

MADHAV INSTITUTE OF TECHNOLOGY & SCIENCE, GWALIOR

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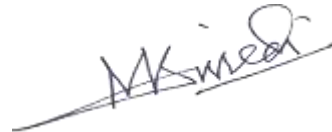
DEPARTMENT OF CIVIL ENGINEERING

Summary of Board of Studies Meeting Held on 09th June, 2021

DETAILS OF PROGRAMMES WHERE SYLLABUS REVISION WAS CARRIED OUT

(Session: Jul 2021 – Dec 2021)

(Course/subject name)	Course Code	Year/Date of introduction	Year/Date of revision	Percentage of content added or replaced	ItemNo.	PageNo.
-	-	-	-	-	-	-

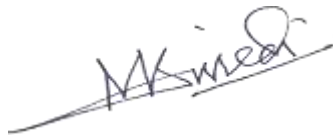


MADHAV INSTITUTE OF TECHNOLOGY & SCIENCE, GWALIOR

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DEPARTMENT OF CIVIL ENGINEERING**Summary of Board of Studies Meeting Held on 09th June, 2021****DETAILS OF NEW COURSES ADDED****(Session: Jul 2021 – Dec 2021)**

(Course/subject name)	Course Code	Activities/contents which have a bearing on increasing skill and employability	Item No.	Page No.
Introduction to Multimodal Urban Transportation System	110755	Planning of urban transportation systems, NMT system	2	3,4,9
Infrastructure Planning and Management	110756	Construction & Economic Risks, Flexible Project Arrangements, Stakeholder Management	2	3,4,9
Urban Governance and Development Management	800308	Metropolitan Planning, Dealing challenging urban issues	13	6,76
Trace & Ultra trace analysis of metals using Atomic Adsorption Spectrometry	800309	Application of AAS techniques	13	6,77
Sustainable Transportation Systems	H110703	EIA of transportation systems	4	4

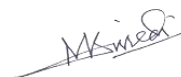
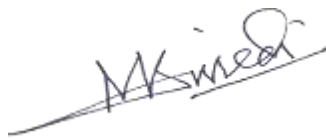


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DEPARTMENT OF CIVIL ENGINEERING**Summary of Board of Studies Meeting Held on 09th June, 2021****COURSES FOCUSING ON EMPLOYABILITY/ENTREPRENEURSHIP/SKILL DEVELOPMENT****(Session: Jul 2021 – Dec 2021)**

(Course/subject name)	Course Code	Activities/contents which have a bearing on increasing skill and employability	Item No.	Page No.
Urban Governance & Development Management	800308	Metropolitan Planning, Dealing challenging urban issues	13	6,76
Trace & Ultra Trace Analysis of Metals using Atomic Adsorption Spectrometry	800309	Application of AAS techniques	13	6,77
Sustainable Transportation Systems	H110703	EIA of transportation systems	4	4
Survey Practice Lab	110315	Use of Total Station in Surveying	7	5, 26,39
Software Application for Solving Civil Engineering Problems	110701	Study on Prima Vera, STADD Pro & MATLAB	8	5,9
Creative Problem Solving	110703	Providing engineering solutions of critical problems	8	5,9
Advanced Structural Design (RCC)	110713	Design of Water Tanks, Prestressed Concrete	1	3,9, 10
Integrated Waste Management for Smart City	900201	Waste Management, E waste management, biomedical waste management	3	4,9, 15
Project Planning & Control	900202	network techniques in project planning & management, resource planning, cost control	3	4,9, 16
Urban Planning & Transportation Systems	900213	Planning of urban transportation systems, intelligent systems	3	4,9, 17
Introduction to Multimodal Urban Transportation System	110755	Planning of urban transportation systems, NMT system	2	3,4, 9
Infrastructure Planning & Management	110756	Construction & Economic Risks, Flexible Project Arrangements, Stakeholder Management	2	3,4,9



D. no 765

18.10.2021

***DEPARTMENT OF CIVIL
ENGINEERING***

***MINUTES OF BOARD OF
STUDIES MEETING, JUNE
2021***

Minutes of Board of Studies Meeting held on 09th June 2021

The meeting of Board of Studies of the Civil Engineering department was held on Wednesday, 09th June 2021 online through Google meet (Owing to the unprecedented situation of Covid-19 virus outbreak). Following were present:

1. Dr. A. K. Nema (Expert nominated by V.C.)
Professor, Civil Engg., IIT Delhi
2. Dr. P. K. Jain (Subject Expert nominated by Academic Council)
Professor, Civil Engg., MANIT Bhopal
3. Dr. Mahesh Jat (Subject Expert nominated by Academic Council)
Professor, Civil Engg., MNIT Jaipur
4. Dr. M. K. Trivedi (Chairman BoS & Head of the department)
5. Prof. (Mrs.) Archana Tiwari (Member, BOS)
6. Dr. S. K. Jain (Member, BOS)
7. Dr. R. Kansal (Member, BOS)
8. Dr. S. Tiwari (Member, BOS)
9. Prof. D. Rastogi (Member, BOS)
10. Prof. A. K. Dwivedi (Member, BOS)
11. Prof. A. K. Saxena (Member, BOS)
12. Prof. G. Bhadoriya (Member, BOS)
13. Prof. Aditya K. Agarwal (Member, BOS)
14. Prof. Renuka Darshyamkar (Member, BOS)
15. Dr. Hemant Shrivastava (Member, BOS)
16. Dr. Prachi Singh (Member, BOS)
17. Dr. Jayvant Choudhary (Member, BOS)
18. Dr. Chayan Gupta (Member, BOS)
19. Dr. Abhilash Shukla (Member, BOS)

Leave of absence was granted to the two external members who could not attend the meeting.

Following agendas were discussed & deliberated upon

Item No. / CE - 1	<p>To propose the list and syllabi for all <i>Departmental Elective (DE)</i> Courses of VII Semester under the flexible curriculum along with their COs (Batch admitted in 2018-2019)</p> <p>Following courses are finalized as Departmental Elective (DE) courses for VII semester which will be offered in conventional mode under the flexible curriculum for 2018 admitted batch.</p> <ol style="list-style-type: none"> 1. 110713, Advanced Structural Design (RCC) 2. 110714, Hydraulic Structure 3. 110715, Advanced Structural Analysis <p>The syllabus along with COs for these courses were discussed & finalized. The syllabus is attached in Annexure - 1 and the same has been incorporated in the syllabus file for 2018 batch.</p>
Item No. / CE - 2	<p>To propose the list of Courses from SWAYAM/NPTEL/MOOC Platform to be offered in <i>online mode</i> under <i>Departmental Elective (DE)</i> category for credit transfer in the VII Semester (Batch admitted in 2018-19)</p> <p>Following courses are finalized as Departmental Elective (DE) courses for VII semester which will be offered in online mode through SWAYAM NPTEL/MOOC</p>

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	<p>for credit transfer under the flexible curriculum for 2018 admitted batch.</p> <ol style="list-style-type: none">1. 110754, Wastewater Treatment & Recycling2. 110755, Introduction to Multimodal Urban Transportation Systems3. 110756, Infrastructure Planning & Management
Item No. / CE - 3	<p>To propose the list & Syllabi for all <i>Open Category (OC)</i> Courses for VII semester students of other departments along with their COs (<i>Batch admitted in 2018-19</i>)</p> <p>Following courses are finalized as Open Category (OC) courses for VII semester which will be offered in conventional mode to students of other departments for 2018 admitted batch.</p> <ol style="list-style-type: none">1. 900201, Integrated Waste Management for Smart City2. 900202, Project Planning & Control3. 900213, Urban Planning & Transportation Systems. <p>The syllabus along with COs for these courses were discussed & finalized. The syllabus is attached in Annexure - II and the same has been incorporated in the syllabus file for 2018 batch.</p>
Item No. / CE - 4	<p>To propose the list of "Additional Courses" which can be opted for getting an</p> <p>(i) <i>Honours (for students of the host department)</i></p> <p>(ii) <i>Minor Specialization (for students of other departments)</i></p> <p><i>[These will be offered through SWAYAM/NPTEL/MOOC based Platforms for the V semester (for the batch admitted in 2019-20) and for VII semester students (for the batch admitted in 2018-19)]</i></p> <p>Following SWAYAM/NPTEL/MOOC courses are proposed as additional courses which can be opted for getting Minor Specialization during VII semester under the flexible curriculum for 2018 admitted batch.</p> <ol style="list-style-type: none">1. Project Management for Managers.2. Integrated Waste Management for Smart City <p>Following SWAYAM/NPTEL/MOOC courses are proposed as additional courses which can be opted for getting Honours during VII semester under the flexible curriculum for 2018 admitted batch.</p> <ol style="list-style-type: none">1. Theory of Elasticity.2. Earthquake Resistant Design of Foundation.3. Sustainable Transportation Systems <p>Following SWAYAM/NPTEL/MOOC courses are proposed as additional courses which can be opted for getting Minor Specialization during V semester under the flexible curriculum for 2019 admitted batch.</p> <ol style="list-style-type: none">1. Building Materials & Composites.2. Municipal Solid Waste Management.3. Strength of Materials. <p>Following SWAYAM/NPTEL/MOOC courses are proposed as additional courses which can be opted for getting Honours during V semester under the flexible curriculum for 2019 admitted batch.</p> <ol style="list-style-type: none">1. Integrated Waste Management for Smart City.2. Matrix Method of Structural Analysis.3. River Engineering4. Introduction to Multimodal Urban Transportation Systems.

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Item No. / CE - 5	To review and update the syllabi for all Departmental Core (DC) Courses of V & VII Semester (for batches admitted in 2018-19 & 2019-20) under the flexible curriculum along with their COs The courses & syllabi along with their COs which are being offered under DC category for batch admitted in 2018 & 2019 for VII & V semester were reviewed and minor changes are being made in the existing syllabus of 110502 Structural Design & Drawing (RCC) by adding one or two topics & change in COs. The modified syllabus is attached in Annexure - III and also incorporated in the syllabus file of 2019 admitted batch. Overall percentage change in syllabus from existing syllabus is 05% (approx.)
Item No. / CE - 6	To propose the list of courses which the students can opt from SWAYAM/NPTEL/MOOC platform for Seminar/Self Study Courses in V Semester (Batch admitted in 2019-20) Following courses are finalized as Seminar/Self Study courses for V Semester through NPTEL platform <ol style="list-style-type: none">1. Principles and Application of Building Science2. Geotechnical Engineering Laboratory.3. Global Navigation Satellite Systems & Applications.4. C Programming & Assembly Language.
Item No. / CE - 7	To prepare and recommend the Scheme & Syllabi (along with the Course Outcomes) of III & IV semester of the B.Tech students of 2020-21 admitted batch according to the revised structure The new Scheme & Syllabi for III & IV Semester for B.Tech Civil Engineering for batch admitted in 2020-2021 was discussed and finalized. The scheme as well as syllabus is being attached in Annexure - IV.
Item No. / CE - 8	To review and finalize the Experiment list/ Lab manual for Laboratory Courses to be offered in V and VII semester (Batches admitted in 2018-19 & 2019-2020) The existing list of experiments for laboratory courses to be offered in V & VII semester under the flexible curriculum were reviewed and found to be ok, hence no changes are recommended in this.
Item No. / CE - 9	To propose a suggestive list of projects which can be assigned under the 'Skill based mini-project' category in various laboratory courses to be offered in July-December 2021 A list of projects which can be assigned as 'Skill based mini project' in various lab courses to be offered in July December 2021 is attached in Annexure - V.
Item No. / CE - 10	To review the CO attainments for July-December 2020 semester, to identify gaps and to suggest corrective measures for the improvement in the CO attainment levels CO attainment calculations were done based upon mathematical model developed by the institute which is followed uniformly by all the departments. The gap analysis in CO attainment level for all the courses was carried on the basis of the set targets. On the basis of this analysis it is observed that in almost all the courses the CO attainment level was found to achieve the set target, however in some of the courses the CO attainment level for some COs was found to be below the set target, for those COs corrective actions to be taken have been suggested. The compiled report is

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attached in Annexure – VI. In addition to above remedial classes for such courses were CO fall short below the target can also be planned to be conducted to improve the performance of the students. The summary of the same is presented below:

Total No of Courses	Total Number of COs	No. of COs Not attained	Percentage of COs not attained
33	154	12	7.8 %

**Item No. /
CE - 11**

To review Curricula feedback from various stakeholders, its analysis and impact

The curricula feedback was taken from various stakeholders. The compiled report along with its analysis is attached in Annexure – VII. Some important suggestions given by the stakeholders are as follows:

1. Include topics like 3D printing, Building Information Modelling, basic financing management & taxation in course curriculum.
2. Availability of standard books in library in sufficient number for all courses.
3. Improvement in internship opportunities for students.

**Item No. /
CE - 12**

To review course outcomes (COs) feedback of various courses, its analysis and impact

The course outcomes (COs) feedback of various courses running in the previous semester had been taken by various course coordinators/class coordinators. The compiled report along with its analysis is attached in Annexure – VIII.

**Item No. /
CE - 13**

To present matters, if any, related to new curriculum/structure PG programme (Batch admitted in 2020-21) needing ratification in the forthcoming Academic Council meeting

1. **Shifting of contact hours of MOOC Course for PG 3rd Semester (Batch Admitted in 2020-2021)**

The contact hours of MOOC Course for PG 3rd Semester (Batch admitted in 2020-2021) has been shifted from Lab Slot to Lecture Slot as the course is theory course in nature & not a practical course. The credit remain the same i.e. 2 (two).

2. **Approval of MOOC course for PG 3rd Semester (Batch Admitted in 2020-2021)**

Following is the list of courses which will be offered as MOOC Course (Through SWAYAM/NPTEL) in the upcoming 3rd Semester of PG programme (Batch admitted in 2020-2021).

M.E. C.T.M. 3rd Semester – Urban Governance & Development Management

M.Tech Environmental Engineering 3rd Semester – Trace & Ultra trace analysis of metals using atomic absorption spectrometry.

In view of the above 2 points, the existing schemes of 3rd Semester M.E. C.T.M. & M.Tech Environmental Engineering is slightly modified to include the list of these courses, the modified schemes are attached in Annexure - IX.


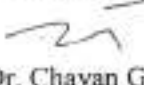
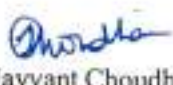
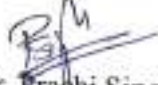




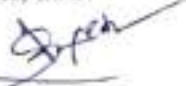

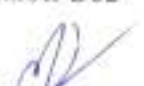

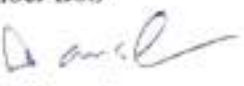
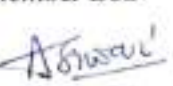
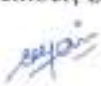
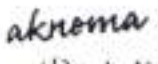
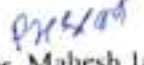
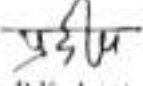
3. **Change in Course Name, Course Code & Course Contents for existing course 510112 of M.E. CTM 1st Semester (Batch to be admitted in 2021)**

The existing course 510112 of M.E. CTM 1st Semester is being modified by changing its name, contents & course code too for upcoming batch to be admitted in 2021, this course will now run as 510211, Construction Materials, Machines & Techniques. In view of this M.E. CTM 1st Semester Scheme is being modified, the modified scheme & syllabus is being attached in Annexure – X.


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Item No. / CE - 14	<p>Any other department specific matters</p> <p>1. To propose the list of courses which the students can opt from SWAYAM/NPTEL/MOOC platform for Seminar/Self Study Courses in III Semester (Batch admitted in 2020-21)</p> <p>Following courses are finalized as Seminar/Self Study courses for III Semester through NPTEL platform</p> <ol style="list-style-type: none"> 1. Water, Society & Sustainability 2. Principles & Applications of Building Science 3. C Programming & Assembly Language <p>2. To propose changes in the courses to be taught in II Semester (Batch to be admitted in 2021-22)</p> <p>It is proposed to make following changes in courses to be taught in II Semester for B.Tech Civil Engineering Students (Batch to be admitted in 2021-22)</p> <ol style="list-style-type: none"> a. To teach courses of Engineering Mechanics & Basic Civil Engineering separately instead of 1 course presently i.e. Basic Civil Engineering & Mechanics as its very lengthy and the course is important as far as Civil Engineering Students are concerned. b. In view of proposed changes in point a above the existing course of Building Planning & Design in II Semester & Building Materials & Construction in III Semester will also be revised to accommodate course contents. <p>The above proposed changes will be taken up in next meeting of Board of Studies of the department to be held in Nov 2021 subjected to approval of academic council.</p>
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The meeting ended with vote of thanks to the chair.

 (Dr. Abhilash Shukla) Member, BoS	 (Dr. Chayan Gupta) Member, BoS	 (Dr. Jayvant Choudhary) Member, BoS	 (Dr. Prashi Singh) Member, BoS
 (Dr. Hemant Shrivastava) Member, BoS	 (Prof. Renuka Darshyamkar) Member BoS	 (Prof. Aditya K. Agarwal) Member BoS	 (Prof. G. Bhadoriya) Member BoS
 (Prof. A. K. Saxena) Member BoS	 (Prof. A. K. Dwivedi) Member BoS	 (Prof. D. Rastogi) Member, BoS	 (Dr. S. Tiwari) Member, BoS
 (Dr. R. Kansal) Member, BoS	 (Prof. (Mrs.) A. Tiwari) Member, BoS	 (Dr. S. K. Jain) Member, BoS	 (Dr. A. K. Nema) Expert Nominated By V.C.
 (Dr. Mahesh Jat)	 (Dr. P. K. Jain)		

Subject Expert Nominated by Academic Council


DEAN (ACADEMICS)
M.I.T.S
GWALIOR


(Dr. M. K. Trivedi)
Head of Department & Chairman, BoS

MADHAV INSTITUTE OF TECHNOLOGY & SCIENCE, GWALIOR
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ANNEXURE – I

**(Scheme & Syllabus 7th Sem DE B.Tech Civil
Engineering (2018 Admitted Batch))**

MADHAV INSTITUTE OF TECHNOLOGY & SCIENCE, GWALIOR
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Scheme of Examination
B. Tech. VII Semester (Civil Engineering)

For batches admitted in academic session 2018 – 19

S. No.	Subject Code	Category Code	Subject Name	Maximum Marks Allotted						Total Marks	Contact Periods per Week			Total Credits	
				Theory Slot			Practical Slot		MOOCS		L	T	P		
				End Sem.	Mid Sem.	Quiz / Assignment	End Sem.	Lab Work / Sessional	Assignment						Exam
1.		DE	(DE-3)*	70	20	10	-	-			100	3	-	-	3
2.		DE	(DE-4)*	-	-	-	-	-	25	75	100	2	-	-	2
3.		OC	(OC-2)*	70	20	10	-	-			100	2	1	-	3
4.		OC	(OC-3)*	70	20	10	-	-			100	3	-	-	3
5.	100008	MC	Intellectual Property rights (IPR) (MC)	70	20	10	-	-			100	2	-	-	2
6.	110701	DLC	Software Application for Solving Civil Engineering Problems (DLC-6)	-	-	-	50	50			100	-	-	4	2
7.	110702	DLC	Summer Internship Project – III (04 weeks) (Evaluation) (DLC-7)	-	-	-	50	50			100	-	-	4	2
8.	110703	DLC	Creative Problem Solving (Evaluation) (DLC-8)	-	-	-	25	25			50	-	-	2	1
Total				280	80	40	125	125	25	75	750	12	1	10	18
9.		Additional Courses for obtaining Honours or Minor Specialization by desirous students		Permitted to opt for <u>maximum 02 additional courses</u> for the award of Honours or Minor Specialization											

* At least one of these courses must be run through SWAYAM / NPTEL / MOOC.

SEMESTER – VII			
DE – 3	DE – 4 (Through SWAYAM/NPTEL)	OC – 2	OC – 3
110713. Advanced Structural Design (RCC)	110754. Wastewater Treatment & Recycling	900201. Integrated Waste Management for Smart City	900213. Urban Planning & Transportation Systems.
110714. Hydraulic Structure	110755. Introduction to Multimodal Urban Transportation Systems	900202. Project Planning & Control	
110715. Advanced Structural Analysis	110756. Infrastructure Planning & Management		

ANNEXURE - I

SYLLABUS FOR DEPARTMENTAL ELECTIVE COURSES (DEs) TO BE
OFFERED IN VII SEMESTER

Course Code: 110713

Course Name: Advanced Structural Design (R.C.C.)

L	T	P	Credit
3	0	0	3

Course Objectives:

- 1) To understand the behavior of RC structures like Retaining wall, Water tanks, Highway Bridges and prestressed concrete beams.
- 2) To apply the codal provision for estimation of loads on Retaining wall, Water tanks, Highway Bridges and prestressed concrete beams sections
- 3) To know analysis of Retaining walls, Water tanks, Highway Bridges and prestressed concrete beam sections subjected to realistic loads.
- 4) To learn design of Retaining walls, Water tanks, Highway Bridges and prestressed concrete beam sections using Codal provisions.

Syllabus:

Unit-I

Design of Water Tanks:

General design requirements; Design of circular tanks resting on ground; Design of rectangular tanks resting on ground; Design of under ground tanks.

Unit-II

Over Head Water tanks and Flat Slabs:

Overhead Tank: Intze type (Membrane analysis only), Design of Staging

Design of Flat slabs: (i) Direct design method and (ii) Equivalent frame method; Design Shear.

Unit-III

Earth Retaining Structures:

Types of retaining walls, Stability of retaining walls, Design of Cantilever type retaining wall; Design of Counterfort type retaining walls.

Unit-IV

Design of Bridges:

IRC loading for highway bridges, Design of Slab bridges for IRC Loads; Design of T-beams bridges for IRC Loads.

Unit-V

Prestressed Concrete:

Prestressing concepts, materials; systems of prestressing; prestress losses. Introduction to working & limit state design method for prestress beam sections.

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Course Outcomes:

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

CO1: Explain the structural behaviour of water retaining structures; earth retaining structures; bridges and Prestressed concrete structures.

CO2: Determine design forces in water retaining structures; earth retaining structures; highway bridges; and Prestressed sections.

CO3: Analyse the water retaining structures; earth retaining structures; highway bridges and Prestressed sections for realistic loadings.

CO4: Design economic and safe water retaining structures; earth retaining structures; highway bridges and Prestressed sections as per Codal provisions.

Reference Books:

1. Plain and Reinforced Concrete by O.P. Jain and Jai Krishna Vol. I & II, Nem Chand & Bros, Roorkee
2. Reinforced Concrete Limit State Design by Ashok K. Jain, Nem Chand & Bros, Roorkee.
3. Reinforced Concrete Design by S. U. Pillai and D. Menon, Tata McGraw-Hill Publishing Company Limited, New Delhi.
4. Essentials of Bridge Engineering by D.J. Victor, Oxford and IBH publishers.
5. Design of Bridges by N.K. Raju, CBS Publishers
6. Prestressed Concrete by N.K. Raju, CBS Publishers
7. Advanced Reinforced Concrete Design by P. C. Varghese, Prentice Hall of India publisher
8. Prestressed concrete by T.Y. Lin & N.H. Burns, Wiley publisher

Course Code: 110714

Course Name: Hydraulic Structure

L	T	P	Credit
3	0	0	3

Course Objectives:

- 1) To study the different aspects of design of hydraulic structures.
- 2) To build the necessary theoretical background for the selection of a suitable site for a dam and a suitable dam for a given site location.
- 3) To emphasize on the basic design principle of the gravity dam & earthen dam
- 4) To carry out the stability & seepage analysis of various types of dams.
- 5) To provide knowledge on various hydraulic structures such as energy dissipaters, spillways & gates & understand their designs.
- 6) To understand the design of cross drainage structures for uninterrupted water supply in natural channels and manmade canals.
- 7) To provide a basic knowledge on various types of hydropower plants and their components.

Syllabus:

Unit-I Gravity dams:

Design Criteria, forces acting on gravity dams, elementary profile, low and high gravity dams, stability analysis, evaluation of profile by method of zoning, practical profile, foundation treatment, construction joints, galleries in gravity dams.

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Unit-II Earth and Rock fill dams:

Earth Dams: Types, causes of failure and design criteria, soils suitable for earth dam construction, construction methods, foundation requirements, typical earth dam sections, estimation of seepage through and below the dam, seepage control, stability of slopes by slip circle method, pore pressures, sudden draw down, steady seepage and construction pore pressure condition.

Rock fill dams: Types, merits and demerits, conditions favourable for their adoption

Unit-III Cross drainage works:

Types, selection of suitable type, design criteria, fluming of canal- Mitra & Chaturvedi methods. Design of Different types of CD works.

Unit-IV Spillways, Energy dissipators and gates:

Ogee spillway and its design, details of syphon, shaft, chute and side channel spillways, emergency spillways. Principles of energy dissipation, Energy dissipators based on tail water rating curve and jump height curves, Spillway crest gates – vertical lift and radial gates, their design principles and details.

Unit-V Hydropower Plants:

Hydropower development, assessment of power potential, types of hydropower plants, general features of hydro-electric schemes, selection of turbines, draft tubes, surge tanks, penstocks, power house dimensions, development of micro hydel stations, tidal plants, pumped storage plants and their details.

Course Outcomes:

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

- CO1: Identify different components of hydro project.
- CO2: Explain basic principles of designing hydropower plant & cross drainage works.
- CO3: Solve problems of dam analysis, energy dissipators & cross drainage works.
- CO4: Evaluate suitability of types of hydraulic structures.
- CO5: Design various elements of hydraulic structures.

Reference Books:

1. Engineering for Dams (Volumes I, II & III) by Creager, Justin & Hinds
2. Hydroelectric Hand Book by Creager
3. Hydraulic Structures by Varshney
4. Irrigation & Water Power Engg. By Punmia & Pandey
5. Water Power Engineering by Dandekar
6. Irrigation Engineering & Hydraulic Structure by S.K. Garg.

Course Code: 110715

Course Name: Advanced Structural Analysis

L	T	P	Credit
3	0	0	3

Course Objectives:

- 1) To understand the analytical procedure related to the analysis of building frame by some classical methods viz. Kani's methods and approximate methods of analysis.
- 2) To study the multi storey frames subjected to gravity loads and lateral loads
- 3) To understand matrix method and its application for computer based analysis of structure.
- 4) To understand the influence line concepts for indeterminate structures
- 5) To develop the skill to deal with the problems of moving loads in the structures & their analysis techniques.
- 6) To understand the concepts of plastic analysis of structures.

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Syllabus:

Unit-I

Moment distribution method in analysis of frames with sway, Analysis of box frames, analysis of beams and frames by Kani's methods.

Unit-II

Analysis of tall frames, Calculation of various loads including wind and earthquake loads, Introduction to Code provisions for lateral loads. Approximate analysis of multistorey frames for vertical and lateral loads.

Unit-III

Force method of structural analysis: Application of force method in analysis of rigid connected and pin connected structures

Unit-IV

Rolling Loads and Influence Lines: Influence Lines for Statically determinate and indeterminate structures, Muller Breslau Principle

Unit-V

Displacement method of structural analysis. Introduction to use of softwares for analysis: Modeling, analysis and post processing.

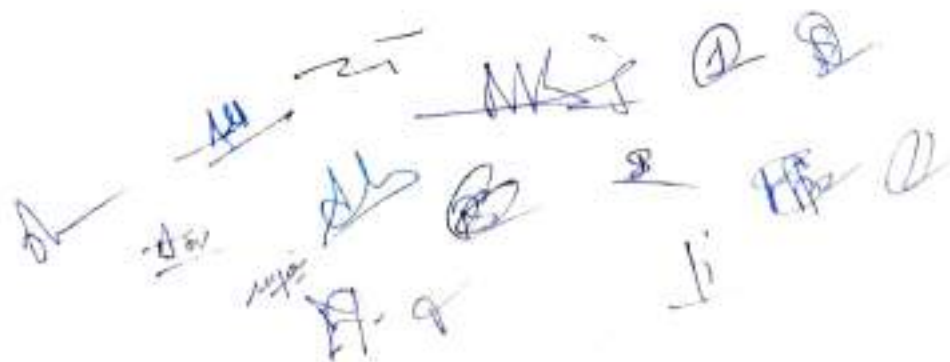
Course Outcomes:

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

- CO 1: Determine response of structures by classical methods
- CO 2: Use approximate methods for analysis of statically indeterminate structures
- CO 3: Determine response of structures by matrix force method
- CO 4: Evaluate and draw the influence lines for reactions, shears, and bending moments in beams and girders due to moving loads
- CO 5: Model and analyze structural systems (building) with the aid of softwares

Reference Books:

1. Reddy C.S., Basic Structural Analysis, Tata McGraw Hill Publishing Company, New Delhi.
2. Structural Analysis 5ed. (2015) by Aslam Kassimali, Cengage.
3. Structural Analysis, 10th Edition by Russell C. Hibbeler, 2018, Pearson.
4. Matrix Analysis of Structures, SI Edition, by Aslam Kassimali, 2021 CI Engineering
5. Weaver W & Gere J.M. Matrix Methods of Framed Structures, CBS Publishers & Distributors, Delhi



ANNEXURE – II

**(Syllabus OC 7th Sem B.Tech Civil Engineering
(2018 Admitted Batch))**

ANNEXURE – II

SYLLABUS FOR OPEN CATEGORY COURSES (OCs) TO BE
OFFERED IN VII SEMESTER

Course Code: 900201

Course Name: Integrated Waste Management for Smart City

L	T	P	Credit
2	1	0	3

Course Objectives:

- 1) To provide broad knowledge on various aspects of planning & implementation of waste management system in a smart city/town.
- 2) To understand the principles applied in waste management.
- 3) To understand various ways to collect, treat & disposal of waste.
- 4) To understand various methods of energy recovery from waste.
- 5) To understand various aspects of hazardous waste management, E-waste management, biomedical waste management etc.

Syllabus:

Unit I:

Introduction to waste management, classification of solid waste, objective of solid waste management, principles of integrated waste management, 3R policy, various laws & rules of waste management (MSW Rules, hazardous waste management rules, E-waste rules etc.), role of various agencies in planning of waste management system, swachh bharat mission and smart cities program – implementation, current status, challenges and future trend of waste management.

Unit II:

Municipal solid waste – generation, composition, characterization, handling of waste at source, collection of waste – collection system, collection routes, collection equipments, transportation of waste, transfer stations, segregation and recycling of waste, disposal of waste through landfills – types of landfills, planning & operation of landfills, leachate management & control of gases in landfills, environmental monitoring of landfills.

Unit III:

Energy recovery from municipal solid waste - thermal conversion technologies, incineration, pyrolysis, gasification, environmental control system, biological & chemical conversion technologies, aerobic composting, anaerobic digestion, refuse derived fuels, other biological and chemical transformation methods.

Unit IV:

Hazardous waste management – characteristics, source, health effects, physiochemical treatment methods of hazardous waste, disposal of hazardous waste, Biomedical waste management – sources, health effects, issues in India, challenges, handling of biomedical waste.

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Unit V:

E-waste management – sources, health effects, issues in India, challenges, handling of E-waste. Plastic waste management – types of plastics, sources of plastic waste, impacts of plastic waste, plastic waste management practices. Management of construction & demolition wastes.

Course Outcomes:

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

CO 1: Explain the principles & concepts of waste management.

CO 2: Apply various techniques of handling the waste.

CO 3: Apply various techniques of energy recovery from waste.

CO 4: Plan an effective & efficient waste management system.

Text Books:

1. Text Book of Solid Wastes Management, Iqbal H. Khan and Naved Ahsan, CBS Publishers, 1st edition 2012.
2. Integrated Solid Waste Management, Hilary Theisen and Samuel A. Vigil, George Tchobanoglous, McGraw Hill New York, 1993.

Reference Books:

1. Environmental Engineering, Rowe, Peavy & Tchobanoglous, Tata McGraw Hill Publications, 2017.
2. CPHEEO, Manual on Municipal Solid Waste management, Central Public Health and Environmental Engineering organization, Government of India, New Delhi, 2016.
3. Solid Waste Engineering, Vesilind P. A., Worrel H. W. and Reinhard, Thomson Learning Inc, 2003.

Course Code: 900202

Course Name: Project Planning & Control

1	T	P	Credit
2	1	0	3

Course Objectives:

- 1) To know about techniques of project planning.
- 2) To develop the network of project's activities.
- 3) To understand the precedence network technique.
- 4) To discuss the resource utilization in project.
- 5) To understand the project cost control.

Syllabus:

Unit 1

Project Planning

Introduction to Project Planning Process: Types of Project Plans: Project feasibility plan, Project preliminary plan. Introduction to network techniques – CPM, PERT and Precedence network.

Project Work Breakdown: Levels of Project work breakdown. Identification of construction activities by work breakdown structure. Activity duration and methods of estimating activity duration. One time estimate, three time estimates, triangular distribution estimate. Duration estimation procedure.

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Unit - II

Project Network Analysis:

Elements of Network, development of network, Numbering of events, Event times – Earliest events time and latest event time. Slack, critical events. Activity times – Earliest start time, Latest finish time, Float and critical activities. Network critical path and its significance. Network analysis by CPM – Defining scope of work, determining activities, establishing work package logic, preparation of network logic program and draft network. Numerical problems.

Unit-III

Precedence Network Analysis:

Precedence Network Analysis – Modeling procedure analysis of time in PN. Use of PN in repetitive works network. Difference between PN and CPM. Application of Network techniques and their limitations.

Unit-IV

Resource Planning:

Resources, Types of resources – renewable and non-renewable resources, Resource Histogram, Method of Resource allocation – resource smoothing and resource levelling.

Unit-V

Project Cost Control:

Direct and indirect cost, slope of direct cost curve, Total project cost and optimum duration, contracting the network for cost optimization, Escalate & Variation in prices.

Course Outcomes

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

- CO 1: Know the project planning and project network.
- CO 2: Analyze the network by CPM & PERT,
- CO 3: Analyze the project using precedence network.
- CO 4: Analyze the effect of resource planning on project.
- CO 5: Evaluate the cost of project during planning.

Recommended Books:

1. Project planning and Control with PERT and CPM by Dr. B.C. Punmia, K.K. Khandelwal
2. CPM & PERT by L.S. Srinath
3. Construction Management by Sen & Gupta
4. CPM & PERT by Weist & Levy

Course Code: 900213

Course Name: Urban Planning & Transportation Systems

L	T	P	Credit
3	0	0	3

Course Objectives:

- 1) To introduce the scope and nature of Urban Planning and Transportation Systems as disciplines.
- 2) To understand the objectives, domains and principles of town planning.
- 3) To study the urbanization trends in India - Issues, concerns and experiences; City planning process and implementation framework in Indian context
- 4) To differentiate between types of plans and concepts in planning.

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- 5) To understand how urbanization and why migration takes place in an urban region.
- 6) To understand the traditional and current planning processes and techniques involved in the urban and transportation planning.
- 7) To understand the urban governance, policies and strategies of the government to tackle issues of an urban environment.
- 8) To understand the impact of technology in both urban and transportation planning.

Syllabus:

Unit-I Introduction to planning discipline

Defining planning as a discipline, it's multidisciplinary nature, role of a planner, Objectives and Principles of Urban planning.

Fields of planning - Urban, regional, environmental, transport and infrastructure.

Evolution of settlements- Settlement size, pattern and structure as a function of sociocultural, economic, military and religious factors in historical cities.

Concepts of different types of cities like garden city, linear city etc.

Contributions of eminent planners: Lewis Mumford, Ebenezer Howard, Patrick Geddes, Sir Arthur Clarence Perry, Charles Correa, Le-Corbusier.

Unit-II Urbanization

Definition of urbanization, rural-urban migration, various definitions of town and country planning, goals and objectives of planning, socio-economic impacts of growth of urban areas, significance of Census and Demographics, impacts of urbanization, impact of Government Policies on urbanization, urban structure and form - land use distribution, different Land use planning norms.

Overview of Urban Governance Definition, concepts, components, government and governance, hierarchy and structure, forms of governance, process of inclusion and exclusion, 73rd and 74th Constitution Amendment Acts.

Unit-III Transportation Systems

Evaluation of urban structure: Transport system, infrastructure and management, transport systems and their types, urban road hierarchy, planning, and management criteria for road and junction improvements, arterial improvement techniques.

Transport survey and studies: study area definitions, survey and their types, sampling methods, survey techniques.

Transportation Planning Process and analytical techniques: Techniques for urban structures analysis, Urban travel characteristics.

Transport and environment: Traffic noise, factor affecting noise statement measures, standards, air pollution standards, traffic safety, accident reporting and recording systems, factors affecting road safety, transport planning for different target groups.

Unit-IV Planning in Indian Context

Introduction to types of plans with choice of appropriate scale- development plans, master plan, city development plan, structure plan, district plan, action area plan, subject plan, comprehensive planning, zonal plans etc., hierarchy of plans: regional plan, sub-regional plan, sector plans and spatial plans, town planning schemes, contents of base maps at various scales, notations, measurement of areas.

Database for planning and socio - economic surveys: data requirements for urban and regional planning, sources of primary and secondary data, questionnaire design, measurement scale and their application, sampling techniques; Objectives, types, and significance of planning surveys.

Role of URDPFI guidelines in Town planning, Urban Development Policies and Programmes at various

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levels.

Graphic presentation of statistical and spatial data.

Unit-V Current trends in urban planning and transportation systems

Indian scenario - Issues and Policies, Global scenario, Future trends of urbanization. Review of existing traffic management schemes in Indian cities.

Impact of technology on urban forms and planning, role of disruptive innovations and disaster mitigation in urban planning, advanced transportation systems with their merits and demerits, Intelligent transport system (ITS) its types and applications.

Course Outcomes:

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

CO1: Explain the concepts for planning a city and land-use patterns.

CO2: Differentiate various theories used in urban planning.

CO3: Analyse various requirements for transportation systems.

CO4: Design approaches in addressing the issues and concerns of urban environment through planning.

CO5: Plan strategies for any project with an urban planning perspective as a member and/or leader in a team of planning projects.

Text Books:

1. A.B. Gillion and Simon Eisner, "The Urban Pattern", CBS Publishers and Distributors, Delhi.
2. Rishma A., "Town Planning in Hot Cities", Mir Publishers, Moscow.
3. Ward S (2002), "Planning the 20th Century City" John Wiler & Sons.
4. R. Ramachandran, "Urbanisation and Urban Systems in India", Oxford Publications.
5. K. C. Shivrama Krishnan, "Revisioning Indian Cities", Sage Publications.
6. ITPI reader
7. Bruton, M.J., "Introduction to Transportation Planning," Hutchinson Publication, London.
8. Kadiali, L.R., "Traffic and Transportation Planning", Khanna Publishers, Delhi.

Reference Books:

1. Broadbent, Geoffery: "Emerging Concepts in Urban Space Design", Van Nostand Reinhold, 1990.
2. Edmund Bacon. "Design of Cities". Penguin. 1976.
3. Francis Tibbalds, "Making people-friendly towns: improving the public environment in towns and cities", Longman, 1992.
4. Rob Krier. "Urban Space", Random House Incorporated, 1979.
5. Jonathan Barnett, "Urban design as public policy: practical methods for improving cities", Architectural Record Books, 1974.
6. Papacoster, C S And Prevendons. "Transportation Engineering and Planning" Prentice Hall of India
7. Introduction to transport planning by Michael J Bruton
8. Principal of Urban transport system planning by Hutchinson

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ANNEXURE – III

**(Modified Syllabus DC 5th Sem B.Tech Civil Engineering
(2019 Admitted Batch))**

Course Code: 110502

Course Name: Structural Design & Drawing (R.C.C.)

L	T	P	Credit
3	1	0	4

Course Objectives:

- 1) To understand various design philosophies for RC components.
- 2) To study the desired properties of steel and concrete for use in Reinforced concrete.
- 3) To learn design of RC elements for flexure and deflection.
- 4) To learn design of RC elements for shear and bond as per relevant IS codes.
- 5) To learn design of RC elements subjected to compression.

Syllabus:

Unit-I

Design principles: Materials; Introduction to IS 456; Design philosophies: Working stress, Ultimate load and Limit state design

Singly reinforced beam sections: Analysis and design of singly reinforced rectangular beams: Lintel, Cantilever, Simply supported beams; Design for deflection.

Unit-II Design of Beams:

Design for Shear; Design for bond; Doubly-reinforced and Flanged sections; Design of Continuous beams

Unit-III Design of Slabs:

Slabs spanning in one direction: Cantilever, Simply supported and Continuous slabs; Slabs spanning in two directions; Circular slabs.

Unit-IV Columns & Footing:

Design of short columns subjected to axial loads, axial load and bending moments (section with no tension); Design of long columns; Introduction to IS 13920; Design of isolated and combined footings.

Unit-V Staircases:

Design of Staircases with waist slab: straight flight, dog legged, and open well staircase with different support conditions; Design of Tread-riser (without waist slab) staircase.

Course Outcomes:

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

- CO1: Apply the concepts of different design philosophies for deriving basic expressions used in RC design.
- CO2: Determine the capacity of RC elements using IS456 guidelines.
- CO3: Analyze the RC elements for determining design variables as per IS456 & IS 875 recommendations.
- CO4: Design the RC elements as per IS 456 provisions.
- CO5: Develop the design sketches for RC elements as per IS456; IS13920 and SP34 provisions.

Text Books:

1. Reinforced Concrete Limit State Design, A.K. Jain, Nem Chand Pub., 7th edition, 2012
2. Reinforced Concrete, Pillai & Menon, Tata McGraw Hill, New Delhi, 3rd edition, 2017
3. Limit State Design, P.C. Varghese, Prentice Hall of India, New Delhi, 2nd edition, 2008
4. RCC Design, Neelam Sharma. Katson Publishers, 2014

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Reference Books:

1. Reinforced Cement Concrete, P. Dayaratnam, Medtech Publishers, 5th edition, 2017
2. Reinforced Concrete Design, S.N. Sinha, Tata McGraw Hill, 3rd edition, 2017
3. Plain and Reinforced Concrete, O.P. Jain and Jai Krishna, Nem Chand Pub., 8th edition, 2008
4. Reinforced Cement Concrete, Winter & Nelson, McGraw Hill, 11th edition, 1991

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ANNEXURE – IV

**(Scheme & Syllabus 3rd & 4th Sem B.Tech Civil
Engineering (2020-2021 onwards Admitted Batch))**

Scheme of Examination
GROUP X: I Semester
B. Tech. I Semester (Civil Engineering)

For batches admitted in academic session 2020 - 21 onwards

S. No.	Subject Code	Category Code	Subject Name	Maximum Marks Allotted							Total Marks	Contact Hours per week			Total Credits	Mode of Teaching (Offline/ Online)	Mode of Exam
				Theory Slot				Practical Slot				L	T	P			
				End Term Evaluation		Continuous Evaluation		End Sem Exam	Continuous Evaluation								
				End Sem Exam	Proficiency in subject /course	Mid Sem Exam	Quiz/ Assignment		Lab Work & Sessional	Skill Based Mini Project							
1.	100011	BSC	Engineering Mathematics – I (BSC - 1)	50	10	20	20	-	-	-	100	3	1	-	4	Offline (4/0)	PP
2.	100012	BSC	Engineering Chemistry (BSC - 2)	50	10	20	20	60	20	20	200	2	1	2	4	Blended (2/1)	MCQ
3.	100014	ESC	Engineering Graphics (ESC - 1)	50	10	20	20	-	-	-	100	1	2	-	3	Blended (2/1)	A+O
4.	100015	HSMC	Energy, Environment, Ecology & Society (HSMC - 1)	50	10	20	20	-	-	-	100	3	-	-	3	Online (0/3)	MCQ
5.	100016	HSMC	Technical Language (HSMC - 2)	50	10	20	20	-	-	-	100	3	-	-	3	Blended (2/1)	PP
6.	100017	HSMC	Language Lab (HSMC - 3)	-	-	-	-	60	20	20	100	-	-	2	1	Offline (1/0)	SO
7.	100018	ESC	Engineering Graphics Lab (ESC - 2)	-	-	-	-	60	20	20	100	-	-	2	1	Offline (1/0)	SO
Total				250	50	100	100	180	60	60	800	12	4	6	19	-	-

Induction programme of three weeks (MC): Physical activity, Creative Arts, Universal Human Values, Literary, Proficiency Modules, Lectures by Eminent People, Visits to local Areas, Familiarization to Dept./Branch & Innovations.

GROUP X: (Civil, Mechanical, Electrical and Automobile)

GROUP Y: (Electronics, Computer Science & Engineering, Information Technology, Electronics & Telecommunication, Chemical) 01 Theory

Period = 1 Credit; 02 Practical Periods = 1 Credit

MCQ – Multiple Choice Questions, PP – Pen paper Mode, A+O – Assignment + Oral, SO – Submission + Oral, CLC – College Level Course

Mode of Teaching				Mode of Examination				Credits
Theory		Lab		Theory			Lab	
Offline	Online	Blended		Offline	PP	A+O	MCQ	
		Offline	Online					
4	3	6	3	3	7	3	6	3
21%	16%	31%	16%	16%	33%	16%	31%	16%

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(170)

B. Tech. II Semester (Civil Engineering)

For batches admitted in academic session 2020 - 21 onwards

S. No.	Subject Code	Category Code	Subject Name	Maximum Marks Allotted						Total Marks	Contact Hours per week			Total Credits	Mode of Teaching (Offline/ Online)	Mode of Exam	
				Theory Slot				Practical Slot			L	T	P				
				End Term Evaluation		Continuous Evaluation		End Sem Exam	Continuous Evaluation								
				End Sem Exam	Proficiency in subject /course	Mid Sem Exam	Quiz/ Assignment		Lab Work & Sessional		Skill Based Mini Project						
1.	110211	DC	Building Planning & Design (DC - 1)	50	10	20	20	-	-	-	100	1	-	-	3	Blended (2/1)	PP
2.	100020	ESC	Basic Civil Engineering & Mechanics (ESC - 3)	50	10	20	20	-	-	-	100	2	1	-	3	Blended (2/1)	PP
3.	100021	ESC	Basic Mechanical Engineering (ESC - 4)	50	10	20	20	-	-	-	100	2	1	-	3	Blended (2/1)	MCQ
4.	100022	ESC	Basic Electrical & Electronics Engineering (ESC - 5)	50	10	20	20	60	20	20	200	2	1	2	4	Blended (2/1)	MCQ
5.	100023	ESC	Basic Computer Engineering (ESC - 6)	50	10	20	20	60	20	20	200	2	1	2	4	Blended (2/1)	A+O
6.	100024	ESC	Manufacturing Practices (ESC - 7)	-	-	-	-	60	20	20	100	-	-	2	1	Offline (1/0)	SO
7.	100026	ESC	Basic Civil Engineering Lab (ESC - 8)	-	-	-	-	60	20	20	100	-	-	2	1	Offline (1/0)	SO
Total				250	50	100	100	240	80	80	900	11	4	8	19	-	-
8.		MAC	Engineering Physics (Mandatory VAC)	50	10	20	20	-	-	-	100	2	-	-	Grade	Online	MCQ

Summer Internship Project - I (Institute Level) (Qualifier): Minimum two-week duration; Evaluation in III Semester.

The certification/marksheet will be issued separately by examination cell.

Mode of Teaching				Mode of Examination					
Theory		Blended		Lab		Theory		Lab	
Offline	Online	Offline	Online	Offline	PP	A+O	MCQ	SO	
-	-	10	5	4	6	3	6	4	19
		53%	26%	33%	33%	12%	33%		

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Scheme of Examination
B.Tech. III Semester (Civil Engineering)

For batches admitted in academic session 2020 - 21 onwards

S. No.	Subject Code	Category Code	Subject Name	Maximum Marks Allotted						Contact Hours per week			Total Credits	Mode of Teaching (Offline/Online)	Mode of Exam		
				Theory Slot			Practical Slot			Total Marks	L	T				P	
				End Term Evaluation		Continuous Evaluation		End Sem Exam	Continuous Evaluation								
				End Sem Exam	Proficiency in subject /course	Mid Sem Exam	Quiz/ Assignment		Lab Work & Sessional								Skill Based Mini Project
1.	100025	BSC	Engineering Mathematics - II (BSC - 3)	50	10	20	20	-	-	-	100	3	-	-	3	Offline (3:0)	PP
2.	110311	DC	Building Materials & Construction (DC - 2)	50	10	20	20	60	20	20	200	2	1	2	4	Blended (2:1)	PP
3.	110312	DC	Fluid Mechanics - I (DC - 3)	50	10	20	20	60	20	20	200	2	1	2	4	Blended (2:1)	PP
4.	110313	DC	Surveying (DC - 4)	50	10	20	20	-	-	-	100	2	1	-	3	Blended (2:1)	PP
5.	110314	DC	Strength of Materials (DC - 5)	50	10	20	20	60	20	20	200	2	1	2	4	Blended (2:1)	PP
6.	110315	DLC	Survey Practice Lab (DLC - 1)	-	-	-	-	60	20	20	100	-	-	2	1	Offline (1:0)	SO
7.	110316	DLC	Self-learning /Presentation (SWAYAM/NPTEL MOOC)*	-	-	-	-	-	40	-	40	-	-	2	1	Online - Mentoring	SO
8.	200XXX	-	Novel Engaging Courses	-	-	-	-	50	-	-	50	-	-	2	1	Interactive	SO
9.	110317	DLC	Summer Internship Project-I (Institute Level) (Evaluation)	-	-	-	-	60	-	-	60	-	-	4	2	Offline (2:0)	SO
Total				250	50	100	100	350	120	80	1050	11	4	16	23	-	-
10.	1000001	VIA	Indian Constitution & Traditional Knowledge (Mandatory VIA)*	50	10	20	20	-	-	-	100	2	-	-	Grade	Online	MCQ

* compulsory registration for one online course using SWAYAM/NPTEL MOOC, evaluation through attendance, assignments and presentation

* Proficiency in course/subject - includes the weightage towards ability /skill /competence /knowledge level /expertise attained /attendance etc. in that particular course/subject

The certification mark-sheet will be issued separately by examination cell.

Mode of Teaching						Mode of Examination						
Theory				Lab/SIP	Seminar	NEC	Theory			Lab	SIP/SIP/NEC	
Offline	Online	Blended		Offline	Online Mentoring	Interactive	PP	A+O	MCQ	SO	SO	
		Offline	Online									
3	-	8	4	6	1	1	15	-	-	4	4	23
11%	-	34%	18%	26%	4%	4%	64%	-	-	18%	18%	Credits %

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P, M, K, T, D, etc.

Scheme of Examination
B.Tech. IV Semester (Civil Engineering)

For batches admitted in academic session 2020-21 onwards

S. No.	Subject Code	Category Code	Subject Name	Maximum Marks Allotted							Total Marks	Contact Hours per week			Total Credits	Mode of Teaching (Offline/ Online)	Mode of Exam
				Theory Slot				Practical Slot				I	T	P			
				End Term Evaluation		Continuous Evaluation		End Sem Exam	Continuous Evaluation								
				End Sem Exam	Proficiency in subject /course	Mid Sem Exam	Quiz/ Assignment		Lab Work & Sessional	Skill Based Mini Project							
1.		BSC	Engineering Mathematics - III (BSC - 4)	50	10	20	20	-	-	-	100	3	-	-	3	Offline (3/0)	PP
2.	110411	DC	Geotechnical Engineering - I (DC - 6)	50	10	20	20	60	20	20	200	2	1	2	4	Blended (2:1)	PP
3.	110412	DC	Theory of Structure- I (DC - 7)	50	10	20	20	-	-	-	100	2	1	-	3	Offline (3/0)	PP
4.	110413	DC	Transportation Engineering (DC - 8)	50	10	20	20	60	20	20	200	2	1	2	4	Blended (2:1)	PP
5.	110414	DC	Water Resources Engineering (DC - 9)	50	10	20	20	-	-	-	100	2	1	-	3	Blended (2:1)	PP
6.	110415	DLC	Civil Drawing Lab (DLC - 2)	-	-	-	-	60	20	20	100	-	-	2	1	Offline (1/0)	SO
7.	100004	MO	Cyber Security	50	10	20	20	-	-	-	100	3	-	-	3	Online (0/3)	MCQ
8.	200XXX	CCC	Novel Engaging Courses	-	-	-	-	50	-	-	50	-	-	2	1	Interactive	SO
Total				300	60	120	120	230	60	60	950	14	4	8	22	-	-
9.	1000002	MO	Biology for Engineers (Mandatory VAC)	50	10	20	20	-	-	-	100	2	-	-	Grade	Online	MCQ

Summer Internship Project-II (Soft skills Based) for two weeks duration: Evaluation in V Semester

Proficiency in course subject - includes the weightage towards ability /skill/ competence /knowledge level /expertise attained /attendance etc. in that particular course subject
The certification for subject will be issued separately by examination cell.

Mode of Teaching						Mode of Examination						Credits %
Theory		Blended		Lab	NEC	Theory		Lab	NEC			
Offline	Online	Offline	Online	Offline	Interactive	PP	A+O	MCQ	SO	SO		
6	3	6	3	3	1	18	-	3	3	1		
27%	14%	27%	14%	14%	4%	68%	-	14%	14%	4%	22	

M. K. Singh

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**DEPARTMENT OF CIVIL
ENGINEERING**

**SYLLABUS B.Tech Civil
Engineering**

**2020 ONWARDS ADMITTED
BATCHES**

SEMESTER-
III

MADHAV INSTITUTE OF TECHNOLOGY & SCIENCE, GWALIOR

(A Govt. Aided U.G. Autonomous & NAAC Accredited Institute Affiliated to I.C.G.P.V., Bhopal MP)

Course Code: 110311

Course Name: Building Materials & Construction

L	T	P	Credit
2	1	2	4

Course Objectives:

1. To study the properties of concrete ingredients i.e. cement, Sand and coarse aggregate by conducting different tests.
2. To select of different types of admixtures to improve the properties of concrete for different field applications.
3. To conduct the field and laboratory tests on concrete in fresh and hardened state.
4. To provide knowledge about various types of bricks, stones, woods & timber, ferrous & nonferrous construction material & their applications.
5. To provide knowledge on design of foundation, including selection of appropriate foundation.
6. To understand laying & construction of brick & stone masonry and various methods of damp proofing etc.
7. To provide knowledge about stairs, floors & roofs in various types of buildings.

Syllabus:

Unit-1

Types of Foundation & its design: masonry construction, masonry classification, stone v/s brick masonry, joints in stone masonry, brick masonry (bonds in brick masonry, characteristics of bonds, type of bonds), typical structures in brickwork, Damp prevention (causes, effects, control & prevention techniques, material used for damp proofing), Anti termite treatment, water proofing treatment, Arches & lintels, stair & stair case, (types & design of stair case), Types of floor & flooring, Roof & roof covering.

Unit - II

Ingredients of Concrete: Portland cement Chemical composition of cement, Hydration of cement, setting of cement, tests on physical properties of cement. Types of Portland cement - Ordinary Portland cement - Rapid Hardening Portland cement - low heat Portland cement- Sulphate Resisting cement - Portland Blast furnace cement- Super Sulphated cement- Portland Pozzolana cement and Pozzolanas. Fly ash; use of pozzolanas, white cement, Expansive cements - High alumina cement.

Aggregates: General classification of aggregates, natural and artificial aggregates, particle shape and texture, bond of aggregate, strength of aggregate, Mechanical properties of aggregate, specific gravity, Bulk density, porosity and absorption of aggregate, moisture content of aggregate, Bulking of sand deleterious substances in aggregates, organic impurities. Soundness of aggregates, Alkali-aggregate reaction, Alkali carbonate reaction, sieve analysis - Grading curves. Fineness modulus, Grading requirements, Grading of fine and coarse aggregates and Gap graded aggregates. Thermal properties of aggregates.

Admixtures: Introduction, functions of admixtures, classification of admixtures. Accelerators, Retarders, Water Reducing Agents, Super plasticizers.

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Unit-III

Fresh and Hardened Concrete: Fresh Concrete, Workability of concrete, factors affecting workability, measurement of workability using slump test, Compaction factor test, Flow test, Vee-Bee Test, Ball penetration test, Nasser's 'K'- probe test, Segregation and Bleeding of concrete, Mixing of concrete, Vibration of concrete, Different types of mixers and vibrators, Concreting in Hot weather and Cold weather.

Hardened Concrete: Compressive & Flexural strength of concrete, Stress and strain characteristics of concrete, drying shrinkage of concrete, Creep of concrete, Permeability and durability of concrete, Fire resistance of concrete, Thermal properties of concrete. Micro-cracking of concrete, methods of curing, Influence of temperature on strength, Fatigue & Impact strength of concrete.

Unit IV

Bricks (classification, characteristics, manufacturing, testing, and types). Stones (classification, Quarrying, seasoning characteristics, testing, selection & uses, preservation), Wood & Timber (Classification, Structure & characteristics, seasoning and its methods, defects & diseases, preservation & various treatment testing), wood products and their applications

Unit V

Mortar (Classification, characteristics, functions of ingredients). Types of mortar and their uses grout, guniting, ferrous material (Pig iron, CI, Mild steel, wrought iron, stainless steel, compositions & proposition). Reinforced steel bars (classification, types, designation), Aluminium (its alloys & uses). Copper (its alloys & uses), Ceramics (classification, properties, commercial forms), Paint varnishes & enamels (types, composition, method of application, defects)

Course Outcomes:

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

- CO1: **Explain** the basic elements of buildings, engg. materials & construction.
- CO2: **Evaluate** the properties of various materials like cement, aggregate, concrete, admixture, brick, stone etc.
- CO3: **Distinguish** the suitability of building materials in the construction of elements of buildings.
- CO4: **Evaluate** various types of concrete in building construction accordingly.
- CO5: **Apply** various techniques for finishing & protection works of various elements of building.

Text Books:

1. Concrete Technology, M. L. Gambhir, Tata McGraw Hill education Pvt. Ltd., 5th edition 2013
2. Concrete Technology, M.S. Shetty, S. Chand Publications, 2006
3. Building Materials, M.L. Gambhir, Tata McGraw Hill education Pvt. Ltd., 2017
4. Building Construction, B.C. Punmia, A.K. Jain, Laxmi Publishers New Delhi, 2016

Reference Books:

1. Properties of Concrete, Neville, ELBS, Pearson Education, 5th edition 2012
2. Building Material, S.K. Duggal, New Age Publishers, 4th revised edition 2012

List of Experiments:

1. Determination of properties of cement.
2. Determination of properties of sand.
3. Determination of properties of aggregate.
4. Determination of Fineness of cement.



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5. Determination of consistency of cement.
6. Determination of workability of concrete by slump test.
7. Determination of workability of concrete by compacting factor apparatus.
8. Determination of workability by Vee Bee consistometer.
9. Determination of water absorption of bricks.
10. Determination of efflorescence of brick.
11. Field testing on bricks.
12. Determination of crushing strength of bricks.

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

CO 1: Determine the properties of cement, sand & aggregate as per IS code.

CO 2: Determine the workability of concrete for suitability of concrete mix in different construction works.

CO 3: Evaluate compressive strength of various concrete mixes.

CO 4: Determine physical properties of brick by experiment and practice accordingly.

CO 5: Examine the properties of the cement mortar for various elements of the buildings



Course Code: 110312

Course Name: Fluid Mechanics - I

L	T	P	Credit
2	1	2	4

Course Objectives:

- 1) To understand fluid properties and concept of fluid continuum.
- 2) To understand the concepts of kinematics & dynamics of fluid flow.
- 3) To apply fluid flow principles to various fluid flow problems.
- 4) To understand the mechanism of fluid measurement.
- 5) To understand the method of simulation & dimensional analysis.
- 6) To understand the concepts of laminar flow.

Syllabus:

Unit I

Review of Fluid Properties: Engineering units of measurement, density, specific weight, specific volume, specific gravity, surface tension, capillary, viscosity, bulk modulus of elasticity, pressure and vapour pressure.

Fluid Statics: Pressure at a point, pressure variation in static fluid, Absolute and gauge pressure, manometers, Forces on plane and curved surfaces (Problems - gravity dams and Tainter gates), buoyant force, Stability of floating and submerged bodies, Relative equilibrium.

Unit II

Kinematics of Flow: Types of flow-ideal & real, steady and unsteady, uniform & non-uniform, one, two and three dimensional flow, path lines, streamlines, streamlines and stream tubes, continuity equation for one and three dimensional flow, rotational & irrotational flow, circulation, stagnation point, separation of flow, sources & sinks, velocity potential, stream function, flownets-their utility & method of drawing flownets.

Unit III

Dynamics of Flow: Euler's equation of motion along a streamline and derivation of Bernoulli's equation, application of Bernoulli's equation, energy correction factor, linear momentum equation for steady flow, momentum equation, forces of fixed and moving vanes, velocity triangles.

Fluid Measurements: Velocity measurement, flow measurement (Orifices, nozzles, mouth pieces, orifice meter, Nozzle meter, venturimeter, weirs and notches).

Unit IV

Dimensional Analysis and Hydraulic Similitude: Dimensional analysis, dimensional homogeneity, use of Buckingham-pi theorem, calculation of dimensionless numbers, similarity laws, specific model investigations (submerged bodies, partially submerged bodies, weirs, spillways, etc.)

Unit V

Laminar Flow: Introduction to laminar, transition & turbulent flow, Reynolds experiment & Reynolds number, relation between shear & pressure gradient, laminar flow through circular pipes, laminar flow between parallel plates, laminar flow through porous media, stokes law, Bach wash processing, Instability of laminar flow to turbulent flow.



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Course Outcomes:

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

- CO 1: Define various fluid properties & states of fluid.
- CO 2: Apply principles of fluid flow & dimensional analysis.
- CO 3: Solve fluid flow problems.
- CO 4: Analyze characteristics of fluid at rest, fluid at motion & dimensionless numbers.
- CO 5: Discriminate different types of fluid flow, measurement techniques & principles.
- CO 6: Apply the concepts of laminar flow in solving various fluid flow problems.

Text Books:

1. Fluid Mechanics, Modi & Seth, Standard Book House, Delhi, 21st edition, 2018.
2. Fluid mechanics, Girde & Mirazgaonkar, SCI Tech Publishers, 2019
3. Fluid Mechanics, R.K. Bansal, Laxmi Publishers, 2015

Reference Books:

1. Fluid Mechanics, A.K. Jain, Khanna Publishers, Delhi, 2014
2. Fluid Mechanics, Streeter, McGraw Hill Publishers, 9th edition, 2017

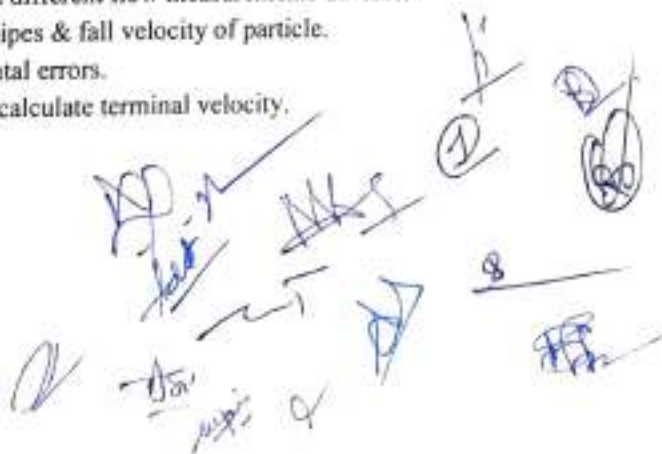
List of Experiments:

1. Determination of viscosity of fluid by redwood viscometer
2. Determination of metacentric height of floating body
3. Calibration of Venturimeter
4. Determination of C_c , C_d , C_v of Circular Orifice
5. Calibration of Mouthpiece
6. Calibration of Orifice Meter
7. Reynolds experiment for demonstration of stream lined & turbulent flow
8. Determination of Friction Factor for a pipe
9. Verification of Stoke's law.

Course Outcomes:

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

- CO 1: Differentiate between different flow measurements devices.
- CO 2: Notice flow through pipes & fall velocity of particle.
- CO 3: Correct the instrumental errors.
- CO 4: Apply Stoke's law to calculate terminal velocity.



Course Code: 110313
Course Name: Surveying

L	T	P	Credit
2	1	0	3

Course Objectives:

- 1) To understand the working of theodolite.
- 2) To understand the determination of heights & distances by tacheometry.
- 3) To understand various types of curves used in practice.
- 4) To provide knowledge on setting out civil engineering works & detailed field surveying.
- 5) To understand the concepts of hydrographic & photographic surveying.

Syllabus:

Unit I

Traversing by theodolite, Fieldwork checks, traverse computations, latitude and departures, computations of co-ordinates, plotting & adjustment of traverse. Omitted measurements. Trigonometrical levelling, precise levelling.

Unit II: Tacheometry

Tacheometric systems and principles, stadia system, uses of anallactic lens, tangential system, substance system, instrument constant, field work reduction, direct reading tacheometers, use of tacheometry, accuracy.

Unit III: Curves:

Classification and use, elements of circular curves, setting out curves by offsets and by theodolites, obstacles and special problems, compound curves, reverse curves, transition curves, cubic spiral and lemniscate, vertical curves, computation and setting out.

Unit IV: Control Surveys:

Providing frame work of control points, triangulation principle, forms of framework, reconnaissance survey, selection and making of stations, Control line, baseline measurement & corrections, flexible apparatus and corrections, computation of sides, precisetraversing.

Unit V: Photographic & Hydrographic Surveying:

Principles of photographic surveying - aerial photography, tilt and height distortions, uses. Hydrographic Surveying - Methods, Elements of Hydrographic Surveying.

Course Outcomes:

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

- CO1: Explain** the techniques used for linear & angular measurements in surveying.
- CO2: Analyse** different geodetic methods of survey such as triangulation, trigonometric levelling, tachometry, photographic & hydrographic surveying.
- CO3: Apply** methods in control surveys.
- CO4: Apply** tachometry in traverse computations.
- CO5: Apply** various methods for setting curves, area & volume computations.

Text Books:

1. Surveying Vol. I, II, III, B.C. Punmia, Laxmi Publications New Delhi, 2016
2. Fundamentals of surveying, S.K. Roy, Prentice Hall of India New Delhi, 2nd edition 1999

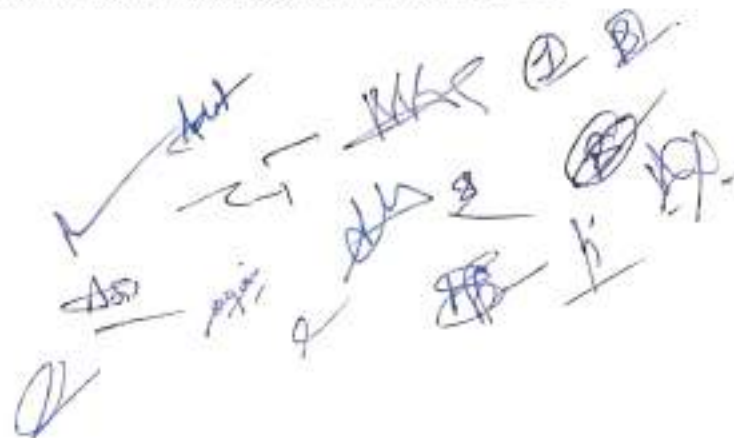
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Reference Books:

1. Surveying theory & Practice, R.E. Devise, McGraw Hill, New York, 4th revised edition 2001
2. Plane & Geodetic surveying Vol. I & II, David Clark & J Clendinning, Constable & C. London, 2017
3. Surveying Vol. I & II, K.R. Arora, Standard book House, New Delhi, 13th edition 2016



Course Code: 110314

Course Name: Strength of Materials

L	T	P	Credit
2	1	2	4

Course Objectives:

- 1) To understand the concepts of simple and compound stresses and strains.
- 2) To understand the behaviour of elastic materials in bending, shear and torsion.
- 3) To understand the stability behaviour of long columns under axial load.
- 4) To understand the power transmission by shaft.
- 5) To understand stresses & strain developed in storage vessels
- 6) To calculate stresses / strain in statically indeterminate structures.

Syllabus:

Unit-I

Stress and Strains: Concept of Elastic body, stress and strain. Hooke's law various types of stress and strains. Elastic constants and their relation Stresses in compound bars, composite and tapering bars, temperature stresses.

Two-dimensional stress system. Normal and tangential stresses, Principal Planes, Principal Stresses and strains. Mohr's circle of stresses. Strain energy and theories of failure.

Unit - II

Theory of simple bending: Concept of pure bending and bending stress, equation of bending, Neutral axis, Section-Modulus, Bending stress distribution across a section, Shear Stresses in Beams, beams of uniform strength, shear centre.

Unit-III

Torsion of Shafts: Concept of pure torsion, Torsion equation, Determination of shear stress and angle of twist of shafts of circular section, Hollow circular shafts. Combined bending and torsion. Open and closed springs, leaf spring and spiral spring.

Pressure Vessels: Thin cylinders and spheres. Stress due to internal pressure. Change in diameter and volumes.

Unit-IV

Columns and Struts: Euler's buckling load for uniform section, various end conditions. Slenderness Ratio. Merchant Ranking formulae, Eccentric loading on columns.

Unit-V

Deflection of statically determinate structure by Geometrical methods & Introduction of method of virtual work.

Course Outcomes:

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

- CO1: Explain the concepts of stress, strains, bending, deflection, buckling & torsion.
- CO 2: Explain various theories for determining stress, buckling of columns & deflections of structures.
- CO 3: Apply various theories for determining stress, buckling of columns & deflections of structures.

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Course Code: 110315

Course Name: Survey Practice Lab

L	T	P	Credit
0	0	2	1

Syllabus:

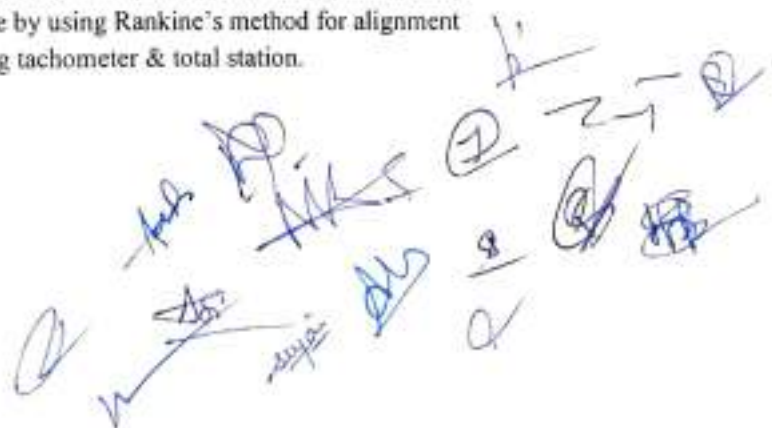
List of Experiments:

1. Measurement of horizontal and vertical angle by Vernier Theodolite.
2. Theodolite, traversing.
3. Determination of R.L. of a point whose base is accessible & inaccessible by Trigonometrical levelling.
4. Determination of tachometric contents in field.
5. Determination of height & distance by using Stadia method & Tangential tachometry
6. Measurement of base line by using Substance Bar.
7. Setting out of a simple circular curve by using Rankine's method.
8. Setting out of a simple circular curve by using Offset from the chord produced or deflection distance.
9. Profile Levelling & Cross Sectioning of Road
10. Prepare Contour map by using Grid Pattern & Tachometric Method.
11. Resection by Two point problem & Three point problem.
12. Determination of horizontal & vertical position of a point by Total Station.
13. Traversing by Total Station.

Course Outcomes:

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

- CO 1: Follow** the guidelines for field surveying.
- CO 2: Follow** the working principles of survey instruments for measurements.
- CO 3: Measure** horizontal & vertical angle by theodolite for traversing and levelling.
- CO 4: Determine** tachometric constants for linear measurements by tachometry.
- CO 5: Create** a simple circular curve by using Rankine's method for alignment
- CO 6: Develop** contour map by using tachometer & total station.



Course Code: 110316

Course Name: Self Learning / Presentation

L	T	P	Credit
0	0	2	1

Course Objectives:

- 1) To encourage students to read, study & understand different topics of civil engineering published in articles, literatures.
- 2) To help in presenting different topics of civil engineering and related subjects to supplement theoretical knowledge gained in class.
- 3) To make student acquire good oral & written communication skills.
- 4) To promote the habit of lifelong learning.
- 5) To prepare students develop adequate soft skills to be able to present their topic effectively to listeners.

Syllabus:

1. Any relevant topic related to civil engineering from within or beyond the syllabus through Swayam / NPTEL /MOOC.

Course Outcomes:

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

- CO1: Analyze** contemporary issues in civil engineering & its allied areas through literature survey.
- CO2: Distinguish** state of art & relevance of the topic in national & international arena.
- CO3: Demonstrate** good oral & written communication skills.
- CO4: Develop** poster and power point presentations for effective communication.
- CO5: Display** lifelong learning.

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Course Code: 110317

Course Name: Summer Internship Project - I

L	T	P	Credit
0	0	4	2

Course Objectives:

- 1) To encourage students to read, study & understand different topics of civil engineering
- 2) To make student acquire good oral & written communication skills.
- 3) To promote the habit of lifelong learning.

Syllabus:

Each candidate shall have to undergo 15 days in-house summer internship at the institute after the completion of their 2nd Semester exams (in summer vacations). Candidate can choose from various modules which are offered by the institute and after successful completion of internship they have to submit detailed report.

Course Outcomes:

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

- CO1: Observe** various activities in field.
- CO2: Examine** the utility of general and specific equipments for construction.
- CO3: Differentiate** the construction projects individually and in team.
- CO4: Develop** the writing and communication skills for various engineering problems.
- CO5: Adapt** lifelong learning for benefit of society.



SEMESTER-IV

Course Code: 110411**Course Name: Geotechnical Engineering - I**

L	T	P	Credit
2	1	2	4

Course Objectives:

- 1) The students will get the basic knowledge about natural material like rocks and get acquainted with natural dynamic processes and their actions.
- 2) The students will know the significance of geological investigations for civil engineering projects and site selection.
- 3) To inculcate the basic knowledge of soil such as its identification and classification, determination of various engineering properties and its suitability as a foundation/subgrade material.
- 4) To develop an understanding of the relationships between physical characteristics and mechanical properties of soils by experimentally measuring them.
- 5) To explain role of water in soil behavior and how soil stresses, permeability and quantity of seepage including flow net are estimated.
- 6) To determine shear parameters and stress changes in soil due to foundation loads & estimate the magnitude and time-rate of settlement due to consolidation.
- 7) To apply the principles of soil mechanics in stability analysis of slopes and settlement calculations.

Syllabus:**Unit-I Engineering geology & soil properties**

Introduction to geology, mineralogy, petrology – Three-fold classification of rocks and their characteristic features. Structural geology - Types and classification of structures (Joints, Unconformities, Folds and faults) and their effect on civil engineering projects.

Introduction – Types of soils, their formation & deposition, basic definitions and relationships - Three phase system. Index properties of soil and their determination. Relationship between volume weight, void ratio-moisture content, moisture content-specific gravity, and unit weight- air voids etc.

Plasticity Characteristics of soil & indices and their determination, use of consistency limits, Classification of soil based on particle size and consistency limits, unified soil classification systems, Indian standard soil classification system, general characteristics of soil in different groups.

Unit-II Soil Water and Consolidation:

Permeability of soil: Darcy law and its validity, Determination of permeability in laboratory and in field using various methods like constant head method, pumping tests etc. factors affecting permeability of soil, Seepage analysis – introduction, stream & potential functions, flow nets, uses of a flow net, Introduction to effective, neutral and total stresses, effect of water table, fluctuations of effective stress, effective stress in soils saturated by capillary action, seepage pressure, quick sand condition.

Consolidation – Introduction, Compressibility and consolidation, 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, Determination of consolidation settlement and secondary consolidation.

Unit-III Stress Distribution in Soils:

Stresses in soil – Introduction, stresses due to point load, line load, strip load, uniformly loaded circular area, rectangular loaded area, influence factors, isobars, Boussinesq's equation, westergaard's analysis, Newmark's influence chart. Contact pressure under rigid & flexible area, computation of displacements from elastic theory.

Unit – IV Shear Strength of Soils:

Mohr Circle and its characteristics, principal planes, relation between major and minor principal stresses, Mohr-Coulomb's theory, types of shear tests, direct shear test, merits of direct shear test, Triaxial compression test, test

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Course Code: 110411

Course Name: Geotechnical Engineering - I

L	T	P	Credit
2	1	2	4

Course Objectives:

- 1) The students will get the basic knowledge about natural material like rocks and get acquainted with natural dynamic processes and their actions.
- 2) The students will know the significance of geological investigations for civil engineering projects and site selection.
- 3) To inculcate the basic knowledge of soil such as its identification and classification, determination of various engineering properties and its suitability as a foundation/subgrade material.
- 4) To develop an understanding of the relationships between physical characteristics and mechanical properties of soils by experimentally measuring them.
- 5) To explain role of water in soil behavior and how soil stresses, permeability and quantity of seepage including flow net are estimated.
- 6) To determine shear parameters and stress changes in soil due to foundation loads & estimate the magnitude and time-rate of settlement due to consolidation.
- 7) To apply the principles of soil mechanics in stability analysis of slopes and settlement calculations.

Syllabus:

Unit-I Engineering geology & soil properties

Introduction to geology, mineralogy, petrology – Three-fold classification of rocks and their characteristic features. Structural geology - Types and classification of structures (Joints, Unconformities, Folds and faults) and their effect on civil engineering projects.

Introduction – Types of soils, their formation & deposition, basic definitions and relationships - Three phase system. Index properties of soil and their determination. Relationship between volume weight, void ratio-moisture content, moisture content-specific gravity, and unit weight- air voids etc.

Plasticity Characteristics of soil & indices and their determination, use of consistency limits, Classification of soil based on particle size and consistency limits, unified soil classification systems, Indian standard soil classification system, general characteristics of soil in different groups.

Unit-II Soil Water and Consolidation:

Permeability of soil: Darcy law and its validity, Determination of permeability in laboratory and in field using various methods like constant head method, pumping tests etc. factors affecting permeability of soil, Seepage analysis – introduction, stream & potential functions, flow nets, uses of a flow net, Introduction to effective, neutral and total stresses, effect of water table, fluctuations of effective stress, effective stress in soils saturated by capillary action, seepage pressure, quick sand condition.

Consolidation – Introduction, Compressibility and consolidation, 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, Determination of consolidation settlement and secondary consolidation.

Unit-III Stress Distribution in Soils:

Stresses in soil – Introduction, stresses due to point load, line load, strip load, uniformly loaded circular area, rectangular loaded area, influence factors, isobars, Boussinesq's equation, westergaard's analysis, Newmark's influence chart. Contact pressure under rigid & flexible area, computation of displacements from elastic theory.

Unit – IV Shear Strength of Soils

Mohr Circle and its characteristics, principal planes, relation between major and minor principal stresses, Mohr-Coulomb's theory, types of shear test, direct shear test, merits of direct shear test, Triaxial compression test, test

Handwritten notes and diagrams:
A diagram showing a Mohr circle on a coordinate system with normal stress on the x-axis and shear stress on the y-axis. The circle is drawn in the upper half-plane. A point on the circle is labeled with σ_1 and τ . Another point is labeled with σ_3 and τ . The center of the circle is marked on the x-axis. There are other handwritten notes and symbols, including what looks like σ_1 , σ_3 , and some arrows indicating directions.

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behaviour of UU, CU and CD tests, pore-pressure measurements, computation of effective shear strength parameters, unconfined compression test, vane shear test, critical void ratio, Liquefaction.

Unit – V Stability of Slopes:

Introduction, Types of slopes and their failure mechanisms, factor of safety, analysis of Infinite and finite slopes, wedge failure, Swedish circle method, friction circle method, stability numbers and charts. Effect of ground water. Selection of shear strength parameters in slope stability analysis. Stability of Earth dams.

Course Outcomes:

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

- CO1: Evaluate different properties of rocks & soil and its classification.
- CO2: Examine the flow and shear parameters & their effects on various types of soil.
- CO3: Determine the stress distribution & shear failure by various methods.
- CO4: Evaluate the shear strength parameter of soil by various methods.
- CO5: Analyse the stability of slopes using various methods.

Text Books:

1. Soil Mech. & Found. Engg., Dr. K.R. Arora, Std. Publishers Delhi, 7th Edition, 2014
2. Soil Mech. & Foundation, Dr. B.C. Punmia, Laxmi Publications, Delhi, 16th Edition, 2017
3. Soil Mech. & Found Engg., S.K. Garg, Khanna Publishers, Delhi, 1st Edition, 2003
4. Basic & Applied Soil Mechanics, Gopal Ranjan, New Age International Publishers, 2016
5. Parbin Singh., "Engineering and General Geology", S. K. Kataria and Sons, 2009

Reference Books:

1. Modern Geotech Engg. Dr. Aram Singh, IBT Publishers, Delhi, 8th Edition, 2016
2. Geotech Engg., C. Venkatramaiah, New Age International Publishers, 16th Edition, 2018
3. Soil Testing for Engg., T.W. Lambe, John Wiley & Sons. Inc. 1969
4. Bangar, K.M, Principles of Engineering Geology, Standard Publishers Distributors, 1995. New Delhi

List of Experiment's:

1. Moisture Content Determination. Oven Drying Method.
2. Grain Size Analysis – Mechanical Method.
3. Grain Size Analysis – Hydrometer Method.
4. Liquid Limit, Plastic Limit, Shrinkage Limit Tests.
5. In-Place Density tests – Core Cutter Method, Sand Replacement Method.
6. Specific Gravity Tests.
7. Permeability Tests, Variable Head Method.
8. Compaction Test.
9. Unconfined Compression Test.
10. Direct Shear Test.
11. Triaxial Shear Test (UU)
12. Vane Shear Test.
13. Plate Load Test (Demonstration)
14. Consolidation Test.

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

- CO 1: Check physical properties of soil.
- CO 2: Check strength properties of soil.
- CO 3: Differentiate the flow properties and stresses of soil.
- CO 4: Check shear strength of soil.



Course Code: 110412

Course Name: Theory of Structure - I

L	T	P	Credit
2	1	0	3

Course Objectives:

- 1) To develop an understanding of the behavior of structure under serviceability load.
- 2) To understand the mechanics of the material behavior of different type of structures.
- 3) To understand the concepts of analysis of indeterminate structures by various classical methods.
- 4) To make student aware of different methods of structural analysis.

Syllabus:

Unit-I

Deflection of beams: Double Integration method, Area Moment Method and Slope - Deflection Method. Beam of variable cross section, M/EI diagram, Conjugate Beam Method.

Unit-II

Virtual work and Energy Principles: Principles of Virtual work applied to deformable bodies, Maxwell's Reciprocal theorems, Energy theorems, Application to pin jointed frames only.

Unit - III

Indeterminate Structures - I: Static and Kinematics indeterminacy, Analysis of Fixed and continuous beams by Theorem of three moments, Effect of sinking and rotation of supports.

Unit-IV

Indeterminate Structures - II: Analysis of beams and analysis of frames (with and without sway) by slope Deflection method.

Unit-V

Moment Distribution Method: Moment distribution method for analysis of beams and analysis of frames (without sway) Three hinged arches of different shapes, Eddy's Theorem. Two Hinged and Fixed Arches.

Course Outcomes:

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

- CO 1:** Classify different type of structures based on support conditions
- CO 2:** Explain various methods & principles for analysis of structures.
- CO 3:** Apply various methods & principles for structural analysis.
- CO 4:** Analyse various structures using various methods, principles & theorems.
- CO 5:** Evaluate different methods of structural analysis.

Text Books:

1. Basic Structural Analysis, Reddy C. S., Tata McGraw Hill Publishing Company, 2017
2. Theory of Structures, S. Ramamrutham, R. Narayanan, Dhanpat Rai Publications, 9th edition, 2014
3. Theory of Structures, B.C. Punmia, Laxmi Publications, 2017

Reference Books:

1. Structural Analysis - A Unified classical and matrix Approach, Ghali A & Neville M, Chapman and Hall, New York, 6th edition, 2000

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Course Code: 110413

Course Name: Transportation Engineering

L	T	P	Credit
2	1	2	4

Course Objectives:

- 1) To study the planning aspects of roads & highway.
- 2) To study the geometric design aspects of highway and road.
- 3) To know about pavement material and design.
- 4) To understand the construction process and methods of roads & highway.
- 5) To study about traffic characteristics and design of intersections.

Syllabus:

Unit – I Highway Development and Planning

Highway Development in India — Necessity for Highway Planning – Different Road Development Plans; Classification of Roads, Road Network Patterns — Highway Alignment- Factors affecting Alignment- Engineering Surveys.

Unit – II Highway Geometric Design

Importance of Geometric Design – Design controls and Criteria – Highway Cross Section Elements – Sight Distance Elements – Stopping Sight Distance, Overtaking Sight Distance and Intermediate Sight Distance – Design of Horizontal Alignment – Design of Super elevation and Extra widening – Design of Transition Curves – Design of Vertical alignment - Gradients- Vertical curves.

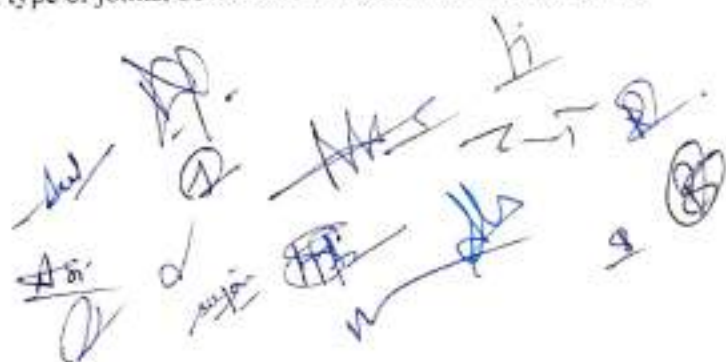
Unit – III Traffic Studies

Spot Speed Studies and Volume Studies, Speed and Delay Studies purpose, causes of delay, methods of conducting speed and delay studies, Origin and destination Studies (O & D); Various methods, collection and interpretation of data, Traffic Capacity Studies: Volume, density, basic practical and possible capacities, level of service, Parking Studies: Methods of parking studies, design of intersections at grade & grade separated.

Unit -IV

Highway Construction Materials: Aggregates and their types, physical and engineering properties, Fillers, Bitumen, Characteristics, Emulsions and cutbacks, Basic tests on all materials.

Design of Flexible & Rigid Pavements: Introduction, flexible pavement, factors affecting design and performance, stress in flexible pavement, design of flexible pavement as per IRC, rigid pavements – components & functions, factors affecting design & performance of CC pavements, stress in rigid pavement, type of joints, dowel bar, tie bar and its functionalities.



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Unit – V Evaluation and Maintenance of Pavements

Pavement distress in flexible and rigid pavements, Pavement evaluation, structural evaluation, evaluation by deflection measurements, Strengthening of pavements, Types of maintenance, Importance of highway drainage, Surface and sub-surface drainage arrangements.

Course Outcomes:

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

- CO 1: **Explain** the principles of highway planning & their geometrical design.
- CO 2: **Evaluate** physical properties of suitable highway engineering materials with drainage provisions.
- CO 3: **Apply** the concepts of traffic engineering in transportation planning.
- CO 4: **Design** pavements as per regulations.
- CO 5: **Formulate** the layers of pavement along with provisions of its drainage & maintenance.

Text Books:

1. Highway Engineering, S.K. Khanna & C.E.G. Justo, Nemchand Pub., 10th edition, 2018
2. Highway Engineering, Gurucharan Singh, Standard Publishers, 5th edition, 2006
3. Principles & Practices of Highway Engineering, L R Kadiyali, N B Lal, Khanna Publishers, 2016

Reference Books:

1. Principles of Pavement Design, E.J. Yoder & M.W. Witzech, Wiley India, 2nd edition, 2011
2. Highway Engineering, O' Flaherty, Butterworth-Heinemann, 4th edition, 2002
3. Principles of Practice of Highway Engg., Sharma & Sharma, Asia Publishing House, 1965
4. Analysis and Design of Pavements, Haung, Pearson, 2nd edition, 2004

List of Experiments:

1. Aggregate Crushing Value Test
2. Determination of Aggregate Impact Value
3. Determination of Los Angeles Abrasion Value
4. Determination of flakiness index and elongation index of aggregates.
5. Determination of California Bearing Ratio Value
6. Determination of Penetration Value of Bitumen
7. Determination of Viscosity of Bituminous Material
8. Determination of Softening Point of Bituminous Material
9. Determination of Ductility of the Bitumen
10. Determination of Flash Point and Fire Point of Bituminous Material
11. Determination of Bitumen Content by Centrifuge Extractor
12. Determination of Stripping Value of Road Aggregate
13. Determination of Marshall Stability Value for Bitumen.

Course Outcomes:

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

- CO 1: **Select** suitable aggregate material by testing the physical properties.
- CO 2: **Determine** properties of bitumen and its grade.
- CO 3: **Determine** CBR value of material for subgrade and subsequent layers of pavement.
- CO 4: **Design** job mix formula for bituminous surface using Marshal Stability test

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Course Code: 110414

Course Name: Water Resources Engineering

L	T	P	Credit
2	1	0	3

Course Objectives:

- 1) To understand the water requirements of various types of crops.
- 2) To understand the different types of irrigation systems.
- 3) To plan the reservoir systems as per the requirements.
- 4) To understand the concepts of Khosla's and Bligh's theory & its applications.
- 5) To understand the concepts of Lacey's and Kennedy theory for design of canal systems.
- 6) To develop an understanding of various components of hydrological cycle, their behaviors & factors affecting it & solve problems on measurement on rainfall, infiltration, evaporation.
- 7) To understand concepts of Hydrometry & ground water hydrology.
- 8) To discuss the importance of estimation of runoff, analysis of rainfall data and various hydrographs and analyze various problems off runoff using various hydrograph theories.
- 9) To develop an understanding of various methods of flood estimation in general & flood frequency.

Syllabus:

Unit-I Irrigation Water Requirement and Soil Water Crop Relationship:

Irrigation, Definition, Necessity, Advantages and disadvantages, Type and methods, Irrigation development.

Soil: Types and their occurrence, Suitability for irrigation purposes, Wilting, Coefficient and field capacity, Optimum water supply, Consumptive use and its determination. Irrigation methods - surface and subsurface, Sprinkler and drip irrigation.

Duty of water, factors affecting duty and methods to improve duty, Suitability of water for irrigation, Crops and crop seasons, Principal crops and their water requirement, Crop ratio and crop rotation, Intensity of irrigation, Water logging-causes, effects & its prevention.

Unit - II Reservoir Planning and Canal Irrigation

Types of reservoir, Reservoir planning, Estimation of storage capacity by mass curve analyses, Economical height of dam, Reservoir sedimentation, Canal systems, Planning and layout of canal systems, Regime concept and tractive force method of channel design, Channel losses, Design of unlined and lined canals, Kennedy's and Lacey's silt theories, Typical canal section, Water-logging: Causes and effects, Remedial measures, Salinity, Land reclamation and Drainage.

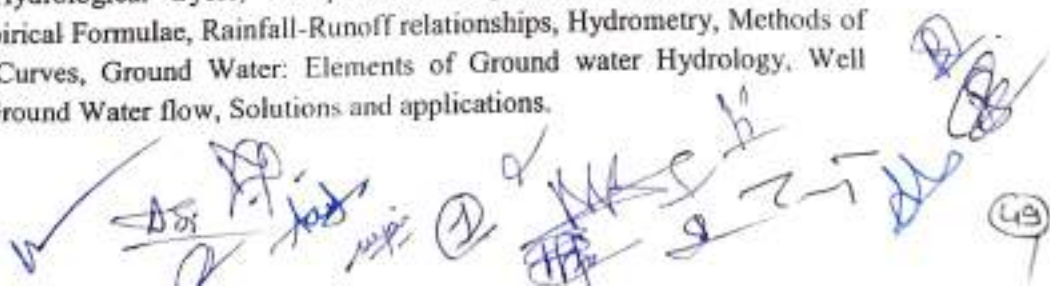
Unit - III Diversion works and Canal Regulation Structures

Elements of diversion works, Type of weirs and barrages, Weir design for surface and sub-surface flow, Bligh's, Lane's and Khosla's theories, Silt excluders and Silt ejectors.

Canal regulation structure like Head & Cross regulations, falls, Escapes, Outlets, Their Need, Functions sketches.

Unit - IV

Hydrology: Definition, Hydrological Cycle, Precipitation, Evaporation, Infiltration, Runoff, Estimation of Runoff, Empirical Formulae, Rainfall-Runoff relationships, Hydrometry, Methods of Stream Gauging, Rating Curves, Ground Water: Elements of Ground water Hydrology, Well Hydraulics, Equations of Ground Water flow, Solutions and applications.



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Course Code: 100415

Course Name: Civil Drawing Lab

L	T	P	Credit
0	0	2	1

Course Objectives:

- 1) To draw plan, elevation & section of various components of a building.
- 2) To prepare sketches of various components of building like doors, windows etc.
- 3) To expose students to use software's like AutoCAD in civil engineering drawing.

Syllabus:

List of Experiments:

1. One drawing sheet containing Foundations and Footing using AutoCAD
2. One drawing sheet containing Doors, Windows, Ventilators using AutoCAD
3. One drawing sheet containing Lintels, Trusses and Arches etc. using AutoCAD
4. One drawing sheet containing detailed planning of one room residential building
5. One drawing sheet containing detailed planning of multi rooms residential building
6. Drawing sheets one each of residential building using AutoCAD
7. One Drawing sheet of Institutional building using AutoCAD
8. One Drawing sheet of Commercial building using AutoCAD
9. One Drawing sheet of Hospital building using AutoCAD
10. Sketches of various building components i.e. floors, roof & roof covering
11. Sketches of various building components i.e. staircase

Course Outcomes:

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

CO1: Attempt to draw different components of a building.

CO2: Produce plan, elevation & section of various components of a residential and institutional building.

CO3: Use AutoCAD software in civil engineering drawing.

CO4: Prepare drawing sheets of various types of buildings like residential, institutional, commercial etc



ANNEXURE – V

(Suggestive List of Skill Based Mini Projects)

ANNEXURE – V

Suggestive List of Skill Based Mini Projects

110311, Building Materials & Construction:

1. Mix Design – (M20 & M25)
2. Fresh & Hardened Concrete Design.
3. Development of Innovative Building Materials like brick etc using waste materials.

110312, Fluid Mechanics - I:

1. Determination of Metacentric height of different shapes
2. Comparison of velocity measurement by orifice & pitot tube
3. Verification of Bernoulli's theorem for pipe flow & tank
4. Verification of Stoke's law for different liquid
5. Determination of Reynold's Number for different fluid.

110314, Strength of Materials:

1. Unsymmetrical bending & shear center.
2. Beam Deflection
3. Stress Strain curve for steel.

110315, Survey Practice Lab:

1. Development of contour map using Total Station.
2. Setting out of Horizontal Curve using Total Station & Theodolite.
3. Area Volume calculations using Total Station.



ANNEXURE – VI

(CO Gap Analysis July December 2020 semester)

ANNEXURE – VI

CO Attainment Gap Analysis July December 2020

Course Code & Name	Course Outcomes	Mid Sem 1 CO Attainment % (Online)	Mid Sem 2 CO Attainment % (Online)	Direct CO Attainment %	Indirect CO Attainment %	Overall CO Attainment %	Target Attainment %	Gap in Attainment %	Status of CO Attainment	Action Taken
100020: Basic Civil Engineering & Mechanics (CSE)	CO 1	67.24	88.64	77.94	73.33	77.0	65	-12.02	Attained	The subject required proper coverage of CO for numerical questions.
	CO 2	66.67	84.61	75.64	78.10	76.1	65	-11.13	Attained	
	CO 3	82.44	92.04	87.24	77.14	85.2	65	-20.22	Attained	
	CO 4	83.42	84.97	84.20	75.24	82.4	65	-17.40	Attained	
	CO 5	85.97	88.25	87.11	82.86	86.3	65	-21.26	Attained	
100020: Basic Civil Engineering & Mechanics (EC)	CO 1	68.17	83.17	75.67	68.75	74.3	65	-9.29	Attained	
	CO 2	61.72	89.23	75.48	66.67	73.7	65	-8.72	Attained	
	CO 3	77.88	93.60	85.74	60.42	80.7	65	-15.68	Attained	
	CO 4	82.13	93.05	87.59	64.58	83.0	65	-17.99	Attained	
	CO 5	83.51	83.42	83.47	70.83	80.9	65	-15.94	Attained	
100020: Basic Civil Engineering & Mechanics (ET)	CO 1	74.08	80.56	77.32	69.61	75.8	65	-10.78	Attained	
	CO 2	59.10	86.94	73.02	62.75	71.0	65	-5.97	Attained	
	CO 3	80.73	93.24	86.99	69.61	83.5	65	-18.51	Attained	
	CO 4	83.62	88.81	86.21	69.61	82.9	65	-17.89	Attained	
	CO 5	80.41	85.45	82.93	75.49	81.4	65	-16.44	Attained	
100020: Basic Civil Engineering & Mechanics (IT)	CO 1	75.98	83.81	79.90	71.97	78.3	65	-13.31	Attained	
	CO 2	66.49	86.23	76.36	74.24	75.9	65	-10.94	Attained	
	CO 3	87.31	95.25	91.28	71.97	87.4	65	-22.42	Attained	
	CO 4	86.40	85.87	86.13	71.21	83.1	65	-18.15	Attained	
	CO 5	90.81	84.64	87.73	76.52	85.5	65	-20.49	Attained	
100020: Basic Civil Engineering & Mechanics (Chemical)	CO 1	88.50	80.00	84.25	83.33	84.1	65	-19.07	Attained	
	CO 2	87.50	85.25	86.38	80.39	85.2	65	-20.18	Attained	
	CO 3	81.25	88.50	84.88	77.45	83.4	65	-18.39	Attained	
	CO 4	61.00	69.25	65.13	78.43	67.8	65	-2.79	Attained	
	CO 5	58.75	39.25	49.00	79.41	55.1	65	9.92	Attained	

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110302: Building Planning & Design	CO 1	89.00	-	89.00	61.90	83.6	65	-18.58	Attained
	CO 2	87.40	86.00	86.70	64.29	82.2	65	-17.22	Attained
	CO 3	90.20	85.00	87.60	59.52	82.0	65	-16.98	Attained
	CO 4	89.20	85.00	87.10	66.67	83.0	65	-18.01	Attained
	CO 5	-	90.00	90.00	59.52	83.9	65	-18.90	Attained
110303: Building Material & Construction	CO 1	76.00	-	76.00	69.05	74.6	65	-9.61	Attained
	CO 2	67.00	82.60	74.80	71.43	74.1	65	-9.13	Attained
	CO 3	86.00	81.40	83.70	69.05	80.8	65	-15.77	Attained
	CO 4	91.00	85.00	88.00	69.05	84.2	65	-19.21	Attained
	CO 5	-	86.80	86.80	66.67	82.8	65	-17.77	Attained
110303: Building Material & Construction (Practical)	CO 1	84.00		84.00	69.05	81.0	65	-16.01	Attained
	CO 2	84.00		84.00	69.05	81.0	65	-16.01	Attained
	CO 3	84.00		84.00	69.05	81.0	65	-16.01	Attained
	CO 4	84.00		84.00	66.67	80.5	65	-15.53	Attained
	CO 5	84.00		84.00	64.29	80.1	65	-15.06	Attained
110304: Surveying	CO 1	96.22	83.82	90.02	66.67	85.4	65	-20.35	Attained
	CO 2	97.37	92.99	95.18	61.90	88.5	65	-23.52	Attained
	CO 3	95.66	93.55	94.60	64.29	88.5	65	-23.54	Attained
	CO 4	96.41	92.08	94.25	61.90	87.8	65	-22.78	Attained
	CO 5	94.51	93.22	93.86	59.52	87.0	65	-21.99	Attained
110304: Surveying (Practical)	CO 1	72.00		72.00	66.67	70.9	65	-5.93	Attained
	CO 2	72.00		72.00	56.41	68.9	65	-3.88	Attained
	CO 3	68.00		68.00	58.97	66.2	65	-1.19	Attained
	CO 4	68.00		68.00	56.41	65.7	65	-0.68	Attained
	CO 5	72.00		72.00	58.97	69.4	65	-4.39	Attained
110305: Strength of Materials	CO 1	73.50	76.70	75.10	66.67	73.4	65	-8.41	Attained
	CO 2	71.50	84.70	78.10	69.23	76.3	65	-11.33	Attained
	CO 3	71.60	74.80	73.20	61.54	70.9	65	-5.87	Attained
	CO 4	88.70	63.50	76.10	66.67	74.2	65	-9.21	Attained
	CO 5	73.30	69.30	71.30	61.54	69.3	65	-4.35	Attained
110305: Strength of Materials (Practical)	CO 1	68.00		68.00	64.29	67.3	65	-2.26	Attained
	CO 2	68.00		68.00	61.90	66.8	65	-1.78	Attained
	CO 3	68.00		68.00	64.29	67.3	65	-2.26	Attained
	CO 4	68.00		68.00	59.52	66.3	65	-1.30	Attained

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110306: Software Lab	CO 1	76.00	76.00	54.76	71.8	65	-6.75	Attained	
	CO 2	76.00	76.00	50.00	70.8	65	-5.80	Attained	
	CO 3	68.00	68.00	54.76	65.4	65	-0.35	Attained	
	CO 4	76.00	76.00	54.76	71.8	65	-6.75	Attained	
110308: Summer Internship Project - I	CO 1	76.00	76.00	58.33	72.5	65	-7.47	Attained	
	CO 2	68.00	68.00	61.11	66.6	65	-1.62	Attained	
	CO 3	72.00	72.00	58.33	69.3	65	-4.27	Attained	
	CO 4	80.00	80.00	66.67	77.3	65	-12.33	Attained	
	CO 5	76.00	76.00	63.89	73.6	65	-8.58	Attained	
110501: Estimating, Costing & Contracting	CO 1	57.00	62.00	59.50	78.13	65	1.78		More practice problems to be given for estimating questions and remedial classes conducted.
	CO 2	60.00	58.00	59.00	75.00	65	2.80		
	CO 3	58.00	56.00	57.00	74.48	65	4.50		
	CO 4	66.00	44.00	55.00	79.69	65	5.06		
	CO 5	49.00	30.00	39.50	78.13	65	17.78		
110502: Structural Design & Drawing (R.C.C.)	CO 1	64.00	58.00	61.00	71.51	65	1.90		Course required more practice for numerical questions for which remedial classes were taken.
	CO 2	51.00	49.00	50.00	72.04	65	10.59		
	CO 3	41.00	51.00	46.00	69.35	65	14.33		
	CO 4	54.00	52.00	53.00	74.19	65	7.76		
	CO 5	48.00	46.00	47.00	73.66	65	12.67		
110503: Fluid Mechanics-II	CO 1	50.00	75.00	62.50	75.41	65	-0.08	Attained	More problems on principles of analysis of fluid flow problem given for practice.
	CO 2	40.00	83.00	61.50	70.49	65	1.70		
	CO 3	46.00	83.00	64.50	69.95	65	-0.59	Attained	
	CO 4	46.00	82.00	64.00	71.58	65	-0.52	Attained	
	CO 5	62.00	82.00	72.00	69.95	65	-6.59	Attained	
110503: Fluid Mechanics-II (Practical)	CO 1	68.00	68.00	79.89	70.4	65	-5.38	Attained	
	CO 2	68.00	68.00	75.29	69.5	65	-4.46	Attained	
	CO 3	68.00	68.00	74.14	69.2	65	-4.23	Attained	
110509: Environmental Engineering	CO 1	67.00	80.00	73.50	82.78	65	-10.36	Attained	
	CO 2	79.00	76.00	77.50	77.78	65	-12.56	Attained	
	CO 3	87.00	68.00	77.50	75.56	65	-12.11	Attained	
	CO 4	86.00	71.00	78.50	78.33	65	-13.47	Attained	

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	CO 5	73.00	62.00	67.50	75.00	69.0	65	-4.00	Attained
110509: Environmental Engineering (Practical)	CO 1	68.00		68.00	80.36	70.5	65	-5.47	Attained
	CO 2	64.00		64.00	80.36	67.3	65	-2.27	Attained
	CO 3	64.00		64.00	77.98	66.8	65	-1.80	Attained
	CO 4	68.00		68.00	77.98	70.0	65	-5.00	Attained
110505: Transportation Engineering	CO 1	85.50	77.50	81.50	86.67	82.5	65	-17.53	Attained
	CO 2	92.00	93.00	92.50	86.67	91.3	65	-26.33	Attained
	CO 3	82.00	94.50	88.25	81.67	86.9	65	-21.93	Attained
	CO 4	72.50	91.00	81.75	84.44	82.3	65	-17.29	Attained
	CO 5	89.50	83.50	86.50	83.33	85.9	65	-20.87	Attained
110505: Transportation Engineering (Practical)	CO 1	96.00		96.00	89.08	94.6	65	-29.62	Attained
	CO 2	96.00		96.00	84.48	93.7	65	-28.70	Attained
	CO 3	96.00		96.00	82.76	93.4	65	-28.35	Attained
	CO 4	96.00		96.00	85.06	93.8	65	-28.81	Attained
110506: Minor Project - I	CO 1	96.00		96.00	75.14	91.8	65	-26.83	Attained
	CO 2	96.00		96.00	76.27	92.1	65	-27.05	Attained
	CO 3	92.00		92.00	81.36	89.9	65	-24.87	Attained
	CO 4	88.00		88.00	77.40	85.9	65	-20.88	Attained
	CO 5	92.00		92.00	77.40	89.1	65	-24.08	Attained
110507: SIP - II	CO 1	64.00		64.00	80.95	67.4	65	-2.39	Attained
	CO 2	72.00		72.00	81.55	73.9	65	-8.91	Attained
110508: Self Learning Presentation	CO 1	80.00		80.00	77.40	79.5	65	-14.48	Attained
	CO 2	80.00		80.00	75.71	79.1	65	-14.14	Attained
	CO 3	80.00		80.00	74.01	78.8	65	-13.80	Attained
	CO 4	76.00		76.00	75.14	75.8	65	-10.83	Attained
	CO 5	80.00		80.00	79.66	79.9	65	-14.93	Attained
110711: Irrigation Engineering (DI-3)	CO 1	68.00	91.00	79.50	82.22	80.0	65	-15.04	Attained
	CO 2	73.00	89.00	81.00	77.78	80.4	65	-15.36	Attained
	CO 3	78.00	90.00	84.00	86.67	84.5	65	-19.53	Attained
	CO 4	76.00	87.00	81.50	77.78	80.8	65	-15.76	Attained
	CO 5	71.00	85.00	78.00	77.78	78.0	65	-12.96	Attained
110712: Industrial Waste	CO 1	71.00	63.00	67.00	66.67	66.9	65	-1.93	Attained
	CO 2	70.00	65.00	67.50	66.67	67.3	65	-2.33	Attained
	CO 3	78.00	56.00	67.00	66.67	66.9	65	-1.93	Attained

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Treatment (DE-3)	CO 4	78.00	55.00	66.50	66.67	66.5	65	-1.53	Attained
	CO 5	79.00	51.00	65.00	66.67	65.3	65	-0.33	Attained
Software Application for Solving Civil Engineering Problems (110701)	CO 1	72.00		72.00	52.08	68.0	65	-3.02	Attained
	CO 2	72.00		72.00	47.92	67.2	65	-2.18	Attained
	CO 3	72.00		72.00	50.00	67.6	65	-2.60	Attained
	CO 4	72.00		72.00	52.08	68.0	65	-3.02	Attained
	CO 5	72.00		72.00	56.25	68.9	65	-3.85	Attained
Summer Internship Project - III (110702)	CO 1	84.00		84.00	68.89	81.0	65	-15.98	Attained
	CO 2	76.00		76.00	68.89	74.6	65	-9.58	Attained
	CO 3	72.00		72.00	66.67	70.9	65	-5.93	Attained
	CO 4	70.00		70.00	66.67	69.3	65	-4.33	Attained
	CO 5	72.00		72.00	66.67	70.9	65	-5.93	Attained
Creative Problem Solving (110703)	CO 1	84.00		84.00	71.11	81.4	65	-16.42	Attained
	CO 2	76.00		76.00	68.89	74.6	65	-9.58	Attained
	CO 3	76.00		76.00	64.44	73.7	65	-8.69	Attained
	CO 4	76.00		76.00	66.67	74.1	65	-9.13	Attained
900201: Integrated Waste Management for Smart City	CO 1	65.00	80.00	72.50	86.90	75.38	65.00	-10.38	Attained
	CO 2	62.00	73.00	67.50	83.33	70.67	65.00	-5.67	Attained
	CO 3	67.00	72.00	69.50	79.76	71.55	65.00	-6.55	Attained
	CO 4	63.00	71.00	67.00	84.52	70.50	65.00	-5.50	Attained
900202: Project Planning & Control (OC - 2)	CO 1	89.60	91.00	90.30	77.20	87.7	65	-22.68	Attained
	CO 2	86.00	90.40	88.20	75.60	85.7	65	-20.68	Attained
	CO 3	89.00	88.50	88.75	73.70	85.7	65	-20.74	Attained
	CO 4	88.50	89.50	89.00	74.80	86.2	65	-21.16	Attained
	CO 5	88.67	90.67	89.67	76.70	87.1	65	-22.08	Attained
900213: Urban Planning & Transportation Systems (OC - 3)	CO 1	88.00	85.00	86.50	73.40	83.9	65	-18.88	Attained
	CO 2	90.00	87.00	88.50	72.60	85.3	65	-20.32	Attained
	CO 3	89.00	83.00	86.00	73.20	83.4	65	-18.44	Attained
	CO 4	89.00	86.00	87.50	73.40	84.7	65	-19.68	Attained
	CO 5	88.00	91.00	89.50	72.20	86.0	65	-21.04	Attained

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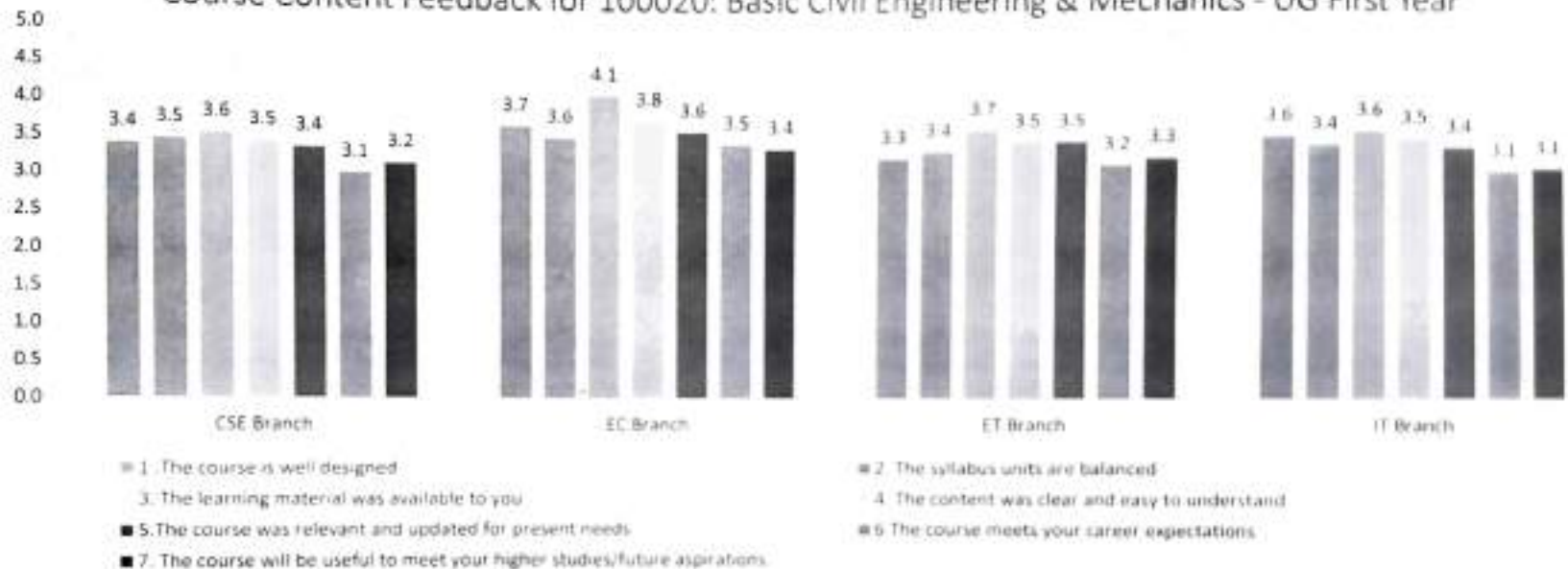
ANNEXURE – VII

(Curriculum Feedback Analysis)

ANNEXURE – VII

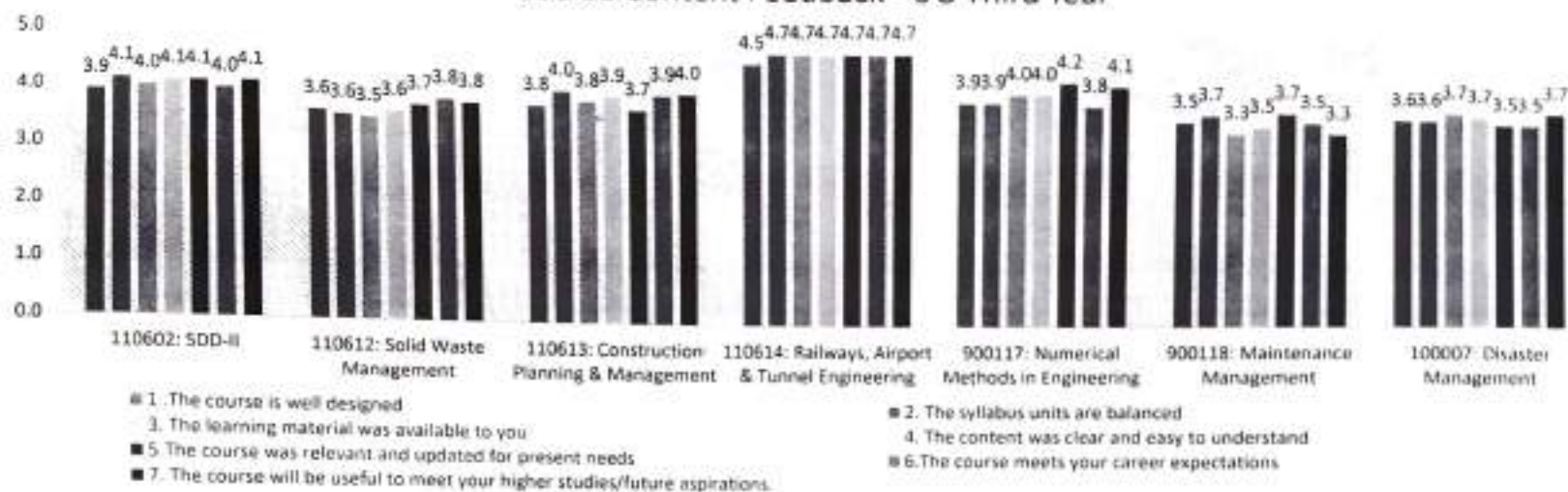
CURRICULUM FEEDBACK ANALYSIS FROM STAKEHOLDERS

Course Content Feedback for 100020: Basic Civil Engineering & Mechanics - UG First Year



Mention the course / contents which in your opinion is outdated & needs to be removed.	Name course / contents which needs to be updated.	Is any new course required to meet current needs?
Outdated technique of construction,	Building material; Solving papers	Machines

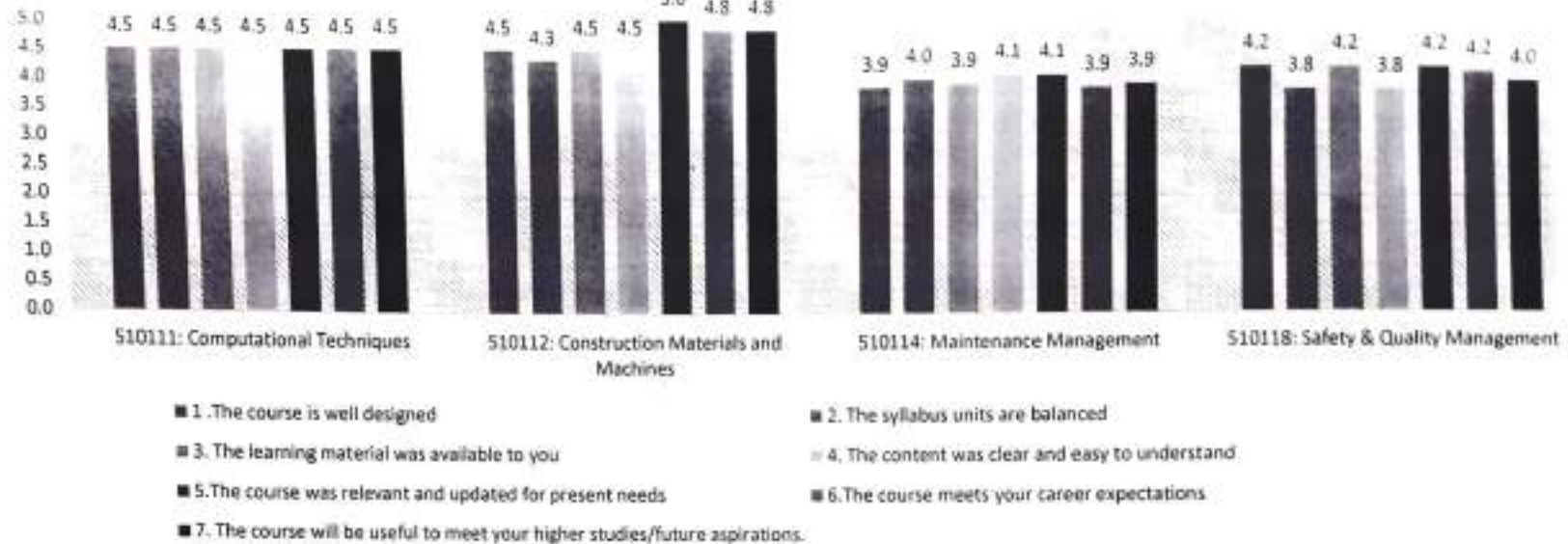
Course Content Feedback - UG Third Year



Mention the course / contents which in your opinion is outdated & needs to be removed.	Name course / contents which needs to be updated.	Is any new course required to meet current needs?
Good	Steel	Good
I think, big subjects like Geotech, Environment and SOM can be divide in two parts because in a single part the syllabus can't complete & we are not getting benefit of these	I think "technical lab" should include in this session; SWM system	I think, the course which connects us to the applications of all the courses, so that we can relate all are theoretical aspects (whatever we have study previously) to the technical implementation
Computation using cpm	Modern management techniques; Basic civil engineering; Methods of Pavement design	Nothing
-	Please introduce about metro	-

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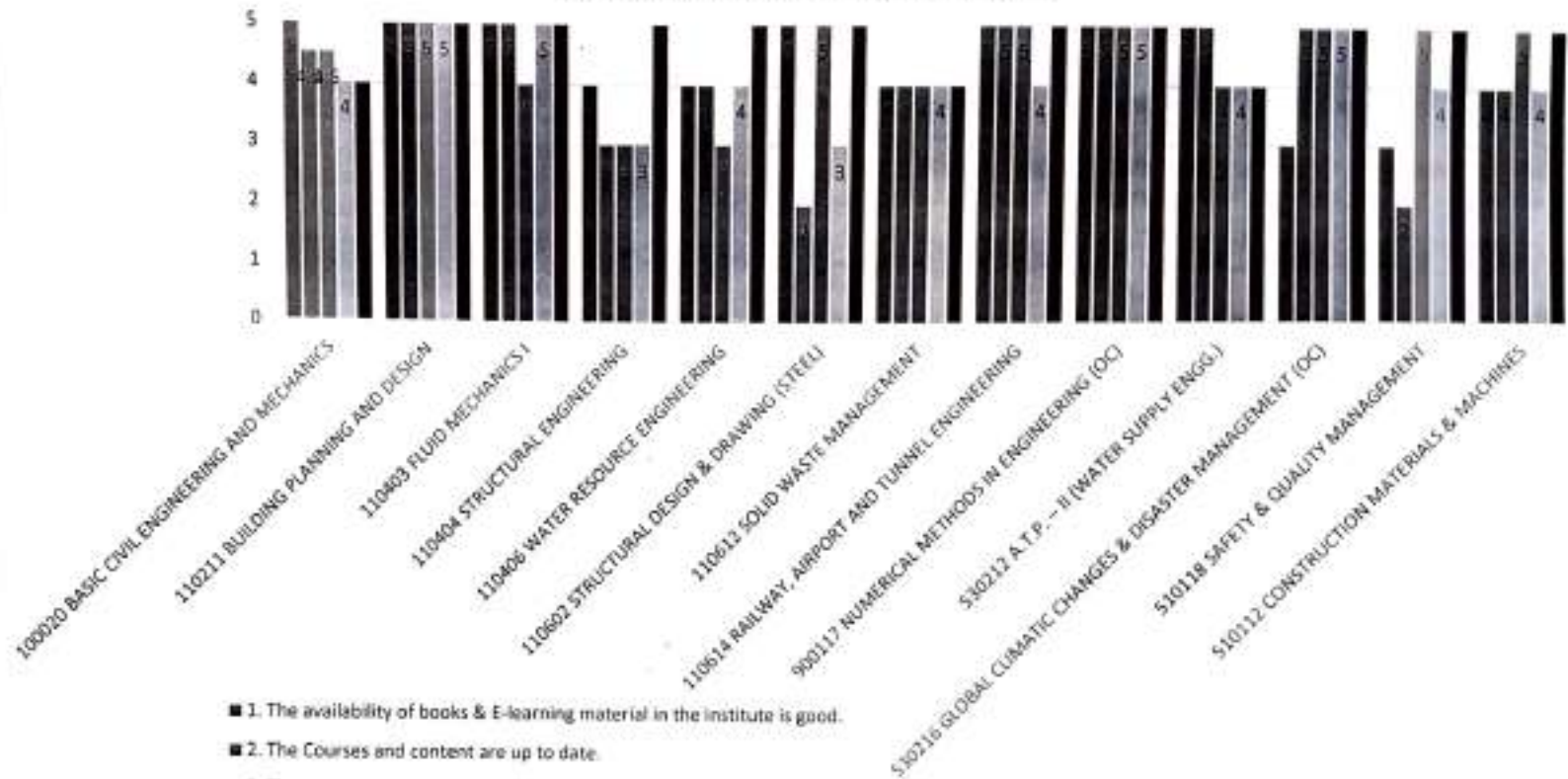
Course Content Feedback - PG First Year



Mention the course / contents which in your opinion is outdated & needs to be removed.	Name course / contents which needs to be updated.	Is any new course required to meet current needs?
No	No	Design of highway/civil 3d/MX road

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 - Middle left: *AD*
 - Middle: *Li*
 - Middle right: *AKR*
 - Bottom right: *AKR*
 - Far right: *AKR*

Course Content Faculty Feedback



- 1. The availability of books & E-learning material in the institute is good.
- 2. The Courses and content are up to date.
- 3. The course curriculum/syllabi are helpful in meeting the higher studies/placement requirements according to present global trends.
- 4. The course / contents in your domain/area are well designed and frequently updated, hence need no changes at present.
- 5. The curriculum is capable of inculcating life-long learning abilities in students.

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Inputs received from Faculty:

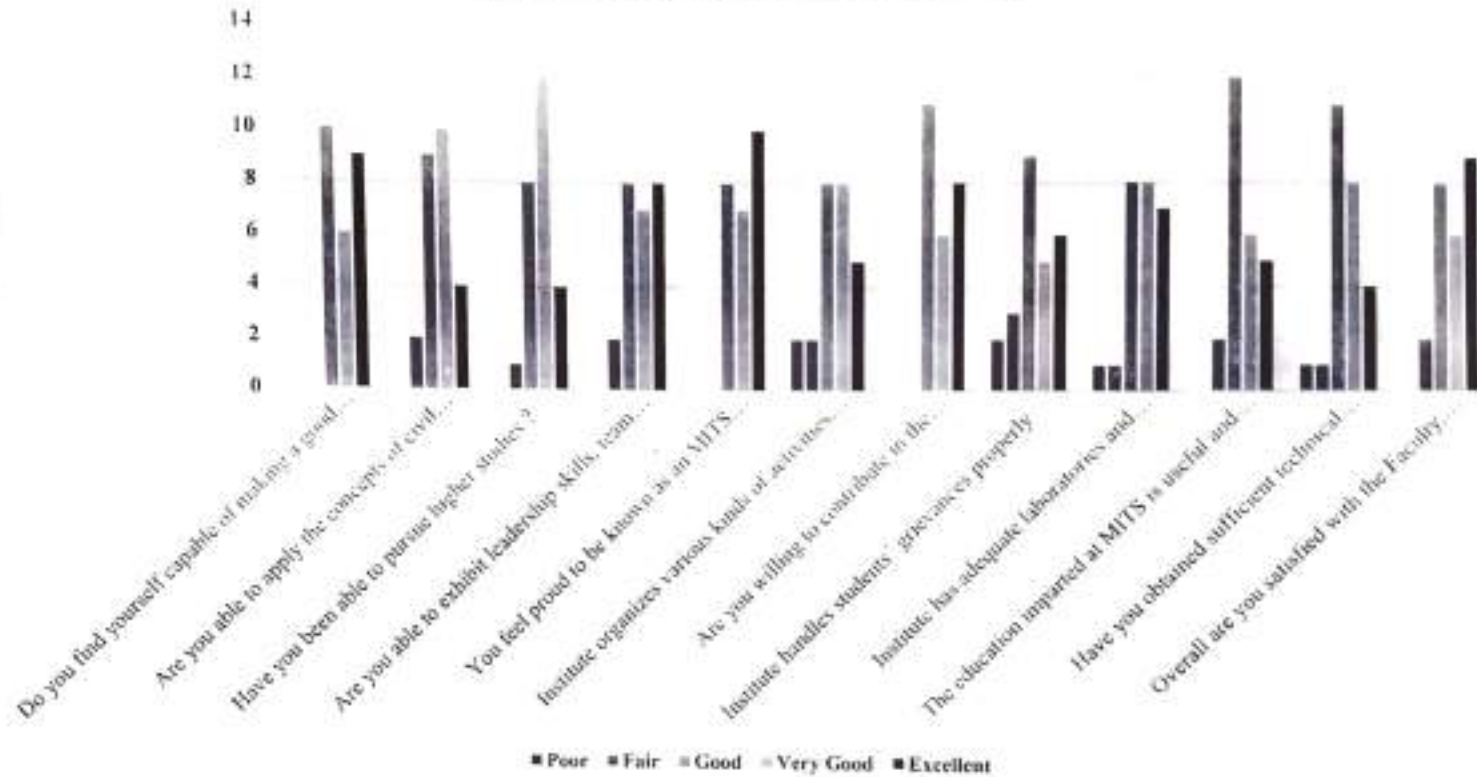
Course level	Course	1. The availability of books & E-learning material in the institute is good. (Please give your opinion)	2. The Courses and content are up to date. Please suggest if you feel any new course(s) need to be introduced to meet current needs & technological changes?	3. The course curriculum/syllabi are helpful in meeting the higher studies/placement requirements according to present global trends.	4. The course / contents in your domain/area are well designed and frequently updated, hence need no changes at present. [If you feel some changes (new content to be added or outdated content to be removed) are needed]	5. The curriculum is capable of inculcating life-long learning abilities in students.
B. Tech	110403 Fluid Mechanics I	it is available in the institute as e book also	The course is up to date.	This course is basic course and will meet for higher education.	Updation is not required.	yes
B. Tech	110404 Structural Engineering	Library has sufficient number of books.	Somme part of the syllabus need to be changed	Basic knowledge provided by this course is certainly helpful for higher education.	Some content is to be added like influence line diagram.	Yes it is.
B. Tech	110406 Water Resource Engineering	it is available in the institute as e book also	this course combined with two courses. it requires more learning materials. a new course should be introduced that contains irrigation and hydraulic structure. Engineering Hydrology should be separate subjects.		Actual separation of subjects are required	yes
B. Tech	110602 Structural Design & Drawing (Steel)				Design of tubular section may be introduced	
M. Tech	510112 Construction Materials & Machines		Contents are more and require more periods to teach with normal pace.		The contents to be more specific.	

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(i) Honours:	(ii) Minor specialization:	(iii) Departmental electives:	(iv) Open electives:
-	-	Hydraulic Structure	-
Advanced concrete Technology.	Design of prestressed concrete structures.	construction contract	Project management
water economics & governance, theory of elasticity, Sustainable Engineering Concepts and Life Cycle Analysis. Introduction to Multimodal Urban Transportation Systems (MUTS), Rock Mechanics and Tunneling	environmental chemistry, municipal solid waste management, Project Planning & Control,	optimization methods for civil engineering, remote sensing & gis, matrix method of structural analysis, advanced concrete technology	integrated waste management for smart city, Project Planning & Control, Introduction to Multimodal Urban Transportation Systems (MUTS)
Matrix method of structural analysis , Integrated waste management for a smart city	Project planning & control , Optimization methods for civil engineering	Wastewater treatment and recycling , Remote sensing and G I S	Finite element method and computational structural dynamics
-	-	Prefabricated construction	-
-	-	Optimization methods for civil engineering	Project management

ALUMNI SATISFACTION SURVEY



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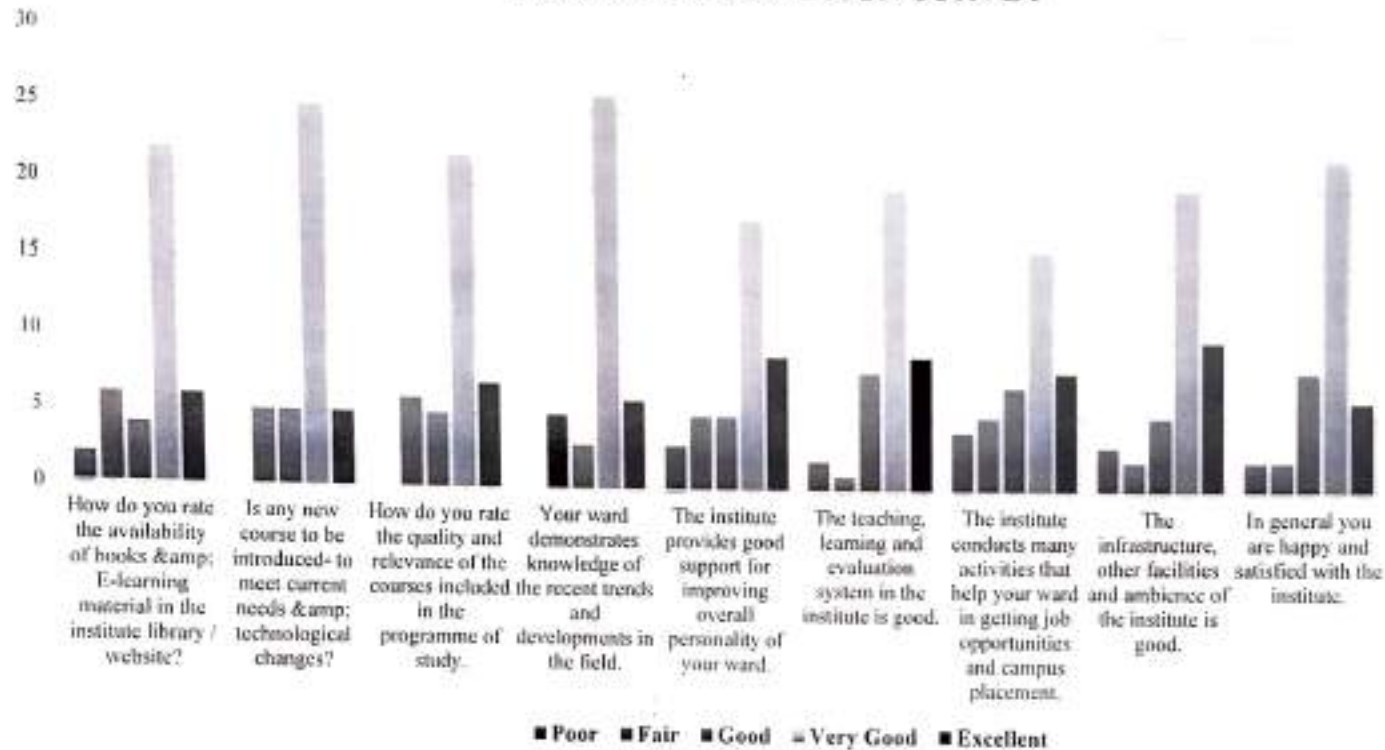
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ALUMNI SATISFACTION SURVEY

Sample Size: 25

S. No.	Parameter	Poor	Fair	Good	Very Good	Excellent	Alumni Satisfaction Index
1	Do you find yourself capable of making a good career ?	0	0	10	6	9	3.96
2	Are you able to apply the concepts of civil engineering in your profession?	0	2	9	10	4	3.64
3	Have you been able to pursue higher studies ?	0	1	8	12	4	3.76
4	Are you able to exhibit leadership skills, team spirit & ethical practices while performing your duty?	0	2	8	7	8	3.84
5	You feel proud to be known as an MITS Alumnus	0	0	8	7	10	4.08
6	Institute organizes various kinds of activities for the overall development of students	2	2	8	8	5	3.48
7	Are you willing to contribute in the development of the Institute	0	0	11	6	8	3.88
8	Institute handles students' grievances properly	2	3	9	5	6	3.4
9	Institute has adequate laboratories and equipment for practical exposure to students	1	1	8	8	7	3.76
10	The education imparted at MITS is useful and relevant in your career and present job	0	2	12	6	5	3.56
11	Have you obtained sufficient technical knowledge (both in theory and practical) at MITS	1	1	11	8	4	3.52
12	Overall are you satisfied with the Faculty, Staff and Administration during Program	0	2	8	6	9	3.88

PARENT SATISFACTION SURVEY



P Aditya
 ASR
 V
 ①
 W
 M. J. S.
 S.K.
 P
 B
 P.

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PARENT SATISFACTION SURVEY

Sample Size: 40

S. No.	Parameter	Poor	Fair	Good	Very Good	Excellent	Parent Satisfaction Index
1	How do you rate the availability of books & E-learning material in the institute library / website?	2	6	4	22	6	3.60
2	Is any new course to be introduced- to meet current needs & technological changes?	0	5	5	25	5	3.75
3	How do you rate the quality and relevance of the courses included in the programme of study.	0	6	5	22	7	3.75
4	Your ward demonstrates knowledge of the recent trends and developments in the field.	0	5	3	26	6	3.83
5	The institute provides good support for improving overall personality of your ward.	3	5	5	18	9	3.63
6	The teaching, learning and evaluation system in the institute is good.	2	1	8	20	9	3.83
7	The institute conducts many activities that help your ward in getting job opportunities and campus placement.	4	5	7	16	8	3.48
8	The infrastructure, other facilities and ambience of the institute is good.	3	2	5	20	10	3.80
9	In general you are happy and satisfied with the institute.	2	2	8	22	6	3.70
Parent Satisfaction Index (PSI) (on a scale of 5) (5: Excellent, 4: Very Good, 3: Good, 2: Fair, 1: Poor)							

ANNEXURE – VIII

(CO Feedback Analysis)

ANNEXURE – VIII

CO Feedback Analysis

1. CO Feedback was conducted for every course after the completion of teaching for the respective semester.
2. The analysis of CO attainment was done keeping 65% as the target attainment with 80 % weightage given to direct attainment and 20 % weightage given to indirect attainment.
3. The indirect CO attainment values for all courses are in the table below:

S. No	Course Code & Name	Indirect CO Attainment %				
		CO 1	CO 2	CO 3	CO 4	CO 5
1	100020: Basic Civil Engineering & Engineering Mechanics (CSE)	73.33	78.10	77.14	75.24	82.86
2	100020: Basic Civil Engineering & Engineering Mechanics (EC)	68.75	66.67	60.42	64.58	70.83
3	100020: Basic Civil Engineering & Engineering Mechanics (ET)	69.61	62.75	69.61	69.61	75.49
4	100020: Basic Civil Engineering & Engineering Mechanics (FI)	71.97	74.24	71.97	71.21	76.52
5	100020: Basic Civil Engineering & Engineering Mechanics (Chemical)	83.33	80.39	77.45	78.43	79.41
6	110302: Building Planning & Design	61.90	64.29	59.52	66.67	59.52
7	110303: Building Material & Construction	69.05	71.43	69.05	69.05	66.67
8	110303: Building Material & Construction (Practical)	69.05	69.05	69.05	66.67	64.29
9	110304: Surveying	66.67	61.90	64.29	61.90	59.52
10	110304: Surveying (Practical)	66.67	56.41	58.97	56.41	58.97
11	110305: Strength of Materials	66.67	69.23	61.54	66.67	61.54
12	110305: Strength of Materials (Practical)	64.29	61.90	64.29	59.52	NA
13	110306: Software Lab	54.76	50.00	54.76	54.76	NA
14	110307: Self Learning Presentation	55.56	58.33	55.56	55.56	58.33
15	110308: Summer Internship Project - I	58.33	61.11	58.33	66.67	63.89
16	110501: Estimating, Costing & Contracting	78.13	75.00	74.48	79.69	78.13
17	110502: Structural Design & Drawing (R.C.C.)	71.51	72.04	69.35	74.19	73.66
18	110503: Fluid Mechanics-II	75.41	70.49	69.95	71.58	69.95
19	110503: Fluid Mechanics-II (Practical)	79.89	75.29	74.14	NA	NA
20	110505: Transportation Engineering	86.67	86.67	81.67	84.44	83.33
21	110505: Transportation Engineering (Practical)	89.08	84.48	82.76	85.06	NA
22	110506: Minor Project - I	75.14	76.27	81.36	77.40	77.40
23	110507: Summer Internship Project - II	80.95	81.55	NA	NA	NA
24	110508: Self Learning Presentation	77.40	75.71	74.01	75.14	79.66
25	110509: Environmental Engineering	82.78	77.78	75.56	78.33	75.00
26	110509: Environmental Engineering (Practical)	80.36	80.36	77.98	77.98	NA
27	110708: Intellectual Property rights (IPR)	50.00	47.92	52.08	50.00	47.92
28	110711: Irrigation Engineering (DE-3)	82.22	77.78	86.67	77.78	77.78

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ANNEXURE – IX

(Scheme PG Programme 3rd Semester)

MADHAV INSTITUTE OF TECHNOLOGY & SCIENCE, GWALIOR
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Master of Technology in Environmental Engineering (Semester – III)

For batch admitted in academic session 2020 – 21

Scheme of Examination

S. No.	Subject Code	Subject Name	Maximum Marks Allotted						Total Marks	Contact Hours per week			Total Credits	
			Theory Slot			Practical Slot		MOOCs		L	T	P		
			End Sem.	Mid Sem.	Quiz/ Assignment	End Sem. /Practical Viva	Sessional Work/ Practical Record/ Assignment/ Quiz/ Presentation	Assignment						Exam
1.	530311	Dissertation Part-I (Literature Review/ Problem Foundation/ Synopsis/survey paper, etc.)	-	-	-	150	100	-	-	-	10	10		
2.	530312	*MOOC Course	-	-	-	-	-	25	75	100	02	-	02	
		Total	-	-	-	150	100	25	75	350	-	-	12	12

*MOOC course : Trace & Ultra Trace Analysis of metals using Atomic Absorption Spectrometry (800309)

M/S
27/7/2024
(ACADEMICS)

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GWALIOR

ANNEXURE – VIII

**(Scheme & Modified syllabus M.E. CTM 1st
Semester)**

W.E.F JULY 2021

Master of Engineering in Construction Technology & Management (Semester – I)

Scheme of Examination

S. No.	Subject Code	Subject Name	Maximum Marks Allotted						Total Marks	Contact Periods per week			Total Credits	
			Theory Slot			Practical Slot		MOOCs		L	T	P		
			End Sem	Mid Sem	Quiz/ Assignment	End Sem	Lab Work / Sessional	Assignment						Exam
1.	510111	Computational Techniques	70	20	10	-	-	-	-	100	3	-	-	3
2.	510121	Construction Materials, Machines & Techniques	70	20	10	-	-	-	-	100	3	-	-	3
3.	510113	Contract Management	70	20	10	-	-	-	-	100	3	-	-	3
4.		#Elective - I	70	20	10	-	-	-	-	100	3	-	-	3
5.		Open Category Course (OC-1)	70	20	10	-	-	-	-	100	3	-	-	3
6.	510119	Construction Lab	-	-	-	90	60	-	-	150	-	-	4	4
7.	510120	S Self Learning / Presentation	-	-	-	-	100	-	-	100	-	-	2	2
		Total	350	100	50	90	160	-	-	750	15	-	6	21

#Elective - I

- 510114. Maintenance Management
- 510115. Infrastructure Development
- 510116. Formwork for Concrete Structures

* **Open Category Course (OC-1)** will have to be opted from the pool of open courses (Student can opt from parent department and other department) and based on interdisciplinary aspects.

- 800108. Organizational Behaviour & Management
- 800109. Safety & Quality Management

During labs, students have to perform practical/assignments/ minor projects related to theory subjects/theoretical concepts of respective semester using recent technologies / languages / tools etc.

Self learning / presentation through SWAYAM / NPTEL (Registration in a course will be compulsory for students bus assessment will be based on internal seminar presentation

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GWALIOR
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ANNEXURE - X

Course Code: 510121

Course Name: Construction Materials, Machines & Techniques

L	T	P	Credit
3	0	0	3

Course Objectives:

1. To impart knowledge about ingredients of concrete, production of concrete at site and ready mix concrete.
2. To apprise about special concretes for different field requirements.
3. To apprise about various types of equipments/machineries used in construction industry.
4. To develop understanding of construction procedure for piles and well foundations.
5. To impart know-how of formwork and scaffolding.
6. To develop technical know-how of shop and insitu construction/fabrication.

Syllabus:

Unit-I

Concrete and its ingredients: Ingredients of concrete including mineral admixtures and chemical admixtures; Proportioning of ingredients, Stages in production of concrete i.e. Batching, Mixing, Transporting, Placing compacting and curing. Design of high strength concrete, Production of Ready mix concrete.

Unit-II

Special Concrete: Polymer concrete, Light weight concrete, Heavy weight concrete, Concrete for radiation shielding, No-Fines concrete, Pervious concrete, Ferro cement, Fiber reinforced concrete, Dry lean concrete and Pavement quality concrete; Self compacting concrete.

Unit-III

Construction Equipments: Characteristics, Operation and selection of different types of construction equipments viz. Power shovels, Drag lines, Scraper, Bulldozer, Tractor, Rippers, Motor graders, Equipments for aggregate processing plant, Ready Mix Concrete Plant; and Hot Mix plant

Unit-IV

Foundations: Construction of piles, Well foundations, Cofferdams and diaphragms; Drilling and blasting, Underpinning, Shoring and shuttering.

Formwork: Different types of formworks, Stationary and slip formwork techniques, Formwork of special structures eg. Shells, Bridges, Towers etc; Scaffolding

Unit-V

Steel Construction: Shop and insitu construction techniques, Pre-engineered buildings; Erection of steel structures like bridges, and trusses.

Prefabrication: Application of prefabrication in construction, Modular coordination and standardization; equipments for industrial production of prefabricated components.

Prestressing: Prestressing methods; Materials; Loss of prestress; equipments for industrial production of prestressed components; Production of Railway Sleepers, Poles and Tanks.

Course Outcomes:

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

- CO 1: Define the relevant characteristics of concrete and its ingredients.
- CO 2: Explain the details of various stages in concrete production.
- CO 3: Design concrete mix for specific requirements using codal provisions.

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- CO 4: **Determine** the suitability of special concretes for specific requirements
CO 5: **Evaluate** the suitability of various equipments for a construction site
CO 6: **Apply** shop and insitu methods and the pre-stressing concepts for a construction project

Reference Books:

1. D. G. Gransberg, C. M. Popescu and R. C. Ryan, Construction Equipment Management for Engineers, Estimators, and Owners, Taylor & Francis, New York.
2. R. L. Peurifoy, C. J. Schexnayder, A. Shapira and R. Schmitt, Construction planning, equipment, and methods, 8th ed., McGraw Hill, New York, 2010.
3. A. R. Santha Kumar, Concrete Technology, Oxford University press.
4. A.M. Neville, Properties of concrete, Pearson Publication
5. M.L. Gambhir, Concrete Technology, Tata Mc Graw Hill Pub. Co
6. Soil Mechanics by Gopal Ranjan, New Age Publishers
7. Mahesh Verma, Construction Equipment, its planning & Application, Metropolitan Book Co (P) Ltd
8. Foundation Design Manual by Narayan V. Nayak, Dhanpat Rai Publications
9. Prestressed Concrete by T.Y. Lin and N.H. Burns, Wiley Publishers
10. Highway Engg by Justo and Khanna, Publisher: Nem Chand and Brothers



Course Code: 110713

Course Name: Advanced Structural Design (R.C.C.)

L	T	P	Credit
3	0	0	3

Course Objectives:

- 1) To understand the behavior of RC structures like Retaining wall, Water tanks, Highway Bridges and prestressed concrete beams.
- 2) To apply the codal provision for estimation of loads on Retaining wall, Water tanks, Highway Bridges and prestressed concrete beams sections
- 3) To know analysis of Retaining walls, Water tanks, Highway Bridges and prestressed concrete beam sections subjected to realistic loads.
- 4) To learn design of Retaining walls, Water tanks, Highway Bridges and prestressed concrete beam sections using Codal provisions.

Syllabus:

Unit-I

Design of Water Tanks:

General design requirements; Design of circular tanks resting on ground; Design of rectangular tanks resting on ground; Design of under ground tanks.

Unit-II

Over Head Water tanks and Flat Slabs:

Overhead Tank: Intze type (Membrane analysis only), Design of Staging
Design of Flat slabs: (i) Direct design method and (ii) Equivalent frame method; Design Shear.

Unit-III

Earth Retaining Structures:

Types of retaining walls, Stability of retaining walls, Design of Cantilever type retaining wall; Design of Counterfort type retaining walls.

Unit-IV

Design of Bridges:

IRC loading for highway bridges, Design of Slab bridges for IRC Loads; Design of T-beams bridges for IRC Loads.

Unit-V

Prestressed Concrete:

Prestressing concepts, materials; systems of prestressing; prestress losses. Introduction to working & limit state design method for prestress beam sections.

Course Outcomes:

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

CO1: Explain the structural behaviour of water retaining structures; earth retaining structures; bridges and Prestressed concrete structures.

CO2: Determine design forces in water retaining structures; earth retaining structures; highway bridges; and Prestressed sections.

CO3: Analyse the water retaining structures; earth retaining structures; highway bridges and Prestressed sections for realistic loadings.

CO4: Design economic and safe water retaining structures; earth retaining structures; highway bridges and Prestressed sections as per Codal provisions.

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Reference Books:

1. Plain and Reinforced Concrete by O.P. Jain and Jai Krishna Vol. I & II, Nem Chand & Bros, Roorkee
2. Reinforced Concrete Limit State Design by Ashok K. Jain, Nem Chand & Bros, Roorkee.
3. Reinforced Concrete Design by S. U. Pillai and D. Menon, Tata McGraw-Hill Publishing Company Limited, New Delhi.
4. Essentials of Bridge Engineering by D.J. Victor, Oxford and IBH publishers.
5. Design of Bridges by N.K. Raju, CBS Publishers
6. Prestressed Concrete by N.K. Raju, CBS Publishers
7. Advanced Reinforced Concrete Design by P. C. Varghese, Prentice Hall of India publisher
8. Prestressed concrete by T.Y. Lin & N.H. Burns, Wiley publisher



Reference Books:

1. Engineering for Dams (Volumes I, II & III) by Creager, Justin & Hinds
2. Hydroelectric Hand Book by Creager
3. Hydraulic Structures by Varshney
4. Irrigation & Water Power Engg. By Punmia & Pandey
5. Water Power Engineering by Dandekar
6. Irrigation Engineering & Hydraulic Structure by S.K. Garg.



Course Code: 110715
Course Name: Advanced Structural Analysis

L	T	P	Credit
3	0	0	3

Course Objectives:

- 1) To understand the analytical procedure related to the analysis of building frame by some classical methods viz. Kani's methods and approximate methods of analysis.
- 2) To study the multi storey frames subjected to gravity loads and lateral loads
- 3) To understand matrix method and its application for computer based analysis of structure.
- 4) To understand the influence line concepts for indeterminate structures
- 5) To develop the skill to deal with the problems of moving loads in the structures & their analysis techniques.
- 6) To understand the concepts of plastic analysis of structures.

Syllabus:

Unit-I

Moment distribution method in analysis of frames with sway, Analysis of box frames, analysis of beams and frames by Kani's methods.

Unit-II

Analysis of tall frames, Calculation of various loads including wind and earthquake loads, Introduction to Code provisions for lateral loads. Approximate analysis of multistorey frames for vertical and lateral loads.

Unit-III

Force method of structural analysis: Application of force method in analysis of rigid connected and pin connected structures

Unit-IV

Rolling Loads and Influence Lines: Influence Lines for Statically determinate and indeterminate structures, Muller Breslau Principle

Unit-V

Displacement method of structural analysis. Introduction to use of softwares for analysis: Modeling, analysis and post processing.

Course Outcomes:

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

- CO 1: Determine response of structures by classical methods
- CO 2: Use approximate methods for analysis of statically indeterminate structures
- CO 3: Determine response of structures by matrix force method
- CO 4: Evaluate and draw the influence lines for reactions, shears, and bending moments in beams and girders due to moving loads
- CO 5: Model and analyze structural systems (building) with the aid of softwares

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Reference Books:

1. Reddy C.S., Basic Structural Analysis, Tata McGraw Hill Publishing Company, New Delhi.
2. Structural Analysis 5ed. (2015) by Aslam Kassimali, Cengage.
3. Structural Analysis, 10th Edition by Russell C. Hibbeler, 2018, Pearson.
4. Matrix Analysis of Structures, SI Edition, by Aslam Kassimali, 2021 CL Engineering
5. Weaver W & Gere J.M. Matrix Methods of Framed Structures, CBS Publishers & Distributors, Delhi

