gupta, Machine design
- D.K. Aggarwal & P.C. Sharma, Machine Design

MACHINE DESIGN - I

Course Code: BTM 501

Credit Units: 03

Course Objective:

The objective of this course is to help students apply concepts learned in the mechanics, structure, material and manufacturing courses. This course offers working knowledge in the use of proper failure theories under steady and variable loading, design of mechanical elements, such as shaft, coupling, power screws, and detachable, permanent and welded connections.

Course Contents:

Module I: Variable stresses in Machine Parts

Fatigue and Endurance Limit, Factor of Safety for Fatigue Loading, Stress concentration, Notch sensitivity, Gerber Method, Goodman Method and Soderberg Method for combination of stresses.

Module II: Power Screws

Types of screw threads, Torque required to raise and lower the load, Efficiency of square threaded screw, overhauling and self locking screw, stresses in power screw, design of screw jack.

Module III: Cotter and Knuckle Joints

Types of cotter joints, design of socket and spigot joint, design of sleeve and cotter joint, design of jib and cotter joint, Design procedure of Knuckle joint.

Module IV: Riveted and Welded Joint

Types of Riveted joint, Lap joint, Butt Joint, Caulking and Fullering, Failure of Riveted joint, Strength of Riveted joint, Efficiency of Riveted joint, Advantages and Disadvantages of welded joint over Riveted joint, Strength of Fillet joint, strength of Butt joints.

Module V: Keys and Couplings

Types of Keys, Splines, Strength of Sunk Key, types of shaft coupling, Sleeve and muff coupling, Flange coupling, Flexible coupling, Oldham coupling, Universal coupling.

Module VI: Drives

Types of Belt drives, Flat Belt drives, Velocity ratio, Slip, Creep of Belt, Length of open Belt, length of cross belt, power transmission by belt, Maximum tension in the belt. Types of V belt and Pulleys, advantages and disadvantages of V belt over Flat Belt, Ratio of Driving tensions for V belt, Rope drives. Chain drives, advantages and disadvantages of Chain drives.

Module VII: Industrial Visit

At least one visit to local industry in the field of Mechanical Engineering.

Examination Scheme:

Components	A	CT	S/V/Q	HA	EE
Weightage (%)	5	10	8	7	70

CT: Class Test, HA: Home Assignment, S/V/Q: Seminar/Viva/Quiz, EE: End Semester Examination; Att: Attendance

Text & References:

- J.E. Shigley, Mechanical Engineering Design.
- Sadhu Singh, Machine Design
- R.S. Khurmi & J.K. Gupta, Machine design
- D.K. Aggarwal & P.C. Sharma, Machine Design

(Syllabus to be replaced)

AUTOMATIC CONTROL SYSTEMS

Course Code: RT 4603

Credit Units: 03

Course Objective:

In this course student will be able to understand the complexity of control systems, Transfer Function Representation of linear systems

Proportional and Integral Controllers The various automatic control systems and their principle as well as technology used in real world.

To study the basics of control system and its response, stability of mechanical and electrical systems. Use of MATLAB to design a stable control system.

UNIT – I, INTRODUCTION : Open loop and closed loop systems - Examples - Elements of closed loop systems - Transfer function of elements - Modeling of physical systems - Mechanical systems - Translational and Rotational systems - Electrical networks - Analog circuits Thermal & Hydraulic systems – Block diagram.

UNIT – II, TRANSFER FUNCTION: Transfer function - Transfer function of DC generator, DC servomotor, AC servomotor - Transfer function of potentiometer, Synchro, Tacho-generator, Stepper motor.

UNIT – III, TIME DOMAIN ANALYSIS: Standard Test signals – Time response of second order system - Time domain response Performance criteria - Types of systems - Steady state error constants - Generalised error series - Feedback characteristics of control systems introduction to PID Controllers

UNIT – IV, STATE SPACE ANALYSIS: Introduction to state space analysis - Phase variable and canonical forms - State transition matrix - Solutions to state space equation - Discretisation of state space equation - Controllability and Observability of systems.

UNIT – V, FREQUENCY RESPONSE OF SYSTEMS: Frequency domain specifications - peak resonance, resonant frequency, bandwidth and cut-off rate - Estimation for second order systems - correlation between time and frequency response for second order systems.

Examination Scheme:

Components	Att	Mid Sem	HA	EE
Weightage (%)	5	15	10	70

CT: Class Test, HA: Home Assignment, EE: End Semester Examination; Att: Attendance

References:

1. Patranabis D: "Sensor & Actuators", Prentice Hall of India (Pvt) Ltd, 2005
2. Renganathan S, "Transducer Engineering", Allied Publishers (P) Ltd., 2003
3. Ernest O. Deoblin, "Measurement System, Application & Design", Tata McGraw Hill Publishing Company Ltd, Fifteth Edition, 2004
4. Bolton W, Mechatronics, Thomson Press, 2003
5. John P. Bentley, "Principles of Measurement Systems", 3ed Edition, Pearson Education, 2000

(Proposed Syllabus)
MODERN MATERIAL HANDLING SYSTEM

Course Code: RT 4603

Credit Units: 03

Course Objective:

In this course student will be able to understand the complexity of material handling systems. AGV's AS/RS system, conveyor systems, storage systems and Application of Robotics in material handling r Function Representation of linear systems Proportional and Integral Controllers The various automatic control systems and their principle as well as technology used in real world.
To study the basics of control system and its response .stability of mechanical and electrical systems . Use of MATLAB to design a stable control system.

UNIT I-INTRODUCTION

Material Handling – Functions, Types, analysis, Importance & Scope, Principles, - Part feeding device – types of material handling system – Unit material movement & Unit loads – Receiving, Shipping, inprocess handling bulk handling equipment & methods.

UNIT II-MATERIAL HANDLING EQUIPMENT

Industrial trucks, lifting device, monorails, manipulators, conveyors, storage systems, elevators, racks, bins, pallets, cranes – Automation of material handling – mechanization of part handling.

UNIT III-AUTOMATED GUIDED VEHICLE SYSTEM

Types of AGV's – Guidance techniques – Painted line, wire guided, vision guided method – Applications – Vehicle guidance & routing – Traffic control & safety – system management – Quantitative analysis of AGV system.

UNIT IV-STORAGE SYSTEM

Conveyor systems – types, Quantitative relationship & analysis – Automated storage system, performance – AS/RS system – Basic components, types, controls, features, applications, Quantitative analysis – carousel storage system – applications.

UNIT V-ROBOTICS IN MATERIAL HANDLING

General considerations in robot material handling – material transfer application – pick & place operations – machine loading & unloading –characteristics of robot application – Robot cell design – processing

operations – Spot welding, Spray painting, Plastic moulding, forging.

Examination Scheme:

Components	Att	Mid Sem	HA	EE
Weightage (%)	5	15	10	70

CT: Class Test, HA: Home Assignment, EE: End Semester Examination; Att: Attendance

References:



1. Mikell P. Groover, Automated Production system & computer integrated manufacturing — Prentice Hall of India – 1987.
2. Mikell P Groover, Industrial Robotics –McGraw Hill – 1986
3. Allegeri, Theodove . H, Material Handling Principle & Praticce – C.B.S.Publisher – 1987.
4. Alexandrov .M.P & Rudenko .N, Material handling equipments – MIR Publisher – 1981.
5. Govindan .K.R, Plant Layout & Material Handling – Anuradha agency –2001.
6. Material Handling Equipment for the manufacturing industry – AICTE –1995.
7. Measwani .N.V & Mehta .A.C., Advances in material handling equipment

Justification

After reviewing all the subject of Robotics Program, It was found that there is no subject who can give knowledge to the student about the application of robotics in the industry.

The proposed syllabus is focusing on various material handling systems which are widely used in the industries like Automobiles, food processing chemicals, pharmaceuticals etc.

Since the students have a subject “Project on Robotics” (MRB 600) so this subject will give the idea about the innovative projects



MICROPROCESSOR & MICROCONTROLLER

Course Code: RT 4604

Credit Units: 04

Course Objective:

This course deals with the systematic study of the Architecture and programming issues of 8085-microprocessor family. The aim of this course is to give the students basic knowledge of the above microprocessor needed to develop the systems using it.

UNIT – I, ARCHITECTURE OF 16-BIT MICROPROCESSOR

Difference between 8085 and 8086, Block diagram and architecture of 8086 family, pin configuration of 8086, minimum mode & maximum mode Operation, Bus Interface Unit, Register Organization, Instruction Pointer, Stack & Stack pointer, merits of memory segmentation, Execution Unit, Register Organization.

UNIT – II, 8086 Instructions set , addressing modes, programming, application programming

UNIT – III, OVERVIEW OF MICROCONTROLLER: Microcontroller and Embedded Processors, Overview of 8051 Microcontroller family: Architecture, basic assembly language programming concepts, The program Counter and ROM Spaces in the 8051, Data types, 8051 Flag Bits and PSW Register, 8051 Register Banks and Stack Instruction set, Loop and Jump Instructions, Call Instructions, Time delay generations and calculations, I/O port programming Addressing Modes, accessing memory using various addressing modes, Arithmetic instructions and programs, Logical instructions, BCD and ASCII application programs, Single-bit instruction programming, Reading input pins vs. port Latch, Programming of 8051 Timers, Counter Programming.

UNIT – IV, COMMUNICATION WITH 8051

Basics of Communication, Overview of RS-232, I2C Bus, UART, USB, IEEE 488 (GPIB). Parallel input output applications. (Stepper motor Sequencer program, Strobed input/output). Interrupt driven applications (real time clock, serial input/output with interrupt). Analog-digital interfacing (Pulse width modulator, 8-bit ADC).

UNIT – V, BASICS OF 8051 C PROGRAMMING

Introduction to 8051 C, 8051 memory constitution, Constants, variables and data types. Arrays structures and unions, pointers, Loops and decisions, Functions, Modules and programs.

Examination Scheme:

Components	Att	Mid Sem	HA	EE
Weightage (%)	5	15	10	70

CT: Class Test, HA: Home Assignment, EE: End Semester Examination; Att: Attendance

Reference:



- Raj Kamal, 2004, "Embedded Systems", TMH.
- James W. Stewart and Kai X. Miao, 2en Edition. "The 8051 microcontroller" Pearson Edu. Prentice Hall.
- M.A. Mazidi and J. G. Mazidi, 2004 "The 8051 Microcontroller and Embedded Systems", PHI.
- B. Ram, "Fundamentals of microprocessors and microcomputer" Dhanpat Rai, 5th Edition.]
- Douglas V Hall.
- M. Rafiquzzaman, "Microprocessor Theory and Application" PHI – 10th Indian Reprint.
- Naresh Grover, "Microprocessor comprehensive studies Architecture, Programming and Interfacing" Dhanpat Rai, 2003.

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ARTIFICIAL INTELLIGENCE

Course Code: RT 4605

Credit Units: 04

Course Objective:

To develop semantic-based and context-aware systems to acquire, organise, process, share and use the knowledge embedded in multimedia content. Research will aim to maximise automation of the complete knowledge lifecycle and achieve semantic interoperability between Web resources and services. The field of Robotics is a multi disciplinary as robots are amazingly complex system comprising mechanical, electrical, electronic H/W and S/W and issues germane to all these.

UNIT – I, PROBLEM SOLVING AND SCOPE OF AI

Introduction to Artificial Intelligence. Applications- Games, theorem proving, natural language processing, vision and speech processing, robotics, expert systems. AI techniques- search knowledge, abstraction.

PROBLEM SOLVING

State space search; Production systems, search space control: depth-first, breadth-first search. Heuristic search - Hill climbing, best-first search, branch and bound. Problem Reduction, Constraint Satisfaction End, Means-End Analysis.

UNIT – II, KNOWLEDGE REPRESENTATION

Knowledge Representation issues, first order predicate calculus, Horn Clauses, Resolution, Semantic Nets, Frames, Partitioned Nets, Procedural Vs Declarative knowledge, Forward Vs Backward Reasoning.

UNIT – III, UNDERSTANDING NATURAL LANGUAGES

Introduction to NLP, Basics of Syntactic Processing, Basics of Semantic Analysis, Basics of Parsing techniques, context free and transformational grammars, transition nets, augmented transition nets, Shanks Conceptual Dependency, Scripts, Basics of grammar free analyzers, Basics of sentence generation, and Basics of translation.

UNIT – IV, EXPERT SYSTEM: Need and justification for expert systems, knowledge acquisition, Case studies: MYCIN, RI.

LEARNING: Concept of learning, learning automation, genetic algorithm, learning by inductions, neural nets.

PROGRAMMING LANGUAGE: Introduction to programming Language, LISP and PROLOG.

HANDLING UNCERTAINTIES: Non-monotonic reasoning, Probabilistic reasoning, use of certainty factors, Fuzzy logic.

UNIT – V, INTRODUCTION TO ROBOTICS

Fundamentals of Robotics, Robot Kinematics: Position Analysis, Dynamic Analysis and Forces, Trajectory Planning, Sensors and vision system.

Robot Programming languages & systems: Introduction, the three levels of robot programming, requirements of a robot programming language, problems peculiar to robot programming languages.

Examination Scheme:

Components	Att.	Mid Sem.	HA	EE
Weightage (%)	5	15	10	70

CT: Class Test, HA: Home Assignment EE: End Semester Examination; Att: Attendance

References:

- E. Rich and K. Knight, "Artificial intelligence", TMH, 2nd ed., 1992.
- N.J. Nilsson, "Principles of AI", Narosa Publ. House, 1990.
- John J. Craig, "Introduction to Robotics", Addison Wesley publication
- Richard D. Klafter, Thomas A. Chmielewski, Michael Negin, "Robotic Engineering – An integrated approach", PHI Publication
- Tsuneo Yoshikawa, "Foundations of Robotics", PHI Publication



PROJECTS ON ROBOTICS

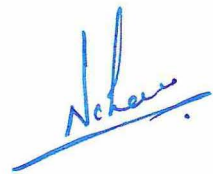
Course Code: RT 4606

Credit Units: 01

Course Objective:

Students will be applying the skills learned and make models of robots.

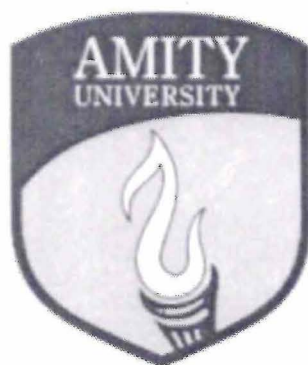
Students have to make a project based on subject input of all the previous five semester and evaluation will be done on the basis of innovativeness and usefulness, objectivity, and learning outcome.



Bachelor of Technology
(Mechanical & Automation Engineering)

Programme Code: BTM

Duration – 4 Years Full Time



Programme
Scheme of Examination

2018-19

AMITY UNIVERSITY
MADHYA PRADESH

PROGRAMME STRUCTURE-B.TECH(MAE)

FIRST SEMESTER

Course Code	Course Title	Lecture (L) Hours Per week	Tutorial (T) Hours Per week	Practical (P) Hours Per week	Total Credits
BTM 101	Applied Mathematics – I	3	-	-	3
BTM 102	Applied Physics - I – Fields & Waves	2	1	-	3
BTM 103	Element of Mechanical Engineering	2	-	-	2
BTM 104	Introduction to Computers & Programming in C	2	1	-	3
BTM 105	Applied Chemistry	2	1	-	3
BTM 106	Environmental Studies – I	2	-	-	2
BTM 120	Applied Physics Lab – I	-	-	2	1
BTM 121	Element of Mechanical Engineering Lab	-	-	2	1
BTM 122	Programming in C Lab	-	-	2	1
BTM 123	Applied Chemistry Lab	-	-	2	1
BTM 124	Engineering Graphics Lab	-	-	2	1
BTM 141	English Language usage essentials	1	-	-	1
BTM 143	Understanding self for effectiveness	1	-	-	1
BTC 144	Foreign Language – I French	2	-	-	2
TOTAL CREDITS					25
Including CBCS		3			28
Total Hrs Including CBCS					33

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SECOND SEMESTER

Course Code	Course Title	Lecture (L) Hours Per week	Tutorial (T) Hours Per week	Practical (P) Hours Per week	Total Credits
BTM 201	Applied Mathematics – II	3	-	-	3
BTM 202	Applied Physics - II – Modern Physics	2	1	-	3
BTM 203	Electrical Science	2	1	-	3
BTM 204	Object oriented programming using C++	2	1	-	3
BTM 205	Engineering Mechanics	2	1	-	3
BTM 206	Environmental Studies-II	2	-	-	2
BTM 220	Applied Physics Lab – II	-	-	2	1
BTM 221	Electrical Science Lab	-	-	2	1
BTM 222	Object oriented programming using C++ Lab	-	-	2	1
BTM 223	Engineering Mechanics Lab	-	-	2	1
BTM 240	English	1	-	-	1
BTM 243	Behavioural science - II	1	-	-	1
	Foreign Language - II	2	-	-	2
BTM 244	French				
TOTAL CREDITS					25
Including CBCS		3			28
Total Hrs Including CBCS					32
TERM PAPER DURING SUMMER BREAK					

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THIRD SEMESTER					
Course Code	Course Title	Lecture (L) Hours Per week	Tutorial (T) Hours Per week	Practical (P) Hours Per week	Total Credits
BTM 301	Numerical Analysis & Programming	2	-	-	2
BTM 302	Thermodynamics	2	1	-	3
BTM 303	Mechanics of Solids	2	1	-	3
BTM 304	Material Science & Metallurgy	2	1	-	3
BTM 305	Mechanics of Fluids	3	-	-	3
BTM 306	Electronics	2	-	-	2
BTM 320	Mechanics of Solids & Fluids Lab	-	-	2	1
BTM 321	Machine Drawing with CAD Lab	-	-	2	1
BTM 322	Programming Lab - I (Numerical Analysis)	-	-	2	1
BTM 323	Electronics Lab	-	-	2	1
BTM 324	Thermodynamics Lab	-	-	2	1
BTM 341	Communication Skills – I	1	-	-	1
BTM 343	Behavioural Science - III	1	-	-	1
	Foreign Language – III	2	-	-	2
BTM 344	French				
BTM 330	Term Paper (Evaluation)	-	-	-	2
TOTAL CREDITS					27
Including CBCS		3			30
Total Hrs Including CBCS					33

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FOURTH SEMESTER					
Course Code	Course Title	Lecture (L) Hours Per week	Tutorial (T) Hours Per week	Practical (P) Hours Per week	Total Credits
BTM 401	Kinematics & Dynamics of Machines	3	-	-	3
BTM 402	Heat & Mass Transfer	2	1	-	3
BTM 403	Manufacturing Machines	3	-	-	3
BTM 404	Theory of Metal Forming	3	-	-	3
BTM 405	Electrical Machines	3	-	-	3
BTM 406	Principles of Computer Graphics	2	-	-	2
BTM 420	Kinematics & Dynamics of Machines Lab	-	-	2	1
BTM 421	Manufacturing Machines Lab	-	-	2	1
BTM 422	Electrical Machines Lab	-	-	2	1
BTM 423	Principles of Computer Graphics Lab	-	-	2	1
BTM 424	Heat & Mass Transfer Lab	-	-	2	1
BTC 441	Communication Skills - II	1	-	-	1
BTC 443	Behavioural Science - IV	1	-	-	1
	Foreign Language – IV	2	-	-	2
BTC 444	French				
TOTAL CREDITS					26
Including CBCS		3	1		30
Total Hrs Including CBCS					35
PRACTICAL TRAINING – I: 6 – 8 WEEKS					

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FIFTH SEMESTER					
Course Code	Course Title	Lecture (L) Hours Per week	Tutorial (T) Hours Per week	Practical (P) Hours Per week	Total Credits
BTM 501	Machine Design – I	3	-	-	3
BTM 502	Metrology	3	-	-	3
BTM 503	Measurements & Controls	2	1	-	3
BTM 504	Relational Database Management System	3	-	-	3
BTM 505	Microprocessor System	3	1	-	4
BTM 521	Metrology Lab	-	-	2	1
BTM 522	Measurements & Controls Lab	-	-	2	1
BTM 523	Microprocessor System Lab	-	-	2	1
BTM 524	Programming Lab - II (MAT Lab)	-	-	2	1
BTM 525	Relational Database Management System Lab	-	-	2	1
BTM 541	Communication Skills - III	1	-	-	1
BTM 543	Behavioural Science - V	1	-	-	1
	Foreign Language – V	2	-	-	2
BTM 544	French				
BTM 550	Industrial Practical Training - I (Evaluation)	-	-	-	3
TOTAL CREDITS					28
Including CBCS		3	1		32
Total Hrs Including CBCS					34

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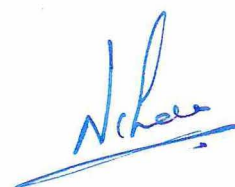
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SIXTH SEMESTER					
Course Code	Course Title	Lecture (L) Hours Per week	Tutorial (T) Hours Per week	Practical (P) Hours Per week	Total Credits
BTM 601	Management of Manufacturing Systems	3	-	-	3
BTM 602	Machine Design – II	3	-	-	3
BTM 603	Fluid Power Systems	2	1	-	3
BTM 604	Metal Cutting & Tool Design	3	-	-	3
BTM 605	IC Engine & Gas Turbine	3	-	-	3
BTM 606	Computer Networks	2	1	-	3
BTM 620	Machine Design Lab - II	-	-	2	1
BTM 621	Fluid Power Systems Lab	-	-	2	1
BTM 622	IC Engine & Gas Turbine Lab	-	-	2	1
BTM 641	Communication Skills - IV	1	-	-	1
BTM 643	Behavioural Science - VI	1	-	-	1
	Foreign Language – VI	2	-	-	2
BTM 644	French				
TOTAL CREDITS					25
Including CBCS				1	26
Total Hrs Including CBCS					29

SEVENTH SEMESTER					
Course Code	Course Title	Lecture (L) Hours Per week	Tutorial (T) Hours Per week	Practical (P) Hours Per week	Total Credits
BTM 701	Operations Research	3	-	-	3
BTM 702	Computer Aided Manufacturing	3	-	-	3
BTM 703	Mechatronics	3	-	-	3
BTM 720	Operations Research (Programming) Lab	-	-	2	1
BTM 721	Computer Aided Manufacturing Lab	-	-	2	1
BTM 722	Mechatronics Lab	-	-	2	1
BTM 741	Communication Skills - V	1	-	-	1
BTM 743	Behavioural Science -VII	1	-	-	1
	Foreign Language – VII	2	-	-	2
BTM 744	French				
BTM 750	Practical Training – II(Evaluation)	-	-	-	6
BTM 760	Project (Dissertation)	-	-	-	6
ELECTIVES (Any one from each category)					
A (With Practical)					
BTM 704	Automotive Engineering	3	-	-	3
BTM 705	Computer Aided Designing	3	-	-	3
BTM 723	Automotive Engineering Lab	-	-	2	1
BTM 724	Computer Aided Designing Lab	-	-	2	1
ELECTIVES (Any one from each category)					
B (Without Practical)					
BTM 706	Marketing Management	3	-	-	3
BTM 707	Solar Energy	3	-	-	3
BTM 708	Power Plant Practices	3	-	-	3
BTM 709	Combustion Engine Emissions	3	-	-	3
TOTAL CREDITS					35
Total Hrs					33

EIGHTH SEMESTER					
Course Code	Course Title	Lecture (L) Hours Per week	Tutorial (T) Hours Per week	Practical (P) Hours Per week	Total Credits
BTM 801	Quality Control & Quality Assurance	3	-	-	3
BTM 802	Refrigeration & Air-conditioning	3	-	-	3
BTM 820	Refrigeration & Air-conditioning Lab	-	-	2	1
BTM 841	Communication Skills - VI	1	-	-	1
BTM 843	Behavioural Science - VIII	1	-	-	1
	Foreign Language – VIII	2	-	-	2
BTM 844	French				
BTC 860	Project	-	-	-	9
ELECTIVES (Any one from following with Practical)					
BTM 803	Advanced Methods of Manufacturing	3	-	-	3
BTM 804	Gear Technology	3	-	-	3
BTM 805	Artificial Intelligence & Robotics	3	-	-	3
BTM 821	Advanced Methods of Manufacturing Lab	-	-	2	1
BTM 822	Gear Technology Lab	-	-	2	1
BTM 823	Artificial Intelligence & Robotics Lab	-	-	2	1
TOTAL CREDITS					24
Total Hrs.					26

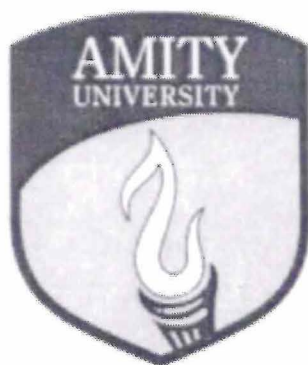


Bachelor of Technology
(Mechanical & Automation Engineering)

Programme Code: BTM

Duration – 4 Years Full Time



Programme
Scheme of Examination

2017-18

AMITY UNIVERSITY
MADHYA PRADESH

PROGRAMME STRUCTURE-B.TECH(MAE)

FIRST SEMESTER

Course Code	Course Title	Lecture (L) Hours Per week	Tutorial (T) Hours Per week	Practical (P) Hours Per week	Total Credits
BTM 101	Applied Mathematics – I	3	-	-	3
BTM 102	Applied Physics - I – Fields & Waves	2	1	-	3
BTM 103	Element of Mechanical Engineering	2	-	-	2
BTM 104	Introduction to Computers & Programming in C	2	1	-	3
BTM 105	Applied Chemistry	2	1	-	3
BTM 106	Environmental Studies – I	2	-	-	2
BTM 120	Applied Physics Lab – I	-	-	2	1
BTM 121	Element of Mechanical Engineering Lab	-	-	2	1
BTM 122	Programming in C Lab	-	-	2	1
BTM 123	Applied Chemistry Lab	-	-	2	1
BTM 124	Engineering Graphics Lab	-	-	2	1
BTM 141	English Language usage essentials	1	-	-	1
BTM 143	Understanding self for effectiveness	1	-	-	1
BTC 144	Foreign Language – I French	2	-	-	2
TOTAL CREDITS					25
Including CBCS					28
Total Hrs Including CBCS					33

SECOND SEMESTER

Course Code	Course Title	Lecture (L) Hours Per week	Tutorial (T) Hours Per week	Practical (P) Hours Per week	Total Credits
BTM 201	Applied Mathematics – II	3	-	-	3
BTM 202	Applied Physics - II – Modern Physics	2	1	-	3
BTM 203	Electrical Science	2	1	-	3
BTM 204	Object oriented programming using C++	2	1	-	3
BTM 205	Engineering Mechanics	2	1	-	3
BTM 206	Environmental Studies-II	2	-	-	2
BTM 220	Applied Physics Lab – II	-	-	2	1
BTM 221	Electrical Science Lab	-	-	2	1
BTM 222	Object oriented programming using C++ Lab	-	-	2	1
BTM 223	Engineering Mechanics Lab	-	-	2	1
BTM 240	English	1	-	-	1
BTM 243	Behavioural science - II	1	-	-	1
	Foreign Language - II	2	-	-	2
BTM 244	French				
TOTAL CREDITS					25
Including CBCS					28
Total Hrs Including CBCS					32
TERM PAPER DURING SUMMER BREAK					

THIRD SEMESTER					
Course Code	Course Title	Lecture (L) Hours Per week	Tutorial (T) Hours Per week	Practical (P) Hours Per week	Total Credits
BTM 301	Numerical Analysis & Programming	2	-	-	2
BTM 302	Thermodynamics	2	1	-	3
BTM 303	Mechanics of Solids	2	1	-	3
BTM 304	Material Science & Metallurgy	2	1	-	3
BTM 305	Mechanics of Fluids	3	-	-	3
BTM 306	Electronics	2	-	-	2
BTM 320	Mechanics of Solids & Fluids Lab	-	-	2	1
BTM 321	Machine Drawing with CAD Lab	-	-	2	1
BTM 322	Programming Lab - I (Numerical Analysis)	-	-	2	1
BTM 323	Electronics Lab	-	-	2	1
BTM 324	Thermodynamics Lab	-	-	2	1
BTM 341	Communication Skills – I	1	-	-	1
BTM 343	Behavioural Science - III	1	-	-	1
	Foreign Language – III	2	-	-	2
BTM 344	French				
BTM 330	Term Paper (Evaluation)	-	-	-	2
TOTAL CREDITS					27
Including CBCS					30
Total Hrs Including CBCS					33

FOURTH SEMESTER					
Course Code	Course Title	Lecture (L) Hours Per week	Tutorial (T) Hours Per week	Practical (P) Hours Per week	Total Credits
BTM 401	Kinematics & Dynamics of Machines	3	-	-	3
BTM 402	Heat & Mass Transfer	2	1	-	3
BTM 403	Manufacturing Machines	3	-	-	3
BTM 404	Theory of Metal Forming	3	-	-	3
BTM 405	Electrical Machines	3	-	-	3
BTM 406	Principles of Computer Graphics	2	-	-	2
BTM 420	Kinematics & Dynamics of Machines Lab	-	-	2	1
BTM 421	Manufacturing Machines Lab	-	-	2	1
BTM 422	Electrical Machines Lab	-	-	2	1
BTM 423	Principles of Computer Graphics Lab	-	-	2	1
BTM 424	Heat & Mass Transfer Lab	-	-	2	1
BTC 441	Communication Skills - II	1	-	-	1
BTC 443	Behavioural Science - IV	1	-	-	1
	Foreign Language – IV	2	-	-	2
BTC 444	French				
TOTAL CREDITS					26
Including CBCS					29
Total Hrs Including CBCS					34
PRACTICAL TRAINING – I: 6 – 8 WEEKS					

FIFTH SEMESTER					
Course Code	Course Title	Lecture (L) Hours Per week	Tutorial (T) Hours Per week	Practical (P) Hours Per week	Total Credits
BTM 501	Machine Design – I	3	-	-	3
BTM 502	Metrology	3	-	-	3
BTM 503	Measurements & Controls	2	1	-	3
BTM 504	Relational Database Management System	3	-	-	3
BTM 505	Microprocessor System	3	1	-	4
BTM 521	Metrology Lab	-	-	2	1
BTM 522	Measurements & Controls Lab	-	-	2	1
BTM 523	Microprocessor System Lab	-	-	2	1
BTM 524	Programming Lab - II (MAT Lab)	-	-	2	1
BTM 525	Relational Database Management System Lab	-	-	2	1
BTM 541	Communication Skills - III	1	-	-	1
BTM 543	Behavioural Science - V	1	-	-	1
	Foreign Language – V	2	-	-	2
BTM 544	French				
BTM 550	Industrial Practical Training - I (Evaluation)	-	-	-	3
TOTAL CREDITS					28
Including CBCS					31
Total Hrs Including CBCS					33

SIXTH SEMESTER

Course Code	Course Title	Lecture (L) Hours Per week	Tutorial (T) Hours Per week	Practical (P) Hours Per week	Total Credits
BTM 601	Management of Manufacturing Systems	3	-	-	3
BTM 602	Machine Design – II	3	-	-	3
BTM 603	Fluid Power Systems	2	1	-	3
BTM 604	Metal Cutting & Tool Design	3	-	-	3
BTM 605	IC Engine & Gas Turbine	3	-	-	3
BTM 606	Computer Networks	2	1	-	3
BTM 620	Machine Design Lab - II	-	-	2	1
BTM 621	Fluid Power Systems Lab	-	-	2	1
BTM 622	IC Engine & Gas Turbine Lab	-	-	2	1
BTM 641	Communication Skills - IV	1	-	-	1
BTM 643	Behavioural Science - VI	1	-	-	1
	Foreign Language – VI	2	-	-	2
BTM 644	French				
TOTAL CREDITS					25
Including CBCS					28
Total Hrs Including CBCS					31

SEVENTH SEMESTER

Course Code	Course Title	Lecture (L) Hours Per week	Tutorial (T) Hours Per week	Practical (P) Hours Per week	Total Credits
BTM 701	Operations Research	3	-	-	3
BTM 702	Computer Aided Manufacturing	3	-	-	3
BTM 703	Mechatronics	3	-	-	3
BTM 720	Operations Research (Programming) Lab	-	-	2	1
BTM 721	Computer Aided Manufacturing Lab	-	-	2	1
BTM 722	Mechatronics Lab	-	-	2	1
BTM 741	Communication Skills - V	1	-	-	1
BTM 743	Behavioural Science -VII	1	-	-	1
	Foreign Language – VII	2	-	-	2
BTM 744	French				
BTC 750	Practical Training – II(Evaluation)	-	-	-	6
BTC 760	Project (Dissertation)	-	-	-	6
ELECTIVES (Any one from each category)					
A (With Practical)					
BTM 704	Automotive Engineering	3	-	-	3
BTM 705	Computer Aided Designing	3	-	-	3
BTM 723	Automotive Engineering Lab	-	-	2	1
BTM 724	Computer Aided Designing Lab	-	-	2	1
ELECTIVES (Any one from each category)					
B (Without Practical)					
BTM 706	Marketing Management	3	-	-	3
BTM 707	Solar Energy	3	-	-	3
BTM 708	Power Plant Practices	3	-	-	3
BTM 709	Combustion Engine Emissions	3	-	-	3
TOTAL CREDITS					35
Total Hrs					33

EIGHTH SEMESTER

Course Code	Course Title	Lecture (L) Hours Per week	Tutorial (T) Hours Per week	Practical (P) Hours Per week	Total Credits
BTM 801	Quality Control & Quality Assurance	3	-	-	3
BTM 802	Refrigeration & Air-conditioning	3	-	-	3
BTM 820	Refrigeration & Air-conditioning Lab	-	-	2	1
BTM 841	Communication Skills - VI	1	-	-	1
BTM 843	Behavioural Science - VIII	1	-	-	1
	Foreign Language – VIII	2	-	-	2
BTM 844	French				
BTC 860	Project	-	-	-	9
ELECTIVES (Any one from following with Practical)					
BTM 803	Advanced Methods of Manufacturing	3	-	-	3
BTM 804	Gear Technology	3	-	-	3
BTM 805	Artificial Intelligence & Robotics	3	-	-	3
BTM 821	Advanced Methods of Manufacturing Lab	-	-	2	1
BTM 822	Gear Technology Lab	-	-	2	1
BTM 823	Artificial Intelligence & Robotics Lab	-	-	2	1
TOTAL CREDITS					24
Total Hrs.					26



AMITY UNIVERSITY

MADHYA PRADESH

(Established by Ritnand Balved Education Foundation)

Date: 11/03/2019

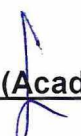
NOTE- SHEET

1. The Department of Mechanical Engineering, ASET, AUMP, Board of Studies Meeting was held on 11 March 2019.
2. The minutes of the meeting submitted for your kind perusal & approval please.

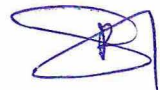

Dr. Moon Banerjee
Asst. Prof.(ME)


Mr. Nasir Khan
HoD(ME)

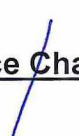

Director-ASET


Dean (Academics)

Submit a copy (soft & hard) of BOS minutes and syllabus.


11/3/2019

Hon'ble Pro Vice Chancellor


11/03/2019

Hon'ble Vice Chancellor


12/3/19



AMITY UNIVERSITY

MADHYA PRADESH

(Established by Ritnand Balved Education Foundation)

Date: 11/03/2019

BOARD OF STUDIES (Mechanical Engineering)

MINUTES OF THE MEETING

(5 Pages Only)

1. Board of Studies (BoS) meeting has been held by the Mechanical Engineering, Amity School of Engineering & Technology, Amity University Madhya Pradesh on March 11, 2019 at AUMP, Gwalior, under the Chairmanship of Maj Gen (Dr) SC Jain, VSM** (Retd), Director (ASET). The following members attended the meeting: -

(a) **Chairman:** Maj Gen (Dr) SC Jain, VSM** (Retd), Director (ASET)

(b) **Members**

- i) Dr. Chaitanya Sharma, Associate Professor, Rustam Ji Institute of Technology, Gwalior- External Member.
- ii) Mr. Nasir Khan, Off Head, Dept of Mechanical Engineering, Amity University Madhya Pradesh, Gwalior, Member
- iii) Dr. Moon Banerjee, Asst. Professor, Dept of Mechanical Engineering, Amity University Madhya Pradesh, Gwalior, Member.
- iv) Dr. Abhishek Sharma, Asst. Professor, Dept of Mechanical Engineering, Amity University Madhya Pradesh, Gwalior, Member

2. The agenda of the meeting includes the following points:

(a) **B.Tech ME 2018-22 Batch:**

In continuation with the 1st year AICTE model curriculum approved for B.Tech ME in the academic year 2018-19, 2nd year B.Tech ME scheme and syllabus has been put forward for approval for 2018-22 batch.

(b) **B.Tech ME 2019-23 Batch:**

Introducing new curriculum with uniform course coding for B.Tech ME as per AICTE Model curriculum from the academic year 2019-20 & 2020-21 (1st & 2nd year) for 2019-23 batch.

(c) Discussion on mechanical trends and technological advancement to improve the skill sets in graduates in mechanical engineering field and consideration of their inclusion in syllabus.

(d) Any other point with due permission of the Chairperson.

(e) **Discussions/Comments:**

a. (i) **Discussion:** The existing syllabi of the courses offered by Department of ME in 1st and 2nd semester B.Tech CSE, ECE, ME, Bio-Tech and CE presented before the members of the Board of Studies. The syllabus of all the courses has been reviewed.

(ii) **Comments:** The existing syllabus is well aligned with the syllabus recommended by AICTE model curriculum and few changes were recommended in some subjects. Uniform course coding has been adopted for common courses and value-added courses.

b. (i) **Discussion:** The scheme and syllabus of Second year B.Tech ME presented before the members of the Board of Studies. The syllabus of all the courses has been reviewed. Further the courses offered by the Dept of ME to 2nd year (2018-22 batch), CE also reviewed.

(ii) **Comments:** The syllabus recommended by AICTE model curriculum has been adopted for Second year B.Tech ME and the courses offered by Dept of ME to other departments. Uniform course coding has been adopted for the common courses and value added courses.

c. (i) **Discussion:** The syllabus of M. Tech, CBCS and Pre-PhD course work courses was presented to BOS members and reviewed.

(ii) **Comments:** The Syllabus of M. Tech., CBCS and Pre-PhD course work subjects is well aligned and needs no change. Uniform course coding has been adopted for Value added subjects of M. Tech. and CBCS subjects.

f. Recommendations:

B. Tech Program:

i. **ME 2019-23 Batch:** Uniform course coding has been recommended to all the courses B.Tech ME programs from the academic year 2019-20, 2020-21 (1st & 2nd year) for 2019-23 batch. The new curriculum as per the AICTE model curriculum with uniform course coding is put forward to the kind approval of BoS members. **(Refer Annexure -I)**

ii. Uniform Course coding has been adopted for value added courses for 2019-23 batch.

iii. Uniform course coding has been adopted for value added courses (All semesters), Basic science courses (Physics, Chemistry, Maths) and courses offered to other Institutes by the department.

iv. Industrial visit in BTM 402 and Mechanical project has been added in BTM-422 and both are compulsory.

M. Tech Program:

i. There is no change in the scheme and syllabus of the course.

ii. Uniform course coding has been adopted for value added courses (All semesters).



Pre Ph.D. Course:

Pre PhD course work subjects to be decided in accordance to the **Appendix-G** of URC dated February, 08, 2019.

CBCS:

- i. There is no change in the scheme and syllabus of the course.
- ii. Uniform course coding has been adopted for all courses offered by the department.
- iii. MOOC courses are included in three courses as per the UGC guidelines (Robotics, Renewable Energy and Mechanical Engineering) in Semester-III.

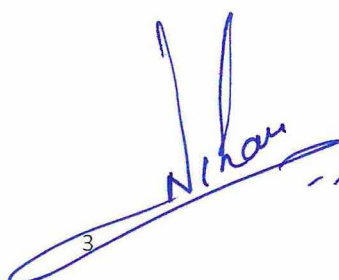
S.No	Name of the Minor Track	MOOC Course by UGC	Course IDs	Semester	Credits
1	Robotics	Industrial Safety Engineering	noc19-me40	III	3
2	Renewable Energy	Product Design Using Value Engineering	noc19-me51	III	3
3	Mechanical Engineering	Manufacturing System Technology	noc19-me45	III	3

All the aforesaid points have been approved by all the board members present in the meeting.

(g) **Summary of changes are given below: -**

Codes:

- (a) All codes are subject to change as per further alignment and higher directions.
- (b) Codes and syllabus for the subjects offered outside ASET are being decided in consultation with the respective HOI's.


3

Present Course Code					Proposed Changes/ Modifications			
Sr.No	Programme	Course Title	Old Course Code	No. of Credits	Title/ Syllabu	Uniform Course	No. of Credits	
1	B.Tech ME I Sem	Engineering Graphics and Design	BTM 104	1	No Changes in Both title and Syllabus for the proposed course	BME 101	1	
2	B.Tech CE I Sem		BTCE 104					
3	B.Tech CSE II Sem		BTC 204					
4	B.Tech EC II Sem		BTE 204					
5	B.Tech ME I Sem	Engineering Graphics and Design Lab	BTM 122	2		BME 121	2	
6	B.Tech CE I Sem		BTCE 122					
7	B.Tech CSE II Sem		BTC 222					
8	B.Tech EC II Sem		BTE 222					
9	B.Tech CSE I Sem	Workshop/ Manufacturing Practice	BTC 104	1		BME 102	1	
10	B.Tech EC I Sem		BTE 104					
11	B.Tech ME II Sem		BTM 204					
12	B.Tech CE II Sem		BTCE 204					
13	B.Tech CSE I Sem	Workshop Manufacturing Practice Lab	BTC 122	2		BME 122	2	
14	B.Tech EC I Sem		BTE 122					
15	B.Tech ME II Sem		BTM 222					
16	B.Tech CE II Sem		BTCE 222					
17	BCA II Sem	Production & operations	BCA 204	3			BME 103	3
18	B.Tech CE IV sem	Mechanical Engineering	BTCE 401	2			No change	2

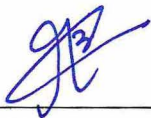
BME – Basics of Mechanical Engineering

NOTE:

1. The codes of BTM-104,BTCE-104,BTC-204 and BTE-204 are renamed as BME-101.
2. The codes of BTM-122,BTCE-122,BTC-222 and BTE-222 are renamed as BME-121.
3. The codes of BTC-104, BTE-104, BTM-204 and BTCE-204 are renamed as BME-102.
4. The codes of BTC-122, BTE-122, BTM-222 and BTCE-222 are renamed as BME-122.
5. The code of BCA-204 is renamed as BME-103.

BOARD OF STUDIES (B.Tech, ME, Second Year)
MINUTES OF THE MEETING

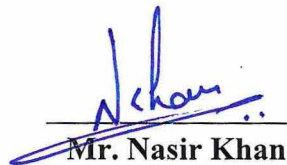
Signature of Members:



Dr. Moon Banerjee



Dr. Abhishek Sharma



Mr. Nasir Khan



Associate Prof. (Dr.) Chaitanya Sharma
External Member

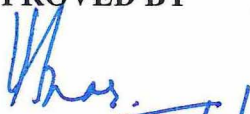


Maj Gen (Dr) S C Jain
Chairman- BOS



Prof.(Dr.) M.P. Kaushik
Hon'ble Pro Vice Chancellor
AUMP, Gwalior

APPROVED BY



Hon'ble Vice Chancellor
AUMP, Gwalior

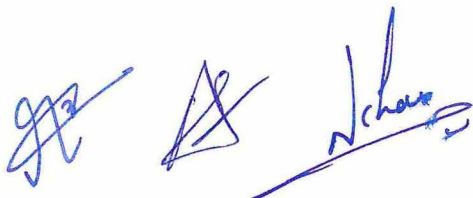
**Bachelor of Technology
(Mechanical Engineering)**

ME

CURRICULUM

**1st & 2nd YEAR
(2019-23 Batch)**

(AICTE)

Three handwritten signatures in blue ink are located at the bottom left of the page. The first signature is a stylized 'H' or 'J' with a long horizontal stroke. The second is a simple 'A' shape. The third is a more complex signature, possibly 'N. Chandra', with a long horizontal stroke extending to the right.

**Bachelor of Technology
(Mechanical Engineering)**

Programme Code: BTM

Duration – 4 Years Full Time



**Programme Structure
&
Curriculum & Scheme of Examination**

**2019-23
(As per AICTE)**

**AMITY UNIVERSITY
MADHYA PRADESH**

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PREAMBLE

Amity University aims to achieve academic excellence by providing multi-faceted education to students and encourage them to reach the pinnacle of success. The University has designed a system that would provide rigorous academic programme with necessary skills to enable them to excel in their careers.

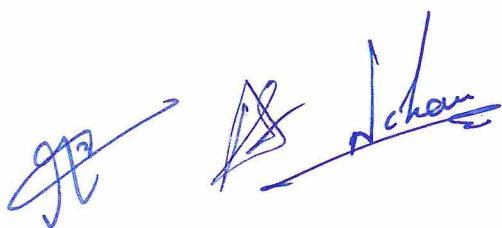
This booklet contains the Programme Structure, the Detailed Curriculum and the Scheme of Examination. The Programme Structure includes the courses (Core and Elective), arranged semester wise. The importance of each course is defined in terms of credits attached to it. The credit units attached to each course has been further defined in terms of contact hours i.e. Lecture Hours (L), Tutorial Hours (T), Practical Hours (P). Towards earning credits in terms of contact hours, 1 Lecture and 1 Tutorial per week are rated as 1 credit each and 2 Practical hours per week are rated as 1 credit. Thus, for example, an L-T-P structure of 3-0-0 will have 3 credits, 3-1-0 will have 4 credits, and 3-1-2 will have 5 credits.

The Curriculum and Scheme of Examination of each course includes the course objectives, course contents, scheme of examination and the list of text and references. The scheme of examination defines the various components of evaluation and the weightage attached to each component. The different codes used for the components of evaluation and the weightage attached to them are:

<u>Components</u>	<u>Codes</u>	<u>Weightage (%)</u>
Case Discussion/ Presentation/ Analysis	C	05 - 10
Home Assignment	H	05 - 10
Project	P	05 - 10
Seminar	S	05 - 10
Viva	V	05 - 10
Quiz	Q	05 - 10
Class Test	CT	10 - 15
Attendance	A	05
End Semester Examination	EE	70

It is hoped that it will help the students study in a planned and a structured manner and promote effective learning. Wishing you an intellectually stimulating stay at Amity University.

March, 2019



PROGRAM OUTCOMES

PO1. Engineering Knowledge: Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems.

PO2. Problem Analysis: Identify, formulate, review research literature, and analyze complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences.

PO3. Design/Development of Solutions :Design solutions for complex engineering problems and design system components or processes that meet the specified needs with appropriate consideration for the public health and safety, and the cultural, societal, and environmental considerations.

PO4. Conduct Investigations of Complex Problems :Use research-based knowledge and research methods including design of experiments, analysis and interpretation of data, and synthesis of the information to provide valid conclusions.

PO5. Modern Tool Usage: Create, select, and apply appropriate techniques, resources, and modern engineering and IT tools including prediction and modelling to complex engineering activities with an understanding of the limitations.

PO6. The Engineer and Society: Apply reasoning informed by the contextual knowledge to assess societal, health, safety, legal and cultural issues and the consequent responsibilities relevant to the professional engineering practice.

PO7. Environment and Sustainability: Understand the impact of the professional engineering solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development.

PO8. Ethics: Apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering practice.

PO9. Individual and Team Work: Function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings.

PO10. Communication: Communicate effectively on complex engineering activities with the engineering community and with society at large, such as, being able to comprehend and write effective reports and design documentation, make effective presentations, and give and receive clear instructions.

PO11. Life-long Learning: Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change.

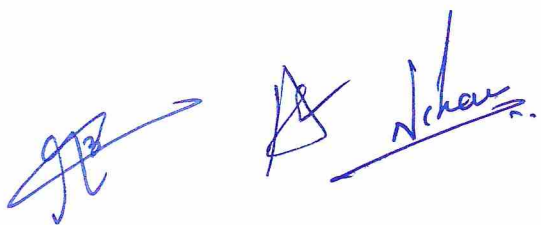
PO12. Project Management and Finance: Demonstrate knowledge and understanding of the engineering and management principles and apply these to one's own work, as a member and leader in a team, to manage projects

PROGRAM SPECIFIC OUTCOMES

PSO1. Professional Skills : An ability to understand the basic concepts in Mechanical Engineering and to apply them to various areas, like Automobile, power plant, Production, Manufacturing etc., in the design and implementation of complex systems.

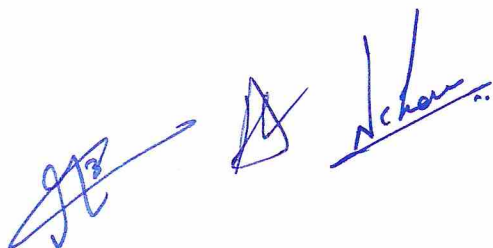
PSO2. Problem-solving skills: An ability to solve complex Mechanical Engineering problems, using latest hardware and software tools, along with analytical skills to arrive cost effective and appropriate solutions.

PSO3. Successful career and Entrepreneurship: An understanding of social-awareness & environmental-wisdom along with ethical responsibility to have a successful career and to sustain passion and zeal for real-world applications using optimal resources as an Entrepreneur.



FIRST SEMESTER						
Course Code	Course Title	Lecture (L) Hours Per week	Tutorial (T) Hours Per week	Practical (P) Hours Per week	Total Credits	Hours
MAT-101	Applied Mathematics – I (Calculus and Linear Algebra)	3	1	-	4	40
CHE101	Applied Chemistry I	3	1	-	4	40
ECE 101	Basic Electrical Engineering	3	-	-	3	30
BME 101	Engineering Graphics & Design	1	-	-	1	10
CHE121	Applied Chemistry Lab I	-	-	2	1	20
ECE 121	Basic Electrical Engineering Lab	-	-	2	1	20
BME 121	Engineering Graphics & Design Lab	-	-	4	2	40
BCU-141	Communication Skill-I	1	-	-	1	10
EVS-142	Environmental Studies - I	2	-	-	2	20
BSU-143	Behavioural Science - I	1	-	-	1	10
FLU-144	French	2	-	-	2	20
CBCS		3	-	-	3	30
TOTAL CREDITS (Including CBCS)					25	
Total Hrs Including CBCS per week						29
Total Hrs in the Semester						290

SECOND SEMESTER						
Course Code	Course Title	Lecture (L) Hours Per week	Tutorial (T) Hours Per week	Practical (P) Hours Per week	Total Credits	Hours
MAT-201	Mathematics – II (Ordinary & Partial Differential Equations and Transform)	3	1	-	4	40
PHY-101	Applied Physics-I	3	1	-	4	40
BTC 101	Programming for Problem Solving	3	-	-	3	30
BME 102	Workshop/ Manufacturing Practices	1	-	-	1	10
PHY-121	Applied Physics lab-I	-	-	2	1	20
BTC 121	Programming for Problem Solving Lab	-	-	4	2	40
BME 122	Workshop/ Manufacturing Practices Lab	-	-	4	2	40
BCU-241	Communication Skill-II	1	-	-	1	10
EVS-242	Environmental Studies - II	2	-	-	2	20
BSU-243	Behavioural Science - II	1	-	-	1	10
FLU-244	French	2	-	-	2	20
CBCS		3	-	-	3	30
TOTAL CREDITS (Including CBCS)					26	
Total Hrs Including CBCS						31
Total Hrs in the Semester						310
TERM PAPER DURING SUMMER BREAK						



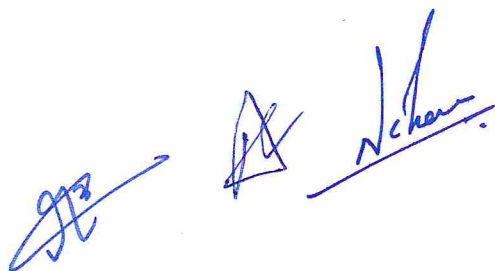
Annexure-1
PROGRAMME STRUCTURE

THIRD SEMESTER

THIRD SEMESTER						
Course Code	Course Title	Lecture (L) Hours Per week	Tutorial (T) Hours Per week	Practical (P) Hours Per week	Total Credits	Hours
MAT-301	Applied Mathematics- III (Probability, Statistics and Numerical Methods)	3	-	-	3	30
PHY 303	Applied Physics-II	2	1	-	3	30
BTM-302	Thermodynamics	2	1	-	3	30
BTM-304	Material Science & Metallurgy	3	-	-	3	30
BTM-305	Engineering Mechanics	2	1	-	3	30
ECE 302	Basic Electronics	2	-	-	2	20
PHY 323	Applied Physics II Lab	-	-	2	1	20
BTM-321	Machine Drawing with CAD Lab	-	-	2	1	20
BTM-322	Thermodynamics Lab	-	-	2	1	20
ECE 322	Basic Electronics Lab	-	-	2	1	20
BCU 341	Communication Skill-III	1	-	-	1	10
BSU 343	Behavioural Science-III	1	-	-	1	10
FLU 344	French	2	-	-	2	20
BTM 330	Term Paper (Evaluation (NTCC))				2	
CBCS		3	-	-	3	30
TOTAL CREDITS (Including CBCS)					30	
Total Hrs Including CBCS per week						32
Total Hrs in the Semester						320

FOURTH SEMESTER

FOURTH SEMESTER						
Course Code	Course Title	Lecture (L) Hours Per week	Tutorial (T) Hours Per week	Practical (P) Hours Per week	Total Credits	Hours
BTM-401	Applied Thermodynamics	3	1	-	4	40
BTM-402	Fluid Mechanics	3	1	-	4	40
BTM-403	Strength of Materials	3	1	-	4	40
BTM-404	Instrumentation & Control	2	1	-	3	30
BTM-421	Applied Thermodynamics Lab	-	-	2	1	20
BTM-422	Fluid Mechanics Lab	-	-	2	1	20
BTM-423	Strength of Materials Lab	-	-	2	1	20
BCU 441	Communication Skills-IV	1	-	-	1	10
BSU 443	Behavioural Science-IV	1	-	-	1	10
FLU 444	French	2	-	-	2	20
CBCS		4	-	-	4	30
TOTAL CREDITS (Including CBCS)					26	
Total Hrs Including CBCS						29
Total Hrs in the Semester						290

PRACTICAL TRAINING: 6 – 8 WEEKS


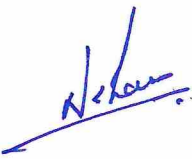
**Bachelor of Technology
(Mechanical Engineering)**

Programme Code: BTM

Duration – 4 Years Full Time

OVERALL CREDIT

Sr. No.	Semester	No. of Credits	No. of Hours
1	I	25	29
2	II	26	31
3	III	30	32
4	IV	26	29
1st and 2nd Year Total Credits		107	121



PROPOSED POLICY CHANGES IF ANY RELATED TO RESEARCH / GUIDELINES FOR REGISTRATION

The policy/Agenda issues discussed by URC are as numerated in succeeding paragraphs.

Research Subjects.

1. Ref Para 13(a) & (e) of Ordinance No. 12(Amended).
 - (a) The credit assigned to the Ph.D. course work shall be a minimum of 12 credits and a maximum of 16 credits.
 - (e) Each candidate will be required to take Course Units of minimum 12 credits, including compulsory paper on Research Methodology and specific Courses prescribed by the SRC and approved by DRC.
2. CoE proposed that the proposed topic of research ideally be short listed during SRC and the same be forwarded for tentative approval of Hon Vice Chancellor.
3. The candidates should plan and formulate the synopsis on the approved topics.
4. The point was agreed to and approved by URC.

Question Papers for Ph D Course Work Examination.

5. Ref Para 5(b)(i) and (iii) of Ordinance No. 12(Amended) pertaining to Ph D where in the SRC shall perform the following functions:-
 - (I) Invite the candidate for scrutinizing his research proposal to ensure that the proposal is suitable.
 - (II) Ascertain the availability of facilities required for the proposed research.
 - (III) Prescribe the Course Units to be taken by the candidate, subject to a minimum of two, or in exceptional cases, recommend exemption from the requirement with justification.
6. Hon Vice Chancellor restricted that at least one paper offered to the student shall pertain to the direction of research proposed by the student. The distribution of course work be as follows: -

(a) Paper-I	Research Methodology
(b) Paper-II	Review of Literature
(c) Paper-III	Broad study of Subject
(d) Paper-IV	Research area specific Subject

Minimum Acceptable Standards of Research Publications.

7. It was unanimously decided that UGC norms shall be the accepted norms for Minimum acceptable standards of Research Publications at AUMP and Ph D scholar must publish at least one (1) research paper in refereed journal and make two paper presentations in conferences/seminars before the submission of the dissertation/thesis for adjudication and produce evidence for the same in the form of presentation certificates and/or reprints.

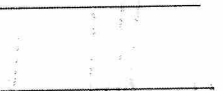
REVIEW AND RECOMMENDATIONS IF ANY AREAS / THEMES/ TOPICS FOR RESEARCH

Nil Point

Member Secretary

Chairman – Hon Vice Chancellor







AMITY UNIVERSITY

MADHYA PRADESH

[Established by Ritnand Balved Education Foundation]

Date: 06/03/2020

BOARD OF STUDIES (Mechanical Engineering)

MINUTES OF THE MEETING

(05 Pages Only)

1. A meeting of board of studies of Department of Mechanical Engineering, Amity School of Engineering & Technology, Amity University Madhya Pradesh was held on 06/03/2020 at AUMP, under the Chairmanship of Maj Gen (Dr) S C Jain VSM** (Retd), Director (ASET). The following members attended the meeting: -

(a) **Chairman**: Maj Gen (Dr) S C Jain VSM ** (Retd), Director (ASET)

(b) **Member**

- i) Dr. Chaitanya Sharma, Associate Professor and Head ME, RJIT, Tekanpur, External Member
- ii) Dr. CP Jawahar, Professor & Head ME, Member
- iii) Mr. Nasir Khan, Asst. Prof. ME, Member
- iv) Dr. Sandeep Rathee, Assistant Professor, ME, Member

2. **The agenda of the meeting included the following:**

- (a) Curriculum of First year B.Tech ME Program for 2020-24 batch.
- (b) Introducing Uniform Course codes for Pre-Ph.D course work subjects and changing their credits structure.
- (c) Discussion on trends and technologies in ME and consideration of its inclusion in syllabus.
- (d) Any other point with due permission of the Chairperson.

3. **Discussions/Comments:**

- a. (i) Discussion: The Scheme and syllabus of the subjects to be offered by ME Department to B. Tech. ME for batch 2020 -2024 was presented before the members of the Board of studies. The Scheme and syllabus of all the subjects was reviewed.

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- (ii) Comments: The existing scheme and syllabus is well aligned, and few changes were recommended in few subjects.
- b. (i) Discussion: The syllabus of Programme B.Tech in ME for batches 2017-2021, 2018-2022, 2019-2023 and along with the syllabus of the subjects offered by ME to other departments was presented to BOS members and reviewed.
- (ii) Comments: The syllabus of the mentioned batches and the subjects offered by ME to other departments is well aligned and needs no change.
- c. (i) Discussion: The syllabus of M. Tech, CBCS and Pre-PhD course work subjects was presented to BOS members and reviewed.
- (ii) Comments: The Syllabus of M. Tech., CBCS course work subjects is well aligned and needs no change. Uniform course coding is adopted for Pre-PhD course work subjects and credit structure has been reviewed.

4. Recommendations:

B. Tech Program

The Scheme and syllabus of the subjects to be offered by ME Department to B. Tech.ME for batch 2020 -2024 was presented before the members of the Board of studies. The BOS members approved the ME curriculum and syllabus.

M. Tech Program:

There is no change in the scheme and syllabus of the course.

Pre Ph.D. Course:

There is a change in the scheme and syllabus of the courses. (Ref Annexure -1)

PME 104: Optimization Technique - (Credits: 04)

PME 105: Experimental Methods for Engineers - (Credits: 04)

PME 106: Advance Welding Techniques and Metallurgy - (Credits: 04)

PME 107: Product Design & Development - (Credits: 04)

CBCS:

There is no change in the scheme and syllabus of the course.

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All the aforesaid points have been approved by all the board members present in the meeting.

5. Summary of changes is given below:-

Current Syllabus					Proposed Changes/ Modifications			
Sr. No	Program	Course Title	Old Course Code	No. of Credits	Addition/ deletion in the Syllabus	New Course Title	New Course Code	No. of Credits
1	PhD	Optimization Technique	PhDME 103	3	YES (subject & module addition)	No Change	PME 104	4
2	PhD	Experimental Methods for Engineers	NA	3			PME 105	4
3	PhD	Advance Welding Techniques and Metallurgy	NA	3			PME106	4
4	PhD	Product Design & Development	PhDME 104	3			PME 107	4

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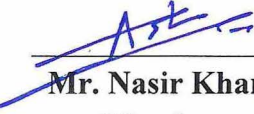
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BOARD OF STUDIES (ME)
MINUTES OF THE MEETING

Signature of Members:



Dr Sandeep Rathee
Member



Mr. Nasir Khan
Member



Dr C P Jawahar
Member



Maj Gen (Dr) S C Jain
Chairman- BOS

Dr Chaitanya Sharma
External Member
(ABSENT)



Prof (Dr) R S Tomar
Dean (Academics)
AUMP, Gwalior



Prof (Dr) M P Kaushik
Hon'ble Pro Vice Chancellor
AUMP, Gwalior

APPROVED BY



Hon'ble Vice Chancellor
AUMP, Gwalior



AMITY UNIVERSITY

MADHYA PRADESH

(Established by Rit and Balved Education Foundation)

MEETING OF BOARD OF STUDIES (BOS)
(Mechanical Engineering)
Amity School of Engineering & Technology
March, 2020

Remarks & Suggestions by BOS Members

MOOC Courses for the Department of Mechanical Engineering:

The following course of SWAYAM is recommended to be given as CBCS "Mechanical Engineering" in the Batch 2020-2024: -

S No.	Name of Minor Track	Semester/ CBCS Course Code/ Course Name	Name of course from SWAYAM	Duration	Credits
1	Mechanical Engineering	III /CBK302 Design of Machine Elements	Strength of Materials	12 Weeks	3

More than 70 % consistency/ similarity exist between the syllabus of course offered in the CBCS and MOOC course.

Signatures :


Dr Sandeep
Rathore




HOD, ME

MOOC Courses for the Department of Mechanical Engineering:

The following course of SWAYAM is recommended to be given as CBCS "Renewable Energy" in the Batch 2020-2024: -

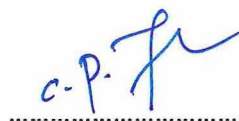
S No.	Name of Minor Track	Semester/ CBCS Course Code/ Course Name	Name of course from SWAYAM	Duration	Credits
1	Renewable Energy	III /CBL302 Renewable Energy System-II	Technologies for Clean and Renewable Energy Production	12 Weeks	3

More than 70 % consistency/ similarity exist between the syllabus of course offered in the CBCS and MOOC course.

Signatures :


.....
Dr. Sandeep
Rathore

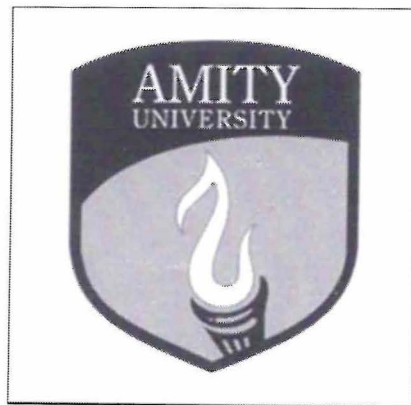

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c.p. for
HOD, ME

Amity University Madhya Pradesh

Amity School of Engineering and Technology

Department of Mechanical Engineering



Pre Ph. D. Course Scheme batch 2020-2023 Mechanical Engineering

Note:

The candidate has to opt one paper from the following for the Pre Ph. D. Course:

1. Optimization Technique (PME 104)
2. Experimental Methods for Engineers (PME 105)
3. Advance Welding Techniques for Engineers (PME 106)
4. Product Design & Development (PME 107)

OPTIMIZATION TECHNIQUE**Course Code: PME 104****Credit Units: 04****Total Hours: 40****Course Objective:**

The objective of the course is to learn classical optimization techniques and numerical methods of optimization. Know the basics of different evolutionary algorithms. Explain Integer programming techniques and apply different optimization techniques to solve various models arising from engineering areas.

Course Contents:**Module I: Linear Programming: (10 Hours)**

Solution of LPP by simplex Method, Duality and its solution, Transportation Problem: Initial Solution, Test for Optimality, Unbalanced Transportation Problem, Degeneracy, Alternative Optimal Solutions, Prohibited Transportation, Maximization Transportation Problem Routs, Assignment Problem: Introduction, solution by Hungarian Method, Multiple Optimal Solution, Unbalanced Assignment Problem, Maximization Case in Assignment Problem, Restriction on Assignments.

Module II: Game Theory: (10 Hours)

Introduction, Two-Person Zero Sum Games, Pure Strategies: Games with Saddle Point, Mixed Strategies: Games without saddle point, Principle of Dominance, Solution Methods for games without saddle point – Algebraic Method, Arithmetic Method, Matrix Method, and Graphical Method.

Module III: Simulation and Sequencing: (10 Hours)

Process of simulation, Monte Carlo Simulation, Simulation of an Inventory system, Simulation of Queuing System, Applications of Simulation. Gantt charts, Algorithm for solving sequencing problems: Johnson's Rule, Processing n Jobs Through 2 Machines, Processing N Jobs Through 3 Machines, Processing 2 Jobs Through 'K' Machines, Maintenance Crew Scheduling

Module IV: Network Analysis and Inventory Models: (10 Hours)

Network Definition and Network Diagram, Probability in Pert Analysis, Project Time Cost Trade Off, Introduction to Resource Smoothing and Allocation.

Introduction to Inventory Control, Deterministic Inventory Model, EOQ Model with Quantity Discount. Replacement of Items, Subject to Deterioration of Items, Subject to Random Failure, Group Vs Individual Replacement Policies.

Course Outcomes:

After successful completion of the course students will have the knowledge and skill to:

- Understand importance of optimization of industrial process management
- Apply basic concepts of mathematics to formulate an optimization problem
- Analyse and appreciate variety of performance measures for various optimization problems

Examination Scheme:

Components	A	CT	S/V/Q/HA	EE
Weightage (%)	5	15	10	70

CT: Class Test, HA: Home Assignment, S/V/Q: Seminar/Viva/Quiz, EE: End Semester Examination; A: Attendance

Text & Reference Books

- S.S. Rao, Optimization: Theory and applications, Wiley Eastern Ltd
- G.V. Reklaitis, Engg. Optimization Methods & applications
- London N.P. Linear Programming, Tata McGraw-Hill
- Sharma J.K. 1997, Operations Research: Theory & Applications, Mac Millan India Ltd.
- Grobner D.F. & Shannon P.W., Essential of Business Statistics: A Decision Making Approach, MacMillan College Publishing Co.
- Inventive thinking through TRIZ: a practical guide, By Michael A. Orloff, Springer.
- Systematic innovation: an introduction to TRIZ ; (theory of inventive Problem Solving), By John Terninko, AllaZusman, CRC Press.

EXPERIMENTAL METHODS FOR ENGINEERS**Course Code: PME 105****Credit Units: 04****Total Hours: 40****Course Objective:**

To understand the measurement characteristics and working principle of various measuring devices.

Course contents:**Module I Measurement Characteristics: (08 Hours)**

Introduction - Basic concepts – Calibration – Standards - Generalized measurement system - Basic concepts in dynamic measurements – zeroth, first and second order systems – Experimental errors, types and analysis.

Module II Analysis of Experimental Data: (10 Hours)

Statistical analysis of experimental data – Probability distribution – Normal error distribution – Comparison of data with normal distribution – Methods of least squares – Correlation coefficient – Multivariable regression – Graphical analysis and curve fitting – General considerations in data analysis.

Module III Pressure and Flow Measurements: (12 Hours)

Mechanical pressure measurement devices – Manometer, Bourdon type pressure gauge, Mcleod gauge. Flow measurement - Anemometers. Flow visualization methods – Shadowgraph, Interferometer, Laser Doppler Anemometer. Temperature measurements by mechanical and electrical effects – Force measurements – Mass balance and Elastic elements - Torque measurements - Strain measurements – Vibration measurements – Simple vibration instrument, seismic instrument.

Module IV Data Acquisition and Design of Experiments: (10 Hours)

General data acquisition system – Data transmission – Digital-to-analog – Analog-to-digital conversion- Data storage and display.

Design of experiments – Types - Experiment design factors – Experiment design protocol – Examples.

Course Outcomes:

At the end of the course, students will be able to

- Estimate the experimental uncertainty.
- Analyse the experimental data using various methods.
- Select the measuring devices according to the applications.

Examination Scheme

Components	A	CT	S/V/Q/HA	EE
Weightage (%)	5	15	10	70

CT: Class Test, HA: Home Assignment, S/V/Q: Seminar/Viva/Quiz, EE: End Semester Examination; A: Attendance

Text & Reference Books

- Holman, J.P., Experimental methods for Engineers, Tata McGraw-Hill.
- Doblin E.O, Measurement System Application and Design, Second Edition, McGraw Hill.
- Nakra, B.C., Choudhry K.K., Instrumentation, Measurements and Analysis Tata McGraw Hill.
- Morris.A.S, Principles of Measurements and Instrumentation, Prentice Hall of India.

2

ADVANCE WELDING TECHNIQUES AND METALLURGY**Course Code: PME 106****Credit Units: 04****Total Hours: 40****Course Objective:**

The objective of this course is to introduce the scholars to the basic concepts of welding and the advanced welding techniques.

Course Contents:**Module I: Introduction to Conventional Welding: (08 Hours)**

Overview of joining techniques, introduction to welding, classification of welding techniques, types of joints, edge preparation, weld symbols and weld nomenclature, heat sources, heat flux, Arc welding processes, resistance and other conventional welding processes.

Module II: Advance Welding Processes: (10 Hours)

Electron beam welding, laser beam welding, ultrasonic welding, friction welding, friction stir welding, Dissimilar metal joining, joining processes selection, applications of welding processes. Case studies and applications of advance welding techniques in industries, automotive and aerospace applications.

Module III: Testing of Welding: (12 Hours)

Microstructures of weldment, segregation of alloying elements, impact of micro/ macro-structures and segregation on mechanical properties, pre and post-treatment. Effects of heat flow on residual stresses and distortion. Weldability tests.

Methods of testing weldments - mechanical, pressure and leak testing. Inspection methods- visual, penetrant, magnetic, ultrasonic, x-ray and gamma radiography. Use of imaging techniques for online monitoring.

Module IV: Welding Metallurgy: (10 Hours)

Introduction to welding metallurgy, phase diagrams, metal strengthening approaches, heat treatment processes for weldments. Welding characteristics of ferrous and non ferrous metals. Introduction and properties of different zones in welds, effect of heat input on grain sizes of weldment, recrystallization and grain growth, effect of grain size on mechanical properties of welded joints.

Course Outcomes:

After successful completion of this course, students will have the knowledge and skills to:

- Understand the basic mechanisms of welding
- Physics of welding arc
- Solid state welding techniques
- Welding metallurgy

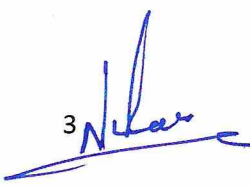
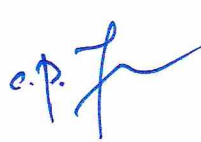
Examination Scheme

Components	A	CT	S/V/Q/HA	EE
Weightage (%)	5	15	10	70

CT: Class Test, HA: Home Assignment, S/V/Q: Seminar/Viva/Quiz, EE: End Semester Examination; A: Attendance

Text & Reference Books

- Edward R. Bohnart - Welding: Principles and Practices- Mc Graw Hill India
- Little R. L. - 'Welding and Welding Technology' - Tata McGraw Hill Publishing Company Limited.
- Grong O. - 'Metallurgical Modelling of Welding' - The Institute of Materials.
- Kou S. - 'Welding Metallurgy' - John Wiley Publications, New York.
- Sindo Kou, Welding Metallurgy, John Wiley
- S. A. David, Ed.; Advances in Welding Science and Technology, American Society for Metals, Ohio, 1986.
- K. Easterling, Introduction to Physical Metallurgy of Welding, Butterworths Publication.

3  

PRODUCT DESIGN & DEVELOPMENT

Course Code: PME 107**Credit Units: 04****Total Hours: 40****Course Objective:**

The focus of Product Design and Development is integration of the marketing, design, and manufacturing functions of the firm in creating a new product. The course is intended to provide you with the following benefits: Competence with a set of tools and methods for product design and development.

Course Contents:**Module I: Introduction: (10 Hours)**

Significance of Product Design, Product Design and Development Process, Sequential Engineering Design Method, The Challenges of Product Development,

Product Planning and Project Selection: Identifying Opportunities Evaluate and Prioritize Projects, Allocation of Resources

Module II: Identifying Customer Needs and Concept Generation: (10 Hours)

Interpret Raw Data in Terms of Customers Need, Organize Needs in Hierarchy and Establish The Relative Importance of Needs.

Product Specifications: Establish Target Specifications, Setting Final Specifications, **Concept Generation** Activities of Concept Generation, Clarifying Problem, Search Both Internally and Externally, Explore the Output.

Module III: Industrial Design: (10 Hours)

Assessing Need for Industrial Design, Industrial Design Process, Management, Assessing Quality of Industrial Design.

Theory of inventive problem solving (TRIZ): Fundamentals, Methods and Techniques, General Theory of Innovation and TRIZ, Value Engineering Applications in Product Development and design, Model-Based Technology for Generating Innovative Ideas

Concept Testing: Elements of Testing: Qualitative And Quantitative Methods Including Survey, Measurement of Customers' Response,

Module IV: Intellectual Property and Reverse Engineering: (10 Hours)

Elements and Outline, Patenting Procedures, Claim Procedure.

Design for Environment: Impact, Regulations From Government, ISO System.

Place of Reverse Engineering in Product Development. Data Acquisition Methods, Practical Problems in Data Acquisition, Preprocessing: Registration, Segmentation, Triangulation, Definition, Surface Fitting Methods-Bezier, B-Spline & NURBS, CAD Model Creation.

Course Outcomes:

After successful completion of the course students will have the knowledge and skill to:

- Identify and analyse the product design and development processes in manufacturing industry.
- Define the components and their functions of product design and development processes and their relationships from concept to customer over whole product lifecycle.
- Analyse, evaluate and apply the methodologies for product design, development and management.
- Undertake a methodical approach to the management of product development to satisfy customer needs.
- Carry out cost and benefit analysis through various cost models.
- Be familiar with the design protection and Intellectual Property.

Examination Scheme

Components	A	CT	S/V/Q/HA	EE
Weightage (%)	5	15	10	70

CT: Class Test, HA: Home Assignment, S/V/Q: Seminar/Viva/Quiz, EE: End Semester Examination; A: Attendance

Text & Reference Books

- Ulrich K. T, and Eppinger S.D, Product Design and Development, Tata McGraw Hill
- Otto K, and Wood K, Product Design, Pearson
- Engineering of creativity: introduction to TRIZ methodology of inventive Problem
- Solving, By Semyon D. Savransky, CRC Press.

**Bachelor of Technology
(Mechanical Engineering)**

BME

**AICTE MODEL
CURRICULUM**

(2020-24 Batch)

**Bachelor of Technology
(Mechanical Engineering)**

Programme Code: BME

Duration – 4 Years Full Time



**Programme Structure
&
Curriculum & Scheme of Examination**

**2020-24
(Based on AICTE)**

**AMITY UNIVERSITY
MADHYA PRADESH**

PREAMBLE

Amity University aims to achieve academic excellence by providing multi-faceted education to students and encourage them to reach the pinnacle of success. The University has designed a system that would provide rigorous academic programme with necessary skills to enable them to excel in their careers.

This booklet contains the Programme Structure, the Detailed Curriculum and the Scheme of Examination. The Programme Structure includes the courses (Core and Elective), arranged semester wise. The importance of each course is defined in terms of credits attached to it. The credit units attached to each course has been further defined in terms of contact Hours i.e. Lecture Hours (L), Tutorial Hours (T), Practical Hours (P). Towards earning credits in terms of contact Hours, 1 Lecture and 1 Tutorial per week are rated as 1 credit each and 2 Practical Hours per week are rated as 1 credit. Thus, for example, an L-T-P structure of 3-0-0 will have 3 credits, 3-1-0 will have 4 credits, and 3-1-2 will have 5 credits.

The Curriculum and Scheme of Examination of each course includes the course objectives, course contents, scheme of examination and the list of text and references. The different codes used for the components of evaluation are given below:-

<u>Components</u>	<u>Codes</u>
Case Discussion/ Presentation/ Analysis	C
Home Assignment	H
Project	P
Seminar	S
Viva	V
Quiz	Q
Class Test	CT
Attendance	A
End Semester Examination	ESE

It is hoped that it will help the students study in a planned and a structured manner and promote effective learning. Wishing you an intellectually stimulating stay at Amity University.

2020


3

PROGRAM OUTCOMES

PO1. Engineering Knowledge: Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems.

PO2. Problem Analysis: Identify, formulate, review research literature, and analyze complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences.

PO3. Design/Development of Solutions :Design solutions for complex engineering problems and design system components or processes that meet the specified needs with appropriate consideration for the public health and safety, and the cultural, societal, and environmental considerations.

PO4. Conduct Investigations of Complex Problems :Use research-based knowledge and research methods including design of experiments, analysis and interpretation of data, and synthesis of the information to provide valid conclusions.

PO5. Modern Tool Usage: Create, select, and apply appropriate techniques, resources, and modern engineering and IT tools including prediction and modelling to complex engineering activities with an understanding of the limitations.

PO6. The Engineer and Society: Apply reasoning informed by the contextual knowledge to assess societal, health, safety, legal and cultural issues and the consequent responsibilities relevant to the professional engineering practice.

PO7. Environment and Sustainability: Understand the impact of the professional engineering solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development.

PO8. Ethics: Apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering practice.

PO9. Individual and Team Work: Function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings.

PO10. Communication: Communicate effectively on complex engineering activities with the engineering community and with society at large, such as, being able to comprehend and write effective reports and design documentation, make effective presentations, and give and receive clear instructions.

PO11. Life-long Learning: Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change.

PO12. Project Management and Finance: Demonstrate knowledge and understanding of the engineering and management principles and apply these to one's own work, as a member and leader in a team, to manage projects

PROGRAM SPECIFIC OUTCOMES

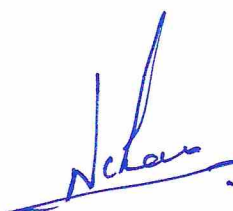
PSO1. Professional Skills : An ability to understand the basic concepts in Mechanical Engineering and to apply them to various areas, like Automobile, power plant, Production, Manufacturing etc., in the design and implementation of complex systems.

PSO2. Problem-solving skills: An ability to solve complex Mechanical Engineering problems, using latest hardware and software tools, along with analytical skills to arrive cost effective and appropriate solutions.

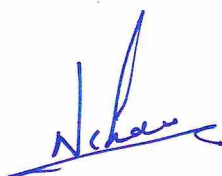
PSO3. Successful career and Entrepreneurship: An understanding of social-awareness & environmental-wisdom along with ethical responsibility to have a successful career and to sustain passion and zeal for real-world applications using optimal resources as an Entrepreneur.

PROGRAMME STRUCTURE

FIRST SEMESTER						
Course Code	Course Title	Lecture (L) Hours Per week	Tutorial (T) Hours Per week	Practical (P) Hours Per week	Total Credits	Hours
MAT101	Applied Mathematics – I (Calculus and Linear Algebra)	3	1	-	4	40
CHE101	Applied Chemistry	3	1	-	4	40
CSE104	Programming for Problem Solving	3	-	-	3	30
BME101	Engineering Graphics & Design	1	-	-	1	10
CIV101	Basic Civil Engineering & Applied Mechanics	2	-	-	2	20
CHE121	Applied Chemistry Lab	-	-	2	1	20
CSE124	Programming for Problem Solving Lab	-	-	4	2	40
BME121	Engineering Graphics & Design Lab	-	-	4	2	40
BCU141	Communication Skills – I	1	-	-	1	10
EVS142	Environmental Studies – I	2	-	-	2	20
BSU143	Behavioural Science – I	1	-	-	1	10
FLU144	French -I	2	-	-	2	20
CBCS		3	-	-	3	30
TOTAL CREDITS (Including CBCS)					28	
Total Hours Including CBCS per week					33	
Total Hours in the Semester					330	


SECOND SEMESTER						
Course Code	Course Title	Lecture (L) Hours Per week	Tutorial (T) Hours Per week	Practical (P) Hours Per week	Total Credits	Hours
MAT201	Applied Mathematics–II (Ordinary & Partial Differential Equations and Transform)	3	1	-	4	40
PHY101	Applied Physics – I	3	1	-	4	40
ECE101	Basic Electrical Engineering	3	-	-	3	30
CSE204	Object Oriented Programming Using C++	1	1	-	3	30
BME102	Workshop/ Manufacturing Practices	1	-	-	1	10
PHY121	Applied Physics Lab – I	-	-	2	1	20
ECE121	Basic Electrical Engineering Lab	-	-	2	1	20
CSE224	Object Oriented Programming Using C++ Lab	-	-	2	1	20
BME122	Workshop/ Manufacturing Practices Lab	-	-	4	2	40
BCU241	Communication Skills – II	1	-	-	1	10
EVS242	Environmental Studies – II	2	-	-	2	20
BSU243	Behavioural Science – II	1	-	-	1	10
FLU244	French -II	2	-	-	2	20
CBCS		3	-	-	3	30
TOTAL CREDITS (Including CBCS)					29	
Total Hours Including CBCS per week					34	
Total Hours in the Semester					340	
TERM PAPER DURING SUMMER BREAK						

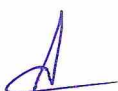




THIRD SEMESTER						
Course Code	Course Title	Lecture (L) Hours Per week	Tutorial (T) Hours Per week	Practical (P) Hours Per week	Total Credits	Hours
MAT 301	Applied Mathematics – III (Probability, Statistics and Numerical Methods)	3	-	-	3	30
PHY 303	Applied Physics – II	3	-	-	3	30
BME 301	Engineering Mechanics	3	-	-	3	30
BME 302	Material Science & Metallurgy	3	-	-	3	30
BME 303	Thermodynamics	3	-	-	3	30
ECE 307	Basic Electronics	2	-	-	2	20
PHY 323	Applied Physics Lab – II	-	-	2	1	20
BME 321	Engineering Mechanics Lab	-	-	2	1	20
BME 323	Thermodynamics lab	-	-	2	1	20
ECE 327	Basic Electronics lab	-	-	2	1	20
BCU 341	Communication Skills – III	1	-	-	1	10
BSU 343	Behavioural Science – III	1	-	-	1	10
FLU 344	French– III	2	-	-	2	20
NTP 330	Term paper (Evaluation)	-	-	-	2	
CBCS		3	-	-	3	30
TOTAL CREDITS (Including CBCS)					30	
Total Hrs Including CBCS					32	
Total Hrs in the Semester					320	



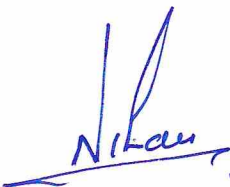


FOURTH SEMESTER						
Course Code	Course Title	Lecture (L) Hours Per week	Tutorial (T) Hours Per week	Practical (P) Hours Per week	Total Credits	Hours
BME 401	Fluid Mechanics	3	-	-	3	30
BME 402	Heat and Mass Transfer	3	-	-	3	30
BME 403	Kinematic of Machine	3	-	-	3	30
BME 404	Manufacturing Machine	3	-	-	3	30
BME 405	Strength of Material	3	-	-	3	30
BME 422	Heat and Mass Transfer Lab	-	-	2	1	20
BME 423	Kinematic of Machine Lab	-	-	2	1	20
BME 424	Manufacturing Machine Lab	-	-	2	1	20
BME 425	Strength of Material & Fluid Mechanics Lab	-	-	2	1	20
BCU 441	Communication Skills – IV	1	-	-	1	10
BSU 443	Behavioural Science – IV	1	-	-	1	10
FLU 444	French– IV	2	-	-	2	20
CBCS		3	1	-	4	40
TOTAL CREDITS (Including CBCS)					27	
Total Hrs Including CBCS					31	
Total Hrs in the Semester					310	
INDUSTRIAL PRACTICAL TRAINING – I: 6 – 8 WEEKS						





FIFTH SEMESTER						
Course Code	Course Title	Lecture (L) Hours Per week	Tutorial (T) Hours Per week	Practical (P) Hours Per week	Total Credits	Hours
BME 501	Applied Thermodynamics	3	-	-	3	30
BME 502	Dynamics of Machines	3	-	-	3	30
BME 503	Machine Design –I	3	-	-	3	30
BME 504	Measurement and Control	3	-	-	3	30
BME 505	Metrology	3	-	-	3	30
BME 522	Dynamics of Machine Lab	-	-	2	1	20
BME 524	Measurement and Control Lab	-	-	2	1	20
BME 525	Metrology lab	-	-	2	1	20
BCU 541	Communication Skills –V	1	-	-	1	10
BSU 543	Behavioural Science – V	1	-	-	1	10
FLU 544	French– V	2	-	-	2	20
NPT 550	Industrial Practical Training - I (Evaluation)	-	-	-	3	-
CBCS		3	1	-	4	40
TOTAL CREDITS (Including CBCS)						29
Total Hrs Including CBCS						29
Total Hrs in the Semester						290


SIXTH SEMESTER						
Course Code	Course Title	Lecture (L) Hours Per week	Tutorial (T) Hours Per week	Practical (P) Hours Per week	Total Credits	Hours
BME 601	Fluid Power Systems	3	-	-	3	30
BME 602	IC Engine & Gas Turbine	3	-	-	3	30
BME 603	Machine Design – II	3	-	-	3	30
BME 604	Manufacturing Technology	3	-	-	3	30
BME 621	Fluid Power Systems Lab	-	-	2	1	20
BME 622	IC Engine & Gas Turbine Lab	-	-	2	1	20
BME 623	Machine Design Lab – II	-	-	2	1	20
ELECTIVES (Anyone from following with Practical)					4	50
BME 606	Mechatronics	3	-	-		
BME 607	Artificial Intelligence and Robotics	3	-	-		
BME 626	Mechatronics Lab	-	-	2		
BME 627	Artificial Intelligence and Robotics lab	-	-	2		
BCU 641	Communication Skills – VI	1	-	-	1	10
BSU 643	Behavioural Science – VI	1	-	-	1	10
FLU 644	French– VI	2	-	-	2	20
NMP 660	Minor Project	-	-	-	2	-
CBCS		-	-	-	1	-
TOTAL CREDITS (Including CBCS)					26	
Total Hrs Per Week					27	
Total Hrs in the Semester					270	
INDUSTRIAL PRACTICAL TRAINING –II: 6 – 8 WEEKS						



SEVENTH SEMESTER						
Course Code	Course Title	Lecture (L) Hours Per week	Tutorial (T) Hours Per week	Practical (P) Hours Per week	Total Credits	Hours
BME 701	Operations Research	3	-	-	3	30
BME 702	Computer Aided Manufacturing	3	-	-	3	30
BME 703	Management of Manufacturing Systems	3	-	-	3	30
BME 721	Operations Research (Programming) Lab	-	-	2	1	20
BME 722	Computer Aided Manufacturing Lab	-	-	2	1	20
ELECTIVES (Any one from each category)					4	50
A (With Practical)						
BME 704	Automotive Engineering	3	-	-		
BME 705	Computer Aided Designing	3	-	-		
BME 724	Automotive Engineering Lab	-	-	2		
BME 725	Computer Aided Designing Lab	-	-	2		
ELECTIVES (Any one from each category)					3	30
B (Without Practical)						
BME 706	Marketing Management	3	-	-		
BME 707	Solar Energy	3	-	-		
BME 708	Power Plant Practices	3	-	-		
BME 709	Combustion Engine Emissions	3	-	-		
BCU 741	Communication Skills – VII	1	-	-	1	10
BSU 743	Behavioural Science – VII	1	-	-	1	10
FLU 744	French– VII	2	-	-	2	20
NPT 750	Industrial Practical Training– II(Evaluation)	-	-	-	5	
NMP 760	Major Project – I	-	-	-	6	
TOTAL CREDITS					33	
Total Hrs Per Week					25	
Total Hrs in the Semester					250	

EIGHT SEMESTER						
Course Code	Course Title	Lecture (L) Hours Per week	Tutorial (T) Hours Per week	Practical (P) Hours Per week	Total Credits	Hours
BME 801	Quality Control & Quality Assurance	3	-	-	3	30
BME 802	Refrigeration & Air-conditioning	3	-	-	3	30
BME 822	Refrigeration & Air-conditioning Lab	-	-	2	1	20
ELECTIVES (Any one from following with Practical)					4	50
BME 803	Advanced Methods of Manufacturing	3	-	-		
BME 804	Gear Technology	3	-	-		
BME 823	Advanced Methods of Manufacturing Lab	-	-	2		
BME 824	Gear Technology Lab	-	-	2		
BCU 841	Communication Skills – VIII	1	-	-	1	10
BSU 843	Behavioural Science – VIII	1	-	-	1	10
FLU 844	French– VIII	2	-	-	2	20
NMP 860	Major Project – II	-	-	-	9	
TOTAL CREDITS					24	
Total Hrs Per Week					17	
Total Hrs in the Semester					170	



**Bachelor of Technology
(Mechanical Engineering)**

Programme Code: BME

Duration – 4 Years Full Time

OVERALL CREDIT

Sr. No.	Semester	No. of Credits	No. of Hours
1	I	28	33
2	II	29	34
3	III	30	32
4	IV	27	31
5	V	29	29
6	VI	26	27
7	VII	33	25
8	VIII	24	17
Total Credits		226	228





Date: 06/03/2021

BOARD OF STUDIES (Mechanical Engineering)
MINUTES OF THE MEETING
(03 Pages Only)

1. A meeting of board of studies of Department of Mechanical Engineering, Amity School of Engineering & Technology, Amity University Madhya Pradesh was held on 06/03/2020 at AUMP, under the Chairmanship of Maj Gen (Dr) S C Jain VSM** (Retd), Director (ASET). The following members attended the meeting: -

(a) **Chairman**: Maj Gen (Dr) S. C. Jain VSM ** (Retd), Director (ASET)

(b) **Member**

- i) Dr. Nitesh Rajput, Assistant Professor ME, AUR, Jaipur, External Member
- ii) Dr. C. P. Jawahar, Professor & Head ME, Member
- iii) Mr. Nasir Khan, Assistant Professor, ME, Member
- iv) Dr. Manvandra Kumar Singh, Assistant Professor, ME, Member

2. **The agenda of the meeting included the following:**

- (a) Curriculum of First year B.Tech. ME Program for 2021-25 batch.
- (b) Discussion on trends and technologies in ME and consideration of its inclusion in syllabus.
- (c) Any other point with due permission of the Chairperson.

3. **Discussions/Comments:**

- a. (i) Discussion: The Scheme and syllabus of the subjects to be offered by ME Department to B. Tech. ME for batch 2021 -2025 was presented before the members of the Board of studies. The Scheme and syllabus of all the subjects was reviewed.
(ii) Comments: The existing scheme and syllabus is well aligned, and few changes were recommended in few subjects.
- b. (i) Discussion: The syllabus of Programme B.Tech in ME for batches 2018-2022, 2019-2023, 2020-2024 and along with the syllabus of the subjects offered by ME to other departments was presented to BOS members and reviewed.

(ii) Comments: The syllabus of the mentioned batches and the subjects offered by ME to other departments is well aligned and needs no change.

c. (i) Discussion: The syllabus of M. Tech, CBCS and Pre-PhD course work subjects was presented to BOS members and reviewed.

(ii) Comments: The Syllabus of M. Tech., CBCS and Pre-PhD course work subjects is well aligned and needs no change.

4. Recommendations:

B. Tech Program

There is a change in the scheme and syllabus of the courses. (Ref Annexure -1)

BME 710 Green Vehicle Technology - (Credits: 03)

M. Tech Program:

There is no change in the scheme and syllabus of the course. (Ref Annexure-2)

Pre Ph.D. Course:

There is no change in the scheme and syllabus of the courses. (Ref Annexure -3)

CBCS:

There is no change in the scheme and syllabus of the course.

All the aforesaid points have been approved by all the board members present in the meeting.

5. Summary of changes is given below:-

Current Syllabus					Proposed Changes/ Modifications			
Sr. No	Program	Course Title	Old Course Code	No. of Credits	Addition/ deletion in the Syllabus	New Course Title	New Course Code	No. of Credits
1	B Tech	Green Vehicle Technology	NA	NA			BME 710	3

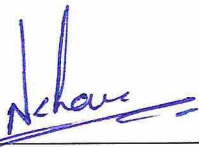
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BOARD OF STUDIES (ME)
MINUTES OF THE MEETING

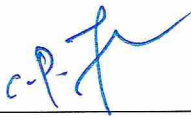
Signature of Members:



Dr. Manvandra Kumar Singh
Member



Mr. Nasir Khan
Member



Dr. C. P. Jawahar
Member



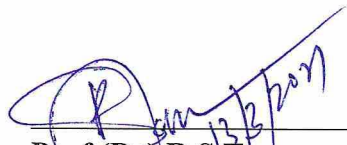
Maj Gen (Dr.) SC Jain
Member



Dr. Nitesh Singh Rajput
External Member

ABSENT

Dr. Chaitanya Sharma
External Member



Prof (Dr) R S Tomar
Dean (Academics)
AUMP, Gwalior



Prof (Dr) M P Kaushik
Hon'ble Pro Vice Chancellor
AUMP, Gwalior



APPROVED BY
Hon'ble Vice Chancellor
AUMP, Gwalior
16/3/21

GREEN VEHICLE TECHNOLOGY

Course Code: BME 710

Credit Units: 03

Total Hours: 30

Course Objective:

This course introduces the fundamental concepts, principles, analysis and design of hybrid and electric vehicles. This course aims to cover different configurations of electric vehicles, hybrid vehicle configuration and its components, performance analysis, drive systems and testing of electric vehicles.

Course Contents:

Module I – Introduction (6 Hours)

Overview of green vehicles in India. Benefit of using green vehicles. Economic and environmental impact of electric hybrid vehicle. Comparison of hybrid electric vehicles and conventional vehicles. Introduction to Hybrid Electric Vehicles: History of hybrid and electric vehicles, social and environmental importance of hybrid and electric vehicles, impact of modern drive-trains on energy supplies. Conventional Vehicles: Basics of vehicle performance, vehicle power source characterization, transmission characteristics.

Module II -Hybrid and Electric Drive-trains (6 Hours)

Hybrid Electric Drive-trains: Basic concept of hybrid traction, introduction to various hybrid drive-train topologies, power flow control in hybrid drive-train topologies, fuel efficiency analysis. Electric Drive-trains: Basic concept of electric traction, introduction to various electric drive-train topologies, power flow control in electric drive-train topologies, fuel efficiency analysis.

Module III-Propulsion System (6 Hours)

Introduction to electric components used in hybrid and electric vehicles, Configuration and control of DC Motor drives, Configuration and control of Induction Motor drives, configuration and control of Permanent Magnet Motor drives, Configuration and control of Switch Reluctance Motor drives, drive system efficiency.

Module IV- Energy Storage System (6 Hours)

Introduction to Energy Storage Requirements in Hybrid and Electric Vehicles, Battery based energy storage and its analysis, Fuel Cell based energy storage and its analysis, Super Capacitor based energy storage and its analysis, Flywheel based energy storage and its analysis, Hybridization of different energy storage devices. .

Module V- Testing of Electric Vehicles (6 Hours)

Homologation & its Types, Regulations overview (EEC, ECE, FMVSS, AIS, CMVR), Type approval Scheme. Types of test tracks, Hardware in The Loop (HIL) concepts for EV/HEVs. static testing of vehicle, dynamics testing of vehicle, vehicle component testing.

Course Outcomes:

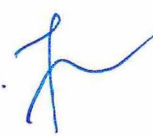
After completing the course, the students will be able to

- Understand the concepts of electric vehicle technology
- Compare the conventional and hybrid vehicles
- Know the propulsion system in the electric vehicle
- Identify various types of storage system
- Perform the testing of electric vehicles

Examination Scheme:

Components	A	CT	S/V/Q	HA	EE
Weightage (%)	5	10	8	7	70

CT: Class Test, HA: Home Assignment, S/V/Q: Seminar/Viva/Quiz, EE: End Semester Examination; A: Attendance

a.p. 

Text and References:

- Mehrdad Ehsani, Yimin Gao, Stefano Longo and Kmbiz Ebrahimi, "Modern Electric, Hybrid Electric, and Fuel Cell Vehicles", CRC Press, 3rd edition (2019)
- A.K. Babu, "Electric & Hybrid Vehicles", Khanna Publishing, 1st edition (2019).
- Tom Denton, "Electric and Hybrid Vehicles", Routledge; 1st edition (2016).
- ARAI Standards for Electric Vehicles (<https://www.araiindia.com/downloads>)

C.P. X

**Bachelor of Technology
(Mechanical Engineering)**

BME

**AICTE MODEL
CURRICULUM**

(2021-25 Batch)

**Bachelor of Technology
(Mechanical Engineering)**

Programme Code: BME

Duration – 4 Years Full Time



**Programme Structure
&
Curriculum & Scheme of Examination**

**2021-25
(Based on AICTE)**

**AMITY UNIVERSITY
MADHYA PRADESH**

PREAMBLE

Amity University aims to achieve academic excellence by providing multi-faceted education to students and encourage them to reach the pinnacle of success. The University has designed a system that would provide rigorous academic programme with necessary skills to enable them to excel in their careers.

This booklet contains the Programme Structure, the Detailed Curriculum and the Scheme of Examination. The Programme Structure includes the courses (Core and Elective), arranged semester wise. The importance of each course is defined in terms of credits attached to it. The credit units attached to each course has been further defined in terms of contact Hours i.e. Lecture Hours (L), Tutorial Hours (T), Practical Hours (P). Towards earning credits in terms of contact Hours, 1 Lecture and 1 Tutorial per week are rated as 1 credit each and 2 Practical Hours per week are rated as 1 credit. Thus, for example, an L-T-P structure of 3-0-0 will have 3 credits, 3-1-0 will have 4 credits, and 3-1-2 will have 5 credits.

The Curriculum and Scheme of Examination of each course includes the course objectives, course contents, scheme of examination and the list of text and references. The different codes used for the components of evaluation are given below:-

Components

Case Discussion/ Presentation/ Analysis
Home Assignment
Project
Seminar
Viva
Quiz
Class Test
Attendance
End Semester Examination

Codes

C
H
P
S
V
Q
CT
A
ESE

It is hoped that it will help the students study in a planned and a structured manner and promote effective learning. Wishing you an intellectually stimulating stay at Amity University.

March 2020



PROGRAM OUTCOMES

PO1. Engineering Knowledge: Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems.

PO2. Problem Analysis: Identify, formulate, review research literature, and analyze complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences.

PO3. Design/Development of Solutions: Design solutions for complex engineering problems and design system components or processes that meet the specified needs with appropriate consideration for the public health and safety, and the cultural, societal, and environmental considerations.

PO4. Conduct Investigations of Complex Problems: Use research-based knowledge and research methods including design of experiments, analysis and interpretation of data, and synthesis of the information to provide valid conclusions.

PO5. Modern Tool Usage: Create, select, and apply appropriate techniques, resources, and modern engineering and IT tools including prediction and modelling to complex engineering activities with an understanding of the limitations.

PO6. The Engineer and Society: Apply reasoning informed by the contextual knowledge to assess societal, health, safety, legal and cultural issues and the consequent responsibilities relevant to the professional engineering practice.

PO7. Environment and Sustainability: Understand the impact of the professional engineering solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development.

PO8. Ethics: Apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering practice.

PO9. Individual and Team Work: Function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings.

PO10. Communication: Communicate effectively on complex engineering activities with the engineering community and with society at large, such as, being able to comprehend and write effective reports and design documentation, make effective presentations, and give and receive clear instructions.

PO11. Life-long Learning: Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change.

PO12. Project Management and Finance: Demonstrate knowledge and understanding of the engineering and management principles and apply these to one's own work, as a member and leader in a team, to manage projects

PROGRAM SPECIFIC OUTCOMES

PSO1. Professional Skills: An ability to understand the basic concepts in Mechanical Engineering and to apply them to various areas, like Automobile, power plant, Production, Manufacturing etc., in the design and implementation of complex systems.

PSO2. Problem-solving skills: An ability to solve complex Mechanical Engineering problems, using latest hardware and software tools, along with analytical skills to arrive cost effective and appropriate solutions.

PSO3. Successful career and Entrepreneurship: An understanding of social-awareness & environmental-wisdom along with ethical responsibility to have a successful career and to sustain passion and zeal for real-world applications using optimal resources as an Entrepreneur.



PROGRAMME STRUCTURE

FIRST SEMESTER						
Course Code	Course Title	Lecture (L) Hours Per week	Tutorial (T) Hours Per week	Practical (P) Hours Per week	Total Credits	Hours
MAT101	Applied Mathematics – I (Calculus and Linear Algebra)	3	1	-	4	40
CHE101	Applied Chemistry	3	1	-	4	40
CSE104	Programming for Problem Solving	3	-	-	3	30
BME101	Engineering Graphics & Design	1	-	-	1	10
CIV101	Basic Civil Engineering & Applied Mechanics	2	-	-	2	20
CHE121	Applied Chemistry Lab	-	-	2	1	20
CSE124	Programming for Problem Solving Lab	-	-	4	2	40
BME121	Engineering Graphics & Design Lab	-	-	4	2	40
BCU141	Communication Skills – I	1			1	10
EVS142	Environmental Studies – I	2	-	-	2	20
BSU143	Behavioural Science – I	1	-	-	1	10
FLU144	French –I	2	-	-	2	20
CBCS		3	-	-	3	30
TOTAL CREDITS (Including CBCS)					28	
Total Hours Including CBCS per week					33	
Total Hours in the Semester					330	



SECOND SEMESTER						
Course Code	Course Title	Lecture (L) Hours Per week	Tutorial (T) Hours Per week	Practical (P) Hours Per week	Total Credits	Hours
MAT201	Applied Mathematics–II (Ordinary & Partial Differential Equations and Transform)	3	1	-	4	40
PHY101	Applied Physics – I	3	1	-	4	40
ECE101	Basic Electrical Engineering	3	-	-	3	30
CSE204	Object Oriented Programming Using C++	2	1	-	3	30
BME102	Workshop/ Manufacturing Practices	1	-	-	1	10
PHY121	Applied Physics Lab – I	-	-	2	1	20
ECE121	Basic Electrical Engineering Lab	-	-	2	1	20
CSE224	Object Oriented Programming Using C++ Lab	-	-	2	1	20
BME122	Workshop/ Manufacturing Practices Lab	-	-	4	2	40
BCU241	Communication Skills – II	1	-	-	1	10
EVS242	Environmental Studies – II	2	-	-	2	20
BSU243	Behavioural Science – II	1	-	-	1	10
FLU244	French –II	2	-	-	2	20
CBCS		3	-	-	3	30
TOTAL CREDITS (Including CBCS)					29	
Total Hours Including CBCS per week					34	
Total Hours in the Semester					340	
TERM PAPER DURING SUMMER BREAK						



THIRD SEMESTER						
Course Code	Course Title	Lecture (L) Hours Per week	Tutorial (T) Hours Per week	Practical (P) Hours Per week	Total Credits	Hours
MAT 301	Applied Mathematics – III (Probability, Statistics and Numerical Methods)	3	-	-	3	30
PHY 303	Applied Physics – II	3	-	-	3	30
BME 301	Engineering Mechanics	3	-	-	3	30
BME 302	Material Science & Metallurgy	3	-	-	3	30
BME 303	Thermodynamics	3	-	-	3	30
ECE 307	Basic Electronics	2	-	-	2	20
PHY 323	Applied Physics Lab – II	-	-	2	1	20
BME 321	Engineering Mechanics Lab	-	-	2	1	20
BME 323	Thermodynamics lab	-	-	2	1	20
ECE 327	Basic Electronics lab	-	-	2	1	20
BCU 341	Communication Skills – III	1	-	-	1	10
BSU 343	Behavioural Science – III	1	-	-	1	10
FLU 344	French– III	2	-	-	2	20
NTP 330	Term paper (Evaluation)	-	-	-	2	
CBCS		3	-	-	3	30
TOTAL CREDITS (Including CBCS)					30	
Total Hrs Including CBCS					32	
Total Hrs in the Semester					320	



FOURTH SEMESTER						
Course Code	Course Title	Lecture (L) Hours Per week	Tutorial (T) Hours Per week	Practical (P) Hours Per week	Total Credits	Hours
BME 401	Fluid Mechanics	3	-	-	3	30
BME 402	Heat and Mass Transfer	3	-	-	3	30
BME 403	Kinematic of Machine	3	-	-	3	30
BME 404	Manufacturing Machine	3	-	-	3	30
BME 405	Strength of Material	3	-	-	3	30
BME 422	Heat and Mass Transfer Lab	-	-	2	1	20
BME 423	Kinematic of Machine Lab	-	-	2	1	20
BME 424	Manufacturing Machine Lab	-	-	2	1	20
BME 425	Strength of Material & Fluid Mechanics Lab	-	-	2	1	20
BCU 441	Communication Skills – IV	1	-	-	1	10
BSU 443	Behavioural Science – IV	1	-	-	1	10
FLU 444	French– IV	2	-	-	2	20
CBCS		3	1	-	4	40
TOTAL CREDITS (Including CBCS)					27	
Total Hrs Including CBCS					31	
Total Hrs in the Semester					310	
INDUSTRIAL PRACTICAL TRAINING – I: 6 – 8 WEEKS						



FIFTH SEMESTER						
Course Code	Course Title	Lecture (L) Hours Per week	Tutorial (T) Hours Per week	Practical (P) Hours Per week	Total Credits	Hours
BME 501	Applied Thermodynamics	3	-	-	3	30
BME 502	Dynamics of Machines	3	-	-	3	30
BME 503	Machine Design –I	3	-	-	3	30
BME 504	Measurement and Control	3	-	-	3	30
BME 505	Metrology	3	-	-	3	30
BME 522	Dynamics of Machine Lab	-	-	2	1	20
BME 524	Measurement and Control Lab	-	-	2	1	20
BME 525	Metrology lab	-	-	2	1	20
BCU 541	Communication Skills –V	1	-	-	1	10
BSU 543	Behavioural Science – V	1	-	-	1	10
FLU 544	French– V	2	-	-	2	20
NPT 550	Industrial Practical Training - I (Evaluation)	-	-	-	3	-
CBCS		3	1	-	4	40
TOTAL CREDITS (Including CBCS)						29
Total Hrs Including CBCS						29
Total Hrs in the Semester						290



SIXTH SEMESTER						
Course Code	Course Title	Lecture (L) Hours Per week	Tutorial (T) Hours Per week	Practical (P) Hours Per week	Total Credits	Hours
BME 601	Fluid Power Systems	3	-	-	3	30
BME 602	IC Engine & Gas Turbine	3	-	-	3	30
BME 603	Machine Design – II	3	-	-	3	30
BME 604	Manufacturing Technology	3	-	-	3	30
BME 621	Fluid Power Systems Lab	-	-	2	1	20
BME 622	IC Engine & Gas Turbine Lab	-	-	2	1	20
BME 623	Machine Design Lab – II	-	-	2	1	20
ELECTIVES (Anyone from following with Practical)					4	50
BME 606	Mechatronics	3	-	-		
BME 607	Artificial Intelligence and Robotics	3	-	-		
BME 626	Mechatronics Lab	-	-	2		
BME 627	Artificial Intelligence and Robotics lab	-	-	2		
BCU 641	Communication Skills – VI	1	-	-	1	10
BSU 643	Behavioural Science – VI	1	-	-	1	10
FLU 644	French– VI	2	-	-	2	20
NMP 660	Minor Project	-	-	-	2	-
CBCS		-	-	-	1	-
TOTAL CREDITS (Including CBCS)					26	
Total Hrs Per Week					27	
Total Hrs in the Semester					270	
INDUSTRIAL PRACTICAL TRAINING –II: 6 – 8 WEEKS						



SEVENTH SEMESTER						
Course Code	Course Title	Lecture (L) Hours Per week	Tutorial (T) Hours Per week	Practical (P) Hours Per week	Total Credits	Hours
BME 701	Operations Research	3	-	-	3	30
BME 702	Computer Aided Manufacturing	3	-	-	3	30
BME 703	Management of Manufacturing Systems	3	-	-	3	30
BME 721	Operations Research (Programming) Lab	-	-	2	1	20
BME 722	Computer Aided Manufacturing Lab	-	-	2	1	20
ELECTIVES (Any one from each category)					4	50
A (With Practical)						
BME 704	Automotive Engineering	3	-	-		
BME 705	Computer Aided Designing	3	-	-		
BME 724	Automotive Engineering Lab	-	-	2		
BME 725	Computer Aided Designing Lab	-	-	2		
ELECTIVES (Any one from each category)					3	30
B (Without Practical)						
BME 706	Marketing Management	3	-	-		
BME 707	Solar Energy	3	-	-		
BME 708	Power Plant Practices	3	-	-		
BME 709	Combustion Engine Emissions	3	-	-		
BME 710	Green Vehicle Technology	3	-	-		
BCU 741	Communication Skills – VII	1	-	-	1	10
BSU 743	Behavioural Science – VII	1	-	-	1	10
FLU 744	French– VII	2	-	-	2	20
NPT 750	Industrial Practical Training– II (Evaluation)	-	-	-	5	
NMP 760	Major Project – I	-	-	-	6	
TOTAL CREDITS					33	
Total Hrs Per Week					25	
Total Hrs in the Semester					250	



EIGHT SEMESTER						
Course Code	Course Title	Lecture (L) Hours Per week	Tutorial (T) Hours Per week	Practical (P) Hours Per week	Total Credits	Hours
BME 801	Quality Control & Quality Assurance	3	-	-	3	30
BME 802	Refrigeration & Air-conditioning	3	-	-	3	30
BME 822	Refrigeration & Air-conditioning Lab	-	-	2	1	20
ELECTIVES (Any one from following with Practical)					4	50
BME 803	Advanced Methods of Manufacturing	3	-	-		
BME 804	Gear Technology	3	-	-		
BME 823	Advanced Methods of Manufacturing Lab	-	-	2		
BME 824	Gear Technology Lab	-	-	2		
BCU 841	Communication Skills – VIII	1	-	-	1	10
BSU 843	Behavioural Science – VIII	1	-	-	1	10
FLU 844	French– VIII	2	-	-	2	20
NMP 860	Major Project – II	-	-	-	9	
TOTAL CREDITS					24	
Total Hrs Per Week						17
Total Hrs in the Semester						170





AMITY UNIVERSITY

MADHYA PRADESH

(Established by Ritnand Balved Education Foundation)

Date: 23.02.2022

BOARD OF STUDIES (Mechanical Engineering)

MINUTES OF THE MEETING

(04 Pages Only)

1. A meeting of board of studies of Department of Mechanical Engineering, Amity School of Engineering & Technology, Amity University Madhya Pradesh was held on 28.01.2022 at AUMP, under the Chairmanship of Maj Gen (Dr) S C Jain VSM** (Retd), Director (ASET). The following members attended the meeting: -

(a) **Chairman**: Maj Gen (Dr) S. C. Jain VSM ** (Retd), Director (ASET)

(b) **Member**

- i) Dr. Nitesh Rajput, Assistant Professor ME, AUR, Jaipur - External Member
- ii) Dr. Chaitanya Sharma, Assistant Professor, RJIT – External Member
- iii) Dr. C. P. Jawahar, Professor & Head ME - Member
- iv) Dr. Nasir Khan, Assistant Professor, ME - Member
- v) Dr. Manvandra Kumar Singh, Assistant Professor, ME - Member

2. **The agenda of the meeting included the following:**

- (a) Curriculum of First year B.Tech. ME Program for 2022-26 batch.
- (b) Discussion on trends and technologies in ME and consideration of its inclusion in syllabus.
- (c) Any other point with due permission of the Chairperson.

3. **Discussions/Comments:**

- a. (i) Discussion: The Scheme and syllabus of the subjects to be offered by ME Department to B. Tech. ME for batch 2022 -2026 was presented before the members of the Board of studies. The Scheme and syllabus of all the subjects was reviewed.
- (ii) Comments: The existing scheme and syllabus is well aligned, and few changes were recommended in few subjects.

- b. (i) Discussion: The syllabus of Programme B.Tech in ME for batches 2019-2023, 2020-2024, 2021-25 and along with the syllabus of the subjects offered by ME to other departments was presented to BOS members and reviewed.
- (ii) Comments: The syllabus of the mentioned batches and the subjects offered by ME to other departments is well aligned and needs no change.
- c. (i) Discussion: The syllabus of M. Tech, CBCS and Pre-PhD course work subjects was presented to BOS members and reviewed.
- (ii) Comments: The Syllabus of M. Tech., CBCS and Pre-PhD course work subjects is well aligned and needs no change.

4. Recommendations:

B. Tech Program

There is a necessity to remove the 1 credit theory subjects BME 101- Engineering Graphics & Design as well as BME 102 – Workshop/Manufacturing Practices and also to reduce the laboratory credits of BME 121 – Engineering Graphics & Design Lab and BME 122 – Workshop/Manufacturing Practices Lab from 2 to 1 due to some mismatch between the theory and lab. Engineering Graphics & Design and Workshop/Manufacturing Practices are offered (scheme attached) as laboratory course only at Amity University Uttar Pradesh. Similarly, Workshop/ Manufacturing Practices Lab is offered as a laboratory course only in most of the universities/affiliated colleges.

M. Tech Program:

There is no change in the scheme and syllabus of the course.

Pre Ph.D. Course:

There is no change in the scheme and syllabus of the courses.

CBCS:

There is no change in the scheme and syllabus of the course. Students have an option to do Robotics course under SWAYAM NPTEL instead of existing CBCS subject CBM 102 – Elements of Robotic System.

S. No.	Name of Minor Track	Semester	Course detail	Course ID	Credits
1	Elements of Robotic System (CBM 102)	First	Introduction to Robotics https://onlinecourses.nptel.ac.in/noc20_de11/previe w	noc20_de11	3

All the aforesaid points have been approved by all the board members present in the meeting.

5. Summary of changes is given below:-

Existing					Proposed		
Sr. No	Program	Course Title	Old Course Code	No. of Credits	New Course Title	New Course Code	No. of Credits
1	B.Tech				Engineering Graphics & Design Lab	BME 123	1
2	B.Tech				Workshop/ Manufacturing Practices Lab	BME 224	1
3	B.Tech	Engineering Graphics & Design	BME 101	1	Removed		
4	B.Tech	Workshop/ Manufacturing Practices	BME 102	1			
5	B.Tech	Engineering Graphics & Design Lab	BME 121	2			
6	B.Tech	Workshop/ Manufacturing Practices Lab	BME 122	2			

There is a necessity to remove the 1 credit theory subjects BME 101- Engineering Graphics & Design as well as BME 102 – Workshop/Manufacturing Practices and also to reduce the laboratory credits of BME 121 – Engineering Graphics & Design Lab and BME 122 – Workshop/Manufacturing Practices Lab from 2 to 1 due to some mismatch between the theory and lab. Engineering Graphics & Design and Workshop/Manufacturing Practices are offered (scheme attached) as laboratory course only at Amity University Uttar Pradesh. Similarly, Workshop/ Manufacturing Practices Lab is offered as a laboratory course only in most of the universities/affiliated colleges.

BOARD OF STUDIES (ME) MINUTES OF THE MEETING

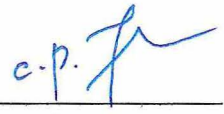
Signature of Members:



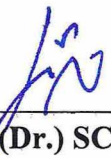
Dr. Manvandra Kumar Singh
Member



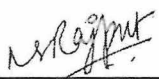
Dr. Nasir Khan
Member



Dr. C. P. Jawahar
Member



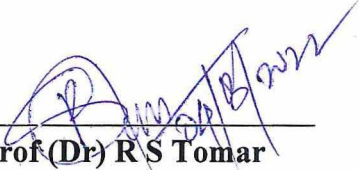
Maj Gen (Dr.) SC Jain
Member



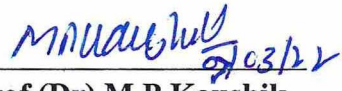
Dr. Nitesh Singh Rajput
External Member



Dr. Chaitanya Sharma
External Member



Prof (Dr) R S Tomar
Dean (Academics)
AUMP, Gwalior



Prof (Dr) M P Kaushik
Hon'ble Pro Vice Chancellor
AUMP, Gwalior

APPROVED BY



Hon'ble Vice Chancellor
AUMP, Gwalior



AMITY UNIVERSITY
MADHYA PRADESH

(Established by Ritnand Balved Education Foundation)

MEETING OF BOARD OF STUDIES (BOS)
(Mechanical Engineering)
Amity School of Engineering & Technology
March, 2021

Remarks & Suggestions by BOS Members

ENGINEERING GRAPHICS & DESIGN LAB

Course Code: BME 123

Credit Units: 01

Total Hours: 20

Course Objective:

This course will provide students concepts on the drawings of different curves like straight line, parabola, ellipse etc. After completion of this course, students will be able to draw different figures manually and will be capable of using various instruments involved in drawings.

Course Contents:

List of experiments/ demonstrations:

1. Practice of Letter writing
2. Practice of Scales
3. Practice of Conic Sections
4. Practice of Projection of Points
5. Practice of Projection of Lines
6. Practice of Projection of Planes
7. Practice of Projection of Solids
8. Practice of development of Surfaces
9. Practice of Isometric Projections
10. Practice of Auto CAD Commands

Laboratory Outcomes:

- Introduction to engineering design and its place in society
- Exposure to the visual aspects of engineering design
- Exposure to engineering graphics standards
- Exposure to solid modeling
- Exposure to computer-aided geometric design
- Exposure to creating working drawings
- Exposure to engineering communication

Examination Scheme:

Components	A	CT	S/V/Q/HA	EE
Weightage (%)	5	15	10	70

CT: Class Test, HA: Home Assignment, S/V/Q: Seminar/Viva/Quiz, EE: End Semester Examination; A: Attendance

WORKSHOP/MANUFACTURING PRACTICES LAB

Course Code: BME 224

Credit Units: 01

Total Hours: 20

Course Objective:

The objective of this course is to impart the basic knowledge of Manufacturing methods, tools, machines & materials to the students of all engineering discipline.

Course Contents:

List of experiments/demonstrations:

- | | |
|---|-----------|
| 1. Machine shop | (4 Hours) |
| 2. Fitting shop | (4 Hours) |
| 3. Carpentry shop | (2 Hours) |
| 4. Welding shop (Arc Welding and Gas Welding) | (6 Hours) |
| 5. Smithy shop | (4 Hours) |

Examinations could involve the actual fabrication of simple components, utilizing one or more of the techniques covered above.

Laboratory Outcomes:

- Upon completion of this laboratory course, students will be able to fabricate components with their own hands.
- They will also get practical knowledge of the dimensional accuracies and dimensional tolerances possible with different manufacturing processes.
- By assembling different components, they will be able to produce small devices of their interest.

Examination Scheme:

Components	A	CT	S/V/Q/HA	EE
Weightage (%)	5	15	10	70

CT: Class Test, HA: Home Assignment, S/V/Q: Seminar/Viva/Quiz, EE: End Semester Examination; A: Attendance

ENGINEERING GRAPHICS & DESIGN

Course Code: BME 101

Credit Units: 01

Total Hours: 10

Except the basic essential concepts, most of the teaching part can happen concurrently in the laboratory itself

Course Objective:

This course will provide students concepts on the drawings of different curves like straight line, parabola, ellipse etc. After completion of this course, students will be able to draw different figures manually and will be capable of using various instruments involved in drawings.

Course Contents:

Exercises are based on the course Engineering Graphics & Design (BME 101)

Module I: Introduction to Engineering Drawing, Orthographic Projections, Projections of Regular Solids, Sections and Sectional Views of Right Angular Solids: **(3 Hours)**

Module II: Sections and Sectional Views of Right Angular Solids, Isometric Projections, Overview of Computer Graphics: **(3 Hours)**

Module III: Customization & CAD Drawing, Annotations, layering & other functions, Demonstration of a simple team design project: **(4 Hours)**

Course Outcomes:

- To prepare students to design a system, component, or process to meet desired needs within realistic constraints such as economic, environmental, social, political, ethical, health and safety, manufacturability, and sustainability
- To prepare students to use the techniques, skills, and modern engineering tools necessary for engineering practice
- To prepare for actual work situations through practical training in a new state-of-the-art computer designed CAD laboratory using engineering software.

Examination Scheme:

Components	A	CT	S/V/Q/HA	EE
Weightage (%)	5	15	10	70

CT: Class Test, HA: Home Assignment, S/V/Q: Seminar/Viva/Quiz, EE: End Semester Examination;
A: Attendance

Text & References:

- M.B. Shah & B.C. Rana, Engineering Drawing, Pearson Education, 2007
- PS Gill, Engineering Drawing, Kataria Publication
- ND Bhatt, Engineering Drawing, Charotar publications
- N Sidheshwar, Engineering Drawing, Tata McGraw Hill
- CL Tanta, Mechanical Drawing, "Dhanpat Rai"
- Agrawal B. & Agrawal C. M. (2012), Engineering Graphics, TMH Publication
- Narayana, K.L. & P Kanniah (2008), Text book on Engineering Drawing, Scitech Publishers
- (Corresponding set of) CAD Software Theory and User Manuals

WORKSHOP/ MANUFACTURING PRACTICES

Course Code: BME 102

Credit

Units: 01

Total

Hours: 10

Course Objective:

The objective of this course is to impart the basic knowledge of Manufacturing methods, CNC machines, materials & their properties and various manufacturing processes to the students of all engineering discipline.

Course Contents:

Module I: Manufacturing Methods- casting, forming, machining, joining, advanced manufacturing methods:

(3

Hours)

Module II: CNC machining, Additive manufacturing, Fitting operations & power tools: (2 Hours)

Module III: Electrical & Electronics, Carpentry, Plastic moulding, glass cutting: (3 Hours)

Module IV: Metal casting, Welding (arc welding & gas welding), brazing: (2 Hours)

Course Outcomes:

- To gain knowledge of the different manufacturing processes which are commonly employed in the industry
- To fabricate components using different materials

Examination Scheme:

Components	A	CT	S/V/Q/HA	EE
Weightage (%)	5	15	10	70

CT: Class Test, HA: Home Assignment, S/V/Q: Seminar/Viva/Quiz, EE: End Semester Examination;
A: Attendance

Text & References:

- Hajra Choudhury S.K., Hajra Choudhury A.K. and Nirjhar Roy S.K., "Elements of Workshop Technology", Vol. I 2008 and Vol. II 2010, Media promoters and publishers private limited, Mumbai.
- Kalpakjian S. And Steven S. Schmid, "Manufacturing Engineering and Technology", 4th edition, Pearson Education India Edition, 2002.
- Gowri P. Hariharan and A. Suresh Babu, "Manufacturing Technology – I" Pearson Education, 2008.
- Roy A. Lindberg, "Processes and Materials of Manufacture", 4th edition, Prentice Hall India, 1998.
- Rao P.N., "Manufacturing Technology", Vol. I and Vol. II, Tata McGrawHill House, 2017

ENGINEERING GRAPHICS & DESIGN LAB

Course Code: BME 121

Units: 02

Hours: 40

Credit

Total

Course Objective:

This course will provide students concepts on the drawings of different curves like straight line, parabola, ellipse etc. After completion of this course, students will be able to draw different figures manually and will be capable of using various instruments involved in drawings.

Course Contents:

List of experiments/ demonstrations:

Module I: Introduction to Engineering Drawing: (4 Hours)

Principles of Engineering Graphics and their significance, usage of Drawing instruments, lettering, Conic sections including the Rectangular Hyperbola (General method only); Cycloid, Epicycloid, Hypocycloid and Involute; Scales – Plain, Diagonal and Vernier Scales

Module II: Orthographic Projections: (4 Hours)

Principles of Orthographic Projections-Conventions - Projections of Points and lines inclined to both planes; Projections of planes inclined Planes - Auxiliary Planes

Module III: Projections of Regular Solids: (4 Hours)

Those inclined to both the Planes- Auxiliary Views; Draw simple annotation, dimensioning and scale. Floor plans that include: windows, doors, and fixtures such as WC, bath, sink, shower, etc.

Module IV: Sections and Sectional Views of Right Angular Solids: (4 Hours)

Prism, Cylinder, Pyramid, Cone – Auxiliary Views; Development of surfaces of Right Regular Solids - Prism, Pyramid, Cylinder and Cone; Draw the sectional orthographic views of geometrical solids, objects from industry and dwellings (foundation to slab only)

Module V: Isometric Projections: (4 Hours)

Principles of Isometric projection – Isometric Scale, Isometric Views, Conventions; Isometric Views of lines, Planes, Simple and compound Solids; Conversion of Isometric Views to Orthographic Views and Vice-versa, Conventions

Module VI: Overview of Computer Graphics: (4 Hours)

Listing the computer technologies that impact on graphical communication, Demonstrating knowledge of the theory of CAD software [such as: The Menu System, Toolbars (Standard, Object Properties, Draw, Modify and Dimension), Drawing Area (Background, Crosshairs, Coordinate System), Dialog boxes and windows, Shortcut menus (Button Bars), The Command Line (where applicable), The Status Bar, Different methods of zoom as used in CAD, Select and erase objects.; Isometric Views of lines, Planes, Simple and compound Solids

Module VII: Customization & CAD Drawing: (4 Hours)

consisting of set up of the drawing page and the printer, including scale settings, Setting up of units and drawing limits; ISO and ANSI standards for coordinate dimensioning and tolerancing; Orthographic constraints, Snap to objects manually and automatically; Producing drawings by using various coordinate input entry methods to draw straight lines, Applying various ways of drawing circles

Module VIII: Annotations, layering & other functions: (6 Hours)

Applying dimensions to objects, applying annotations to drawings; Setting up and use of Layers, layers to create drawings, Create, edit and use customized layers; Changing line lengths through modifying existing lines (extend/lengthen); Printing documents to paper using the print command; orthographic projection techniques; Drawing sectional views of composite right regular geometric solids and project the true shape of the sectioned surface; Drawing annotation, Computer-aided design (CAD) software

WORKSHOP/ MANUFACTURING PRACTICES LAB

Course Code: BME 122
Units: 02

Credit

Total
Hours: 40

Course Objective:

The objective of this course is to impart the basic knowledge of Manufacturing methods, CNC machines, materials & their properties and various manufacturing processes to the students of all engineering discipline.

Course Contents:

List of experiments/demonstrations:

- | | |
|--|-----------|
| 1. Machine shop | (4 Hours) |
| 2. Fitting shop | (4 Hours) |
| 3. Carpentry | (4 Hours) |
| 4. Electrical & Electronics | (6 Hours) |
| 5. Welding shop (Arc welding 4 Hours + gas welding 4Hours) | (8 Hours) |
| 6. Casting | (4 Hours) |
| 7. Smithy | (4 Hours) |
| 8. Plastic molding & Glass Cutting) | (6 Hours) |

Examinations could involve the actual fabrication of simple components, utilizing one or more of the techniques covered above.

Laboratory Outcomes:

- Upon completion of this laboratory course, students will be able to fabricate components with their own hands.
- They will also get practical knowledge of the dimensional accuracies and dimensional tolerances possible with different manufacturing processes.
- By assembling different components, they will be able to produce small devices of their interest.

Examination Scheme:

Components	A	CT	S/V/Q/HA	EE
Weightage (%)	5	15	10	70

CT: Class Test, HA: Home Assignment, S/V/Q: Seminar/Viva/Quiz, EE: End Semester Examination;
A: Attendance

B.Tech (Mechanical Engineering)

Program Code 10998

Search



ABOUT AMITY

PROGRAMS

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INFRASTRUCTURE

RESEARCH

HAPPENINGS

APPLY NOW 2022

1st

2nd Year

3rd Year

4th Year

Year

Semester 1

Basic Electrical Engineering [Engineering Sciences Courses]

Engineering Graphics Lab [Engineering Sciences Courses]

Introduction to Environmental Studies [Engineering Sciences Courses]

Applied Mathematics- I [Basic Sciences Courses]

Engineering Chemistry [Basic Sciences Courses]

Technical Communication – I [Communication Skills]

Foreign Business Language

Open Elective Courses

Outdoor Activity Based Courses

Semester 2

Engineering Mechanics [Engineering Sciences Courses]

Introduction to Computers and Programming in C [Engineering Sciences Courses]

Workshop Practices [Engineering Sciences Courses]

Applied Mathematics - II [Basic Sciences Courses]

Engineering Physics [Basic Sciences Courses]

Technical Communication – II [Communication Skills]

Foreign Business Language

Open Elective Courses

Outdoor Activity Based Courses

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AMITY UNIVERSITY

MADHYA PRADESH

(Established by Ritnand Balved Education Foundation)

Date: 22/02/2017

BOARD OF STUDIES (Civil Engineering)

MINUTES OF THE MEETING

(04 Pages Only)

1. A meeting of board of studies of Department of Civil Engineering, Amity School of Engineering & Technology, Amity University Madhya Pradesh was held on 22nd February 2017 at AUMP, under the Chairmanship of Prof. (Dr.) Anil Vashisht, Director (ASET). The following members attended the meeting:-
 - (a) **Chairman:** Prof. (Dr.) Anil Vashisht, Director (ASET)
 - (b) **Member**
 - i) Dr. M. K. Trivedi, Professor, MITS, Gwalior, External Member
 - ii) Dr. Vijay Rode, Professor, SGSITS, Indore, External Member
 - iii) Mr. Mohan Kantharia, Assistant Professor & Head CE, Member
 - iv) Mr. Parag Agrawal, Assistant Professor CE, Member
 - v) Mr. Ankesh BIRTHARIA, Assistant Professor CE, Member
 - vi) Miss Rashmi Singh, Assistant Professor CE, Member
2. The agenda of the meeting included the following:
 - (a) Review of existing syllabus of M.Tech, B.Tech and CBCS.
 - (b) Discussion on trends and technologies in CE and consideration of its inclusion in syllabus.
 - (c) Any other point with due permission of the Chairperson.

The bottom of the page features several handwritten signatures in blue ink. From left to right, they appear to be: a signature that looks like 'Anil', a signature that looks like 'M. K. Trivedi', a signature that looks like 'Vijay Rode', a signature that looks like 'Mohan Kantharia', a signature that looks like 'Parag Agrawal', and a signature that looks like 'Rashmi Singh'.

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3. Discussions/Comments:

a. (i) Discussion: EDM., Total Station.

(ii) Comments: More focus should be done on total station and GPS.

b. (i) Discussion: Design of ^{specific} big structures.

(ii) Comments: lengthy designs of structure should be shifted to tutorials class. and proper marking scheme should be done for that

c. (i) Discussion: Diagnostic lab.

(ii) Comments: Diagnostic lab for material (concrete & mortar)

4. Recommendations:

B. Tech Program:

- Revision of the list of experiments of Computer Application in Civil Engineering Lab (BTCE-620) as per the software Auto cadd and Staad Pro. (Annexure:1)
- The credits of the Civil Engineering Lab (BTCE-321) are revised from 2 to 1 credits. (Annexure:2)

M. Tech Program:

- Modify the syllabus of Advanced RCC Design (MTCE-302)
- Modify the syllabus of High Rise Building Analysis (MTCE-303)

CBCS:

- Revise the syllabus of Construction Engineering (CE-4903)

4. Summary of changes is given below:-

Current Syllabus B.Tech (CE), M.Tech(CE) and CBCS					Proposed Changes/Modification s (addition/deletion in the Syllabus)	New Course Code B.Tech (ECE)	No. of Credits
Sr. No.	Course Title	Module of the syllabus	Old Course Code	No. of Credits			
1	Computer Application in Civil engineering lab (BTCE- 620)	Lab Experime nts	BTcE-620	1	Annexure-1	BTce-620	1
2	Civil engineering Drawing lab (BTCE-321)	Experime nt list	BTCE- 321	2	Annexure-II	BTCE-321	1
			Total credits	03			02
3	Advanced RCC (MTCE- 302)	5	MTCE- 302	4	Annexure-III	MTCE-302	4
4	High Rise Building (MTCE-303)	5	MTCE- 303	4	Annexure-IV	MTCE-303	4
5	(CBCE) Surveying (CE-4903)	3	CE-4903	3	Annexure-V	CE-4903	3
Total Credits =14					Total Credits=13		

The total number of credits after revision for B. Tech works out to 02 credits as against 03 credits, and the credits for M.Tech and CBCS remains same.

(Handwritten signatures and initials)

MS nich

Rashmi

Simran

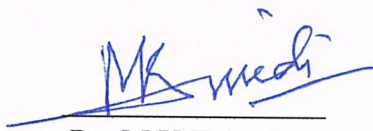
Pooja

Shruti

Signature of Members:



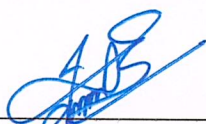
Dr. Anil Vashisht



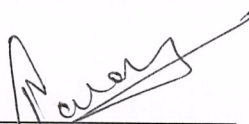
Dr. M.K. Trivedi

ABSENT

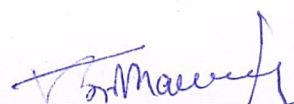
Dr. Vijay Rode



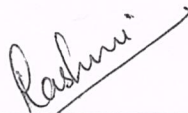
Mr. Mohan Kantharia



Mr. Parag Agrawal



Mr. Ankesh Birtharia



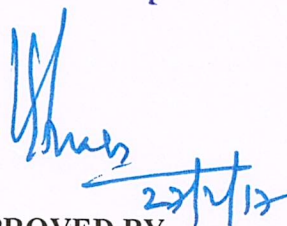
Miss Rashmi Singh



Signature of Chairman- BOS

Forwarded
27/02/2017
Dean - Academics

MAHADEV
27/02/17
Prof. (Dr.) MA Kaushek
Pro-VC, AUMP



APPROVED BY
Hon'ble Vice Chancellor
AUMP, Gwalior



AMITY UNIVERSITY

MADHYA PRADESH

(Established by Ritmand Balved Education Foundation)

MEETING OF BOARD OF STUDIES (BOS)
(Civil Engineering)

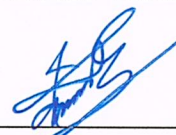
Amity School of Engineering & Technology

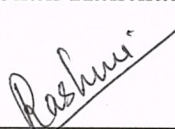
Remarks & Suggestions by BOS Members

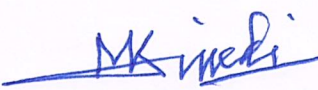
ASCE journals should be subscribed for PG students
and also for UG students
Department need general Civil Engg. software that can
cover water resource, pavement/road designs
with the induction of new faculties department is
getting strength day by day

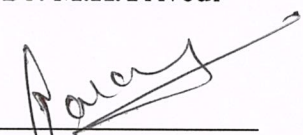
Signature of Members:


Dr. Anil Vashisht


Mr. Mohan Kantharia

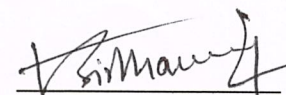

Miss Rashmi Singh


Dr. M.K. Trivedi


Mr. Parag Agrawal

ABSENT

Dr. Vijay Rode


Mr. Ankesh Birtharia

THE UNIVERSITY OF CHICAGO

DEPARTMENT OF CHEMISTRY

LABORATORY OF ORGANIC CHEMISTRY

REPORT OF RESEARCH

BY J. H. HARRIS

IN THE DEPARTMENT OF CHEMISTRY

UNIVERSITY OF CHICAGO

1954-1955

CHICAGO, ILLINOIS

1. INTRODUCTION

The purpose of this report is to

present a summary of the work done

during the past year in the

laboratory of organic chemistry

at the University of Chicago.

ARSHN

John W.

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AMITY UNIVERSITY

MADHYA PRADESH

(Established by Ritnand Balved Education Foundation)

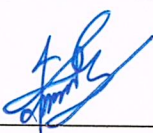
MEETING OF BOARD OF STUDIES (BOS) (Civil Engineering) Amity School of Engineering & Technology

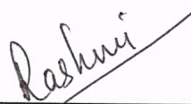
Remarks & Suggestions by BOS Members

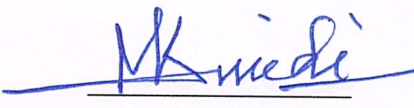
More focus should be given to tutorial classes

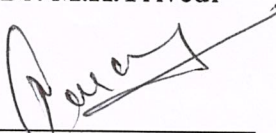
Signature of Members:


Dr. Anil Vashisht

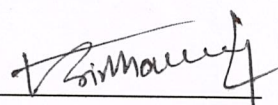

Mr. Mohan Kantharia


Miss Rashmi Singh


Dr. M.K. Trivedi


Mr. Parag Agrawal

ABSENT
Dr. Vijay Rode


Mr. Ankesh Birtharia



AMITY UNIVERSITY

MADHYA PRADESH

(Established by Ritnand Balved Education Foundation)

AMITY SCHOOL OF ENGINEERING AND TECHNOLOGY			
Department of Civil Engineering			
Board of Studies for session 2017-18			
Total Credits			
S. No.	Semester	Previous Credits	New Credits
1	I	26	25
2	II	26	25
3	III	31	30
4	IV	27	27
5	V	29	29
6	VI	25	25
7	VII	32	32
8	VIII	24	24
Total Credits		220	217

Signature of Members:

Dr. Anil Vashisht

Dr. M.K. Trivedi

ABSENT

Dr. Vijay Rode

Mr. Mohan Kantharia

Mr. Parag Agrawal

Mr. Ankesh Birtharia

Miss Rashmi Singh

old

COMPUTER APPLICATIONS LAB

Course Code: BTCE 620

Credit Units: 01

Course Objective:

To familiarize and give hands on training to students in the following areas of Civil Engineering Application software.

Course Contents:

Computer applications in civil engineering by using two dimensional and three dimensional modeling through auto Cadd and Stadd Pro.

1. Drafting and documentation.
2. Surveying – terrain mapping, computation of areas & volumes.
3. Structural Analysis and Design.
4. Water resources
5. Geotechnical Engineering
6. Road/Railway system
7. Environmental Engineering
8. Estimation and costing
9. Project management

Examination Scheme:

IA				EE	
A	PR	LR	V	PR	V
5	10	10	5	35	35

Note: IA –Internal Assessment, EE- External Exam, PR- Performance, LR – Lab Record, V – Viva.

Rashini

Pavani

M. S. Sridhar

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V. R. Manjunath

New

BTCE 620 (BOS-17)

The list of experiments is reviewed and revised modified. The current list of experiments is below.

Practical 1 – Introduction of Staad Pro and its applications.

Practical 2 – Study of various commands for modelling and analysis of a beam

Practical 3 – Modelling and analysis of continuous beams for different loading conditions.

Practical 4 - Modelling of frame structure for different loading conditions.

Practical 5 – Modelling and analysis of frame structure for different loading conditions.

Practical 6 – Seismic Analysis of a frame structure.

Practical 7 – Wind Analysis of a frame structure.

Practical 8 – Design of beams according to Indian Standards.

Practical 9 - Design of columns according to Indian Standards.

Practical 10 – Introduction of different software used in various fields of Civil Engineering.

Practical 11 – Introduction of Auto cad used in various types of building planning.

Rashmi

Ravi

M. N. N. N.

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V. S. S. S.

Justification for Changes in syllabus of BTCE 620 computer application in civil engineering

1. It is not feasible for student to learn and practice 7 to 8 software in a semester as old syllabus consists

of practical on various software.

2. In lab we have only Stadd Pro and Auto Cad software .

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CIVIL ENGINEERING DRAWING LAB

Course Code: BTCE 321

2 → 1
Credit Units: 01

Course Contents:

Lab

1. Panelled doors, glazed windows and ventilators in wood.
2. Steel and aluminium windows.
3. Steel roof trusses.
4. Reinforced concrete staircase.
5. Residential buildings with flat and pitched roof – RC and tiled.
6. Public buildings like office, dispensary, post office, bank etc.
7. Industrial buildings.

Examination Scheme:

IA				EE	
A	PR	LR	V	PR	V
5	10	10	5	35	35

Note: IA –Internal Assessment, EE- External Exam, PR- Performance, LR – Lab Record, V – Viva.

Text & References:

- National Building Code of India
- Local Building Bye-laws
- Callender, John Hancock, Time Saver Standards for Architectural design Data, Tata McGraw Hill.
- Chiara, Callender, John Hancock, Time Saver Standards for Building Type, McGraw Hill
- Chiara, Joseph De, Time Saver Standards for Site Planning, McGraw Hill
- Ching, Francis D K, Architectural Graphics. John Wiley

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V. S. Manu

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theory

BUILDING DESIGN AND DRAWING

Course Code: BTCE 302

Credit Units: 04

Course Objective:

The objective of the course is to develop the capability for carrying out independent design. Information in the form of sketch and images to be illustrated as a part of discussion.

Course Contents:

PART A: PLANNING

Module I: Function, Structure and Appearance

Evolution of architectural styles. Roman, Greek, Medieval and Modern architecture. Examples.

Module II: Creative principles

Design methods. Pragmatic, iconic, canonic and rational design methods. Elements of composition. Point, line, texture and colour etc. Organisation of elements. Proportion, scale, rhythm balance and unity. Architectural examples. Design procedure, brief analysis, synthesis and communication.

Module III: Functional factors

Lighting, ventilation, thermal and acoustics factors and their effects on architectural form.

Module IV: Spaces

Space planning of buildings such as residential, public and commercial. Design process. Activity areas and linkages. Proximity matrix. Adjacency diagram. Form development with respect to site conditions and functional requirements. Preparation of drawings. Elementary perspective and rendering.

PART B: DRAWING

Planning, designing from given requirements of areas and specifications and preparation of sketch design and working drawings for:

1. Residential building- flat and pitched roof, economic domestic units, cottages, bungalows and building flats.
2. Public building – small public utility shelters, dispensaries, banks, schools, offices, libraries, hostels, restaurants, commercial complexes, factories etc.
3. Preparation of site plans and service plans as per Building Rules
4. Septic Tank and Soak Pit – detailed drawings.
5. Plumbing, water supply and drainage for buildings.

Examination Scheme:

Components	A	CT	S/V/Q/ HA	EE
Weightage (%)	5	15	10	70

CT: Class Test, HA: Home Assignment, S/V/Q: Seminar/Viva/Quiz, EE: End Semester Examination; Att: Attendance

Text & References:

- SP 7:2005, National Building Code of India
- Local Building Bye-laws
- Callender, John Hancock, Time Saver Standards for Architectural Design Data, McGraw Hill
- Chiara, Callender, John Hancock, Time Saver Standards for Building Type, McGraw Hill
- Chiara, Joseph De, Time Saver Standards for Site Planning, McGraw Hill
- Scott, Robert Gillan, Design Fundamentals, Mc-Graw Hill.
- Tessie Agan M.S., The House, Its Plan & Use, Oxford & IBH Publishing Co.
- IS 5533: 1969, Recommendation for Dimensions of Spaces for Human Activities. B.I.S
- IS 4963: 1987, Recommendation for Buildings and facilities for the Physically Handicapped. B.I.S
- Shaw and Kale, Building Drawing, Tata Mc Graw Hill Publishers
- Balagopal T S Prabhu, Building Drawing and Detailing, Spades Publishers

Rashmi

Praveen

MS. Nishi

SP

V. Srinivas

Justification for reducing credits of Building Design and Drawing lab

(BTCE302)

1. Now theory and lab are in the same semester (previously they were in separate semester)
2. Some drawing portion is common in both, hence one credit in lab can be reduced .

ADVANCED REINFORCED CONCRETE DESIGN

OLD

Course Code: MTCE 302

Credit Units: 04

Module-I

Earthquake and wind effects on structures, loads on structures, reinforced concrete design of flat slabs, grid floors, deep beams, design of building's load bearing and framed structures, design of foundations, seismic analysis.

Module-II

Design of ground and elevated water tanks, design of bridge decks.

Module-III

Pre-stressed concrete: analysis and design of sections under flexure using limit state approach, anchorage zone and end block design, composite construction, introduction to statistically indeterminate pre-stressed concrete structures.

Module-IV

Silos and bunkers, Janseen's and Airy's theory, rectangular bunkers with sloping bottoms and with high side walls, battery of bunkers.

Module-V

Ductile detailing of RCC frames. Design of beam-column joints;
Design of deep beam. Design of shear walls.

Examination Scheme:

Components	A	CT	S/V/Q/HA	EE
Weightage (%)	5	15	10	70

CT: Class Test, HA: Home Assignment, S/V/Q: Seminar/Viva/Quiz, EE: End Semester Examination;
A: Attendance

Reference Books:

1. Jaikrishna, Chandrasekaran, Elements of earthquake engineering.
2. Shah and Karve, Text book of reinforced concrete
3. Punamia, RCC designs
4. IS-456, -875, -1893, -1984
5. Krishna Raju, Prestressed concrete.
6. Varghese, Advanced RC Designs, PHI
7. Everard, Theory and problems of RC design (Shaum's Outline S), TMH
8. R. Park and T. Pauley, Reinforced concrete structures, John Wiley and sons
9. A. K. Jain, Reinforced Concrete: Limit State design, NemChand and Bros. 1999.
10. J. Krishna and OP Jain, Plain and Reinforced Concrete, Vol. I I, Roorkee, Nem Chand and Bros.
11. H. Nilson, D. Darwin and C. W. Dolar, Design of Concrete structures, Tata McGraw Hill
12. T. Paulay and M.J.N. Priestley, Seismic Design of Reinforced Concrete and Masonry Buildings, John Wiley & Sons Inc

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Pauley
Shah
Jaikrishna

ADVANCED REINFORCED CONCRETE DESIGN (new)

Course Code: MTCE 302

Credit Units: 04

Module:1 Plastic Section Theory for Reinforced Concrete including interaction of flexure Shear-Axial effects, Upper bound and lower bound plastic theorems, Application of plastic analysis to frames – instantaneous centre of rotation

Module:2 Introduction of flat slab, component of flat slab construction, Indian code recommendation, direct design method, equivalent frame method, shear in flat slab, slab reinforcement, openings in flat slab, Introduction of circular slab

Module:3 Introduction of yield line theory, yield line patterns, moment capacity along yield line, ultimate load on slabs, Analysis by virtual work and equilibrium method, Redistribution of moments, moment curvature analysis, Recommendations of IS 456:2000.

Module:4 Introduction to Pre-stressed concrete and behaviour for simple elements, design of section under flexure using limit state, Introduction of Deep beam, IS code method of design of Deep beam.

Examination Scheme:

Components	A	CT	S/V/Q/HA	EE
Weightage (%)	5	15	10	70

CT: Class Test, HA: Home Assignment, S/V/Q: Seminar/Viva/Quiz, EE: End Semester Examination; Attendance

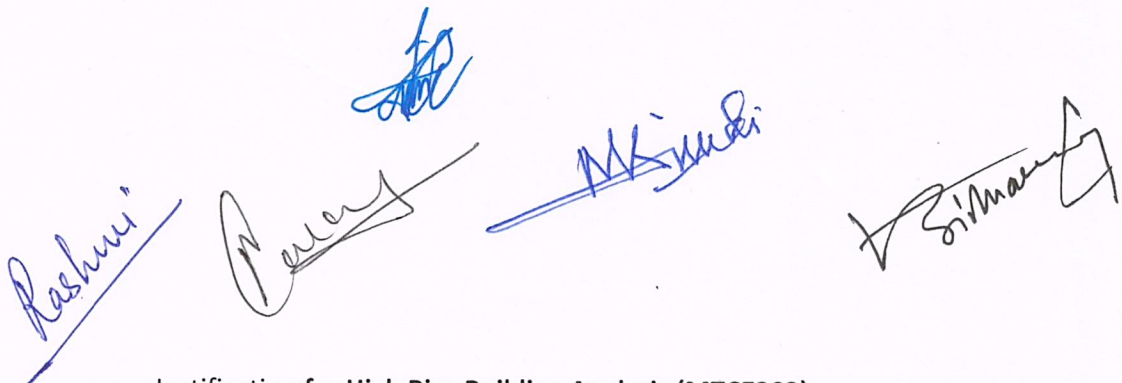
A:

Reference Books:

1. Jaikrishna, Chandrasekaran, Elements of earthquake engineering.
2. Shah and Karve, Text book of reinforced concrete
3. Punamia, RCC designs
4. IS-456, -875, -1893, -1984
5. Krishna Raju, Prestressed concrete.
6. Varghese, Advanced RC Designs, PHI
7. Everard, Theory and problems of RC design (Shaum's Outline S), TMH
8. R. Park and T. Pauley, Reinforced concrete structures, John Wiley and sons
9. A. K. Jain, Reinforced Concrete: Limit State design, NemChand and Bros. 1999.
10. J. Krishna and OP Jain, Plain and Reinforced Concrete, Vol. I I, Roorkee, Nem Chand and Bros.
11. H. Nilson, D. Darwin and C. W. Dolar, Design of Concrete structures, Tata McGraw Hill
12. T. Paulay and M.J.N. Priestley, Seismic Design of Reinforced Concrete and Masonry Buildings, John Wiley & Sons Inc
13. Reinforced Concrete: Mechanics and Design, 6th Ed., McGregor & White
14. Reinforced Concrete: A Fundamental Approach, 6th Ed., Edward Nawy
15. Design of Prestressed Concrete, 2nd Ed., Arthur H. Nilso
16. Darwin & Dolan, "Design of Concrete Structures", 14th Ed., Nilson

Justification for new syllabus for Advanced Concrete Design(MTCE302)

Current Syllabus Module	Proposed syllabus Module	Added	Deleted
M-1(Deleted)			It is already being taught in MTCE 104
	M-1(New)	Referred from IIT Roorkee.	
M-2 (Deleted)			It is covered at B.tech. Level.
	M-2(New)	It is taken from M-1 of old syllabus but covered in detail.	
M-3			
	M-3(New)	M-3 and M-5 are clubbed	
M-4 (Deleted)			It is covered at B.tech. Level.
	M-4 (New)	Referred from IIT Roorkee.	
M-5 (Deleted)			Design of Deep Beam is covered in M-3(New) and underline content is covered in MTCE-303 in M-4



Justification for High Rise Building Analysis (MTCE303)

Current Syllabus	Proposed syllabus	Added	Deleted(Justification)
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INDIAN INSTITUTE OF TECHNOLOGY ROORKEE

NAME OF DEPTT/CENTRE : **Department of Civil Engineering**

1. Subject Code : **CEN-543** Course Title : **Advanced Concrete Design**

2. Contact Hours : **L: 3 T: 0 P: 2**

3. Examination Duration (Hrs) : **Theory : 3 Practical : 0**

4. Relative Weight : **CWS : 15 PRS: 25 MTE: 20 ETE: 40 PRE: 0**

5. Credits : **04**

6. Semester: **Autumn**

7. Subject Area : **PCC**

8. Pre-requisite: **Nil**

9. Objective: To give a consistent and sound theoretical background to the force and stress distributions in reinforced and pre-stressed concrete. To introduce the concepts of yield line analysis, strut-tie models and other state of art analysis techniques and to connect these with the extant design ideologies in the building codes. To study advanced concepts of creep/rheology & crack widths in reinforced and prestressed concrete and creating numerical models of these. To develop a clear theoretical understanding of the underlying reasons behind codal details as ductile detailing, reinforcement placement etc.

10. Details of Course:

S. No.	Contents	Contact Hours
1.	Plastic Section Theory for Reinforced Concrete including interaction of flexure-Shear-Axial effects	5
2.	Upper bound and lower bound plastic theorems	2
3.	Application of plastic analysis to frames – instantaneous centre of rotations	4
4.	Introduction to Pushover Analysis	3
5.	Introduction to Strut-Tie Models	2
6.	Strut-Tie Models for Deep Beams, Beam-Column Joints& Shear walls	5
7.	Introduction to Yield line analysis and application for slabs, raft foundations etc.	4
8.	Introduction to Pre-stressed concrete and behaviour for simple elements	8
9.	Modelling of creep/shrinkage and long term effects for RCC and prestressed concrete	5
10.	Calculation of crack widths and crack control designs	4
Total		42

11. Suggested Books:

S. No.	Name of Authors/Books/Publishers	Year of Publication/ Reprint
1.	Reinforced Concrete: Mechanics and Design, 6 th Ed., McGregor & White	2011
2.	Reinforced Concrete: A Fundamental Approach, 6 th Ed., Edward Nawy	2008
3.	Design of Prestressed Concrete, 2 nd Ed., Arthur H. Nilson	1987
4.	Darwin & Dolan, "Design of Concrete Structures", 14 th Ed., Nilson,	2009
5.	Prestressed Concrete: A Fundamental Approach, 5 th Ed., Edward Nawy	2005
6.	J Schlaich, K Schaefer, and M. Jennewin, "Toward a Consistent Design of Structural Concrete", PCI Journal V. 32, No. 2, pp. 72-150.	1987
7.	Kennedy & Goodchild, "Practical Yield Line Design", The Concrete Centre, TCC/03/3.	2004

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HIGH RISE BUILDING ANALYSIS

Course Code: MTCE 303

Credit Units: 04

Module I:

Analysis of tall building frames, Lateral load analysis, multi bay frames, gravity loads, settlement of foundation.

Module II:

Analysis of shear walls - plane shear walls, infilled frames, coupled frames, frames with shear walls.

Module III:

Principle of three dimensional analysis of tall buildings; perforated cores, pure torsion in thin tubes, bending and warping of perforated cores.

Module IV:

Analysis of floor system in tall buildings, Vierendal girders, diagrid floors.

Module V:

Elastic and inelastic stability of frames and shear walls. Analysis of thermal stresses. Criteria for design of Chimneys, T.V. Towers and other Tall Structure.

Modeling of tall structures, case studies.

Examination Scheme:

Components	A	CT	S/V/Q/HA	EE
Weightage (%)	5	15	10	70

CT: Class Test, HA: Home Assignment, S/V/Q: Seminar/Viva/Quiz, EE: End Semester Examination;
A: Attendance

Reference Books:

1. Coull, Smith, Design of tall buildings
2. Taranath, Design of tall buildings
3. B S Smith & A Coull, Tall Building Structures: - John Wiley & Sons.
4. W. Schueller, High Rise Building Structures: John Wiley & Sons.

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HIGH RISE BUILDING ANALYSIS (new)

Course Code: MTCE 303

Credit Units: 04

Module:1

Structural systems for multi-storey buildings, gravity and lateral loads on buildings, analysis of multi-storey frames. Behaviour of framed tube, tube-in-tube systems, and bundled tube systems

Module:2

Importance of symmetry and regularity in plan, and regularity in elevation. Analysis for torsion in buildings

Module:3

Design of buildings with shear walls and coupled shear walls

Module:4

Design and detailing of various members and beam-column joints for ductility. The capacity design principle. Performance based design philosophy. Design of floor slabs, raft and pile foundations .Application of MS-Excel, ETABS

Examination Scheme:

Components	A	CT	S/V/Q/HA	EE
Weightage (%)	5	15	10	70

CT: Class Test, HA: Home Assignment, S/V/Q: Seminar/Viva/Quiz, EE: End Semester Examination; A: Attendance

Reference Books:

1. U.H.Varyani, "Structural Design of Multi-storeyed Buildings", 2nd Ed., South Asian Publishers, New Delhi.2002
2. V.L. Shah & S.R.Karve, "Illustrated Design of Reinforced Concrete Buildings", (GF+3storeyed), Structures Publications, Pune.2013
3. Design of Multi Storeyed Buildings, Vol. 1 & 2, CPWD Publications. 1976
4. Bungle S. Taranath, "Structural Analysis and Design of Tall Buildings", Mc-Graw Hill.1988
5. Bryan S. Smith and Alex Coull, "Tall Building Structures", Wiley India. 1991
6. Wolfgang Schueller, "High Rise Building Structures", Wiley.
7. Coull, Smith, Design of tall buildings
8. Taranath, Design of tall buildings
9. B S Smith & A Coull, Tall Building Structures: - John Wiley & Sons.
10. W. Schueller, High Rise Building Structures: John Wiley & Sons.

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Justification for High Rise Building Analysis (MTCE303)

Current Syllabus Module	Proposed syllabus Module	Added	Deleted(Justification)
M-1			
	M-1(New)	Referred from IIT Roorkee.	
M-2			
	M-2(New)	Referred from IIT Roorkee.	
M-3 (Deleted)			Most of the part covered in M-1 and M-2
	M-3(New)	Referred from IIT Roorkee.	
M-4 (Deleted)			Not much related to context of syllabus.
	M-4 (New)	Referred from IIT Roorkee.	
M-5 (Deleted)			Shear wall is covered in M-2 and Modelling of tall structures is covered in M-4 (New) and other topics are covered already at B.tech. level.

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INDIAN INSTITUTE OF TECHNOLOGY ROORKEE

NAME OF DEPTT/CENTRE : **Department of Civil Engineering**

1. Subject Code : **CEN-643** Course Title : **Analysis and Design of High-Rise Buildings**

2. Contact Hours : **L: 3 T: 0 P: 2**

3. Examination Duration (Hrs) : **Theory : 3 Practical : 0**

4. Relative Weight : **CWS : 15 PRS: 25 MTE: 20 ETE: 40 PRE: 0**

5. Credits : **4**

6. Semester: **Spring**

7. Subject Area : **PEC**

8. Pre-requisite: **Nil**

9. Objective: To introduce the analysis and design of tall buildings subjected to different loading conditions and detailing of various components.

10. Details of Course:

S. No.	Contents	Contact Hours
1.	Structural systems for multi-storey buildings, gravity and lateral loads on buildings, analysis of multi-storey frames. Behaviour of framed tube, tube-in-tube systems, and bundled tube systems	6
2.	Importance of symmetry and regularity in plan, and regularity in elevation. Analysis for torsion in buildings	6
3.	Design of buildings with shear walls and coupled shear walls	6
4.	Design and detailing of various members and beam-column joints for ductility. The capacity design principle. Performance based design philosophy	6
5.	Design of floor slabs, raft and pile foundations	9
6.	Application of MS-Excel, ETABS and SAFE software	9
Total		42

11. Suggested Books:

S. No.	Name of Authors/Books/Publishers	Year of Publication/ Reprint
1.	U.H.Varyani, "Structural Design of Multi-storeyed Buildings", 2 nd Ed., South Asian Publishers, New Delhi.	2002
2.	V.L. Shah & S.R.Karve, "Illustrated Design of Reinforced Concrete Buildings", (GF+3storeyed), Structures Publications, Pune.	2013
3.	Design of Multi Storeyed Buildings, Vol. 1 & 2, CPWD Publications.	1976
4.	Bungale S. Taranath, "Structural Analysis and Design of Tall Buildings", Mc-Graw Hill.	1988
5.	Bryan S. Smith and Alex Coull, "Tall Building Structures", Wiley India.	1991
6.	Wolfgang Schueller, "High Rise Building Structures", Wiley.	1986

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Simran
AK Singh

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SURVEYING

Course Code: CE 41303 (4903)

Credit Units: 03

Course Objective:

Surveying is the basic element of mapping areas for civil engineering construction. Methods of surveying including leveling, and leveling methods, contours, estimation of volumes etc are covered.

Course Contents:

Module I: Classification & Principles of Surveying:- Introduction - classification of surveys - plane surveying - geodetic surveying - topographic surveying - reconnaissance - principle of working from whole to part - provision of control - conventional signs - chain survey - instruments - principles of chain survey - field book - plotting - tie line and check line - chaining and ranging - obstacles - chaining on sloping ground - errors in chain survey - uses of cross staff and optical square.

Module II: Compass Surveying:- Compass survey - prismatic compass - surveyor's compass - whole circle and reduced bearing- true and magnetic bearing - dip and declination - local attraction - traversing - plotting - error of closure - graphical and analytical adjustments

Module III: Levelling:- Levelling - definition of level surfaces - mean sea level - reduced level - bench marks - levelling instruments - temporary and permanent adjustments - fly leveling - booking - reduction of levels - corrections for refraction and curvature - reciprocal leveling - longitudinal levelling and cross sectioning - contour survey - definition - characteristics of contour - uses of contour - methods of contouring - direct and indirect interpolation - plotting - areas and volumes - trapezoidal rule - Simpson's rule - area from latitude and departure - uses of planimeter - volumes - trapezoidal and prismoidal formula.

Module IV: Plane Table Surveying:- plane table survey - instruments and accessories - different methods - orientation - advantages and disadvantages of plane tabling - two point problem - three point problem - errors in plane tabling - minor instruments - hand levels - clinometer - Ceylon ghat tracer - hypsometer - pantagraph - edigraph - box sextant - telescopic alidade

Module V: Theodolite:- Theodolite surveying - study of theodolite - temporary and permanent adjustments - measurement of horizontal angles - method of repetition and reiteration - measurement of vertical angles - theodolite traverse - calculation of co ordinates - corrections - traverse table - omitted measurements - tachemetric surveying - stadia system - fixed and movable hair methods - staff held vertical and normal - instrument constants - analytic lens - tangential system - direct reading tachemeter - subtense bar - trigonometric leveling - various methods- E.D.M - total station.

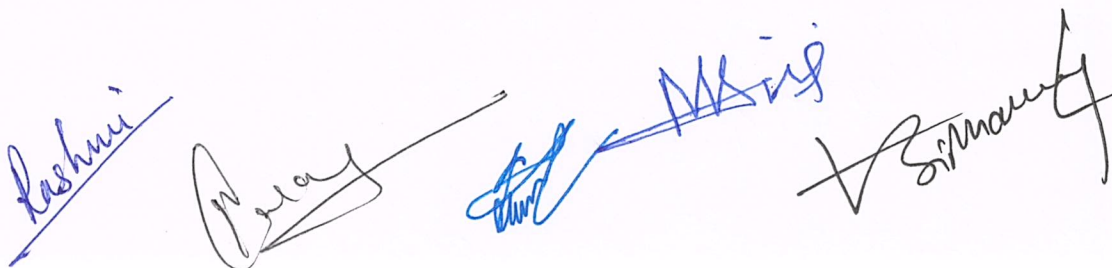
Examination Scheme:

Components	A	CT	S/V/Q	HA	EE
Weightage (%)	5	10	5	5	70

CT: Class Test, HA: Home Assignment, S/V/Q: Seminar/Viva/Quiz, EE: End Semester Examination; Att: Attendance

Text & References:

- S.K Duggal, Surveying Vol 1 and II, 2nd ed., Tata - McGraw Hill, New Delhi (2004).
- Arora K.R., Surveying Vol I & II, Standard Book House, New Delhi (2008)
- Punmia, B.C., Ashok Kr. Jain, Arun Kr. Jain, Surveying Vol I & II, Laxmi Publications, New Delhi (2008)



SURVEYING(new)

Course Code: CE (4903)

Credit Units: 03

Course Objective:

Surveying is the basic element of mapping areas for civil engineering construction. Methods of surveying including leveling, and leveling methods, contours, estimation of volumes etc are covered.

Course Contents:

Module I: Survey Classification and Chain Survey:-

Introduction - classification of surveys plane surveying geodetic surveying topographic surveying - reconnaissance - principle of working from whole to part - provision of control .conventional signs. Minor - instruments - principles of chain survey - field book - plotting , chaining and ranging - obstacles - chaining on sloping ground - errors in chain survey

Module II Compass and Plane Table Surveying:- Compass survey - prismatic compass - surveyor's compass - whole circle and reduced bearing- true and magnetic bearing - dip and declination – included angle ,local attraction. Plane table survey accessories used , method of radiation and intersection.

Module III: Leveling: - definition of level surfaces - mean sea level - reduced level - bench marks - levelling instruments - temporary adjustments - fly leveling - booking - reduction of levels –HI method, and Rise and fall method,

Module IV:- Contour Survey, Area and Volume calculations - definition - characteristics of contour - uses of contour - methods of contouring - Areas and Volumes computations - trapezoidal rule - Simpson's rule - - volumes - trapezoidal and prismoidal formula. uses of planimeter

Module V:-Study Of Theodolite and Modern Survey Equipment:- Theodolite surveying - study of theodolite - temporary and permanent adjustments -measurement of horizontal angles - method of repetition and reiteration - measurement of vertical angles –tacheometric surveying - instrument constants ,. E.D.M – total station.

Examination Scheme:

Components	A	CT	S/V/Q	HA	EE
Weightage (%)	5	10	5	5	70

CT: Class Test, HA: Home Assignment, S/V/Q: Seminar/Viva/Quiz, EE: End Semester Examination; Att: Attendance

Text & References:

- Punmia, B.C., Ashok Kr. Jain, Arun Kr. Jain, Surveying Vol I & II, Laxmi Publications, New Delhi (2008)
- S.K Duggal, Surveying Vol I and II, 2nd ed., Tata - McGraw Hill, New Delhi (2004).
- Arora K.R., Surveying Vol I &II, Standard Book House, New Delhi (2008)

Rashmi
Ashok
Arora
V. Sharma

Justification for change in surveying (CBCS 4903):-

- (1) syllabus should be according to the minor track students , some students are from non technical back ground hence syllabus content is diluted as per this requirement.
- (2) as practical are not in the syllabus but subject is more practical oriented hence elementary knowledge of the surveying practical/instruments is emphasized. With the help of instrument the theory will be demonstrated.

Rashmi

P. Arav

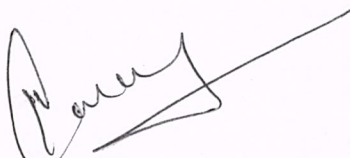
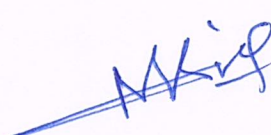
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Semester	Course Name (Vacancies Available)	Course code	Subject	Credit
1	Construction Engineering (30)	CE4901	Building Materials	3
2		CE4902	Building Drawings	3
3		CE4903	Surveying	3
4		CE4904	Building Design Principles	3
5		CE4905	Construction Techniques and Planning	3
6		CE4906	Construction Project Management	3
			Total Credits	18

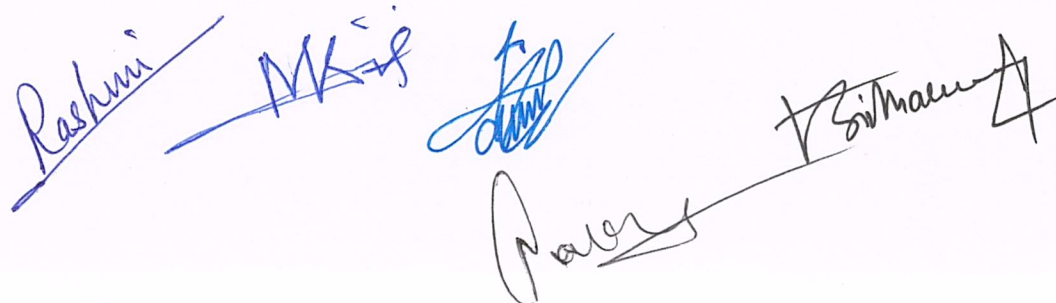


Rashmi



1. AMITY SCHOOL OF ENGINEERING & TECHNOLOGY

Minor Tracks

Semester	Course Name (Vacancies Available)	Course code	Subject	Credit
I	Embedded Systems (30)	ES4101	Digital Electronics	3
II		ES4102	Microprocessor Systems	3
III		ES4103	Microcontrollers	3
IV		ES4104	Embedded Systems	3
V		ES4105	Embedded C	3
VI		ES4106	Project (Embedded System)	3
			Total Credits	18

Semester	Course Name (Vacancies Available)	Course code	Subject	Credit
I	Artificial Intelligence (30)	AI4201	Introduction to Artificial Intelligence	3
II		AI4202	Artificial Neural Networks	3
III		AI4203	Fuzzy Logic	3
IV		AI4204	Genetic Algorithm	3
V		AI4205	Soft Computing	3
VI		AI4206	Project (Artificial Intelligence)	3
			Total Credits	18



Semester	Course Name (Vacancies Available)	Course code	Subjects	Credit
I	Wireless Communication (30)	WC4301	Basic Electronics	3
II		WC4302	Communication Systems	3
III		WC4303	Wireless Communication	3
IV		WC4304	Radar & Satellite Communication	3
V		WC4305	Microwave Engineering	3
VI		WC4306	Antenna and Wave Propagation	3
			Total Credits	18

Semester	Course Name (Vacancies Available)	Course code	Subject	Credit
I	Network Security (30)	NS4401	Introduction to Computer Network	3
II		NS4402	TCP/IP	3
III		NS4403	Network Management	3
IV		NS4404	Wireless and Mobile Network	3
V		NS4405	Cryptography and Network Security	3
VI		NS4406	Projects (Network Security)	3
			Total Credits	18

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Semester	Course Name (Vacancies Available)	Course code	Subject	Credit
I	Cloud Computing (30)	CC4501	Computer Network	3
II		CC4502	TCP/IP	3
III		CC4503	Storage and Computer Virtualization	3
IV		CC4504	Network Virtualization	3
V		CC4505	Cloud Computing	3
VI		CC4506	Information Storage and Management	3
			Total Credits	18

Semester	Course Name (Vacancies Available)	Course code	Subjects	Credit
I	Renewable Energy (30)	RE4601	Renewable Energy System-I	3
II		RE4602	Energy Conversion System	3
III		RE4603	Renewable Energy System-II	3
IV		RE4604	Solar Energy and Applications	3
V		RE4605	Energy Audit	3
VI		RE4606	Renewal Energy Performance Measurement	3
			Total Credits	18

Rashmi



Semester	Course Name (Vacancies Available)	Course code	Subjects	Credit
I	Nanotechnology (30)	NT4701	Basics of Nanotechnology	3
II		NT4702	Properties of Nanomaterials	3
III		NT4703	Graphene Electronics	3
IV		NT4704	Composites and Non-composites	3
V		NT4705	Nanoparticles and their applications	3
VI		NT4706	Synthesis and characterization of Nanomaterials	3
			Total Credits	18

Semester	Course Name (Vacancies Available)	Course code	Subjects	Credit
I	Instrumentation Engineering (30)	IE4801	Instrumentation and Measurement Techniques	3
II		IE4802	Principles of Sensors	3
III		IE4803	Biomedical Instrumentation	3
IV		IE4804	Industrial Instrumentation	3
V		IE4805	Environmental Instrumentation	3
VI		IE4806	Instrumental Analysis	3
			Total Credits	18

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Semester	Course Name (Vacancies Available)	Course code	Subjects	Credit
I	Signal Processing (30)	SP4901	Signals & Systems	3
II		SP4902	Digital Signal Processing-I	3
III		SP4903	Digital Signal Processing-II	3
IV		SP4904	Digital Speech and Audio Signal Processing	3
V		SP4905	Digital Image Processing	3
VI		SP4906	Project (Signal Processing)	3
				18

Semester	Course Name (Vacancies Available)	Course code	Subjects	Credit
I	Robotics (30)	RT41001	Elements of Robotics Systems	3
II		RT41002	Hydraulic and Pneumatic Controls	3
III		RT41003	Automatic Control System	3
IV		RT41004	Microprocessor and Microcontroller	3
V		RT41005	Artificial Intelligence	3
VI		RT41006	Project (Robotics)	3
			Total Credits	18

Rashmi

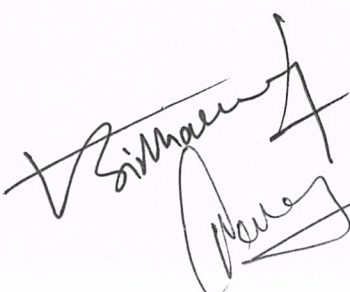
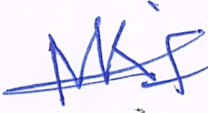
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Semester	Course Name (Vacancies Available)	Course code	Subject	Credit
I	Data Analytics (30)	DA41101	Optimization Techniques	3
II		DA41102	Basic Statistics	3
III		DA41103	Database Management System	3
IV		DA41104	Data Mining	3
V		DA41105	Introduction to Financial Modeling	3
VI		DA41106	Statistical Quality Control	3
			Total Credits	18

Semester	Course Name (Vacancies Available)	Course code	Subjects	Credit
I	Mechanical Engineering (30)	ME41201	Thermal Engineering	3
II		ME41202	Material Science	3
III		ME41203	Manufacturing Processes	3
IV		ME41204	Design of Machine Elements	3
V		ME41205	Manufacturing Systems Engineering	3
VI		ME41206	Automobile Engineering	3
			Total Credits	18



Semester	Course Name (Vacancies Available)	Course code	Subject	Credit
1	Construction Engineering (30)	CE4901	Building Materials	3
2		CE4902	Building Drawings	3
3		CE4903	Surveying	3
4		CE4904	Building Design Principles	3
5		CE4905	Construction Techniques and Planning	3
6		CE4906	Construction Project Management	3
			Total Credits	18







Bachelor of Technology (Civil Engineering)

Programme Code: BTCE

Duration – 4 Years Full Time



**Programme Structure
and
Curriculum & Scheme of Examination**

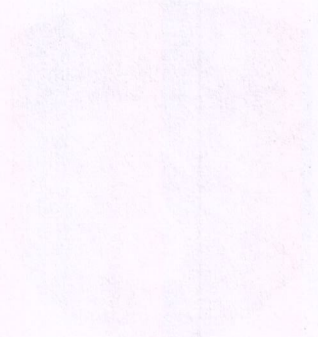
2017-18

**AMITY UNIVERSITY
MADHYA PRADESH**

Department of Education

Division of Higher Education

Division of Higher Education



Department of Education

in

Department of Education

Department of Education

AMITY UNIVERSITY

WARRINGTON

PREAMBLE

Amity University aims to achieve academic excellence by providing multi-faceted education to students and encourage them to reach the pinnacle of success. The University has designed a system that would provide rigorous academic programme with necessary skills to enable them to excel in their careers.

This booklet contains the Programme Structure, the Detailed Curriculum and the Scheme of Examination. The Programme Structure includes the courses (Core and Elective), arranged semester wise. The importance of each course is defined in terms of credits attached to it. The credit units attached to each course has been further defined in terms of contact hours i.e. Lecture Hours (L), Tutorial Hours (T), Practical Hours (P). Towards earning credits in terms of contact hours, 1 Lecture and 1 Tutorial per week are rated as 1 credit each and 2 Practical hours per week are rated as 1 credit. Thus, for example, an L-T-P structure of 3-0-0 will have 3 credits, 3-1-0 will have 4 credits, and 3-1-2 will have 5 credits.

The Curriculum and Scheme of Examination of each course includes the course objectives, course contents, scheme of examination and the list of text and references. The scheme of examination defines the various components of evaluation and the weightage attached to each component. The different codes used for the components of evaluation and the weightage attached to them are:

Components	Codes	Weightage (%)
Case Discussion/ Presentation/ Analysis	C	05 - 10
Home Assignment	H	05 - 10
Project	P	05 - 10
Seminar	S	05 - 10
Viva	V	05 - 10
Quiz	Q	05 - 10
Class Test	CT	10 - 15
Attendance	A	05
End Semester Examination	EE	70

It is hoped that it will help the students study in a planned and a structured manner and promote effective learning. Wishing you an intellectually stimulating stay at Amity University.

22-february 2017

The first part of the report deals with the general situation of the country. It is a very interesting and informative study of the country's development and its potential for the future.

The second part of the report deals with the specific details of the country's development. It is a very detailed and thorough study of the country's development and its potential for the future.

The third part of the report deals with the specific details of the country's development. It is a very detailed and thorough study of the country's development and its potential for the future.

Year	Population	GDP	Exports	Imports
1980	10.0	100.0	10.0	10.0
1981	10.5	105.0	10.5	10.5
1982	11.0	110.0	11.0	11.0
1983	11.5	115.0	11.5	11.5
1984	12.0	120.0	12.0	12.0
1985	12.5	125.0	12.5	12.5
1986	13.0	130.0	13.0	13.0
1987	13.5	135.0	13.5	13.5
1988	14.0	140.0	14.0	14.0
1989	14.5	145.0	14.5	14.5
1990	15.0	150.0	15.0	15.0

The fourth part of the report deals with the specific details of the country's development. It is a very detailed and thorough study of the country's development and its potential for the future.

The fifth part of the report deals with the specific details of the country's development. It is a very detailed and thorough study of the country's development and its potential for the future.

PROGRAMME STRUCTURE- B.Tech(Civil)

FIRST SEMESTER

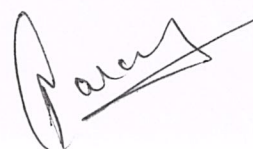
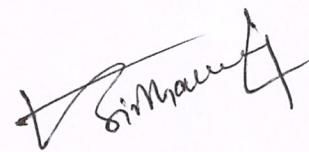
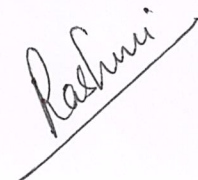
Course Code	Course Title	Lecture (L) Hours Per Week	Tutorial (T) Hours Per Week	Practical (P) Hours Per Week	Total Credits
BTCE 101	Applied Mathematics - I	3	-	-	3
BTCE 102	Applied Physics - I – Fields & Waves	2	1	-	3
BTCE 103	Elements of Mechanical Engineering	2	-	-	2
BTCE 104	Introduction to Computers & Programming in C	2	1	-	3
BTCE 105	Electrical Science	2	1	-	3
BTCE 106	Environmental Studies-I	2	-	-	2
BTCE 120	Applied Physics Lab - I	-	-	2	1
BTCE 121	Elements of Mechanical Engineering Lab	-	-	2	1
BTCE 122	Programming in C Lab	-	-	2	1
BTCE 123	Electrical Science Lab	-	-	2	1
BTCE 124	Engineering Graphics Lab	-	-	2	1
BTCE 141	English Language Usage Essentials	1	-	-	1
BTCE 143	Behavioural Sciences – I (Understanding Self for Effectiveness)	1	-	-	1
BTCE 144 BTCE 145	Foreign Language - I French German	2	-	-	2
	TOTAL				25

SECOND SEMESTER

BTCE 201	Applied Mathematics - II	3	1	-	3
BTCE 202	Applied Physics - II – Modern Physics	2	1	-	3
BTCE 203	Applied Chemistry	2	1	-	3
BTCE 204	Object Oriented Programming in C++	2	1	-	3
BTCE 205	Engineering Mechanics	2	1	-	3
BTCE 206	Environmental Studies II	2	-	-	2
BTCE 220	Applied Physics Lab - II	-	-	2	1
BTCE 221	Applied Chemistry Lab	-	-	2	1
BTCE 222	Object Oriented Programming in C++ Lab	-	-	2	1
BTCE 223	Engineering Mechanics Lab	-	-	2	1
BTCE 241	Introduction To Communication Skills	1	-	-	1
BTCE 243	Behavioural Science – II (Individual, Society and Nation)	1	-	-	1
BTCE 244 BTCE 245	Foreign Language - II French German	2	-	-	2
	TOTAL				25

TERM PAPER DURING SUMMER BREAK



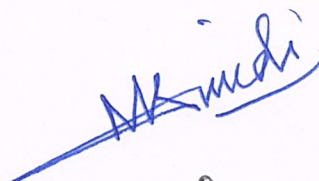
THIRD SEMESTER

BTCE 301	Applied Mathematics - III	3	1	-	4
BTCE 302	Building Design & Drawing	3	1	-	4
BTCE 303	Mechanics of Solids	2	1	-	3
BTCE 304	Mechanics of Fluids	3	1	-	4
BTCE 305	Building Technology	3	-	-	3
BTCE 306	Geo Informatics-I	3	-	-	3
BTCE 320	Mechanics of Solids & Fluids Lab	-	-	2	1
BTCE 321	Civil Engineering Drawing Lab	-	-	2	1
BTCE 322	Surveying Practical - I	-	-	2	1
BTCE 341	Effective Written Communication	1	-	-	1
BTCE 343	Behavioural Science – III (Problem Solving and Creative thinking)	1	-	-	1
BTCE 344	Foreign Language – III	2	-	-	2
BTCE 345	French				
	German				
BTCE 330	Term Paper (Evaluation)	-	-	-	2
	TOTAL				30

FOURTH SEMESTER

BTCE 401	Numerical Analysis & Programming	3	-	-	3
BTCE 402	Structural Analysis - I	3	1	-	4
BTCE 403	Concrete Technology	3	-	-	3
BTCE 404	Geo Informatics-II	3	-	-	3
BTCE 405	Construction Management & Quantity Surveying	3	-	-	3
BTCE 406	Transportation Engineering - I	3	1	-	4
BTCE 420	Numerical Analysis Lab (Programming Lab)	-	-	2	1
BTCE 421	Concrete Technology Lab	-	-	2	1
BTCE 422	Surveying Practical - II	-	-	2	1
BTCE 441	Professional Communication For Recruitment And Employability	1	-	-	1
BTCE 443	Behavioural Science – IV (Value & Ethics for personal & Professional Development)	1	-	-	1
BTCE 444	Foreign Language – IV	2	-	-	2
BTCE 445	French				
	German				
	TOTAL				27

INDUSTRIAL PRACTICAL TRAINING DURING SUMMER BREAK (6-8 WEEKS)




FIFTH SEMESTER

BTCE 501	Structural Analysis - II	3	-	-	3
BTCE 502	Principles of Structural Design	3	1	-	4
BTCE 503	Geotechnical Engineering - I	3	-	-	3
BTCE 504	Transportation Engineering - II	3	-	-	3
BTCE 505	Hydraulic Machines	3	-	-	3
BTCE 506	Hydro Systems	3	-	-	3
BTCE 520	Highway Engineering Lab	-	-	2	1
BTCE 521	Hydraulic Machines Lab	-	-	2	1
BTCE 541	Receptive And Expressive Communication Skills	1	-	-	1
BTCE 543	Behavioural Science – V (Group Dynamic and Team Building)	1	-	-	1
BTCE 544	Foreign Language – V	2	-	-	2
BTCE 545	French				
	German				
BTCE 550	Industrial Practical Training (Evaluation)	-	-	-	4
	TOTAL				29

SIXTH SEMESTER

BTCE 601	Environmental Engineering - I	3	-	-	3
BTCE 602	Structural Concrete Design	3	-	-	3
BTCE 603	Geotechnical Engineering – II	3	1	-	4
BTCE 604	Computer Application in Civil Engineering	3	-	-	3
BTCE 605	Engineering Geology	3	-	-	3
BTCE 606	Irrigation Engineering	3	-	-	3
BTCE 620	Computer Applications Lab	-	-	2	1
BTCE 621	Geotechnical Engineering Lab	-	-	2	1
BTCE 641	Social Communication	1	-	-	1
BTCE 643	Behavioural Science – VI (Stress and Coping Strategies)	1	-	-	1
BTCE 644	Foreign Language – VI	2	-	-	2
BTCE 645	French				
	German				
	TOTAL				25

SUMMER TRAINING (6- 8 WEEKS)

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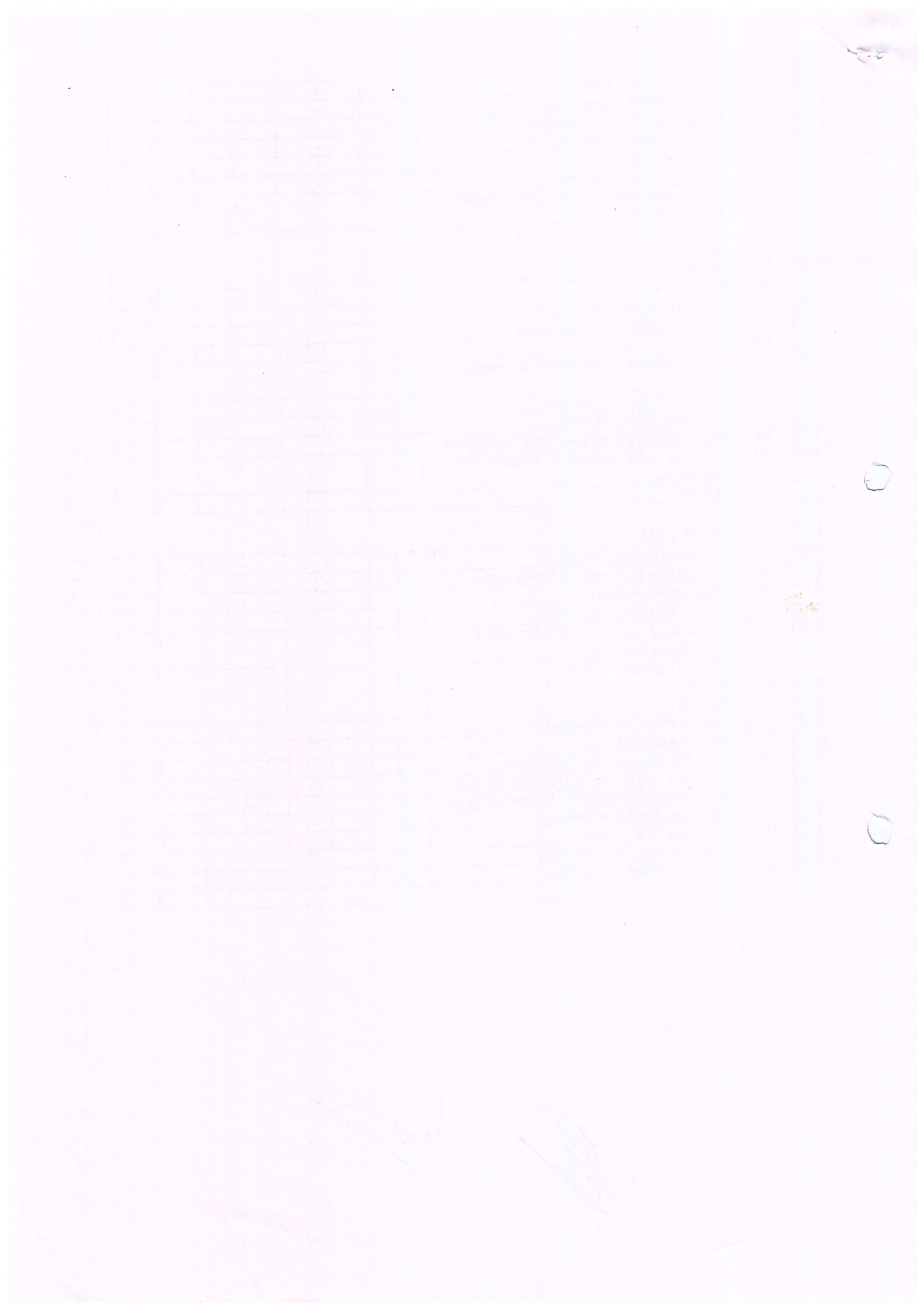
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Rashmi

SEVENTH SEMESTER

BTCE 701	Structural Steel Design	3	1	-	4
BTCE 702	Environmental Engineering – II	3	-	-	3
BTCE 703	Design of Hydraulic structures	3	-	-	3
BTCE 720	Environmental Engineering Lab	-	-	2	1
BTCE 721	Structural Detailing Lab	-	-	2	1
BTCE 741	Workplace Communication	1	-	-	1
BTCE 743	Behavioural Science – VII (Career Planning and Development)	1	-	-	1
BTCE 744	Foreign Language – VI I	2	-	-	2
BTCE 745	French				
BTCE 745	German				
BTCE 760	Project	-	-	-	06
BTCE 750	Industrial Training (Evaluation)	-	-	-	6
ELECTIVE-I (Any one from the Elective list)					
BTCE 704	Prestressed Concrete	3	1	-	4
BTCE 705	Remote Sensing & Geographic Information Systems	4	-	-	4
BTCE 706	Advanced Structural Analysis	3	1	-	4
BTCE 707	Hydrology & Flood Control	3	1	-	4
BTCE 708	Environmental Pollution Control Engineering	4	-	-	4
BTCE 709	Computer Aided Analysis & Design in Civil Engineering	3	-	2	4
	TOTAL				32

EIGHTH SEMESTER

BTCE 801	Advanced Concrete Design	3	1	-	4
BTCE 802	Engineering Economics & Management	3	-	-	3
BTCE 860	Project (Dissertation)	-	-	-	9
BTCE 841	Cross Cultural Communication	1	-	-	1
BTCE 843	Behavioural Science – VIII (Personal & Professional Excellence)	1	-	-	1
BTCE 844	Foreign Language – VIII	2	-	-	2
BTCE 845	French				
BTCE 845	German				
ELECTIVE-I (Any one from the Elective list)					
BTCE 803	Finite Element Method	3	1	-	4
BTCE 804	Traffic Engineering & Management	3	1	-	4
BTCE 805	Computer Application in Hydro Engineering	3	-	2	4
BTCE 806	Water Resources Systems Planning & Design	3	1	-	4
BTCE 807	Functional Design of Buildings	3	1	-	4
BTCE 808	Advanced Steel Design	3	1	-	4
BTCE 809	Architecture & Town Planning	3	-	2	4
BTCE 810	Industrial Waste Engineering	4	-	-	4
	TOTAL				24



**Minor Tracks for
Civil Engineering
(Choice based Credit system)
Programme Code :CE-4901-CE-4906**

Duration – 6 semester



**Programme Structure
and
Curriculum & Scheme of Examination**

2017-18

**AMITY UNIVERSITY
MADHYA PRADESH**

CONSTRUCTION ENGINEERING
(for CBCS)

CE4901: BUILDING MATERIALS

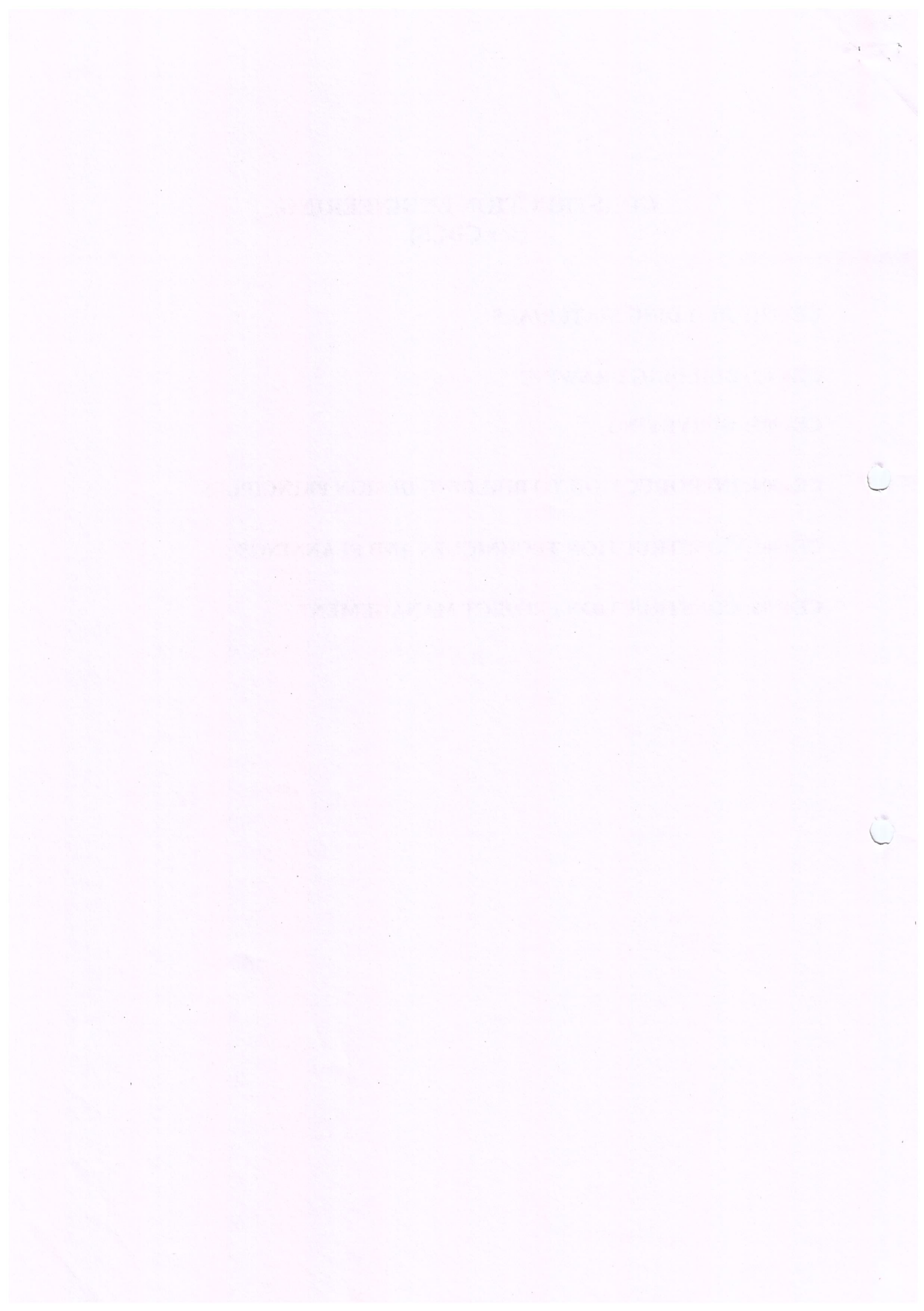
CE4902: BUILDING DRAWING

CE4903: SURVEYING

CE4904: INTRODUCTION TO BUILDING DESIGN PRINCIPLES

CE4905: CONSTRUCTION TECHNIQUES AND PLANNINGS

CE4906: CONSTRUCTION PROJECT MANAGEMENT



BUILDING MATERIALS

Course Code: CE 4901

Credit Units: 03

Course Objective:

The course covers building material and testing, cement and its application, cement concrete and other building materials.

Course Contents:

Module I: Stones:- Building stones - Classification of rocks - Quarrying - Dressing - Properties and uses and tests of common type of stones

Module II: Bricks:- Bricks - Manufacture - IS classifications – Properties, uses and testing - Types of bricks

Module III: Timber:- Timber – Types - Defects - Seasoning - Decay - Preservation - Plywood, fibre board, particle board - Tests of Timber.

Module IV: Cement, Lime & Mortar:- Cement - Ingredients - Manufacture - Types of cement - Properties and testing - Uses; Mortar - Sand - Properties - Types of mortar and uses. Lime - Classification - Manufacture, properties and uses

Module V: Cement Concrete:- Concrete - Properties of fresh concrete and tests - Proportioning of concrete mixes - Properties of hardened concrete and tests – Recent developments in concrete.

Module VI: Other Building Materials:- Properties and uses of materials like Glass, Plastic, AC Sheets, Fibre Sheets Aluminum, Steel & Bitumen.

Examination Scheme:

Components	A	CT	S/V/Q	HA	EE
Weightage (%)	5	10	5	5	70

CT: Class Test, HA: Home Assignment, S/V/Q: Seminar/Viva/Quiz, EE: End Semester Examination; Att: Attendance

Text & References:

- Punamia V.B.C. Reinforced concrete design, Laxmi Publication New Delhi
- Reddy C.S., Basic Structural Analysis, Tata McGraw Hill
- Negi L.S. & Jangid R.S, Structural Analysis, Tata McGraw Hill

Handwritten signatures:

AK mehta

Simranj

Rashmi

Amr

Pavani

BUILDING DRAWING

Course Code: CE 4902

Credit Units: 03

Course Objective:

The student is given an introduction to basics of building designing and its applications

Course Contents:

Module I: General:- Different scales and symbols used in civil engineering drawing, Plan , Elevation & Sections.

Module II: Components of Building:- Drawing of different components of building and their specifications – Foundation, Column, Beam, Slab, Floors, Doors, Windows & Trusses.

Module III:

Structures:- Introduction to different types of civil engineering structures and their specifications

Module IV: Building Design:- General principles of building design, building byelaws.

Module V: Drawings:- Drawing of Residential Buildings.

Examination Scheme:

Components	A	CT	S/V/Q	HA	EE
Weightage (%)	5	10	5	5	70

CT: Class Test, HA: Home Assignment, S/V/Q: Seminar/Viva/Quiz, EE: End Semester Examination; Att: Attendance

Text & References:

- National Building Code of India
- Local Building Bye-laws
- Callender, John Hancock, Time Saver Standards for Architectural design Data, Tata McGraw Hill.
- Chiara, Callender, John Hancock, Time Saver Standards for Building Type, McGraw Hill
- Chiara, Joseph De, Time Saver Standards for Site Planning, McGraw Hill
- Ching, Francis D K, Architectural Graphics. John Wiley

AK Mishra

Amr

Simran
Rashmi

SURVEYING(new)

Course Code: CE -4903

Credit Units: 03

Course Objective:

Surveying is the basic element of mapping areas for civil engineering construction. Methods of surveying including leveling, and leveling methods, contours, estimation of volumes etc are covered.

Course Contents:

Module I: Survey Classification and Chain Survey:-

Introduction - classification of surveys plane surveying geodetic surveying topographic surveying - reconnaissance - principle of working from whole to part - provision of control .conventional signs. Minor - instruments - principles of chain survey - field book - plotting , chaining and ranging - obstacles - chaining on sloping ground - errors in chain survey

Module II Compass and Plane Table Surveying:- Compass survey - prismatic compass - surveyor's compass - whole circle and reduced bearing- true and magnetic bearing - dip and declination – included angle ,local attraction. Plane table survey accessories used , method of radiation and intersection.

Module III: Leveling: - definition of level surfaces - mean sea level - reduced level - bench marks - levelling instruments - temporary adjustments - fly leveling - booking - reduction of levels –HI method, and Rise and fall method,

Module IV:- Contour Survey, Area and Volume calculations - definition - characteristics of contour - uses of contour - methods of contouring - Areas and Volumes computations - trapezoidal rule - Simpson's rule - - volumes - trapezoidal and prismoidal formula. uses of planimeter

Module V:-Study Of Theodolite and Modern Survey Equipment:- Theodolite surveying - study of theodolite - temporary and permanent adjustments -measurement of horizontal angles - method of repetition and reiteration - measurement of vertical angles –tacheometric surveying - instrument constants , E.D.M – total station.

Examination Scheme:

Components	A	CT	S/V/Q	HA	EE
Weightage (%)	5	10	5	5	70

CT: Class Test, HA: Home Assignment, S/V/Q: Seminar/Viva/Quiz, EE: End Semester Examination; Att: Attendance

Text & References:

- Punmia, B.C., Ashok Kr. Jain, Arun Kr. Jain, Surveying Vol I & II, Laxmi Publications, New Delhi (2008)
- S.K Duggal, Surveying Vol I and II, 2nd ed., Tata - McGraw Hill, New Delhi (2004).
- Arora K.R., Surveying Vol I & II, Standard Book House, New Delhi (2008)

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INTRODUCTION TO BUILDING DESIGN PRINCIPLES

Course Code: CE 4904

Credit Units: 03

Course Objective:

The student is given an introduction to basics of building designing and its applications

Course Contents:

Module I: System of forces equilibrium of forces and moment

System of forces, Equilibrium of forces calculation and moments

Module II: Parallel forces inclined forces resultant, component of forces

Types of force, calculation of forces, components of forces

Module III: Centre of gravity, Moment of inertia

Calculation of center of gravity, moment of inertia its uses, forces on building components

Module IV: Support Reactions, Shear force and bending moment

Calculation of Support reactions and bending moments and shear force diagram

Module V: Indeterminate structures, Rigid Supports fix end moments

Types of indeterminate structures, determinate structure rigid supports fix ends moments

Examination Scheme:

Components	A	CT	S/V/Q	HA	EE
Weightage (%)	5	10	5	5	70

CT: Class Test, HA: Home Assignment, S/V/Q: Seminar/Viva/Quiz, EE: End Semester Examination; Att: Attendance

Text & References:

- Punamia \B.C. Reinforced concrete design, Laxmi Publication New Delhi
- Reddy C.S., Basic Structural Analysis, Tata McGraw Hill
- Negi L.S. & Jangid R.S, Structural Analysis, Tata McGraw Hill

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CONSTRUCTION TECHNIQUES AND PLANNINGS

Course Code: CE 4905

Credit Units: 03

Course Objective:

The course covers building materials and its equipments and uses, selection of construction equipments and its uses.

Course Contents:

Module I: Construction equipments and its uses

Different types of construction equipments and its uses

Module II: Construction equipments and its working procedure

Criteria for the selection of different construction equipments, working procedures and its maintenance

Module III: Construction planning, scheduling, bar charts

Steps in construction planning, scheduling procedure, Preparation of job layout – labour schedule – material schedule – equipment schedule

Module IV: PERT and CPM

Network techniques – introduction – Bar charts – use of CPM and PERT for planning – time estimates – critical path – updating – crashing – resource smoothing – resource leveling – computer applications

Module V: Indeterminate structures, Rigid Supports fix end moments

Types of indeterminate structures, determinate structure rigid supports fix ends moments

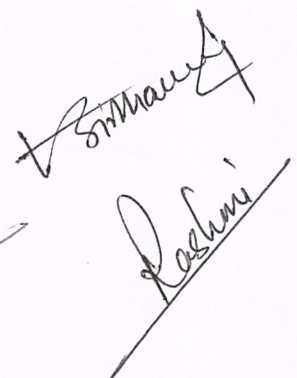
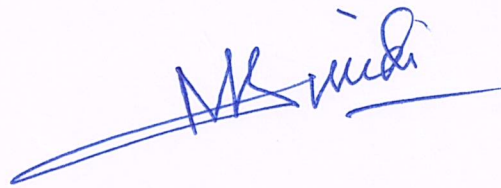
Examination Scheme:

Components	A	CT	S/V/Q	HA	EE
Weightage (%)	5	10	5	5	70

CT: Class Test, HA: Home Assignment, S/V/Q: Seminar/Viva/Quiz, EE: End Semester Examination; Att: Attendance

Text & References:

- Andrew Baldwin, David Bordoli, hand book for construction planning and scheduling
- Dutta B.N., Estimation & Costing in Civil Engg, UBSPD, 1992.
- Peurifoy R.L., & Ledbetter W.B., Construction Planning Equipment & Methods
- I.S 1200 (1968), Methods of Measurement of Building & Civil Engg. Works



CONSTRUCTION PROJECT MANAGEMENT

Course Code: CE 4906

Credit Units: 03

Course Objective:

The main objective of this course is to train the student in construction management field

Course Contents:

Module I: Estimate

Types of estimate ,detailed estimate study, how to prepare estimates of brickwork, Rcc work, Steel work

Module II: Method of valuation

Project Implementation – Tender – earnest money deposit – security deposit – contract – contract documents – measurements – completion certificate – inspection and quality control – standardization – organisations at national and international level (BIS & ISO) – role of certification

Module III: Analysis of Rates

Preparation of specification for common materials of construction and items of work as per IS - analysis of rates and preparation of abstract of estimate

Module IV: Construction Project Management

Preparation of specification for common materials of construction and items of work as per IS - analysis of rates and preparation of abstract of estimate

Introduction to valuation of real properties: Depreciation – Sinking fund – methods of valuation

Examination Scheme:

Components	A	CT	S/V/Q	HA	EE
Weightage (%)	5	10	8	7	70

CT: Class Test, HA: Home Assignment, S/V/Q: Seminar/Viva/Quiz, EE: End Semester Examination; Att: Attendance

Text & References:

- Vazirani V.N. & Chandola S.P., Heavy Construction, 1978.
- Rangwala, Valuation of Real Properties, Charotar, 1978.
- Peurifoy R.L., & Ledbetter W.B., Construction Planning Equipment & Methods,
- Dutta B.N., Estimation & Costing in Civil Engg, UBSPD, 1992.
- Chakrabarthy, Estimation, Costing, Specification in Civil Engg,
- Shah N.A., Quantity Surveying & Specification in Civil Engg.,
- Mahajan S.P., Civil Estimating & Costing, Sathyaprakasham, 1988.

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STATE OF NEW YORK

IN SENATE

1901

REPORT OF THE

COMMISSIONERS OF THE LAND OFFICE

IN RESPONSE TO A RESOLUTION PASSED BY THE SENATE

AT ITS SESSION ON JANUARY 10, 1899

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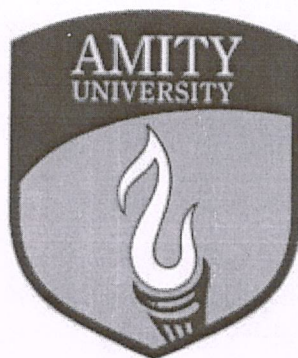
ALBANY: PUBLISHED BY THE STATE OF NEW YORK, 1901.

ALBANY: PUBLISHED BY THE STATE OF NEW YORK, 1901.

ALBANY: PUBLISHED BY THE STATE OF NEW YORK, 1901.

**Master of Technology
CIVIL ENGINEERING
(with specialization in structural Engineering)
Programme Code: MTCE**

Duration – 2 years full Time



**Programme Structure
And
Curriculum & Scheme of Examination
2017-2018**

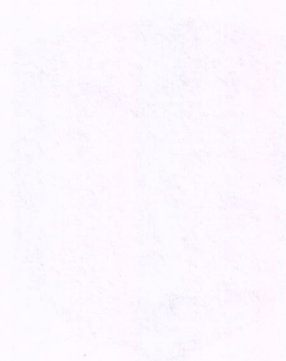
**AMITY UNIVERSITY
MADHYA PRADESH**

1

THE UNIVERSITY OF CHICAGO

DEPARTMENT OF THE HISTORY OF ARTS

1972-1973



OFFICE OF THE DEAN

1972-1973

CHICAGO, ILLINOIS

PREAMBLE

Amity University aims to achieve academic excellence by providing multi-faceted education to students and encourage them to reach the pinnacle of success. The University has designed a system that would provide rigorous academic programme with necessary skills to enable them to excel in their careers.

This booklet contains the Programme Structure, the Detailed Curriculum and the Scheme of Examination. The Programme Structure includes the courses (Core and Elective), arranged semester wise. The importance of each course is defined in terms of credits attached to it. The credit units attached to each course has been further defined in terms of contact hours i.e. Lecture Hours (L), Tutorial Hours (T), Practical Hours (P). Towards earning credits in terms of contact hours, 1 Lecture and 1 Tutorial per week are rated as 1 credit each and 2 Practical hours per week are rated as 1 credit. Thus, for example, an L-T-P structure of 3-0-0 will have 3 credits, 3-1-0 will have 4 credits, and 3-1-2 will have 5 credits.

The Curriculum and Scheme of Examination of each course includes the course objectives, course contents, scheme of examination and the list of text and references. The scheme of examination defines the various components of evaluation and the weightage attached to each component. The different codes used for the components of evaluation and the weightage attached to them are:

<u>Components</u>	<u>Codes</u>	<u>Weightage (%)</u>
Case Discussion/ Presentation/ Analysis	C	05 - 10
Home Assignment	H	05 - 10
Project	P	05 - 10
Seminar	S	05 - 10
Viva	V	05 - 10
Quiz	Q	05 - 10
Class Test	CT	10 - 15
Attendance	A	05
End Semester Examination	EE	70

It is hoped that it will help the students study in a planned and a structured manner and promote effective learning. Wishing you an intellectually stimulating stay at Amity University.

22-February -2017

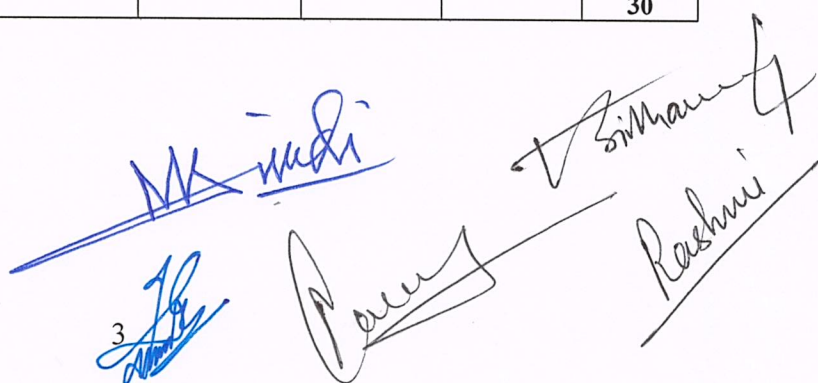
PROGRAMME STRUCTURE
M.TECH. in CIVIL ENGINEERING (Structure)

FIRST SEMESTER

Course Code	Course Title	Lecture (L) Hours Per Week	Tutorial (T) Hours Per Week	Practical (P) Hours Per Week	Total Credits
MTCE 101	Numerical Analysis and Computer Programming	3	1	-	4
MTCE 102	Concrete Technology	3	1	-	4
MTCE 103	Advanced Structural analysis	3	1	-	4
MTCE 104	Elective-I (Select any one) Structural Dynamics and Earthquake Resistant Building	3	1	-	4
MTCE 105	Bridge Engineering				
MTCE 106	Advanced elasticity and plasticity				
MTCE 120	Numerical Analysis Lab	-	-	4	2
MTCE 121	Concrete Lab	-	-	4	2
MTCE 122	Auto Cad Lab	-	-	4	2
MTCE 141	Cs I-Advanced Communication	1	-	-	1
MTCE 143	Behavioral Science – I (Self Development for Interpersonal Skills)	1	-	-	1
MTCE 144	Foreign Language – I French	2	-	-	2
MTCE 145	German				
MTCE 130	Term Paper (Review Paper)	-	-	-	4
	TOTAL				30

SECOND SEMESTER

MTCE 201	Optimization Techniques	3	1	-	4
MTCE 202	Advanced Foundation Engineering	3	1	-	4
MTCE 203	Finite Element Method	3	1	-	4
MTCE 204	Elective - II (Select any one) Advanced Steel Structure	3	1	-	4
MTCE 205	Design of Pre-Stressed Structures				
MTCE 206	Experimental Stress Analysis				
MTCE 220	Structural Engineering lab	-	-	4	2
MTCE 221	Foundation /Soil Testing Lab.	-	-	4	2
MTCE 222	Finite Element Method Lab.	-	-	4	2
MTCE 241	Cs II- Communication For Employment	1	-	-	1
MTCE 243	Behavioral Science – II (Conflict Resolution and Management)	1	-	-	1
MTCE 244	Foreign Language – II French	2	-	-	2
MTCE 245	German				
MTCE 260	Seminar	-	-	-	4
	TOTAL				30



THIRD SEMESTER

MTCE 301	Research Methodology	3	1	-	4
MTCE 302	Advanced RCC design	3	1	-	4
MTCE 303	High rise Buildings analysis	3	1	-	4
MTCE 304	Elective – III (Select any one)	3	1	-	4
MTCE 305	Analysis of Plate and shells				
MTCE 306	Reliability Based Civil Engineering Design				
	Evaluation and Retrofitting of Building				
MTCE 320	Building Design Project Lab using Primavera	-	-	4	2
MTCE 321	Advanced RCC Lab	-	-	4	2
MTCE 322	Structural Material Testing Lab-II	-	-	4	2
MTCE 341	Cs III- Professional Communication Skills	1	-	-	1
MTCE 343	Behavioral Science – III (Professional Competencies & Career Development)	1	-	-	1
MTCE 344	Foreign Language – III	2	-	-	2
MTCE 345	French				
	German				
MTCE 360	Project	-	-	-	6
MTCE 361	Summer Project (Evaluation)	-	-	-	4
	TOTAL				36

FOURTH SEMESTER

MTCE 450	Progress Report Comprehensive Viva Dissertation and Thesis	-	-	-	30
	TOTAL				30

AK mudi

SG mudi

Panay

Rashmi

+ Smaraj



AMITY UNIVERSITY

MADHYA PRADESH

(Established by Ritnand Balved Education Foundation)

Date: 23/02/2017

BOARD OF STUDIES (Electronics & Communication Engineering)

MINUTES OF THE MEETING

(04 Pages Only)

1. A meeting of board of studies of Department of Electronics & Communication, Amity School of Engineering & Technology, Amity University Madhya Pradesh was held on 23rd February 2017 at AUMP, under the Chairmanship of Prof. (Dr.) Anil Vashisht, Director (ASET). The following members attended the meeting:-
 - (a) **Chairman:** Prof. (Dr.) Anil Vashisht, Director (ASET)
 - (b) **Member**
 - i) Dr. Aditya Trivedi, Professor, ABV-IIITM, Gwalior, External Member
 - ii) Dr. Sarita Bhadoria, Professor, MITS, Gwalior, External Member
 - iii) Dr. Raghavendra Sharma, Professor & Head ECE, Member
 - iv) Dr. Manish Gupta, Associate Professor, ECE, Member
 - v) Mr. Narendra Kumar Garg, Assistant Professor, ECE, Member
2. The agenda of the meeting included the following:
 - (a) Review of existing syllabus and modification if any.
 - (b) Discussion on trends and technologies in ECE and consideration of its inclusion in syllabus.
 - (c) Any other point with due permission of the Chairperson.

3. Discussions/Comments:

a. (i) Discussion: on International Conference..

- (ii) Comments:
- (i) Conference must be organized at ASET level or jointly organized by more than one Dept. with different tracks.
 - (ii) Plan for next year i.e. 2018 with association of renowned societies like IEEE/springer/ACM etc..

b. (i) Discussion: on Placement

- (ii) Comments:
- (i) There were problem in the placement of ECE branch because in India the major companies are service oriented.
 - (ii) Industry oriented courses may be include in the curriculum.
 - (iii) Invite the Industry persons for Expert talk.
 - (iv) Target for at least 20% good placement for maintaining the brand value.
 - (v) Motivate students for GATE Exam.

c. (i) Discussion: on Research/Project/Patent

- (ii) Comments:
- (i) To generate the innovative idea for Project/Patent, there must be industry partner.
 - (ii) For that you need to interact the companies in NCR region.
 - (iii) Approach funding agencies like DST, MPDTE etc.

4. Recommendations:

B. Tech Program:

- i. The credits of the Subject Java Programming BTE-305 are revised from 4 to 3 credits but the syllabus will remain same. Being an interdisciplinary subject it can be covered in stipulated time.(Annexure:1)
- ii. The subject code BTE 405 operating systems and BTE 423 operating system lab is removed from the syllabus because these are interdisciplinary courses and not so important from placement point of view for ECE students. (Annexure:2)
- iii. The subject code BTE- 424, Electronics Workshop Lab is renamed as new subject BTE 423 Electronics Workshop Lab without any change in syllabus due to deletion of the subject code BTE 423 operating system lab. (Annexure:3)
Old Subject: BTE 424 Electronics Workshop Lab
New Subject: BTE 423 Electronics Workshop Lab
- iv. The syllabus of the subject code BTE 602, Digital Signal Processing is revised; Module 1 of old syllabus is already covered in the subject Signals & Systems, BTE 404 and Module 3 is not elaborated. The new syllabus is proposed with better elaboration of the topics. (Annexure:4)
- v. The subject code BTE 623 MATLAB Lab is shifted to V Semester with code BTE 524 and reduced credits from 2 to 1 and no change in syllabus. This course is prerequisite to the subject BTE 621 Digital Signal Processing Lab which is also taught in VI semester. (Annexure:5)
Old Subject: BTE 623 MATLAB Lab
New Subject: BTE 524 MATLAB Lab

M. Tech Program:

There is no change in the scheme and syllabus of the course.

- vi. All the aforesaid points have been approved by all the board members present in the meeting.

CBCS: There is no change in the scheme and syllabus of the course.

5: Summary of changes is given below:-

Current Syllabus B.Tech (ECE)					Proposed Changes/Modificati ons (addition/deletion in the Syllabus)	New Course Code B.Tech (ECE)	No. of Credits
Sr. No.	Course Title	Module of the syllabus	Old Course Code	No. of Credits			
1	Java Programming	All	BTE-305	4	No Change in syllabus	BTE-305	3
2	Operating Systems	All	BTE-405	3	Remove the subject		0
3	Operating Systems Lab	All	BTE-423	1	Remove the subject		0
4	Electronics Workshop Lab	All	BTE-424	2	Rename the subject	BTE-423	2
5	MATLAB Lab	All	BTE-623	2	Shift to V Sem	BTE-524	1
Total Credits =12					Total Credits=06		

The total number of credits after revision for B. Tech works out to 06 credits as against 12 credits, and the credits for M.Tech remains same.

Signature of Members:

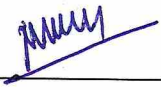

Dr. Anil Vashisht

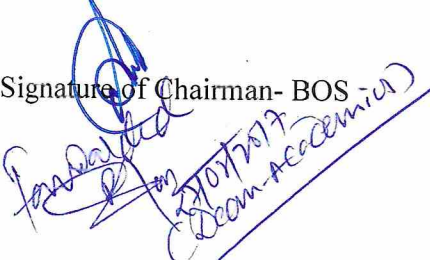

Dr. Aditya Trivedi

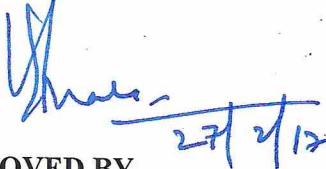
ABSENT
Dr. Sarita Bhadoria


Dr. Raghavendra Sharma


Dr. Manish Gupta


Mr. Narendra Kr. Garg

Signature of Chairman- BOS

27/07/17
Dean-Academic


27/7/17
APPROVED BY
Hon'ble Vice Chancellor
AUMP, Gwalior

Mr. Narender
27/07/17
Prof. (Dr.) M. Kaur
Prin-VC, AUMP



AMITY UNIVERSITY

MADHYA PRADESH

(Established by Ritnand Balved Education Foundation)

MEETING OF BOARD OF STUDIES (BOS)

(Electronics & Communication Engineering)

Amity School of Engineering & Technology

23rd February, 2017

Remarks & Suggestions by BOS Members

Data structure and algorithm may be included in curriculum in future.

Industrial people may be called for giving talks to the benefits of students and faculties.

Signature of Members:

Dr. Anil Vashisht

Dr. Aditya Trivedi

ABSENT

Dr. Sarita Bhadoria

Dr. Raghavendra Sharma

Dr. Manish Gupta

Mr. Narendra Kr. Garg



AMITY UNIVERSITY

MADHYA PRADESH

(Established by Ritnand Balved Education Foundation)

Date: 22/02/2017

BOARD OF STUDIES (MECHANICAL & AUTOMATION ENGINEERING)

MINUTES OF THE MEETING

(04 Pages Only)

1. A meeting of board of studies of Department of Mechanical & Automation Engineering, Amity School of Engineering & Technology, Amity University Madhya Pradesh was held on 22nd February 2017 at AUMP, under the Chairmanship of Prof. (Dr.) Anil Vashisht, Director (ASET). The following members attended the meeting:-

(a) **Chairman:** Prof. (Dr.) Anil Vashisht, Director (ASET)

(b) **Member**

- i) Dr. M. K. Gaur, Associate Professor (ME), MITS Gwalior.
- ii) Mr. Nasir Khan, Assistant Professor, MAE, ASET.
- iii) Mr. Nagendra Kumar Sharma, Assistant Professor, MAE, ASET.
- iv) Mr. Arvind Singh Tomar, Assistant Professor, MAE, ASET.
- v) Mr. Ashish Dixit, Assistant Professor, MAE, ASET.

2. The agenda of the meeting included the following:

- (a) Review of existing syllabus and modification if any.
- (b) Discussion on trends and technologies in MAE and consideration of its inclusion in syllabus.
- (c) Any other point with due permission of the Chairperson.

[Signature]
22/2/17

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22/02/17

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22/02/2017

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22/2/17

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22/02/17

3. Discussions/Comments:

a. (i) Discussion: on National Conference/Seminar

(ii) Comments: Member suggested few names of speakers who belongs to gwalior & Presently working in NIT & IITs.

b. (i) Discussion: on Hands on Workshop

(ii) Comments: Hands on workshop may be Planned by MAE. It gives Practical Exposure to the students.

c. (i) Discussion: on Journal

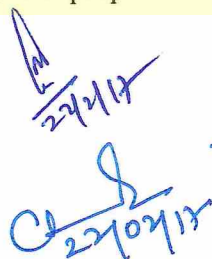
(ii) Comments: MAE may plan for Journal online Journal may be Published & get indexed.

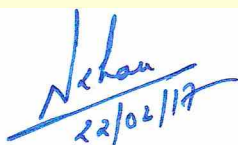
4. Recommendations:

B. Tech Program:

- i. The syllabus of the subject code BTM-305, Mechanics of Fluids is revised; Module VII of (BTM-305) is already covered in Module II. The credits of the Subject Mechanics of Fluids BTM-305 are revised from 4 to 3 credits. The new syllabus is proposed with better elaboration of the topics. (Annexure-1)




22/02/17


22/02/17


22/02/2017


22/2/17

- ii. BTM-321 & BTM-623 be merged into one subject (Machine drawing with CAD Lab) with credits to be unchanged for 1 credit. (Annexure-II)
- iii. The syllabus of the subject code BTM-401, Kinematics and Dynamics of Machines is revised; Module II of (BTM-401) is already covered in BTM-205, BTM-501 & BTM-602. The credits of the Subject Kinematics and Dynamics of Machines BTM-401 are revised from 4 to 3 credits. The new syllabus is proposed with better elaboration of the topics. (Annexure-III)
- iv. BTM-520 & BTM-620 be merged into one subject (Machine Design Lab-II) with credits to be unchanged for 1 credit. (Annexure-IV)
- v. All the aforesaid points have been approved by all the board members present in the meeting.

M. Tech Program:

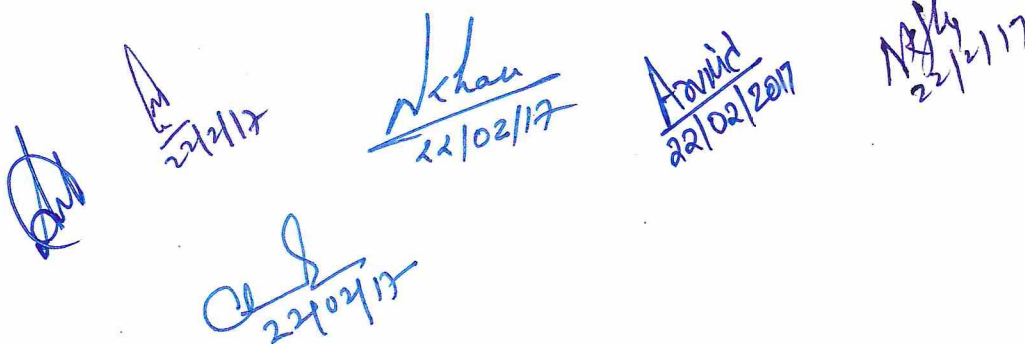
There is no change in the scheme and syllabus of the course.

CBCS:

There is no change in the scheme and syllabus of the course.

Ph. D:

There is no change in the scheme and syllabus of the course.



5. Summary of changes is given below:-

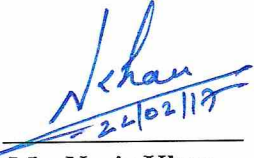
Current Syllabus B.Tech (ECE)					Proposed Changes/Modificati ons (addition/deletion in the Syllabus)	New Course Code B.Tech (ECE)	No. of Credits
Sr. No.	Course Title	Module of the syllabus	Old Course Code	No. of Credits			
1	Mechanics of Fluids	All	BTM-305	4	Annexure-I	BTM-305	3
2	Machine drawing & CADD Lab	All	BTM-321 & BTM- 623	2	Annexure-II	BTM-321	1
3	Kinematics and Dynamics of Machines	All	BTM-401	4	Annexure-III	BTM-401	3
4	Machine Design Lab-I & Machine Design Lab-II	All	BTM-520 & BTM- 620	2	Annexure-IV	BTM-620	1
Total Credits =12					Total Credits=08		

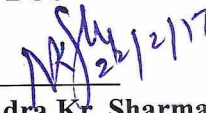
The total number of credits after revision for B. Tech works out to 08 credits as against 12 credits, and the credits for M.Tech, CBCS and Ph. D. remains same.

Signature of Members:


Dr. Anil Vashisht
Chairman- BOS


Dr. M. K. Gaur
External Member-BoS


Mr. Nasir Khan
Member- BoS


Mr. Nagendra Kr. Sharma
Member-BoS


Mr. Arvind Singh Tomar
Member- BoS


Mr. Ashish Dixit
Member-BoS


APPROVED BY
Hon'ble Vice Chancellor
AUMP, Gwalior



AMITY UNIVERSITY

MADHYA PRADESH

(Established by Ritnad Balved Education Foundation)

MEETING OF BOARD OF STUDIES (BOS)
(Mechanical & Automation Engineering)

Amity School of Engineering & Technology

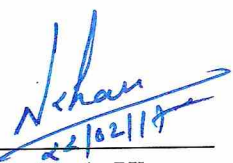
Remarks & Suggestions by BOS Members

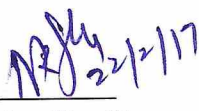
1. Dr. Gaur suggested few names of Speakers who belongs to question & Presently working in NIT/IIIT's.
2. Dr. Gaur suggested to organize Hands on Workshop it may be on automobile.
3. MAE should Plan for publishing online Journal & get it indexed by some Repute agencies.

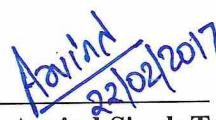
Signature of Members:

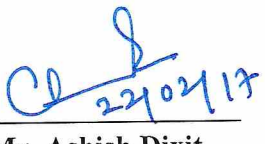

Dr. Anil Vashisht
Chairman- BOS


Dr. M. K. Gaur
External Member-BoS


Mr. Nasir Khan
Member- BoS


Mr. Nagendra Kr. Sharma
Member-BoS


Mr. Arvind Singh Tomar
Member- BoS


Mr. Ashish Dixit
Member-BoS



AMITY UNIVERSITY

MADHYA PRADESH

(Established by Ritnand Balved Education Foundation)

MEETING OF BOARD OF STUDIES (BOS)

(Mechanical & Automation Engineering)

Amity School of Engineering & Technology

Remarks & Suggestions by BOS Members

- Mechanical & Automation Engineering is following the standardized procedure as being followed at National level.
- Teaching by the faculty members are enthusiastic.

Signature of Members:

Dr. Anil Vashisht
Chairman- BOS

Dr. M. K. Gaur
External Member-BoS

Mr. Nasir Khan
Member- BoS

Mr. Nagendra Kr. Sharma
Member-BoS

Mr. Arvind Singh Tomar
Member- BoS

Mr. Ashish Dixit
Member-BoS

MECHANICS OF FLUIDS

Course Code: BTM 305

Credit Units: 03

Course Objective:

The objective of Fluid Mechanics subject is that students should understand the, properties of fluids, pressure measurement devices, hydraulic forces on surfaces, buoyancy and flotation in fluids, kinematics and static behaviour of fluids, dimension and model analysis, laminar and turbulent flow, flow through pipes and orifices, boundary layer theory.

Course Contents:

Module I: Fluid Properties and Fluid Statics

Newtonian and Non-Newtonian Fluids; Viscosity; Incompressible and compressible fluids, compressibility. Forces on plane surfaces, forces on curved surfaces, buoyant forces, and stability of floating bodies, metacentre and metacentre height.

Module II: Kinematics of Fluid Motion

Steady and unsteady flow; uniform and non-uniform flow; Laminar and turbulent flow; streamline, path line and streak line; continuity equation, irrotational and rotational flow, velocity potential and stream function, vortex flow, free and forced vortex.

Module III: Dynamics of Fluid Flow

Euler's equation of motion and its integration to yield Bernoulli's equation, its practical applications – Pilot tube, Venturi meter; steady flow momentum equation, force exerted on a pipe bend.

Module IV: Dimensional Analysis and Principles of Similarity

Buckingham π -Theorem and its applications, Geometric, Kinematics and Dynamic similarity; Dimensionless numbers-Reynolds, Froude, Euler, Mach, Weber Number and their significance.

Module V: Laminar and Turbulent Flow

Reynold's experiment, critical velocity, steady laminar flow through a circular tube, flow between parallel plates. Transition from laminar to turbulent flow, courses of turbulence, velocity distribution law near a solid boundary, velocity distribution in rough pipes, Hazen – Williams's formula.

Module VI: Analysis of Pipe Flow

Energy losses, minor losses in pipe lines, concept of equivalent length, flow between two reservoirs, and multiple pipe systems – in series and parallel, siphon.

Text & References:

Text:

- R.K. Bansal, "Fluid Mechanics & Hydraulic Machines", Laxmi Publications (P) Ltd., 2002.
- Gupta, S. C., Fluid Mechanics and Hydraulic Machines, Pearson Education, 2007
- D.S. Kumar, "Fluid Mechanics and Fluid Power Engineering", S.K. Kataria & Sons, 2000.

References:

- F. M. White, Introduction to Fluid Mechanics, McGraw Hill
- I.H. Shames, "Mechanics of Fluids", Tata McGraw Hill
- Douglas, J. F., Gasiorek, J.M. and Swaffield, J., Fluid Mechanics, Pearson Education, 4/e, 2006
- V.L. Streeter and E.B. Wylie, "Fluid Mechanics", Tata McGraw Hill
- Massey B S, Mechanics of Fluids, Van Nostrand Reinhold Co

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MACHINE DRAWING WITH CAD LAB

Course Code: BTM 321

Credit Units: 01

Course Contents:

Free-Hand Sketching & Shaft Scale Drawing

Components like cotter joint, knuckle joint; rivets and riveted joints; couplings; flywheels, pulleys, bush bearings, Engine parts. Isometric views from Orthographic Projections of Machine Components.

Introduction to CAD

Basics of Auto CAD, Modeling of machine Components such as Connecting Rod, Piston etc., 2D modeling for different Geometries such as Hexagon, Pentagon etc, 3D modeling for Nuts and Bolts, Modeling of Gear. Modeling of Compound Geometries such as Hollow Cylinder containing Sphere, Triangle etc.

Examination Scheme:

IA				EE	
A	PR	LR	V	PR	V
5	10	10	5	35	35

Note: IA –Internal Assessment, EE- External Exam, PR- Performance, LR – Lab Record, V – Viva.

Text & References:

- Pohit, G and Gosh, G., Machine Drawing with Auto CAD, Pearson Education, 2007
- PS Gill, Machine Drawing, S. Chand.
- ND Bhatt, Machine Drawing, Charotar publications
- N Sidheshwar, Machine Drawing , Tata McGraw Hill
- CL Tanta, Mechanical Drawing , “Dhanpat Rai”

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KINEMATICS AND DYNAMICS OF MACHINES

Course Code: BTM 401

Credit Units: 03

Course Objective:

The objective of this course is to identify the alternatives to satisfy the needs of the customer and to quantify and evaluate the alternatives. It includes an introduction to the study of motion of constrained mechanism in machine systems. The objective is to develop the students understanding of basic machine design. Concepts, such as linkages, cams, sliders, crank and rocker, offset crank slider etc. The combination of several of these elements in machine drive trains and the resulting static and dynamic forces will also be studied. This course also includes study of forces, motion and inertia in machines, analysis of linkages, cams, rotor dynamics, reciprocal and rotational balancing.

Course Contents:

Module I: General Concepts, Velocity and Acceleration Analysis

Introduction to simple mechanisms, different types of kinematics pairs, Grubler's rule for degrees of freedom, Grashof's criterion for mobility determination, Inversions of 3R-P, 2R-2P chains, Kinematics analysis of planar mechanism. Instantaneous center method for analysis three center in line theorem, concept of rotating reference frame and its application for Corioli's acceleration

Module II: Cams

Classification, Cams with uniform acceleration and retardation, SHM, Cycloidal motion, oscillating followers.

Module III: Gears

Geometry of tooth profiles, Law of gearing, involutes profile, interference, helical, spiral and worm gears, simple, compound gear trains. Epicyclic gear trains – Analysis by tabular and relative velocity method, fixing torque.

Module IV: Vibrations

Vibration analysis of SDOF systems, natural, damped, forced vibrations, base-excited vibrations, transmissibility ratio.

Module V: Dynamic Analysis

Slider-crank mechanism, turning moment computation

Balancing: Static and dynamic balancing, balancing of revolving and reciprocating masses, single and multi-cylinder engines.

Module VI: Gyroscopes

Gyroscopic law, effect of gyroscopic couple on automobiles, ships, aircrafts.

Examination Scheme:

Components	A	CT	S/V/Q	HA	EE
Weightage (%)	5	10	8	7	70

CT: Class Test, HA: Home Assignment, S/V/Q: Seminar/Viva/Quiz, EE: End Semester Examination; Att: Attendance

Text & References:

- PL Ballaney, Theory of Machines,
- Hams Crone and Roggers, Theory of Machines
- Shigley, Theory of Machines
- J. Lal, Theory of Machines
- SS Rattan, Theory of Machines
- Ghosh and Mallick, Mechanisms and Machines, EWP publication.
- R.S. Khurmi, Theory of Machine, S. Chand.

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MACHINE DESIGN LAB - II

Course Code: BTM 620

Credit Units: 01

Course Contents:

Design and drawing using software Ansys/Solid work/Pro-E based upon the course Machine Design I & II such as automotive transmission, brakes, clutches connecting rod, I.C. engine piston, connecting rod, hydraulic rivet, mechanical hoist, Pipe joint, Spur Gear Train etc.

Examination Scheme:

IA				EE	
A	PR	LR	V	PR	V
5	10	10	5	35	35

Note: IA –Internal Assessment, EE- External Exam, PR- Performance, LR – Lab Record, V – Viva.

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FIRST SEMESTER					
Course Code	Course Title	Lecture (L) Hours Per week	Tutorial (T) Hours Per week	Practical (P) Hours Per week	Total Credits
BTM 101	Applied Mathematics – I	3	-	-	3
BTM 102	Applied Physics - I – Fields & Waves	2	1	-	3
BTM 103	Element of Mechanical Engineering	2	-	-	2
BTM 104	Introduction to Computers & Programming in C	2	1	-	3
BTM 105	Applied Chemistry	2	1	-	3
BTM 106	Environmental Studies – I	2	-	-	2
BTM 120	Applied Physics Lab – I	-	-	2	1
BTM 121	Element of Mechanical Engineering Lab	-	-	2	1
BTM 122	Programming in C Lab	-	-	2	1
BTM 123	Applied Chemistry Lab	-	-	2	1
BTM 124	Engineering Graphics Lab	-	-	2	1
BTM 141	English Language usage essentials	1	-	-	1
BTM 143	Understanding self for effectiveness	1	-	-	1
BTC 144	Foreign Language – I French	2	-	-	2
TOTAL CREDITS					25
Including CBCS					28
Total Hrs Including CBCS					33

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SECOND SEMESTER					
Course Code	Course Title	Lecture (L) Hours Per week	Tutorial (T) Hours Per week	Practical (P) Hours Per week	Total Credits
BTM 201	Applied Mathematics – II	3	-	-	3
BTM 202	Applied Physics - II – Modern Physics	2	1	-	3
BTM 203	Electrical Science	2	1	-	3
BTM 204	Object oriented programming using C++	2	1	-	3
BTM 205	Engineering Mechanics	2	1	-	3
BTM 206	Environmental Studies-II	2	-	-	2
BTM 220	Applied Physics Lab – II	-	-	2	1
BTM 221	Electrical Science Lab	-	-	2	1
BTM 222	Object oriented programming using C++ Lab	-	-	2	1
BTM 223	Engineering Mechanics Lab	-	-	2	1
BTM 240	English	1	-	-	1
BTM 243	Behavioural science - II	1	-	-	1
	Foreign Language - II	2	-	-	2
BTM 244	French				
TOTAL CREDITS					25
Including CBCS					28
Total Hrs Including CBCS					32
TERM PAPER DURING SUMMER BREAK					

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THIRD SEMESTER					
Course Code	Course Title	Lecture (L) Hours Per week	Tutorial (T) Hours Per week	Practical (P) Hours Per week	Total Credits
BTM 301	Numerical Analysis & Programming	2	-	-	2
BTM 302	Thermodynamics	2	1	-	3
BTM 303	Mechanics of Solids	2	1	-	3
BTM 304	Material Science & Metallurgy	2	-	-	3
BTM 305	Mechanics of Fluids	3	-	-	3
BTM 306	Electronics	2	-	-	2
BTM 320	Mechanics of Solids & Fluids Lab	-	-	2	1
BTM 321	Machine Drawing with CAD Lab	-	-	2	1
BTM 322	Programming Lab - I (Numerical Analysis)	-	-	2	1
BTM 323	Electronics Lab	-	-	2	1
BTM 324	Thermodynamics Lab	-	-	2	1
BTM 341	Communication Skills – I	1	-	-	1
BTM 343	Behavioural Science - III	1	-	-	1
	Foreign Language – III	2	-	-	2
BTM 344	French				
BTM 330	Term Paper (Evaluation)	-	-	-	2
TOTAL CREDITS					27
Including CBCS					30
Total Hrs Including CBCS					33

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FOURTH SEMESTER

Course Code	Course Title	Lecture (L) Hours Per week	Tutorial (T) Hours Per week	Practical (P) Hours Per week	Total Credits
BTM 401	Kinematics & Dynamics of Machines	3	-	-	3
BTM 402	Heat & Mass Transfer	2	1	-	3
BTM 403	Manufacturing Machines	3	-	-	3
BTM 404	Theory of Metal Forming	3	-	-	3
BTM 405	Electrical Machines	3	-	-	3
BTM 406	Principles of Computer Graphics	2	-	-	2
BTM 420	Kinematics & Dynamics of Machines Lab	-	-	2	1
BTM 421	Manufacturing Machines Lab	-	-	2	1
BTM 422	Electrical Machines Lab	-	-	2	1
BTM 423	Principles of Computer Graphics Lab	-	-	2	1
BTM 424	Heat & Mass Transfer Lab	-	-	2	1
BTC 441	Communication Skills - II	1	-	-	1
BTC 443	Behavioural Science - IV	1	-	-	1
	Foreign Language – IV	2	-	-	2
BTC 444	French				
TOTAL CREDITS					26
Including CBCS					29
Total Hrs Including CBCS					34
PRACTICAL TRAINING – I: 6 – 8 WEEKS					

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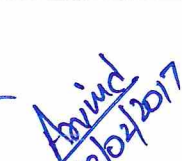
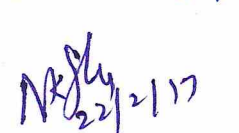
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FIFTH SEMESTER

Course Code	Course Title	Lecture (L) Hours Per week	Tutorial (T) Hours Per week	Practical (P) Hours Per week	Total Credits
BTM 501	Machine Design – I	3	-	-	3
BTM 502	Metrology	3	-	-	3
BTM 503	Measurements & Controls	2	1	-	3
BTM 504	Relational Database Management System	3	-	-	3
BTM 505	Microprocessor System	3	1	-	4
BTM 521	Metrology Lab	-	-	2	1
BTM 522	Measurements & Controls Lab	-	-	2	1
BTM 523	Microprocessor System Lab	-	-	2	1
BTM 524	Programming Lab - II (MAT Lab)	-	-	2	1
BTM 525	Relational Database Management System Lab	-	-	2	1
BTM 541	Communication Skills - III	1	-	-	1
BTM 543	Behavioural Science - V	1	-	-	1
	Foreign Language – V	2	-	-	2
BTM 544	French				
BTM 550	Industrial Practical Training - I (Evaluation)	-	-	-	3
TOTAL CREDITS					28
Including CBCS					31
Total Hrs Including CBCS					33

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SIXTH SEMESTER

Course Code	Course Title	Lecture (L) Hours Per week	Tutorial (T) Hours Per week	Practical (P) Hours Per week	Total Credits
BTM 601	Management of Manufacturing Systems	3	-	-	3
BTM 602	Machine Design – II	3	-	-	3
BTM 603	Fluid Power Systems	2	1	-	3
BTM 604	Metal Cutting & Tool Design	3	-	-	3
BTM 605	IC Engine & Gas Turbine	3	-	-	3
BTM 606	Computer Networks	2	1	-	3
BTM 620	Machine Design Lab - II	-	-	2	1
BTM 621	Fluid Power Systems Lab	-	-	2	1
BTM 622	IC Engine & Gas Turbine Lab	-	-	2	1
BTM 641	Communication Skills - IV	1	-	-	1
BTM 643	Behavioural Science - VI	1	-	-	1
	Foreign Language – VI	2	-	-	2
BTM 644	French				
TOTAL CREDITS					25
Including CBCS					28
Total Hrs Including CBCS					31

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SEVENTH SEMESTER					
Course Code	Course Title	Lecture (L) Hours Per week	Tutorial (T) Hours Per week	Practical (P) Hours Per week	Total Credits
BTM 701	Operations Research	3	-	-	3
BTM 702	Computer Aided Manufacturing	3	-	-	3
BTM 703	Mechatronics	3	-	-	3
BTM 720	Operations Research (Programming) Lab	-	-	2	1
BTM 721	Computer Aided Manufacturing Lab	-	-	2	1
BTM 722	Mechatronics Lab	-	-	2	1
BTM 741	Communication Skills - V	1	-	-	1
BTM 743	Behavioural Science -VII	1	-	-	1
	Foreign Language – VII	2	-	-	2
BTM 744	French				
BTC 750	Practical Training – II(Evaluation)	-	-	-	6
BTC 760	Project (Dissertation)	-	-	-	6
ELECTIVES (Any one from each category)					
A (With Practical)					
BTM 704	Automotive Engineering	3	-	-	3
BTM 705	Computer Aided Designing	3	-	-	3
BTM 723	Automotive Engineering Lab	-	-	2	1
BTM 724	Computer Aided Designing Lab	-	-	2	1
ELECTIVES (Any one from each category)					
B (Without Practical)					
BTM 706	Marketing Management	3	-	-	3
BTM 707	Solar Energy	3	-	-	3
BTM 708	Power Plant Practices	3	-	-	3
BTM 709	Combustion Engine Emissions	3	-	-	3
TOTAL CREDITS					35
Total Hrs					33


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EIGHTH SEMESTER

Course Code	Course Title	Lecture (L) Hours Per week	Tutorial (T) Hours Per week	Practical (P) Hours Per week	Total Credits
BTM 801	Quality Control & Quality Assurance	3	-	-	3
BTM 802	Refrigeration & Air-conditioning	3	-	-	3
BTM 820	Refrigeration & Air-conditioning Lab	-	-	2	1
BTM 841	Communication Skills - VI	1	-	-	1
BTM 843	Behavioural Science - VIII	1	-	-	1
	Foreign Language – VIII	2	-	-	2
BTM 844	French				
BTC 860	Project	-	-	-	9
ELECTIVES (Any one from following with Practical)					
BTM 803	Advanced Methods of Manufacturing	3	-	-	3
BTM 804	Gear Technology	3	-	-	3
BTM 805	Artificial Intelligence & Robotics	3	-	-	3
BTM 821	Advanced Methods of Manufacturing Lab	-	-	2	1
BTM 822	Gear Technology Lab	-	-	2	1
BTM 823	Artificial Intelligence & Robotics Lab	-	-	2	1
TOTAL CREDITS					24
Total Hrs.					26

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MACHINE DESIGN LAB - I

Course Code: BTM 520

Credit Units: 01

Course Contents:

Design of:

- (i) Cotter Joint
- (ii) Knuckle Joint
- (iii) Pipe Joint
- (iv) Screw Jack
- (v) Rigid and Flexible coupling
- (vi) Spur Gear Train

Examination Scheme:

IA				EE	
A	PR	LR	V	PR	V
5	10	10	5	35	35

Note: IA –Internal Assessment, EE- External Exam, PR- Performance, LR – Lab Record, V – Viva.

MACHINE DESIGN - I

Course Code: BTM 501

Credit Units: 03

Course Objective:

The objective of this course is to help students apply concepts learned in the mechanics, structure, material and manufacturing courses. This course offers working knowledge in the use of proper failure theories under steady and variable loading, design of mechanical elements, such as shaft, coupling, power screws, and detachable, permanent and welded connections.

Course Contents:

Module I: Variable stresses in Machine Parts

Fatigue and Endurance Limit, Factor of Safety for Fatigue Loading, Stress concentration, Notch sensitivity, Gerber Method, Goodman Method and Soderberg Method for combination of stresses.

Module II: Power Screws

Types of screw threads, Torque required to raise and lower the load, Efficiency of square threaded screw, overhauling and self locking screw, stresses in power screw, design of screw jack.

Module III: Cotter and Knuckle Joints

Types of cotter joints, design of socket and spigot joint, design of sleeve and cotter joint, design of jib and cotter joint, Design procedure of Knuckle joint.

Module IV: Riveted and Welded Joint

Types of Riveted joint, Lap joint, Butt Joint, Caulking and Fullering, Failure of Riveted joint, Strength of Riveted joint, Efficiency of Riveted joint. Advantages and Disadvantages of welded joint over Riveted joint, Strength of Fillet joint, strength of Butt joints.

Module V: Keys and Couplings

Types of Keys, Splines, Strength of Sunk Key, types of shaft coupling, Sleeve and muff coupling, Flange coupling, Flexible coupling, Oldham coupling, Universal coupling.

Module VI: Drives

Types of Belt drives, Flat Belt drives, Velocity ratio, Slip, Creep of Belt, Length of open Belt, length of cross belt, power transmission by belt, Maximum tension in the belt. Types of V belt and Pulleys, advantages and disadvantages of V belt over Flat Belt, Ratio of Driving tensions for V belt, Rope drives. Chain drives, advantages and disadvantages of Chain drives.

Examination Scheme:

Components	A	CT	S/V/Q	HA	EE
Weightage (%)	5	10	8	7	70

CT: Class Test, HA: Home Assignment, S/V/Q: Seminar/Viva/Quiz, EE: End Semester Examination; Att: Attendance

Text & References:

- J.E. Shigley, Mechanical Engineering Design.
- Sadhu Singh, Machine Design
- R.S. Khurmi & J.K. Gupta, Machine design
- D.K. Aggarwal & P.C. Sharma, Machine Design

Old Syllabus of AUMP MACHINE DESIGN LAB - II

Course Code: BTM 620

Credit Units: 01

Course Contents:

Design and drawing based upon the course Machine Design II such as automotive transmission, brakes, clutches connecting rod, I.C. engine piston, connecting rod, hydraulic rivet, mechanical hoist etc.

Examination Scheme:

IA				EE	
A	PR	LR	V	PR	V
5	10	10	5	35	35

Note: IA –Internal Assessment, EE- External Exam, PR- Performance, LR – Lab Record, V – Viva.

Proposed new Syllabus MACHINE DESIGN LAB - II

Course Code: BTM 620

Credit Units: 01

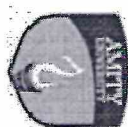
Course Contents:

Design and drawing using software Ansys and Pro-E based upon the course Machine Design I & II such as automotive transmission, brakes, clutches connecting rod, I.C. engine piston, connecting rod, hydraulic rivet, mechanical hoist, Pipe joint, Spur Gear Train etc.

Examination Scheme:

IA				EE	
A	PR	LR	V	PR	V
5	10	10	5	35	35

Note: IA –Internal Assessment, EE- External Exam, PR- Performance, LR – Lab Record, V – Viva.



AMITY UNIVERSITY
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Course Title: MACHINE DESIGN – I

Credit Units: 03

Course Level: UG

Course Code: MAE301

L	T	P/S	TOTAL CREDIT UNITS
3	0	0	3

Course Objectives: The objective of this course is to help students apply concepts learned in the mechanics, structure, material and manufacturing courses. This course offers working knowledge in the use of proper failure theories under steady and variable loading, design of mechanical elements, such as shaft, coupling, power screws, and detachable, permanent and welded connections.

Pre-requisites: Stress and strain, different types of engineering materials and their properties, friction, joints power drive

Course Contents/Syllabus:

	Weightage (%)
Module I: Variable stresses in Machine Parts	18%
Descriptors/Topics	
1. Fatigue and Endurance Limit 2. Factor of Safety for Fatigue Loading. 3. Stress concentration, Notch sensitivity. 4. Gerber Method, Goodman Method and Soderberg Method for combination of stresses.	
Module II: Power Screws	17%
Descriptors/Topics	
1. Types of screw threads, Torque required to raise and lower the load. 2. Efficiency of square threaded screw, overhauling and self locking screw. 3. Stresses in power screw. 4. Design of screw jack.	
Module III: Cotter and Knuckle Joints	15%

Old Syllabus of AUMP

KINEMATICS AND DYNAMICS OF MACHINES

Course Code: BTM 401

Credit Units: 04

Course Objective:

The objective of this course is to identify the alternatives to satisfy the needs of the customer and to quantify and evaluate the alternatives. It includes an introduction to the study of motion of constrained mechanism in machine systems. The objective is to develop the students understanding of basic machine design. Concepts, such as linkages, cams, sliders, crank and rocker, offset crank slider etc. The combination of several of these elements in machine drive trains and the resulting static and dynamic forces will also be studied. This course also includes study of forces, motion and inertia in machines, analysis of linkages, cams, rotor dynamics, reciprocal and rotational balancing.

Course Contents:

Module I: General Concepts, Velocity and Acceleration Analysis

Introduction to simple mechanisms, different types of kinematics pairs, Grubler's rule for degrees of freedom, Grashof's criterion for mobility determination, Inversions of 3R-P, 2R-2P chains, Kinematics analysis of planar mechanism. Instantaneous center method for analysis three center in line theorem, concept of rotating reference frame and its application for Coriolis acceleration

Module II: Friction

Thread friction, pivot and collar friction, clutches, belt and rope drives, friction axis, friction circle;

Module III: Cams

Classification, Cams with uniform acceleration and retardation, SHM, Cycloidal motion, oscillating followers.

Module IV: Gears

Geometry of tooth profiles, Law of gearing, involutes profile, interference, helical, spiral and worm gears, simple, compound gear trains. Epicyclic gear trains – Analysis by tabular and relative velocity method, fixing torque.

Module V: Vibrations

Vibration analysis of SDOF systems, natural, damped, forced vibrations, base-excited vibrations, transmissibility ratio.

Module VI: Dynamic Analysis

Slider-crank mechanism, turning moment computation

Balancing: Static and dynamic balancing, balancing of revolving and reciprocating masses, single and multi-cylinder engines.

Module VII: Gyroscopes

Gyroscopic law, effect of gyroscopic couple on automobiles, ships, aircrafts.

Examination Scheme:

Components	A	CT	S/V/Q	HA	EE
Weightage (%)	5	10	8	7	70

CT: Class Test, HA: Home Assignment, S/V/Q: Seminar/Viva/Quiz, EE: End Semester Examination; Att: Attendance

Text & References:

- PL Ballaney, Theory of Machines,
- Hams Crone and Roggers, Theory of Machines
- Shigley, Theory of Machines
- J. Lal, Theory of Machines
- SS Rattan, Theory of Machines
- Ghosh and Mallick, Mechanisms and Machines, EWP publication.
- R.S. Khurmi, Theory of Machine, S. Chand.

Proposed New Syllabus of AUMP

KINEMATICS AND DYNAMICS OF MACHINES

Course Code: BTM 401

Credit Units: 03

Course Objective:

The objective of this course is to identify the alternatives to satisfy the needs of the customer and to quantify and evaluate the alternatives. It includes an introduction to the study of motion of constrained mechanism in machine systems. The objective is to develop the students understanding of basic machine design. Concepts, such as linkages, cams, sliders, crank and rocker, offset crank slider etc. The combination of several of these elements in machine drive trains and the resulting static and dynamic forces will also be studied. This course also includes study of forces, motion and inertia in machines, analysis of linkages, cams, rotor dynamics, reciprocal and rotational balancing.

Course Contents:

Module I: General Concepts, Velocity and Acceleration Analysis

Introduction to simple mechanisms, different types of kinematics pairs, Grubler's rule for degrees of freedom, Grashof's criterion for mobility determination, Inversions of 3R-P, 2R-2P chains, Kinematics analysis of planar mechanism. Instantaneous center method for analysis three center in line theorem, concept of rotating reference frame and its application for Coriolis acceleration

Module II: Cams

Classification, Cams with uniform acceleration and retardation, SHM, Cycloidal motion, oscillating followers.

Module III: Gears

Geometry of tooth profiles, Law of gearing, involutes profile, interference, helical, spiral and worm gears, simple, compound gear trains. Epicyclic gear trains – Analysis by tabular and relative velocity method, fixing torque.

Module IV: Vibrations

Vibration analysis of SDOF systems, natural, damped, forced vibrations, base-excited vibrations, transmissibility ratio.

Module V: Dynamic Analysis

Slider-crank mechanism, turning moment computation

Balancing: Static and dynamic balancing, balancing of revolving and reciprocating masses, single and multi-cylinder engines.

Module VI: Gyroscopes

Gyroscopic law, effect of gyroscopic couple on automobiles, ships, aircrafts.

Subject: Kinematics and Dynamics of Machine-BTM-401

University	Subject Code	Scheme		
		L	T	P
AU MP	Kinematics and Dynamics of Machine BTM401	3	1	2
AU UP	Kinematics and Dynamics of Machine MAE 205	2	1	2

Please refer the syllabus of BTM-401, BTM-205, BTM-501 and BTM-602 of AUMP.

1. In BTM 401 of AUMP, the topics of Module-II mentioned below, have already been covered in the paper code BTM-205, BTM-501 and BTM-602 of AUMP.

i) Friction and application of friction (Threaded, Belt, Rope, Friction axis and friction circle.

ii) Friction/contacting surface (Pivot and Collar, Clutches)

2. In AU UP syllabus of subject MAE205; Friction and vibration topics are not there.

3. In view of the above it is suggested to exclude Module-II of BTM-401 and allocate the credit 3.

ENGINEERING MECHANICS

Course Code:

BTM 205

Credit Units: 03

Course Objective:

Objective of this course is to provide fundamental knowledge of force system and its effect on the behaviour of the bodies that may be in dynamic or in static state. It includes the equilibrium of different structures like beams, frames, truss etc and the force transfer mechanism in the different components of a body under given loading condition.

Course Contents:

Module I: Force system & Structure

Free body diagram, Equilibrium equations and applications. Plane truss, perfect and imperfect truss, assumption in the truss analysis, analysis of perfect plane trusses by the method of joints, method of section.

Module II: Friction

Static and Kinetic friction, laws of dry friction, co-efficient of friction, angle of friction, angle of repose, cone of friction, friction lock, efficiency of screw jack, transmission of power through belt

Module III: Distributed Force

Determination of center of gravity, center of mass and centroid by direct integration and by the method of composite bodies, mass moment of inertia and area moment of inertia by direct integration and composite bodies method, radius of gyration, parallel axis theorem, Pappus theorems and its application, polar moment of inertia.

Module IV: Work -Energy

Work energy equation, conservation of energy, Virtual work, impulse, momentum conservation, impact of bodies, co-efficient of restitution, loss of energy during impact, D'Alembert principle

Examination Scheme:

Components	A	CT	S/V/Q	HA	EE
Weightage (%)	5	10	8	7	70

CT: Class Test, HA: Home Assignment, S/V/Q: Seminar/Viva/Quiz, EE: End Semester Examination; Att: Attendance

Text & References:

- S.S. Bhavikatti, Engineering Mechanics, New Age International Ltd
- Timoshenko, Engineering Mechanics, McGraw Hill
- R. S. Khurmi, Engineering Mechanics, S. Chand Publication
- H. Shames & G. K. M. Rao, Engineering Mechanics, Pearson Education, 2006

MACHINE DESIGN - I

Course Code: **BTM 501**

Credit Units: 03

Course Objective:

The objective of this course is to help students apply concepts learned in the mechanics, structure, material and manufacturing courses. This course offers working knowledge in the use of proper failure theories under steady and variable loading, design of mechanical elements, such as shaft, coupling, power screws, and detachable, permanent and welded connections.

Course Contents:

Module I: Variable stresses in Machine Parts

Fatigue and Endurance Limit, Factor of Safety for Fatigue Loading, Stress concentration, Notch sensitivity, Gerber Method, Goodman Method and Soderberg Method for combination of stresses.

Module II: Power Screws

Types of screw threads, Torque required to raise and lower the load, Efficiency of square threaded screw, overhauling and self locking screw, stresses in power screw, design of screw jack.

Module III: Cotter and Knuckle Joints

Types of cotter joints, design of socket and spigot joint, design of sleeve and cotter joint, design of jib and cotter joint, Design procedure of Knuckle joint.

Module IV: Riveted and Welded Joint

Types of Riveted joint, Lap joint, Butt Joint, Caulking and Fullering, Failure of Riveted joint, Strength of Riveted joint, Efficiency of Riveted joint. Advantages and Disadvantages of welded joint over Riveted joint, Strength of Fillet joint, strength of Butt joints.

Module V: Keys and Couplings

Types of Keys, Splines, Strength of Sunk Key, types of shaft coupling, Sleeve and muff coupling, Flange coupling, Flexible coupling, Oldham coupling, Universal coupling.

Module VI: Drives

Types of Belt drives, Flat Belt drives, Velocity ratio, Slip, Creep of Belt, Length of open Belt, length of cross belt, power transmission by belt, Maximum tension in the belt. Types of V belt and Pulleys, advantages and disadvantages of V belt over Flat Belt, Ratio of Driving tensions for V belt, Rope drives. Chain drives, advantages and disadvantages of Chain drives.

Examination Scheme:

Components	A	CT	S/V/Q	HA	EE
Weightage (%)	5	10	8	7	70

CT: Class Test, HA: Home Assignment, S/V/Q: Seminar/Viva/Quiz, EE: End Semester Examination; Att: Attendance

Text & References:

- J.E. Shigley, Mechanical Engineering Design.
- Sadhu Singh, Machine Design
- R.S. Khurmi & J.K. Gupta, Machine design
- D.K. Aggarwal & P.C. Sharma, Machine Design

MACHINE DESIGN - II

Course Code:

BTM 602

Credit Units: 03

Course Objective:

The course aims at developing concepts as to how to analyze mechanical systems and select proper machine elements (bearing, gears, belts, chains). It prepares the students how to design machine element by specifying their type, geometry, material and how to integrate these elements to build a mechanical systems.

Course Contents:

Module I: Mechanical Drives

Selection of transmission, helical, bevel and worm gears, belt and chain drives.

Module II: Friction Clutches & Brakes

Common friction materials, shoe, band, cone and disc brake their characteristics and design, friction clutches.

Module III: Bearings and Lubrication

Types of sliding bearing, materials, type of lubrication, design of sliding bearing, selection and application of rolling bearing, seals.

Module IV

Design of spring, helical spring, Leaf spring

Module V: Engine parts

Piston, connecting rod and crankshaft.

Examination Scheme:

Components	A	CT	S/V/Q	HA	EE
Weightage (%)	5	10	8	7	70

CT: Class Test, HA: Home Assignment, S/V/Q: Seminar/Viva/Quiz, EE: End Semester Examination; Att: Attendance

Text & References:

Text:

- Maleeve Hartman and O.P. Grover, "Machine Design", CBS Publication & Publishers.
- V.B Bhandari, "Machine Design", Tata McGraw Hill.
- P.C. Sharma and D.K Aggarwal., "Machine Design", S.K. Kataria & Sons.

References:

- Mahadevan, "Design Data Book", CBS Publication & Publisher



AMITY UNIVERSITY UTTAR PRADESH

Course Title: KINEMATICS AND DYNAMICS OF MACHINES

Credit Units: 04

Course Level: UG

Course Code: MAE205

L	T	P/S	SW/F W	TOTAL CREDIT UNITS
2	1	2	-	04

Course Objectives: The objective of this course is to identify the alternatives to satisfy the needs of the customer and to quantify and evaluate the alternatives. It includes an introduction to the study of motion of constrained mechanism in machine systems. The objective is to develop the students understanding of basic machine design. Concepts, such as linkages, cams, sliders, crank and rocker, offset crank slider etc. The combination of several of these elements in machine drive trains and the resulting static and dynamic forces will also be studied. This course also includes study of forces, motion and inertia in machines, analysis of linkages, cams, rotor dynamics, reciprocal and rotational balancing.

Pre-requisites: Engineering mechanics, friction, motion

Course Contents/Syllabus:

	Weightage (%)
Module I	20%
General Concepts, Velocity and Acceleration Analysis	
1. Introduction to simple mechanisms.	
2. Different types of kinematics pairs.	
3. Grubler's rule for degrees of freedom, Grashof's criterion for mobility determination.	
4. Inversions of 3R-P, 2R-2P chains.	
5. Kinematics analysis of planar mechanism. Instantaneous center method for analysis three center in line theorem.	
6. Concept of rotating reference frame and its application for Coriolis acceleration.	
Module II	20%

CAM	
1. Classification. 2. Camns with uniform acceleration and retardation. 3. SHM, Cycloidal motion. 4. Oscillating followers.	
Module III	20%
Gears	
1. Geometry of tooth profiles, Law of gearing, involutes profile, interference. 2. Helical, spiral and worm gears, simple, compound gear trains. 3. Epicyclic gear trains – Analysis by tabular and relative velocity method, fixing torque.	
Module IV	20%
Dynamic Analysis	
1. Slider-crank mechanism, turning moment computation 2. Balancing: Static and dynamic balancing, balancing of revolving and reciprocating masses, single and multi-cylinder engines	
Module V	10%
Gyroscopes	
1. Gyroscopic law, effect of gyroscopic couple on automobiles, ships, aircrafts	
Module VI	10%
Clutches	

Student Learning Outcomes:

On completion of the course the student will be able to:

1. Demonstrate knowledge of fundamental concepts mechanics.
2. Identify various components of machines and apply basic operations and apply safety procedures.
3. Design and analyze problems relating to Machines and its components.

Pedagogy for Course Delivery:

The course pedagogy will include lectures, numerical practice, case studies, seminars and presentations. It also includes discussion on real life problems and demonstrations of Gyroscopes.

Old Syllabus of AUMP MACHINE DRAWING LAB

Course Code: BTM 321

Credit Units: 01

Course Contents:

Free-Hand Sketching & Shaft Scale Drawing

Components like cotter joint, knuckle joint; rivets and riveted joints; couplings; flywheels, pulleys, bush bearings, Engine parts. Isometric views from Orthographic Projections of Machine Components.

Examination Scheme:

IA				EE	
A	PR	LR	V	PR	V
5	10	10	5	35	35

Note: IA –Internal Assessment, EE- External Exam, PR- Performance, LR – Lab Record, V – Viva.

Text & References:

- Pohit, G and Gosh, G., Machine Drawing with Auto CAD, Pearson Education, 2007
- PS Gill, Machine Drawing, S. Chand.
- ND Bhatt, Machine Drawing, Charotar publications
- N Sidheshwar, Machine Drawing , Tata McGraw Hill
- CL Tanta, Mechanical Drawing , “Dhanpat Rai”

COMPUTER AIDED DRAFTING AND DESIGN LAB

Course Code: BTM 623

Credit Units: 01

Course Contents:

1. Basics of Auto CAD
2. Modeling of machine Components such as Connecting Rod, Piston etc.
3. 2D modeling for different Geometrics such as Hexagon, Pentagon etc.
4. 3D modeling for Nuts and Bolts.
5. Modeling of Gear.
6. Modeling of Compound Geometrics such as Hollow Cylinder containing Sphere, Triangle etc.

Examination Scheme:

IA				EE	
A	PR	LR	V	PR	V
5	10	10	5	35	35

Note: IA –Internal Assessment, EE- External Exam, PR- Performance, LR – Lab Record, V – Viva.

(Proposed Syllabus)
MACHINE DRAWING WITH CAD LAB

Course Code: BTM 321

Credit Units: 01

Course Contents:

Free-Hand Sketching & Shaft Scale Drawing

Components like cotter joint, knuckle joint; rivets and riveted joints; couplings; flywheels, pulleys, bush bearings, Engine parts. Isometric views from Orthographic Projections of Machine Components.

Introduction to CAD

Basics of Auto CAD, Modeling of machine Components such as Connecting Rod, Piston etc., 2D modeling for different Geometrics such as Hexagon, Pentagon etc, 3D modeling for Nuts and Bolts, Modeling of Gear. Modeling of Compound Geometrics such as Hollow Cylinder containing Sphere, Triangle etc.

Text & References:

- Pohit, G and Gosh, G., Machine Drawing with Auto CAD, Pearson Education, 2007
- PS Gill, Machine Drawing, S. Chand.
- ND Bhatt, Machine Drawing, Charotar publications
- N Sidheshwar, Machine Drawing, Tata McGraw Hill
- CL Tanta, Mechanical Drawing, "Dhanpat Rai"

Subject: Machine drawing lab -BTM-321

S. No.	Name of university/Institute	Subject Name	Credit
1	UP Technical university	Machine Drawing lab	1
4	AU UP	Machine drawing with cad lab	1

1. In UP Technical University, Machine Drawing lab is taught in Semester III. In which Machine drawing lab gives the basic knowledge of Machine drawing & CAD software.

2. In Anna University, Tamilnadu, Computer Aided Machine Drawing Practices is taught in semester III. In which Machine drawing along with CAD is taught.

3. In NIT, Warangal, Machine Drawing is taught in 2nd Year II Semester. In which Machine drawing along with CAD is taught.

4. In AUUP, Machine drawing with cad lab is taught in which there are 5 module which contains Machine drawing using both manual drawing & CAD software.

5. In view of the above it is suggested to it is suggested that machine Drawing lab should have combination of CAD software hence both subjects BTM-321 & BTM-623 should be merged into one subject i.e. Machine Drawing with CAD Lab (BTM-321).



Course Title: MACHINE DRAWING WITH CAD LAB

Credit Units: 01

Course Level: UG

Course Code: MAE204

L	T	P/S	SW/F W	TOTAL CREDIT UNITS
0	0	2	-	01

Course Objectives: To effectively design products and machines using sound engineering principles and practice; To produce proper documentation for design using appropriate methods such as CAD drawings, calculations. To use industry accepted codes and specifications to complete mechanical analysis and create working industrial drawings. To use the latest two-dimensional CAD and three-dimensional solid modeling software packages. To perform parametric mechanical analysis for calculations to determine the size and dimensions of components and parts. To understand general mechanical engineering technology fundamentals with an emphasis in the design and development of products and machines.

Pre-requisites: Engineering Drawing, Engineering Mechanics (BTM205), Elements of Mechanical Engineering (BTM104), Applied Chemistry, Applied Physics and Applied Mathematics I & II (Algebra, Geometry, Trigonometry)

Course Contents/Syllabus:

Module I:	Weightage (%)
Descriptors/Topics 1. Sheet 1 – Introduction of conventions of line, materials, rolled sections, machine operations & parts, rivets, nuts & bolts, pipe fittings & welding. Clear conception of drawing & free hand sketching practice & technical terms to be used in machine drawing. 2. Sheet 2 – Interconversion of views – isometric to orthographic in I st & III rd angles.	22%
Module II: Descriptors/Topics 1. Sheet 3 – Thread & Thread fasteners to sketch/draw external & internal threads, V shape & square threads, types of threads, use of threads on nuts & bolts, screws, studs, locking devices & in foundation bolts as lewis, rag, eye type, tee-headed & cottered, Shoe, band, cone and disc brake their characteristics and design. 2. Sheet 4 – To draw/ sketch rivet heads & riveted joints as lap joint & butt joint.	18%

Module III:	20%
Descriptors/Topics - Sheet 5 – To draw/sketch cotter & knuckle joint assembled view. - Sheet 6 - To draw/sketch pulleys as solid, fast, loose, steeped or V-belt pulley.	
Module IV:	20%
Descriptors/Topics - Sheet 7 – To draw/sketch couplings as muff, half lap muff, split muff, solid flange, mounted flange, flexible or old ham or universal coupling. - Sheet 8 - To draw/sketch bearings as solid, bushed, plumber block or ball & roller.	
Module V:	20%
- Sheet 9 - To draw/sketch steam engine parts as piston, stuffing box, or connecting rod etc - Sheet 10 - To draw isometric view of any machine body in syllabus. - Sheet 11 - Introduction, input, output devices, introduction to software AutoCAD basic commands and development of 2D and 3D drawings of simple parts.	

Student Learning Outcomes:

On completion of the course the student will be able to:

1. Be able to know type of line, material, and machining operation with the help of drawing.
2. Be able to know type of fastening type, threads, locking device etc with the help of drawing..
3. Be able to draw Knuckle joint with the help of software.
4. Be able to draw different types of couplings with the help of software.
5. Be able to draw different types of I.C Engine parts with the help of software.

Pedagogy for Course Delivery:

The course pedagogy will include lectures, numerical practice, case studies, seminars and presentations. It also includes discussion on real life problems related to design of mechanical components.

Lab/ Practicals details, if applicable:

List of Experiments:

Sheet 1 – Introduction of conventions of line, materials, rolled sections, machine operations & parts, rivets, nuts & bolts, pipe fittings & welding. Clear conception of drawing & free hand sketching practice & technical terms to be used in machine drawing.

Sheet 2 – Interconversion of views – isometric to orthographic in Ist & IIIrd angles.

Sheet 3 – Thread & Thread fasteners to sketch/draw external & internal threads, V shape & square threads, types of threads, use of threads on nuts & bolts, screws, studs, locking devices & in foundation bolts as lewis, rag, eye type, tee-headed & cotted.

Sheet 4 – To draw/ sketch rivet heads & riveted joints as lap joint & butt joint.

Sheet 5 – To draw/sketch cotter & knuckle joint assembled view.

Sheet 6 - To draw/sketch pulleys as solid, fast, loose, steeped or V-belt pulley.

Sheet 7 – To draw/sketch couplings as muff, half lap muff, split muff, solid flange, mounted flange, flexible or old ham or universal coupling.

Sheet 8 - To draw/sketch bearings as solid, bushed, plumber block or ball & roller.

Sheet 9 - To draw/sketch steam engine parts as piston, stuffing box, or connecting rod etc.

Sheet 10 - To draw isometric view of any machine body in syllabus.

Sheet 11 - Introduction, input, output devices, introduction to software AutoCAD basic commands and development of 2D and 3D drawings of simple parts.

Assessment/ Examination Scheme:

Theory L/T (%)	Lab/Practical/Studio (%)				Total
0%	100%				100%

Lab/ Practical/ Studio Assessment:

	Continuous Assessment/Internal Assessment				End Term Examination	
	A	PR	LR	V	PR	V
Components (Drop down)						
Weightage (%)	5	10	10	5	35	35

Text & References:

Text Books:

- Pohnit, G and Gosh, G., Machine Drawing with Auto CAD, Pearson Education, 2007
- PS Gill, Machine Drawing, S. Chand.
- ND Bhatt, Machine Drawing, Charotar publications
- N Sidheshwar, Machine Drawing, Tata McGraw Hill
- CL Tanta, Mechanical Drawing, “Dhanpat Rai”

Any other Study Material:

Old Syllabus of AUMP MECHANICS OF FLUIDS

Course Code: BTM 305

Credit Units: 04

Course Objective:

The objective of Fluid Mechanics subject is that students should understand the, properties of fluids, pressure measurement devices, hydraulic forces on surfaces, buoyancy and flotation in fluids, kinematics and static behaviour of fluids, dimension and model analysis, laminar and turbulent flow, flow through pipes and orifices, boundary layer theory.

Course Contents:

Module I: Fluid Properties and Fluid Statics

Newtonian and Non-Newtonian Fluids; Viscosity; Incompressible and compressible fluids, compressibility. Forces on plane surfaces, forces on curved surfaces, buoyant forces, and stability of floating bodies, metacentre and metacentre height.

Module II: Kinematics of Fluid Motion

Steady and unsteady flow; uniform and non-uniform flow; Laminar and turbulent flow; streamline, path line and streak line; continuity equation, irrotational and rotational flow, velocity potential and stream function, vortex flow, free and forced vortex.

Module III: Dynamics of Fluid Flow

Euler's equation of motion and its integration to yield Bernoulli's equation, its practical applications – Pilot tube, Venturi meter; steady flow momentum equation, force exerted on a pipe bend.

Module IV: Dimensional Analysis and Principles of Similarity

Buckingham π -Theorem and its applications, Geometric, Kinematics and Dynamic similarity; Dimensionless numbers-Reynolds, Froude, Euler, Mach, Weber Number and their significance.

Module V: Laminar and Turbulent Flow

Reynold's experiment, critical velocity, steady laminar flow through a circular tube, flow between parallel plates. Transition from laminar to turbulent flow, courses of turbulence, velocity distribution law near a solid boundary, velocity distribution in rough pipes, Hazen – Williams's formula.

Module VI: Analysis of Pipe Flow

Energy losses, minor losses in pipe lines, concept of equivalent length, flow between two reservoirs, and multiple pipe systems – in series and parallel, siphon.

Module VII: Flow Measurements

Measurement of flow using Venturi meter, orifice meter, Pitot tube, measurement of flow in open channels – rectangular, triangular, trapezoidal weir, Cipolletti weir

Proposed New Syllabus of AUMP MECHANICS OF FLUIDS

Course Code: BTM 305

Credit Units: 03

Course Objective:

The objective of Fluid Mechanics subject is that students should understand the, properties of fluids, pressure measurement devices, hydraulic forces on surfaces, buoyancy and flotation in fluids, kinematics and static behaviour of fluids, dimension and model analysis, laminar and turbulent flow, flow through pipes and orifices, boundary layer theory.

Course Contents:

Module I: Fluid Properties and Fluid Statics

Newtonian and Non-Newtonian Fluids; Viscosity; Incompressible and compressible fluids, compressibility. Forces on plane surfaces, forces on curved surfaces, buoyant forces, and stability of floating bodies, metacentre and metacentre height.

Module II: Kinematics of Fluid Motion

Steady and unsteady flow; uniform and non-uniform flow; Laminar and turbulent flow; streamline, path line and streak line; continuity equation, irrotational and rotational flow, velocity potential and stream function, vortex flow, free and forced vortex.

Module III: Dynamics of Fluid Flow

Euler's equation of motion and its integration to yield Bernoulli's equation, its practical applications – Pilot tube, Venturi meter; steady flow momentum equation, force exerted on a pipe bend.

Module IV: Dimensional Analysis and Principles of Similarity

Buckingham π -Theorem and its applications, Geometric, Kinematics and Dynamic similarity; Dimensionless numbers-Reynolds, Froude, Euler, Mach, Weber Number and their significance.

Module V: Laminar and Turbulent Flow

Reynold's experiment, critical velocity, steady laminar flow through a circular tube, flow between parallel plates. Transition from laminar to turbulent flow, courses of turbulence, velocity distribution law near a solid boundary, velocity distribution in rough pipes, Hazen – Williams's formula.

Module VI: Analysis of Pipe Flow

Energy losses, minor losses in pipe lines, concept of equivalent length, flow between two reservoirs, and multiple pipe systems – in series and parallel, siphon.

Subject: Mechanics of Fluids-BTM-305

University	Subject Code	Scheme		
		L	T	P
AU MP	Mechanics of Fluids BTM305	3	1	2
AU UP	Mechanics of Fluids MAE 305	2	1	2

1. Contents of Module VII of BTM 305 has already been covered in Module III. The contents includes: Bernoulli's equation, its practical applications – Pilot tube, Venturi meter.
2. The topic “Measurement of flow in open channels” which includes rectangular, triangular, trapezoidal weir, Cipoeletti weir is not in the syllabus of MAE-305 taught by AUUP.
3. Please refer GATE syllabus of Mechanical Engineering (Appended Herewith). The topics listed in point 2 are covered in the syllabus of CIVIL ENGINEERING and not in the Mechanical Engineering.
4. In view of the above it is suggested to exclude module VII of BTM 305 and allocate the credit 3.



Course Title: Mechanics of Fluids

Credit Units: 03

Course Level: UG

Course Code: MAE201

L	T	P/S	SW/F W	TOTAL CREDIT UNITS
3		0	-	03

Course Objectives: The objective of Mechanics of Fluids is to make the students should understand the, properties of fluids, pressure measurement devices, hydraulic forces on surfaces, buoyancy and flotation in fluids, kinematics and static behaviour of fluids, dimension and model analysis, laminar and turbulent flow, flow through pipes and orifices, boundary layer theory.

Pre-requisites: Basic Concepts of Physics, General Chemistry and Mathematics (Differential Equations, Integration and Calculus)

Course Contents/Syllabus:

Weightage (%)	
Module I: Refrigeration	20%
Fluid Properties and Fluid Statics	
1. Newtonian and Non-Newtonian Fluids; 2. Viscosity; Incompressible and compressible fluids, compressibility. 3. Measurement of pressure, Forces on plane surfaces, forces on curved surfaces, buoyant forces, and stability of floating bodies, metacentre and metacentre height.	
Module II	20%
Kinematics of Fluid Motion	
1. Steady and unsteady flow; uniform and non-uniform flow; 2. Laminar and turbulent flow; streamline, path line and streak line; 3. Continuity equation, irrotational and rotational flow, velocity potential and stream function, 4. Vortex flow, free and forced	
Module III	20%

Dynamics of Fluid Flow	
1. Euler's equation of motion and its integration to yield Bernoulli's equation, its practical applications – 2. Pilot tube, Venturi meter, orificemeter; 3. Steady flow momentum equation, force exerted on a pipe bend	
Module IV	15%
Dimensional Analysis and Principles of Similarity	
1. Buckingham π-Theorem and its applications, 2. Geometric, Kinematics and Dynamic similarity; 3. Dimensionless numbers-Reynolds, Froude, Euler, Mach, Weber Number and their significance	
Module V	15%
Laminar and Turbulent Flow	
1. Reynold's experiment, critical velocity, steady laminar flow through a circular tube, flow between parallel plates. 2. Transition from laminar to turbulent flow, courses of turbulence, velocity distribution law near a solid boundary, 3. velocity distribution in rough pipes, Hazen – Williams's formula	
Module VI	10%
Analysis of Pipe Flow	
1. Energy losses, minor losses in pipe lines, 2. Concept of equivalent length, 3. Flow between two reservoirs, and multiple pipe systems – in series and parallel, siphon, weir and notches	

Student Learning Outcomes:

On completion of the course the student will be able to:

1. Demonstrate knowledge of fundamental concepts of Fluid Mechanics.
2. Identify various components of Fluid Mechanics, and perform basic operations and apply safety procedures.
3. Design and analyze problems relating to Fluid Kinematics and Dynamics.

GATE 2017

Organizing Institute: IIT Roorkee

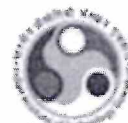


Syllabi

AE: Aerospace Engineering
 AG: Agricultural Engineering
 AR: Architecture and Planning
 BT: Biotechnology
 CE: Civil Engineering
 CH: Chemical Engineering
 CS: Computer Science and Information Technology
 CY: Chemistry
 EC: Electronics and Communications
 EE: Electrical Engineering
 EY: Ecology and Evolution
 GG: Geology and Geophysics
 IN: Instrumentation Engineering
 MA: Mathematics
 ME: Mechanical Engineering
 MN: Mining Engineering
 MT: Metallurgical Engineering
 PE: Petroleum Engineering
 PH: Physics
 PI: Production and Industrial Engineering
 TF: Textile Engineering and Fibre Science
 XE (A-H): Engineering Sciences
 XL (P-U): Life Sciences

Total marks and time (no candidate shall be allowed to leave the exam hall before the complete exam duration of 3 Hours)

Paper Code	General	Subject	Total	Total
	Aptitude (GA)	Marks	Marks	Time
	Marks			
AE, AR, AG, BT, CE, CH, CS, CY, EC, EE, EY, GG, IN, MA, ME, MN, MT, PE, PH, PI, TF	15	85	100	3 Hours
XE (Section A + any two sections)	15	15 + 2 x 35	100	3 Hours
XL (Section P + any two sections)	15	25 + 2 x 30	100	3 Hours



Concrete Structures: Working stress, Limit state and Ultimate load design concepts; Design of beams, slabs, columns; Bond and development length; Prestressed concrete; Analysis of beam sections at transfer and service loads.

Steel Structures: Working stress and Limit state design concepts; Design of tension and compression members, beams and beam- columns, column bases; Connections - simple and eccentric, beam-column connections, plate girders and trusses; Plastic analysis of beams and frames.

Section 3: Geotechnical Engineering

Soil Mechanics: Origin of soils, soil structure and fabric; Three-phase system and phase relationships, index properties; Unified and Indian standard soil classification system; Permeability - one dimensional flow, Darcy's law; Seepage through soils - two-dimensional flow, flow nets, uplift pressure, piping; Principle of effective stress, capillarity, seepage force and quicksand condition; Compaction in laboratory and field conditions; One-dimensional consolidation, time rate of consolidation; Mohr's circle, stress paths, effective and total shear strength parameters, characteristics of clays and sand.

Foundation Engineering: Sub-surface investigations - scope, drilling bore holes, sampling, plate load test, standard penetration and cone penetration tests; Earth pressure theories - Rankine and Coulomb; Stability of slopes - finite and infinite slopes, method of slices and Bishop's method; Stress distribution in soils - Boussinesq's and Westergaard's theories, pressure bulbs; Shallow foundations - Terzaghi's and Meyerhoff's bearing capacity theories, effect of water table; Combined footing and raft foundation; Contact pressure; Settlement analysis in sands and clays; Deep foundations - types of piles, dynamic and static formulae, load capacity of piles in sands and clays, pile load test, negative skin friction.

Section 4: Water Resources Engineering

Fluid Mechanics: Properties of fluids, fluid statics; Continuity, momentum, energy and corresponding equations; Potential flow, applications of momentum and energy equations; Laminar and turbulent flow; Flow in pipes, pipe networks; Concept of boundary layer and its growth.

Hydraulics: Forces on immersed bodies; Flow measurement in channels and pipes; Dimensional analysis and hydraulic similitude; Kinematics of flow, velocity triangles; Basics of hydraulic machines, specific speed of pumps and turbines; Channel Hydraulics - Energy-depth relationships, specific energy, critical flow, slope profile, hydraulic jump, uniform flow and gradually varied flow

Hydrology: Hydrologic cycle, precipitation, evaporation, evapo-transpiration, watershed, infiltration, unit hydrographs, hydrograph analysis, flood estimation and routing, reservoir capacity, reservoir and channel routing, surface run-off models, ground water hydrology - steady state well hydraulics and aquifers; Application of Darcy's law.

Irrigation: Duty, delta, estimation of evapo-transpiration; Crop water requirements; Design of lined and unlined canals, head works, gravity dams and spillways; Design of weirs on permeable foundation; Types of irrigation systems, irrigation methods; Water logging and drainage; Canal regulatory works, cross-drainage structures, outlets and escapes.

Suggested Scheme for BTech MAE

New Scheme - 235

Existing Scheme - 239

FIRST SEMESTER

Course Code	Course Title	Lecture (L) Hours Per week	Tutorial (T) Hours Per week	Practical (P) Hours Per week	Total Credits
BTM 101	Applied Mathematics – I	3	1	-	4
BTM 102	Applied Physics - I – Fields & Waves	2	1	-	3
BTM 103	Element of Mechanical Engineering	2	-	-	2
BTM 104	Introduction to Computers & Programming in C	2	1	-	3
BTM 105	Applied Chemistry	2	1	-	3
BTM 106	Environmental Studies – I	2	-	-	2
BTM 120	Applied Physics Lab – I	-	-	2	1
BTM 121	Element of Mechanical Engineering Lab	-	-	2	1
BTM 122	Programming in C Lab	-	-	2	1
BTM 123	Applied Chemistry Lab	-	-	2	1
BTM 124	Engineering Graphics Lab	-	-	2	1
BTM 141	English Language usage essentials	1	-	-	1
BTM 143	Understanding self for effectiveness	1	-	-	1
BTC 144	Foreign Language – I French	2	-	-	2
TOTAL CREDITS					26
Including CBCS					29
Total Hrs Including CBCS					34

Course Code	Course Title	Lecture (L) Hours Per week	Tutorial (T) Hours Per week	Practical (P) Hours Per week	Total Credits
BTM 101	Applied Mathematics – I	3	1	-	4
BTM 102	Applied Physics - I – Fields & Waves	2	1	-	3
BTM 103	Element of Mechanical Engineering	2	-	-	2
BTM 104	Introduction to Computers & Programming in C	2	1	-	3
BTM 105	Applied Chemistry	2	1	-	3
BTM 106	Environmental Studies – I	2	-	-	2
BTM 120	Applied Physics Lab – I	-	-	2	1
BTM 121	Element of Mechanical Engineering Lab	-	-	2	1
BTM 122	Programming in C Lab	-	-	2	1
BTM 123	Applied Chemistry Lab	-	-	2	1
BTM 124	Engineering Graphics Lab	-	-	2	1
BTM 141	English Language usage essentials	1	-	-	1
BTM 143	Understanding self for effectiveness	1	-	-	1
BTC 144	Foreign Language – I French	2	-	-	2
TOTAL CREDITS					26
Including CBCS					29
Total Hrs Including CBCS					34

SECOND SEMESTER

Course Code	Course Title	Lecture (L) Hours Per week	Tutorial (T) Hours Per week	Practical (P) Hours Per week	Total Credits
BTM 201	Applied Mathematics – II	3	1	-	4
BTM 202	Applied Physics - II – Modern Physics	2	1	-	3
BTM 203	Electrical Science	2	1	-	3
BTM 204	Object oriented programming using C++	2	1	-	3
BTM 205	Engineering Mechanics	2	1	-	3
BTM 206	Environmental Studies-II	2	-	-	2
BTM 220	Applied Physics Lab – II	-	-	2	1
BTM 221	Electrical Science Lab	-	-	2	1
BTM 222	Object oriented programming using C++ Lab	-	-	2	1
BTM 223	Engineering Mechanics Lab	-	-	2	1
BTM 240	English	1	-	-	1
BTM 243	Behavioural science - II	1	-	-	1
	Foreign Language - II	2	-	-	2
BTM 244	French				
TOTAL CREDITS					26
Including CBCS					29
Total Hrs Including CBCS					33
TERM PAPER DURING SUMMER BREAK					

Course Code	Course Title	Lecture (L) Hours Per week	Tutorial (T) Hours Per week	Practical (P) Hours Per week	Total Credits
BTM 201	Applied Mathematics – II	3	1	-	4
BTM 202	Applied Physics - II – Modern Physics	2	1	-	3
BTM 203	Electrical Science	2	1	-	3
BTM 204	Object oriented programming using C++	2	1	-	3
BTM 205	Engineering Mechanics	2	1	-	3
BTM 206	Environmental Studies-II	2	-	-	2
BTM 220	Applied Physics Lab – II	-	-	2	1
BTM 221	Electrical Science Lab	-	-	2	1
BTM 222	Object oriented programming using C++ Lab	-	-	2	1
BTM 223	Engineering Mechanics Lab	-	-	2	1
BTM 240	English	1	-	-	1
BTM 243	Behavioural science - II	1	-	-	1
	Foreign Language - II	2	-	-	2
BTM 244	French				
TOTAL CREDITS					26
Including CBCS					29
Total Hrs Including CBCS					33
TERM PAPER DURING SUMMER BREAK					

THIRD SEMESTER

Course Code	Course Title	Lecture (L) Hours	Tutorial (T) Hours	Practical (P) Hours	Total Credits
BTM 301	Numerical Analysis & Programming	2	-	-	2
BTM 302	Thermodynamics	2	1	-	3
BTM 303	Mechanics of Solids	2	1	-	3
BTM 304	Material Science & Metallurgy	3	-	-	3
BTM 305	Mechanics of Fluids	3	1	-	4
BTM 306	Electronics	2	-	-	2
BTM 320	Mechanics of Solids & Fluids Lab	-	-	2	1
BTM 321	Machine Drawing Lab	-	-	2	1
BTM 322	Programming Lab - I (Numerical Analysis)	-	-	2	1
BTM 323	Electronics Lab	-	-	2	1
BTM 324	Thermodynamics Lab	-	-	2	1
BTM 341	Communication Skills - I	1	-	-	1
BTM 343	Behavioural Science - III	1	-	-	1
	Foreign Language - III	2	-	-	2
BTM 344	French				
BTM 330	Term Paper (Evaluation)	-	-	-	2
TOTAL CREDITS					28
Including CBCS					31
Total Hrs Including CBCS					34

Course Code	Course Title	Lecture (L) Hours	Tutorial (T) Hours	Practical (P) Hours	Total Credits
BTM 301	Numerical Analysis & Programming	2	-	-	2
BTM 302	Thermodynamics	2	1	-	3
BTM 303	Mechanics of Solids	2	1	-	3
BTM 304	Material Science &	2	-	-	3
BTM 305	Mechanics of Fluids	3	1	-	3
BTM 306	Electronics	2	-	-	2
BTM 320	Mechanics of Solids & Fluids Lab	-	-	2	1
BTM 321	Machine Drawing Lab with CAD	-	-	2	1
BTM 322	Programming Lab - I (Numerical Analysis)	-	-	2	1
BTM 323	Electronics Lab	-	-	2	1
BTM 324	Thermodynamics Lab	-	-	2	1
BTM 341	Communication Skills - I	1	-	-	1
BTM 343	Behavioural Science - III	1	-	-	1
	Foreign Language - III	2	-	-	2
BTM 344	French				
BTM 330	Term Paper (Evaluation)	-	-	-	2
TOTAL CREDITS					27
Including CBCS					30
Total Hrs Including CBCS					33

Existing Scheme

New Scheme

FOURTH SEMESTER

Course Code	Course Title	Lecture (L) Hours Per week	Tutorial (T) Hours Per week	Practical (P) Hours Per week	Total Credits
BTM 401	Kinematics & Dynamics of Machines	3	1	-	4
BTM 402	Heat & Mass Transfer	2	1	-	3
BTM 403	Manufacturing Machines	3	-	-	3
BTM 404	Theory of Metal Forming	3	-	-	3
BTM 405	Electrical Machines	3	-	-	3
BTM 406	Principles of Computer Graphics	2	-	-	2
BTM 420	Kinematics & Dynamics of Machines Lab	-	-	2	1
BTM 421	Manufacturing Machines Lab	-	-	2	1
BTM 422	Electrical Machines Lab	-	-	2	1
BTM 423	Principles of Computer Graphics Lab	-	-	2	1
BTM 424	Heat & Mass Transfer Lab	-	-	2	1
BTC 441	Communication Skills - II	1	-	-	1
BTC 443	Behavioural Science - IV	1	-	-	1
	Foreign Language - IV	2	-	-	2
BTC 444	French				
TOTAL CREDITS					27
Including CBCS					30
Total Hrs Including CBCS					35
PRACTICAL TRAINING - I: 6 - 8 WEEKS					

Course Code	Course Title	Lecture (L) Hours Per week	Tutorial (T) Hours Per week	Practical (P) Hours Per week	Total Credits
BTM 401	Kinematics & Dynamics of Machines	3	1	-	3
BTM 402	Heat & Mass Transfer	2	1	-	3
BTM 403	Manufacturing Machines	3	-	-	3
BTM 404	Theory of Metal Forming	3	-	-	3
BTM 405	Electrical Machines	3	-	-	3
BTM 406	Principles of Computer Graphics	2	-	-	2
BTM 420	Kinematics & Dynamics of Machines Lab	-	-	2	1
BTM 421	Manufacturing Machines Lab	-	-	2	1
BTM 422	Electrical Machines Lab	-	-	2	1
BTM 423	Principles of Computer Graphics Lab	-	-	2	1
BTM 424	Heat & Mass Transfer Lab	-	-	2	1
BTC 441	Communication Skills - II	1	-	-	1
BTC 443	Behavioural Science - IV	1	-	-	1
	Foreign Language - IV	2	-	-	2
BTC 444	French				
TOTAL CREDITS					26
Including CBCS					29
Total Hrs Including CBCS					34
PRACTICAL TRAINING - I: 6 - 8 WEEKS					

FIFTH SEMESTER

Course Code	Course Title	Lecture (L) Hours Per week	Tutorial (T) Hours Per week	Practical (P) Hours Per week	Total Credits
BTM 501	Machine Design – I	3	-	-	3
BTM 502	Metrology	3	-	-	3
BTM 503	Measurements & Controls	2	1	-	3
BTM 504	Relational Database Management System	3	-	-	3
BTM 505	Microprocessor System	3	1	-	4
BTM 520	Machine Design Lab – I	-	-	2	1
BTM 521	Metrology Lab	-	-	2	1
BTM 522	Measurements & Controls Lab	-	-	2	1
BTM 523	Microprocessor System Lab	-	-	2	1
BTM 524	Programming Lab - II (MAT Lab)	-	-	2	1
BTM 525	Relational Database Management System Lab	-	-	2	1
BTM 541	Communication Skills - III	1	-	-	1
BTM 543	Behavioural Science - V	1	-	-	1
	Foreign Language – V	2	-	-	2
BTM 544	French				
BTM 550	Industrial Practical Training - I	-	-	-	3
TOTAL CREDITS					29
Including CBCS					32
Total Hrs Including CBCS					35

Course Code	Course Title	Lecture (L) Hours Per week	Tutorial (T) Hours Per week	Practical (P) Hours Per week	Total Credits
BTM 501	Machine Design – I	3	-	-	3
BTM 502	Metrology	3	-	-	3
BTM 503	Measurements & Controls	2	1	-	3
BTM 504	Relational Database Management System	3	-	-	3
BTM 505	Microprocessor System	3	1	-	4
BTM 520	Machine Design Lab – I	-	-	2	1
BTM 521	Metrology Lab	-	-	2	1
BTM 522	Measurements & Controls Lab	-	-	2	1
BTM 523	Microprocessor System Lab	-	-	2	1
BTM 524	Programming Lab - II (MAT Lab)	-	-	2	1
BTM 525	Relational Database Management System Lab	-	-	2	1
BTM 541	Communication Skills - III	1	-	-	1
BTM 543	Behavioural Science - V	1	-	-	1
	Foreign Language – V	2	-	-	2
BTM 544	French				
BTM 550	Industrial Practical Training - I	-	-	-	3
TOTAL CREDITS					28
Including CBCS					31
Total Hrs Including CBCS					33

SIXTH SEMESTER

Course Code	Course Title	Lecture (L) Hours Per week	Tutorial (T) Hours Per week	Practical (P) Hours Per week	Total Credits
BTM 601	Management of Manufacturing Systems	3	-	-	3
BTM 602	Machine Design – II	3	-	-	3
BTM 603	Fluid Power Systems	2	1	-	3
BTM 604	Metal Cutting & Tool Design	3	-	-	3
BTM 605	IC Engine & Gas Turbine	3	-	-	3
BTM 606	Computer Networks	2	1	-	3
BTM 620	Machine Design Lab - II	-	-	2	1
BTM 621	Fluid Power Systems Lab	-	-	2	1
BTM 622	IC Engine & Gas Turbine Lab	-	-	2	1
BTM 623	Computer Aided Drafting & Design Lab	-	-	2	1
BTM 641	Communication Skills - IV	1	-	-	1
BTM 643	Behavioural Science - VI	1	-	-	1
	Foreign Language – VI	2	-	-	2
BTM 644	French				
TOTAL CREDITS					26
Including CBCS					29
Total Hrs Including CBCS					33

Course Code	Course Title	Lecture (L) Hours Per week	Tutorial (T) Hours Per week	Practical (P) Hours Per week	Total Credits
BTM 601	Management of Manufacturing Systems	3	-	-	3
BTM 602	Machine Design – II	3	-	-	3
BTM 603	Fluid Power Systems	2	1	-	3
BTM 604	Metal Cutting & Tool Design	3	-	-	3
BTM 605	IC Engine & Gas Turbine	3	-	-	3
BTM 606	Computer Networks	2	1	-	3
BTM 620	Machine Design Lab - II	-	-	2	1
BTM 621	Fluid Power Systems Lab	-	-	2	1
BTM 622	IC Engine & Gas Turbine Lab	-	-	2	1
BTM 623	Computer Aided Drafting & Design Lab	-	-	2	1
BTM 641	Communication Skills - IV	1	-	-	1
BTM 643	Behavioural Science - VI	1	-	-	1
	Foreign Language – VI	2	-	-	2
BTM 644	French				
TOTAL CREDITS					25
Including CBCS					28
Total Hrs Including CBCS					31

PRACTICAL TRAINING – II: 6 – 8 WEEKS

SEVENTH SEMESTER

Course Code	Course Title	Lecture (L) Hours Per week	Tutorial (T) Hours Per week	Practical (P) Hours Per week	Total Credits
BTM 701	Operations Research	3	-	-	3
BTM 702	Computer Aided	3	-	-	3
BTM 703	Mechatronics	3	-	-	3
BTM 720	Operations Research (Programming) Lab	-	-	2	1
BTM 721	Computer Aided Manufacturing Lab	-	-	2	1
BTM 722	Mechatronics Lab	-	-	2	1
BTM 741	Communication Skills - V	1	-	-	1
BTM 743	Behavioural Science - VII	1	-	-	1
	Foreign Language – VII	2	-	-	2
BTM 744	French				
BTC 750	Practical Training	-	-	-	6
BTC 760	Project (Dissertation)	-	-	-	6
ELECTIVES (Any one from each category)					
A (With Practical)					
BTM 704	Automotive Engineering	3	-	-	3
BTM 705	Computer Aided Designing	3	-	-	3
BTM 723	Automotive Engineering Lab	-	-	2	1
BTM 724	Computer Aided Designing	-	-	2	1
ELECTIVES (Any one from each category)					
B (Without Practical)					
BTM 706	Marketing Management	3	-	-	3
BTM 707	Solar Energy	3	-	-	3
BTM 708	Power Plant Practices	3	-	-	3
BTM 709	Combustion Engine Emissions	3	-	-	3
TOTAL CREDITS					35
Total Hrs					33

Course Code	Course Title	Lecture (L) Hours Per week	Tutorial (T) Hours Per week	Practical (P) Hours Per week	Total Credits
BTM 701	Operations Research	3	-	-	3
BTM 702	Computer Aided	3	-	-	3
BTM 703	Mechatronics	3	-	-	3
BTM 720	Operations Research (Programming) Lab	-	-	2	1
BTM 721	Computer Aided Manufacturing Lab	-	-	2	1
BTM 722	Mechatronics Lab	-	-	2	1
BTM 741	Communication Skills - V	1	-	-	1
BTM 743	Behavioural Science - VII	1	-	-	1
	Foreign Language – VII	2	-	-	2
BTM 744	French				
BTC 750	Practical Training	-	-	-	6
BTC 760	Project (Dissertation)	-	-	-	6
ELECTIVES (Any one from each category)					
A (With Practical)					
BTM 704	Automotive Engineering	3	-	-	3
BTM 705	Computer Aided Designing	3	-	-	3
BTM 723	Automotive Engineering Lab	-	-	2	1
BTM 724	Computer Aided Designing	-	-	2	1
ELECTIVES (Any one from each category)					
B (Without Practical)					
BTM 706	Marketing Management	3	-	-	3
BTM 707	Solar Energy	3	-	-	3
BTM 708	Power Plant Practices	3	-	-	3
BTM 709	Combustion Engine Emissions	3	-	-	3
TOTAL CREDITS					35
Total Hrs					33

EIGHTH SEMESTER

Course Code	Course Title	Lecture (L) Hours Per week	Tutorial (T) Hours Per week	Practical (P) Hours Per week	Total Credits
BTM 801	Quality Control & Quality Assurance	3	-	-	3
BTM 802	Refrigeration & Air-conditioning	3	-	-	3
BTM 820	Refrigeration & Air-conditioning Lab	-	-	2	1
BTM 841	Communication Skills - VI	1	-	-	1
BTM 843	Behavioural Science - VIII	1	-	-	1
	Foreign Language – VIII	2	-	-	2
BTM 844	French				
BTC 860	Project	-	-	-	9
ELECTIVES (Any one from following with Practical)					
BTM 803	Advanced Methods of Manufacturing	3	-	-	3
BTM 804	Gear Technology	3	-	-	3
BTM 805	Artificial Intelligence & Robotics	3	-	-	3
BTM 821	Advanced Methods of Manufacturing Lab	-	-	2	1
BTM 822	Gear Technology Lab	-	-	2	1
BTM 823	Artificial Intelligence & Robotics Lab	-	-	2	1
TOTAL CREDITS					24
Total Hrs.					26

Course Code	Course Title	Lecture (L) Hours Per week	Tutorial (T) Hours Per week	Practical (P) Hours Per week	Total Credits
BTM 801	Quality Control & Quality Assurance	3	-	-	3
BTM 802	Refrigeration & Air-conditioning	3	-	-	3
BTM 820	Refrigeration & Air-conditioning Lab	-	-	2	1
BTM 841	Communication Skills - VI	1	-	-	1
BTM 843	Behavioural Science - VIII	1	-	-	1
	Foreign Language – VIII	2	-	-	2
BTM 844	French				
BTC 860	Project	-	-	-	9
ELECTIVES (Any one from following with Practical)					
BTM 803	Advanced Methods of Manufacturing	3	-	-	3
BTM 804	Gear Technology	3	-	-	3
BTM 805	Artificial Intelligence & Robotics	3	-	-	3
BTM 821	Advanced Methods of Manufacturing Lab	-	-	2	1
BTM 822	Gear Technology Lab	-	-	2	1
BTM 823	Artificial Intelligence & Robotics Lab	-	-	2	1
TOTAL CREDITS					24
Total Hrs.					26