

DEPARTMENT OF CIVIL ENGINEERING

Minutes of Board of Studies Meeting held on 23rd November, 2019

The meeting of Board of Studies of the Civil Engineering department was held on Saturday, 23rd November, 2019 in the head office of the department. Following were present:

- | | |
|--|-------------------------------------|
| 1. Mr. Sanjay Sarwate
Deputy Director, CSM L&T | (Chairman & Head of the department) |
| 2. Dr. M. K. Trivedi | (Member, BOS) |
| 3. Prof. (Mrs.) Archana Tiwari | (Member, BOS) |
| 4. Dr. S. K. Jain | (Member, BOS) |
| 5. Dr. R. Kansal | (Member, BOS) |
| 6. Dr. S. Tiwari | (Member, BOS) |
| 7. Prof. D. Kastogi | (Member, BOS) |
| 8. Prof. A. K. Dwivedi | (Member, BOS) |
| 9. Prof. A. K. Saxena | (Member, BOS) |
| 10. Prof. G. Bhadoriya | (Member, BOS) |
| 11. Prof. Aditya K. Agarwal | (Special Invitee - Alumni) |
| 12. Er. Abhay Agrawal
MD, Eng press Industries Pvt Ltd, Gwalior | (Special Invitee - Alumni) |
| 13. Dr. Suresh Kumar Tiwari
Professor, Civil Engg. Deptt, MNIT Jaipur | (Special Invitee - Alumni) |
| 14. Er. Rahul Gupta
Neoteric Group Ltd., Gwalior | |

Other nominated members of BoS, Dr. A. K. Nema (Expert nominated by Vice chancellor, RGPV), Dr. P. K. Jain, Dr. Mahesh Kumar Jat (Subject experts from outside parent university) and Mr. Brijesh Kumar Gupta (alumnus) could not attend the meeting due to various official and personal reasons. Following agendas were discussed & deliberated upon

Item No. / CE - 1	<p>To review and finalize the list and syllabi for all Departmental Elective (DE) Courses of VI Semester under the flexible curriculum along with their COs</p> <p>Following courses were finalized as Departmental Elective (DE) courses for VI semester which will be offered in traditional mode under the flexible curriculum for 2017 admitted batch.</p> <ol style="list-style-type: none"> 1. Wastewater Engineering 2. Construction Planning & Management. 3. Solid Waste Management. <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 2017 batch.</p>
Item No. / CE - 2	<p>To review and finalize the list of Courses from SWAYAM/NPTEL/MOOC Platform to be offered in online mode under DE category for credit transfer in the VI Semester</p> <p>Following courses were finalized as Departmental Elective (DE) courses for VI</p>

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semester which will be offered in online mode through SWAYAM/NPTEL/MOOC for credit transfer under the flexible curriculum for 2017 admitted batch.

1. Maintenance & Repair of Concrete Structures.
2. Geotechnical Engineering II (Foundation Engineering).
3. Energy Efficiency, Acoustics & Day lighting in Building.

Item No. /
CE - 3

To review and finalize the Courses & Syllabi to be offered under Open Category (OC) Courses for VI semester students of other departments along with their COs

Following courses were finalized as Open Category (OC) courses for VI semester which will be offered in traditional mode to students of other departments for 2017 admitted batch.

1. Building Physics
2. Prefabricated Construction Technology

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 2017 batch.

Item No. /
CE - 4

To propose the list of "Additional Courses" which can be opted for getting an (i) Honours (ii) Minor Specialization
[These will be completed through SWAYAM/NPTEL/MOOC based Platforms during VI semester]

Following SWAYAM/NPTEL/MOOC courses are proposed as additional courses which can be opted for getting Minor Specialization during VI semester under the flexible curriculum for 2017 admitted batch.

1. Introduction to Civil Engineering Profession.
2. Plastic Waste Management.
3. Fire Protection, Services & Maintenance Management of Building.

Following SWAYAM/NPTEL/MOOC courses are proposed as additional courses which can be opted for getting Honours during VI semester under the flexible curriculum for 2017 admitted batch.

1. Structural Dynamics.
2. Characterization of Construction Materials.
3. Environmental Remediation of Contaminated Sites.

Item No. /
CE - 5

To explore and prepare the tentative list of Departmental Elective (DE) Courses (along with COs) for VII semester (including the DE course to be run through SWAYAM/NPTEL/MOOC based platform)

Following courses are proposed as Departmental Elective (DE) courses for VII semester to be offered in traditional mode under the flexible curriculum for 2017 admitted batch.

1. Irrigation Engineering.
2. Advanced Structural Design (RCC).
3. Railways, Airport & Tunnel Engineering.

The COs for these courses are attached in Annexure - III.

AK Mehta *Major* *[Signature]* *[Signature]* *[Signature]*

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	<p>Following courses are proposed as Departmental Elective (DE) courses for VII semester to be offered in online mode through SWAYAM/NPTEL/MOOC for credit transfer under the flexible curriculum for 2017 admitted batch.</p> <ol style="list-style-type: none"> 1. Environmental Geotechnics. 2. Concrete Technology. 3. Photogeology in Terrain Evaluation. 										
Item No. / CE - 6	<p>To prepare the syllabi of Mandatory Course (MC) titled "Intellectual Property Rights" (IPR) of VII semester under the flexible curriculum <i>[This will be prepared & recommended by Institution Level Committee/Academic Development Cell]</i></p> <p>This agenda will be finalized at institute level and adopted uniformly by all the departments.</p>										
Item No. / CE - 7	<p>To prepare and recommend the Experiment list/ Lab manual for Laboratory Courses to be offered in VII semester</p> <p>The list of experiments for laboratory course to be offered in VII semester under the flexible curriculum were discussed & finalised. The list of experiments is attached in Annexure - IV. The lab manual for this course will be prepared in due course of time and will be discussed and finalized in next BoS meeting.</p>										
Item No. / CE - 8	<p>To review the 'Question Paper Analysis' (of mid/end semester examination) conducted for Jan-June 2019 Session <i>[On the basis of COs and other parameters separately]</i></p> <p>The question paper analysis (of mid/end semester examination) for Jan-June 2019 session was carried out by team of faculty members of the department nominated by the head of department in the month of August, 2019. The compiled report of the question paper analysis is attached in Annexure - V and also the same was discussed in the meeting.</p>										
Item No. / CE - 9	<p>To identify gaps in CO attainment levels for Jan-June 2019 semester and propose corrective measures for improvement.</p> <p>CO attainment calculations were done based upon mathematical model developed by the institute which is followed uniformly by all the departments. CO attainment levels have been defined for direct assessment method. The CO attainment level for a course is checked with a set target level which is generally 2 for a particular CO and also for a course to be attained.</p> <p>Attainment levels defined for direct assessment method</p> <table border="1"> <thead> <tr> <th>Assessment Method</th> <th>Level</th> <th>Attainment levels</th> </tr> </thead> <tbody> <tr> <td rowspan="3">Direct Assessment Method (Mid Sem Exam, End Sem Exam, Continuous Assessment)</td> <td>1</td> <td>40% of the students scoring more than Benchmark*</td> </tr> <tr> <td>2</td> <td>60% of the students scoring more than Benchmark*</td> </tr> <tr> <td>3</td> <td>70% of the students scoring more than Benchmark*</td> </tr> </tbody> </table>	Assessment Method	Level	Attainment levels	Direct Assessment Method (Mid Sem Exam, End Sem Exam, Continuous Assessment)	1	40% of the students scoring more than Benchmark*	2	60% of the students scoring more than Benchmark*	3	70% of the students scoring more than Benchmark*
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	<p>* Benchmark – Benchmark is set generally at 60 % of maximum marks for all courses. The benchmark can be changed in some of the courses depending upon the CO attainments in the previous academic years with increase of 5 % to the existing benchmark.</p> <p>The gap analysis in CO attainment levels for all the courses for Jan-June 2019 was carried on the basis of the set target level i.e. 2 for a particular CO and also for a course and the report of the same is attached in Annexure – VI. 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 was found to be marginally attained.</p> <p>Based upon the analysis of result, end sem, mid sem question papers & CO attainment calculations following gap has been identified:</p> <ul style="list-style-type: none"> • Less number of questions / no questions were asked pertaining to certain COs in the mid sem & end sem exams in these courses. <p>Following corrective measure for improvement in CO attainment has been proposed:</p> <ul style="list-style-type: none"> • In such courses, questions papers of both mid sem exam & end sem exam needs to be prepared by keeping a balance among all COs.
<p>Item No. / CE - 10</p>	<p>To propose and recommend the panel of examiners (UG & PG Level) for conducting practical examinations.</p> <p>The existing panel of external examiners (UG & PG level) for conducting practical examination was discussed. Some modifications in the existing panel were suggested with addition & deletion of some names of examiners. The recommended list of examiners is attached in Annexure – VII.</p>
<p>Item No. / CE - 11</p>	<p>To finalize the 'Collaborative Course' to be offered in VI semester (under DE Category) which is to be run jointly with industry person</p> <p>Following courses were finalized as Collaborative Course under Departmental Elective (DE) category courses which will be offered in for VI semester and will run jointly with industry person.</p> <ol style="list-style-type: none"> 1. Construction Planning & Management. 2. Solid Waste Management.
<p>Item No. / CE - 12</p>	<p>Curricula feedback from various stakeholders, its analysis and impact</p> <p>The curricula feedback was taken from various stakeholders viz students, faculty members & parents in the month of October, 2019. The compiled report along with its analysis is attached in Annexure – VIII. Some important suggestions given by the stakeholders are as follows:</p> <ol style="list-style-type: none"> 1. Include more topics of GATE exam in some of the courses and also subsequently remove topics which are not in GATE exam. 2. Availability of standard books in library in sufficient number for all courses. 3. Addition of laboratory experiments in some of the courses. 4. Inclusion of supply chain management in curriculum. 5. Inclusion of topics on metro's and jetti's & harbour (sea structures) in the


04

syllabus of transportation engg.

Item No. /
CE - 13

Any other matters
1. Modification in the scheme's of B.Tech Civil Engg. for 2017 & 2018 admitted batches.

The scheme's of B.Tech Civil Engg. for 2017 & 2018 admitted batches is modified by replacing Environmental Engineering - II course by Structural Design & Drawing (Steel) course in VI Semester as Departmental Core (DC) course. Also the credits for SDD (Steel) course has been modified as follows:

Scheme	L	T	P
2017 admitted batch	2	1	0
2018 admitted batch	3	1	0

The revised scheme's for 2017 & 2018 admitted batches are attached in Annexure's - IX & X. The syllabus of SDD (Steel) has also been incorporated in the syllabus file for 2017 batch.

2. Modification in name and syllabus of 110405, Engineering Hydrology for 2018 admitted batch onwards students.

It is proposed to modify the name of Engineering Hydrology with Water Resources Engineering and also some modifications in the existing syllabus of the same are proposed for 2018 admitted batch onwards students to incorporate the fundamentals of irrigation engineering, as these concepts are very important for all students to know and irrigation engineering being now departmental elective course, all students will not be able to learn them. The modified syllabus of this course is attached in Annexure - XI and also the same will be incorporated in the syllabus file of 2018 batch.

3. Modification in syllabus of 110503, Fluid Mechanics - II for 2018 admitted batch onwards students.

It is proposed to modify the existing syllabus of 110503, Fluid Mechanics - II for 2018 admitted batch onwards students by adding the topic of energy dissipators in Unit IV. The modified syllabus of this course is attached in Annexure - XII and also the same will be incorporated in the existing syllabus file of 2018 batch.

4. Modification in the some of the COs of some of the courses.

During review of COs it has been found out that the action verbs of some of the COs are inappropriate and hence the action verbs of these COs have been replaced in following courses:

- (1) Basic Civil Engineering and Mechanics (100205)
- (2) Transportation Engineering (BCEL 303, 110505)
- (3) Estimating Costing and Contracting (BCEL 401, 110501)
- (4) Water Resources Engineering (BCEL 503)
- (5) Engineering Hydrology (110405)



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- (6) Building Planning and Design (110302)
- (7) Building Material and Construction (110303, BCEL 404)
- (8) Geotechnical Engineering (110402, BCEL 604)
- (9) Construction Planning and Management (BCEL 501)
- (10) Fluid Mechanics I 110403, (BCEL 402)
- (11) S.D.D II (Steel) (BCEL 605)
- (12) Solid Waste, Air and Noise Pollution (BCEL 602)
- (13) Industrial Waste Treatment (BCEL 803)
- (14) A.S.D I (RCC) (BCEL 703)
- (15) A.S.D II (Steel) (BCEL 801)
- (16) Hydraulic Structure (BCEL 802)
- (17) Railway, Bridge and Tunnel (BCEL 704)
- (18) Building Environment and Services (BCEL 804)

The modified COs have been incorporated in the existing syllabus of these courses.

5. Modification in name and syllabus of 110504, Environmental Engineering – I for 2018 admitted batch students.

With changes being made in the scheme of 2018 admitted batch students, it is decided to change the name of 110504, Environmental Engineering – I to Environmental Engineering. The change of name has been incorporated in the scheme of 2018 admitted batch students as attached in Annexure. It is also proposed to modify the syllabus of this course and discussion on the same will be done in the next BoS meeting which will be scheduled in April 2020.

6. Modification in the syllabus of 110501, Estimating Costing & Contracting for 2018 admitted batch students.

It is also proposed to modify the syllabus of this course and discussion on the same will be done in the next BoS meeting which will be scheduled in April 2020.

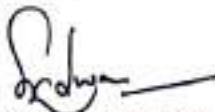
7. Modification in the scheme of B.Tech Civil Engg. for 2019 admitted batch students and syllabus of Building Planning & Design and Building Materials & Construction.

It is also proposed to modify the scheme as well as syllabus of these courses and discussion on the same will be done in the next BoS meeting which will be scheduled in April 2020.

The meeting ended with vote of thanks to the chair.



(Er. Rahul Gupta)
Special Invitee – Alumni



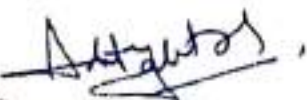
(Dr. Suresh Kumar Tiwari)
Special Invitee – Alumni



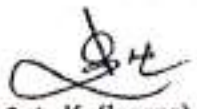
(Er. Abhay Agrawal)
Special Invitee – Alumni




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(Prof. Aditya K. Agarwal)
Member, BoS



(Prof. G. Bhadoriya)
Member, BoS

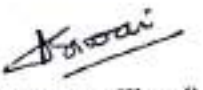

(Prof. A. K. Saxena)
Member, BoS



(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


(Mr. Sanjay Sarwate)
Representative from Industry


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


20/01/2020
DEAN (ACADEMICS)
MITS
GWALIOR

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ANNEXURE - IX

DEPARTMENT OF CIVIL ENGINEERING

SCHEME OF STUDY B.Tech Civil Engineering

2017 ADMITTED BATCH ONLY

ANAND

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[For batch admitted in Academic Session 2017-18]

Semester-Wise Scheme & Guidelines For Flexible Curriculum

Abbreviations used

L	Lecture
T	Tutorial
P	Practical
HSMC	Humanities and Social Sciences including Management Courses
BSC	Basic Science Courses
ESC	Engineering Science Courses
DC	Departmental Core Courses
DE	Departmental Elective Courses
OC	Open Category Courses
DLC	Departmental Laboratory Courses
MC	Mandatory Courses
PD	Professional Development
MOOC	Massive Open Online Courses

Definition of Credit:

1 Hr. Lecture (L) per week	1 credit
1 Hr. Tutorial (T) per week	1 credit
2 Hours Practical(Lab)/week	1 credit

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General Guidelines for Flexible Curriculum
(For batch admitted in 2017-18)

- For the award of basic Under Graduate (UG) Degree in Engineering/Technology (without Honours/Honours with Minor Specialization), it is required to earn 170 Credits. For the B. Architecture Degree the total credit requirement is 260.
- The students can opt up to 34 credits out of these 170 from recognized MOOC (Massive Open Online Courses) platforms against Departmental & Open elective courses (DE/OC). Each such Course must be of minimum 2 credits.
- There is a provision for interested students to opt for additional 20 credits to obtain Honours or Honours with Minor Specialization in chosen field. These additional courses can be selected and opted from the list of courses approved by the department through their recognized bodies.
- In the flexible curriculum there is a provision of 03 Mandatory Credit Courses on Cyber Security, Disaster Management, & Intellectual Property Rights.
- In the flexible curriculum presently there is a provision of 02 Audit Courses on (i) Biology for Engineers & (ii) Indian Constitution & Traditional Knowledge. Auditing a course allows a student to take a class without the benefit of a grade or credit, for the sole purposes of self-enrichment and academic exploration.
- The students have to undergo three Mandatory Summer Internship Programme/Projects (SIPs) after their I, II and III year and their evaluation will reflect in III, V & VII semester examination results, respectively.
- Credit will be given for "Professional Development" of students in order to bring their all kinds of personality and skill development activities into the orbit and to encourage student participation in professional chapter activities, club activities, cultural events, sports, technical events, hackathons, personality development activities etc.
- The marks for "Professional Development" will be awarded to students in VIII semester on the basis of their participation and achievements in extra & co-curricular activities, sports, performance in MOOCs etc. right from I year.

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Guidelines for students opting additional courses for (i) B.Tech. Honours degree or (ii) B.Tech. Honours degree with Minor Specialization

- For getting an (i) B.Tech Honours in parent discipline or (ii) B.Tech Honours with Minor Specialization in other interdisciplinary areas/fields of Engineering, Technology, Applied Science, Management etc. which are offered by the Institute, the additional Credit requirement is 20 for Engineering & Technology students i.e. Total $170 + 20 = 190$ credits needed by the end of VIII semester.
- For students desirous of achieving additional credits for Honours/Honours with Minor Specialization, there is a provision of selecting maximum 02 courses per semester from V semester onwards. Each such Course must be of minimum 2 credits.
- These additional courses can be selected only from the pool of courses specified by the department from recognized SWAYAM/NPTEL/MOOC platforms.

Credit Requirements & Guidelines for MOOCs

- Up to 34 Credits out of total 170 for Engineering/Technology students & 52 credits out of total 260 credits for B. Architecture students can be earned through SWAYAM/NPTEL/MOOC platform based learning for the award of UG degree in Engineering/Technology & Architecture respectively (without Honours/Honours with Minor Specialization).
- To obtain Honours or Honours with Minor Specialization 20 credits additionally can be acquired through SWAYAM/NPTEL/MOOC platform based learning.
- In this manner, students aspiring for Honours or Honours with Minor Specialization during the tenure of B. Tech programme can opt for a total of 54 (34+20) Credits and the students of the B. Architecture programme can earn up to 72 (52+20) credits through SWAYAM/NPTEL/MOOC platform based learning.
- For the courses opted under MOOC, the equivalent credit weightage will be given to the students, for the credits earned in online examination on SWAYAM/NPTEL platform and other similar platforms as approved by the authorized bodies (BoS, AC etc.), in the credit plan of the program.
- Policy for credit equivalence and transfer for the courses opted from SWAYAM/NPTEL/University of Central Florida (UCF)RGPV Bhopal/Institutional (MITS) MOOC/other MOOC (Massive Open Online Courses) platforms, is as follows :

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Duration of MOOC	Credit Transfer
04 week course	01*
06 week course	02**
08 week course	03**
12 week course	04**

* The 01 credit courses can be opted only under seminar/self-study/professional development purposes.

** The 02, 03 & 04 credit courses can be opted under DEs/OCs and additional courses (for Honours/Honours with Minor Specialization).

- The guidelines regarding "credit transfer from MOOCs" by All India Council of Technical Education (AICTE) and the affiliating university, i.e. RGPV Bhopal, as issued from time to time will be binding on the institute.

Guidelines for Departmental Elective (DEs) and Open Category Courses (OCs)

- The list of Departmental/Open Elective Courses (DEs/OCs) will be prepared well in advance and make the list public among the students, possibly in the previous semester itself for preference based registration process.
- The list of courses which the students can opt from the SWAYAM/NPTEL/MOOC platform against DE & OC courses in the scheme will be approved by authorized bodies (BoS, AC etc.) and displayed/communicated to students/on the website well in advance, (in September/October & April/May for even and odd semesters respectively) so that students can select the courses of their choice. Each such Course must be of minimum 2 credits.
- The Open Category (OC) course will be open for students of departments other than the offering (parent) department. Moreover, there will be no pre-requisite for Open Category Courses.
- The allotment of DE/OC Courses will be based on First Come First Serve (FCFS) basis.
- The weightage of continuous assessment (Mid Semester Exam, Quiz, Assignment etc.) for DE/OC courses which are opted from MOOCs will be considered from the score obtained towards assignment work/test etc. conducted by the course offering agency.
- For matching the credit requirement with the curricular/scheme requirements, more than one MOOC course can also be selected against an Elective Course, provided that the collective credits are equal to or more than the credit requirement; however each such selected course must be of minimum 2 credits.

Prof. A. K. Singh Prof. V. K. Singh Prof. S. K. Singh

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Mandatory Summer Internship Programme

- The students have to undergo three Mandatory Summer Internship Programme/Projects (SIPs) after the I, II and III year and their evaluation will reflect in III, V, & VII semester examination results.
- In case, a student fails to appear (due to valid cause)/acquire minimum score, the Head of Concerning Department may schedule the re-conduction of internship program for such students and the same will be monitored and reviewed by the Dean Student Welfare. Such students are required to fill the examination form for III/V semester in order to get the marks/credits reflected in their mark-sheet, which will also clearly indicate the year of completion of Internship.
- The promotion to successive semesters/years will not be affected for students who are not able to complete these requirements in time. However, they will not be awarded the degree until they complete these mandatory Summer Internship programs (SIPs).
-

Provision of Internship/Project

- All the courses offered in VIII semester are DE (Departmental Elective) and OC (Open Category) courses, which will run through online learning platform under the mentorship of faculty members.
- The students can opt for internship/project in the VIII Semester by either making a project or by doing internship in an industry after formal approval of the Institute as well as the concerned industry.

Awareness about Ethics & Academic Integrity

Criteria for accepting similarity index for the submission of UG project report/PG dissertation/Thesis

- The overall similarity index up to 15-20% is acceptable (using turnitin plagiarism check software).
- The highest similarity percentage from any one source is not greater than 4-6%.
- In case of self plagiarism, the permissible percentage may be slightly higher, say at 7-10%.

Ms. Arvind P. Singh *Ms. Arvind P. Singh* *Ms. Arvind P. Singh*

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Guidelines for evaluating "Professional Development"

PERFORMANCE METRICS		
Categories	Suggestive Activities	Marks Assigned
Institute Level* (C1)	Participation in Institute level technical events such as quizzes, extemporary, debate, student volunteers, seminar, professional society local chapters (IET, IEEE, ISTE, IETE, NCC etc.	(02 Marks for each participation) Marks=Number of activities (C1) x 2 (Maximum marks in this category 06)
State Level* (C2)	Participation in State level technical events such as Robotics, Coding challenge, Cultural cum technical fest, technical symposium, volunteers, hackathon, sports etc.	03 marks for each participation Number of activities (C2) x 3 (Maximum marks in this category 09)
National level* (C3)	Participate in National level events such as hands on workshop, national level seminar, national conference, Entrepreneurship, model making, techno culture fest, national youth festival, research conclave, project competition, volunteers, sports festival etc.	05 marks for each participation (Maximum 15) Marks=Number of activities (C3) x 5 (Maximum marks in this category 15)
MOOC's** (C4)	Successfully completed technical certification course in any MOOC's platform such as (NPTEL/SWAYAM/EdX/Coursera/Class Central etc)	10 marks for each course (Maximum 20) Marks= Number of certificates (C4) x 10 (Maximum marks in this category 20)
Evaluation in VIII Semester		
Formula		Marks Scored (Out of 50)
$(C1 \times 2 + C2 \times 3 + C3 \times 5 + C4 \times 10) =$		

In addition to the above, if a student or group of students win a competition in the above three categories (Institute level/State level/National level etc.) then maximum marks in the respective category will be awarded to such students.

Note: * Student must produce a certificate as a proof for each activity.

** Courses for which credits are already earned (for DE/OC/Honours or Minor Specialization from I to VIII semester) through MOOCs by the student during academics will not be counted.



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Structure of Undergraduate Engineering program:

S. No.	Category	Suggested Breakup of Credits (Total 160) (as proposed by AICTE)	Component wise credit allotment	No. of Courses
1	Humanities and Social Sciences including Management Courses (HSMC)	12**	14	04
2	Basic Science Courses (BSC)	26**	25	05
3	Engineering Science courses including workshop, drawing, basics of electrical/mechanical/computer etc. (ESC)	29**	31	06
4	Departmental Core Courses (DC)	47**	49	14
5	Departmental Elective Courses relevant to specialization/branch (DE)	23**	10	05
6	Open Category- Electives from other technical and /or emerging subjects (OC)	11**	12	05
7	Project work, seminar and internship in industry or appropriate work place/ academic and research institutions (DLC/SWAYAM/NPTEL/MOOC-Practical Slot)	12**	21	12
3	Mandatory Courses (MC) and Professional Development		8	04
	Total	160**	170	55

**Minor variation is allowed as per need of the respective disciplines.



Scheme of Examination (B.Tech.)

GROUP B: I Semester & Group A: II Semester **[For batch admitted in Academic Session 2017-18]**

Subject wise distribution of marks and corresponding credits

S.No.	Subject Code	Category Code	Subject Name	Maximum Marks Allotted					Contact Periods per week			Total Credits	
				Theory Slot		Practical Slot		Total Marks	L	T	P		
				End Sem	Mid Sem	Quiz/Assignment	End Sem						Lab work/ sessional
1.	100101	BSC	Engineering Chemistry (BSC-1)	70	20	10	30	20	150	4	1	2	6
2.	100102	BSC	Engineering Mathematics - I (BSC-2)	70	20	10	-	-	100	4	1	-	5
3.	100103	HSMC	Technical English (HSMC-1)	70	20	10	30	20	150	4	1	2	6
4.	100104	ESC	Basic Electrical & Electronics Engineering (ESC-1)	70	20	10	30	20	150	4	1	2	6
5.	100105	ESC	Engineering Graphics (ESC-2)	70	20	10	30	20	150	4	1	2	6
6.	100106	ESC	Manufacturing Practices (ESC-3)	-	-	-	30	20	50			2	1
			Total	350	100	50	150	100	750	20	5	10	30

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 A: (Electrical, Electronics, Computer Science, Information technology, Electronics & telecommunication)

GROUP B: (Civil, Mechanical, Chemical, Biotech, Automobile)

01 Theory Period = 1 Credit; 02 Practical Periods = 1 Credit



Scheme of Examination (B.Tech.)

GROUP A: I Semester & GROUP B: II Semester [For batch admitted in Academic Session 2017-18]

Subject wise distribution of marks and corresponding credits

S.No.	Subject Code	Category Code	Subject Name	Maximum Marks Allotted				Total Marks	Contact Periods per week			Total Credits	
				Theory Slot		Practical Slot			L	T	P		
				End Sem	Mid Sem	Quiz/Assignment	End Sem						Lab work/ sessional
1.	100201	BSC	Engineering Physics (BSC-3)	70	20	10	30	20	4	1	2	6	
2.	100202	HSMC	Energy, Environment, Ecology & Society (HSMC-2)	70	20	10	-	-	4	1	-	5	
3.	100203	ESC	Basic Computer Engineering (ESC-4)	70	20	10	30	20	4	1	2	6	
4.	100204	ESC	Basic Mechanical Engineering (ESC-5)	70	20	10	30	20	4	1	2	6	
5.	100205	ESC	Basic Civil Engineering & Mechanics (ESC-6)	70	20	10	30	20	4	1	2	6	
6.	100206	HSMC	Language Lab. & Seminars (HSMC-3)	-	-	-	30	20	50		2	1	
Total				350	100	50	150	100	750	20	5	10	30
Summer Internship Project - I (Institute Level) (Qualifier): Minimum two-week duration : Evaluation in III Semester.													

GROUP A: (Electrical, Electronics, Computer Science, Information technology, Electronics & telecommunication)

GROUP B: (Civil, Mechanical, Chemical, Biotech, Automobile)

01 Theory Period = 1 Credit; 02 Practical Periods = 1 Credit





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

[For batch admitted in Academic Session 2017-18]

S. No.	Subject Code	Category Code	Subject Name	Maximum Marks Allotted						Total Marks			Contact Hours per Week			Total Credits
				Theory Slot		Practical Slot		End Sem.	Quiz/Assignment	End Sem.	Lab Work / Sessional	Total Marks	L	T	P	
				End Sem.	Mid Sem.	End Sem.	End Sem.									
1.	100001	BSC	Engineering Mathematics-II (BSC-4)	70	20	10	-	-	-	100	3	1	-	4		
2.	110302	DC	Building Planning & Design (DC-1)	70	20	10	-	-	-	100	3	1	-	4		
3.	110303	DC	Building Materials & Construction (DC-2)	70	20	10	30	30	20	150	3	-	2	4		
4.	110304	DC	Surveying (DC-3)	70	20	10	30	30	20	150	3	-	2	4		
5.	110305	DC	Strength of Materials (DC-4)	70	20	10	30	30	20	150	3	-	2	4		
6.	110306	DLC	Software Lab (DLC-1)*	-	-	-	30	30	20	50	-	-	2	1		
7.	110307	Seminar / Self Study	Self Learning/Presentation (Through Swayam/NPTEL/MOOC)*	-	-	-	-	-	25	25	-	-	2	1		
8.	110308	DLC	Summer Internship Project - I (Institute Level) (Evaluation)	-	-	-	25	25	-	25	-	-	4	2		
Total				350	100	50	145	105	105	750	15	2	14	24		
NSS / NCC				Qualifier												

*Compulsory registration for one online course using SWAYAM / NPTEL / MOOC, evaluation through attendance, assignment and presentation.
*Virtual Lab to be conducted along with traditional Lab.

GROUP A: (Electrical, Electronics, Computer Science, Information Technology, Electronics & Telecommunication)

GROUP B: (Civil, Mechanical, Chemical, Biotech, Automobile)

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

[For batch admitted in Academic Session 2017-18]

S. No.	Subject Code	Category Code	Subject Name	Maximum Marks Allotted					Total Marks			Contact Periods per Week			Total Credits
				Theory Slot		Practical Slot			Total Marks	L	T	P			
				End Sem.	Mid Sem.	Quiz/ Assignment	End Sem.	Lab Work / Sessional							
1.	100003	BSC	Engineering Mathematics - III (BSC-5)	70	20	10	-	-	-	100	2	2	-	4	
2.	110402	DC	Geotechnical Engineering (DC-5)	70	20	10	30	20	-	150	2	1	2	4	
3.	110403	DC	Fluid Mechanics - I (DC-6)	70	20	10	30	20	-	150	2	1	2	4	
4.	110404	DC	Structural Analysis (DC-7)	70	20	10	-	-	-	100	3	1	-	4	
5.	110405	DC	Engineering Hydrology (DC-8)	70	20	10	-	-	-	100	3	1	-	4	
6.	100004	MC	Cyber Security (MC)	70	20	10	-	-	-	100	2	1	-	3	
7.	110407	DLC	Survey Practice Lab (DLC-2)*	-	-	-	30	20	-	50	-	-	4	2	
Total				420	120	60	90	60	-	750	14	7	8	25	
8.	100002*	MC	Biology for Engineers (Audit Course) (MC)	70	20	10	-	-	-	100	3	-	-	-	
NSS/NCC				Qualifier											
Summer Internship Project - II (Soft Skills Based) for two weeks duration: Evaluation in V Semester															

* This course will run for Group B/A in IV/III semester respectively. (Passing is optional, however a separate marksheet will be issued to those who qualify).
 *Virtual Lab to be conducted along with traditional Lab.

GROUP A: (Electrical, Electronics, Computer Science, Information Technology, Electronics & Telecommunication)
GROUP B: (Civil, Mechanical, Chemical, Biotech, Automobile)

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Scheme of Examination

B. Tech. V Semester (Civil Engineering)

[For batch admitted in Academic Session 2017-18]

S. No.	Subject Code	Category Code	Subject Name	Maximum Marks Allotted					Total Marks			Contact Periods per Week			Total Credits
				Theory Slot		Practical Slot		End Sem.	Lab work / Sessional	L	T	P			
				End Sem.	Mid Sem.	Quiz/ Assignment	End Sem.								
1.	110501	DC	Estimating, Costing & Contracting (DC-9)	70	20	10	-	-	100	2	-	-	2	2	
2.	110502	DC	Structural Design & Drawing (RCC) (DC-10)	70	20	10	-	-	100	2	1	-	3	3	
3.	110503	DC	Fluid Mechanics – II (DC-11)	70	20	10	30	30	150	2	-	2	3	3	
4.	110504	DC	Environmental Engineering – I (DC-12)	70	20	10	30	30	150	2	-	2	3	3	
5.	110505	DC	Transportation Engineering (DC-13)	70	20	10	30	30	150	2	-	2	3	3	
6.	110506	DLC	Minor Project – I** (DLC-3)	-	-	-	30	20	50	-	-	4	2	2	
7.	110507	DLC	Summer Internship Project – II (Evaluation) (DLC-4)	-	-	-	25	-	25	-	-	4	2	2	
8.	110508	Seminar / Self Study	Self Learning/ Presentation (Through Swayam/NPTEL/MOOC*)	-	-	-	-	25	25	-	-	2	1	1	
Total				350	100	50	145	105	750	10	1	16	19		

Department Level activity / workshop / awareness programme to be conducted; certificate of compliance to be submitted by HoD to the Exam controller through Dean Academics

Permitted to opt for maximum 02 additional courses for the award of Honours or Minor Specialization

** The Minor Project – I may be evaluated by an internal committee for awarding sessional marks.
*Compulsory registration for one online course using SWAYAM / NPTEL / MOOC, evaluation through attendance, assignment and presentation.

GROUP A: (Electrical, Electronics, Computer Science, Information Technology, Electronics & Telecommunication)
GROUP B: (Civil, Mechanical, Chemical, Biotech, Automobile)

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Scheme of Examination

B. Tech. VI Semester (Civil Engineering)

[For batch admitted in Academic Session 2017-18]


S. No.	Subject Code	Category Code	Subject Name	Maximum Marks Allotted				Total Marks	Contact Periods per Week			Total Credits
				Theory Slot		Practical Slot			L	T	P	
				End Sem.	Mid Sem.	Quiz/Assignment	End Sem.					
1.	100005*	HSMC	Ethics, Economics, Entrepreneurship & Management (HSMC-1)	70	20	10	-	100	2	-	-	2
2.	110602	DC	Structural Design & Drawing (Steel) (DC-14)	70	20	10	-	100	2	1	-	3
3.		DE	(DE-1)*	70	20	10	-	100	2	-	-	2
4.		DE	(DE-2)*	70	20	10	-	100	2	-	-	2
5.		OC	(OC-1)*	70	20	10	-	100	2	-	-	2
6.	100007	MC	Disaster Management (MC)	-	-	-	100	150	-	-	4	2
7.	110607	DLC	Minor Project - II (DLC-5)	-	-	-	100	750	12	1	4	15
			Total	420	120	60	100					
8.	100006*	MC	Indian Constitution & Traditional Knowledge (Audit Course) (MC)	70	20	10	-	100	3	-	-	-
9.			Additional Courses for obtaining Honours or Minor Specialization by desirous students	Permitted to opt for maximum 02 additional courses for the award of Honours or Minor Specialization								
			Summer Internship Project - III (On Job Training) for Four Weeks Duration : Evaluation in VII Semester	Permitted to opt for maximum 02 additional courses for the award of Honours or Minor Specialization								

* This course will run for Group B/A in V/V semester respectively.
 * This course will run for Group B/A in V/A semesters respectively. (Passing is optional, however a separate marksheet will be issued to those who qualify.)
 At least one of these courses must be run through SWAYAM / NPTEL / MOOC.

GROUP A: (Electrical, Electronics, Computer Science, Information Technology, Electronics & Telecommunication)
GROUP B: (Civil, Mechanical, Chemical, Biotech, Automobile)

SEMESTER - VI

		OC-1022 (ACADEMICS)
DE - 1		DE - 2 (Through SWAYAM/NPTEL)
110611. Wastewater Engineering	110651. Maintenance & Repair of Concrete Structures.	1. Building Physics M.I.T.S
110612. Solid Waste Management	110652. Geotechnical Engineering II (Foundation Engineering).	2. Prefabricated Construction Technology Gwalior
110613. Construction Planning & Management	110653. Energy Efficiency - Acoustics & Day lighting in Building.	


 Date:

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

[For batch admitted in Academic Session 2017-18]

S. No.	Subject Code	Category Code	Subject Name	Maximum Marks Allotted						Contact Periods per Week			Total Credits
				Theory Slot		Practical Slot		Total Marks	L	T	P		
				End Sem.	Mid Sem.	Quiz / Assignment	End Sem.					Lab Work / Sessional	
1.		DE	(DE-3)*	70	20	10	-	-	100	2	-	-	2
2.		DE	(DE-4)*	70	20	10	-	-	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	MIC	Intellectual Property rights (IPR) (MIC)	70	20	10	-	-	100	2	-	-	2
6.	110706	DLC	Software Application for Solving Civil Engineering Problems (DLC-6)	-	-	-	50	50	100	-	-	4	2
7.	110707	DLC	Summer Internship Project - III (04 weeks) (Evaluation) (DLC-7)	-	-	-	50	50	100	-	-	4	2
8.	110708	DLC	Creative Problem Solving (Evaluation) (DLC-8)	-	-	-	25	25	50	-	-	2	1
Total				350	100	50	125	125	750	11	1	10	17
9.	Additional Courses for obtaining Honours or Minor Specialization by desirous students			Permitted to opt for maximum 02 additional courses for the award of Honours or Minor Specialization									

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

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

[For batch admitted in Academic Session 2017-18]

S.No.	Subject Code	Category Code	Subject Name	Maximum Marks Allotted					Total Marks	Contact Periods per Week			Total Credits
				Theory Slot		Practical Slot		L		T	P		
				End Sem.	Mid Sem.	Quiz/ Assignment	End Sem.					Lab Work / Sessional	
1.		DE	(DE-5)*	70	20	10	-	-	100	2	-	-	2
2.		OC	(OC-4)*	70	20	10	-	-	100	2	-	-	2
3.		OC	(OC-5)*	70	20	10	-	-	100	2	-	-	2
4.	110804	DLC	Internship / Project (DLC-9)	-	-	-	250	150	400	-	-	6	3
5.	110805	PD	Professional Development ²	-	-	-	-	50	50	-	-	2	1
Total				210	60	30	250	200	750	6	-	8	10
6.	Additional Courses for obtaining Honours or Minor Specialization by desirous students			Permitted to opt for maximum 02 additional courses for the award of Honours or Minor Specialization									

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

² Evaluation will be based on participation/laurels brought by the students to the institution in national/state level technical and other events during the complete tenure of the UG program (participation in professional chapter activities, club activities, cultural events, sports, personality development activities, collaborative events, MOOCs and technical events)



Civil Engineering Semester wise Credit Distribution

S.No.	Semesters	Credit Distribution
1	Semester -I	30
2	Semester -II	30
3	Semester -III	24
4	Semester -IV	25
5	Semester -V	19
6	Semester -VI	15
7	Semester -VII	17
8	Semester -VIII	10
Total		170

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A ANNEXURE - X

DEPARTMENT OF CIVIL ENGINEERING

SCHEME OF STUDY B.Tech Civil Engineering

2018 ADMITTED BATCH ONLY

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Scheme Structure & Semester-wise credit distribution (under flexible curriculum design)

[For batches admitted in Academic Session 2018-19 onwards]

Semester-Wise Scheme & Guidelines for Flexible Curriculum

Abbreviations used

L	Lecture
T	Tutorial
P	Practical
HSMC	Humanities and Social Sciences including Management Courses
BSC	Basic Science Courses
ESC	Engineering Science Courses
DC	Departmental Core
DE	Departmental Elective
OC	Open Category
DLC	Departmental Laboratory Courses
MC	Mandatory Course
PD	Professional Development
MOOC	Massive Open Online Courses

Definition of Credit :

1 Hour Lecture (L) per week	1 credit
1 Hour Tutorial (T) per week	1 credit
2 Hours Practical (Lab) per week	1 credit

MADHAV INSTITUTE OF TECHNOLOGY & SCIENCE, GWALIOR

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General Guidelines for Flexible Curriculum

(For batch admitted in 2018-19)

- For the award of basic Under Graduate (UG) Degree in Engineering/Technology (without Honours/Honours with Minor Specialization), it is required to earn 170 Credits. For the B. Architecture Degree the total credit requirement is 260.
- The students can opt up to 34 credits out of these 170 from recognized MOOC (Massive Open Online Courses) platforms against Departmental & Open elective courses (DE/OC). Each such Course must be of minimum 2 credits.
- There is a provision for interested students to opt for additional 20 credits to obtain Honours or Honours with Minor Specialization in chosen field. These additional courses can be selected and opted from the list of courses approved by the department through their recognized bodies.
- In the flexible curriculum there is a provision of 03 Mandatory Credit Courses on Cyber Security, Disaster Management, & Intellectual Property Rights.
- In the flexible curriculum presently there is a provision of 02 Audit Courses on (i) Biology for Engineers & (ii) Indian Constitution & Traditional Knowledge. Auditing a course allows a student to take a class without the benefit of a grade or credit, for the sole purposes of self-enrichment and academic exploration.
- The students have to undergo three Mandatory Summer Internship Programme/Projects (SIPs) after their I, II and III year and their evaluation will reflect in III, V & VII semester examination results, respectively.
- Credit will be given for "Professional Development" of students in order to bring their all kinds of personality and skill development activities into the orbit and to encourage student participation in professional chapter activities, club activities, cultural events, sports, technical events, hackathons, personality development activities etc.
- The marks for "Professional Development" will be awarded to students in VIII semester on the basis of their participation and achievements in extra & co-curricular activities, sports, performance in MOOCs etc. right from 1 year.

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Guidelines for students opting additional courses for (i) B.Tech. Honours degree or (ii) B.Tech. Honours degree with Minor Specialization

- For getting an (i) B.Tech. Honours in parent discipline or (ii) B.Tech. Honours with Minor Specialization in other interdisciplinary areas/fields of Engineering, Technology, Applied Science, Management etc. which are offered by the Institute, the additional Credit requirement is 20 for Engineering & Technology students i.e. Total 170 + 20 = 190 credits needed by the end of VIII semester.
- For students desirous of achieving additional credits for Honours/Honours with Minor Specialization, there is a provision of selecting maximum 02 courses per semester from V semester onwards. Each such Course must be of minimum 2 credits.
- These additional courses can be selected only from the pool of courses specified by the department from recognized SWAYAM/NPTEL/MOOC platforms.

Credit Requirements & Guidelines for MOOCs

- Up to 34 Credits out of total 170 for Engineering/Technology students & 52 credits out of total 260 credits for B. Architecture students can be earned through SWAYAM/NPTEL/MOOC platform based learning for the award of UG degree in Engineering/Technology & Architecture respectively (without Honours/Honours with Minor Specialization).
- To obtain Honours or Honours with Minor Specialization 20 credits additionally can be acquired through SWAYAM/NPTEL/MOOC platform based learning.
- In this manner, students aspiring for Honours or Honours with Minor Specialization during the tenure of B. Tech programme can opt for a total of 54 (34+20) Credits and the students of the B. Architecture programme can earn up to 72 (52+20) credits through SWAYAM/NPTEL/MOOC platform based learning.
- For the courses opted under MOOC, the equivalent credit weightage will be given to the students, for the credits earned in online examination on SWAYAM/NPTEL platform and other similar platforms as approved by the authorized bodies (BoS, AC etc.), in the credit plan of the program.
- Policy for credit equivalence and transfer for the courses opted from SWAYAM/NPTEL/University of Central Florida (UCF)/RGPV Bhopal/Institutional (MITS) MOOC/other MOOC (Massive Open Online Courses) platforms, is as follows :

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Duration of MOOC	Credit Transfer
04 week course	01*
06 week course	02**
08 week course	03**
12 week course	04**

* The 01 credit courses can be opted only under seminar/self-study/professional development purposes.

** The 02, 03 & 04 credit courses can be opted under DEs/OCs and additional courses (for Honours/Honours with Minor Specialization).

- The guidelines regarding "credit transfer from MOOCs" by All India Council of Technical Education (AICTE) and the affiliating university, i.e. RGPV Bhopal, as issued from time to time will be binding on the institute.

Guidelines for Departmental Elective (DEs) and Open Category Courses (OCs)

- The list of Departmental/Open Elective Courses (DEs/OCs) will be prepared well in advance and make the list public among the students, possibly in the previous semester itself for preference based registration process.
- The list of courses which the students can opt from the SWAYAM/NPTEL/MOOC platform against DE & OC courses in the scheme will be approved by authorized bodies (BoS, AC etc.) and displayed/communicated to students/on the website well in advance, (in September/October & April/May for even and odd semesters respectively) so that students can select the courses of their choice. Each such Course must be of minimum 2 credits.
- The Open Category (OC) course will be open for students of departments other than the offering (parent) department. Moreover, there will be no pre-requisite for Open Category Courses.
- The allotment of DE/OC Courses will be based on First Come First Serve (FCFS) basis.
- The weightage of continuous assessment (Mid Semester Exam, Quiz, Assignment etc.) for DE/OC courses which are opted from MOOCs will be considered from the score obtained towards assignment/work/test etc. conducted by the course offering agency
- For matching the credit requirement with the curricular/scheme requirements, more than one MOOC course can also be selected against an Elective Course, provided that the collective credits are equal to or more than the credit requirement; however each such selected course must be of minimum 2 credits.



MADHAV INSTITUTE OF TECHNOLOGY & SCIENCE, GWALIOR

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Mandatory Summer Internship Programme

- The students have to undergo three Mandatory Summer Internship Programme/Projects (SIPs) after the I, II and III year and their evaluation will reflect in III, V, & VII semester examination results.
- In case, a student fails to appear (due to valid cause)/acquire minimum score, the Head of Concerning Department may schedule the re-conduction of internship program for such students and the same will be monitored and reviewed by the Dean Student Welfare. Such students are required to fill the examination form for III/V semester in order to get the marks/credits reflected in their mark-sheet, which will also clearly indicate the year of completion of Internship.
- The promotion to successive semesters/years will not be affected for students who are not able to complete these requirements in time. However, they will not be awarded the degree until they complete these mandatory Summer Internship programs (SIPs).

Provision of Internship/Project

- All the courses offered in VIII semester are DE (Departmental Elective) and OC (Open Category) courses, which will run through online learning platform under the mentorship of faculty members.
- The students can opt for internship/project in the VIII Semester by either making a project or by doing internship in an industry after formal approval of the Institute as well as the concerned industry.

Awareness about Ethics & Academic Integrity

Criteria for accepting similarity index for the submission of UG project report/PG dissertation/Thesis

- The overall similarity index up to 15-20% is acceptable (using turnitin plagiarism check software).
- The highest similarity percentage from any one source is not greater than 4-6%.
- In case of self plagiarism, the permissible percentage may be slightly higher, say at 7-10%.

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Guidelines for evaluating "Professional Development"

PERFORMANCE METRICS		
Categories	Suggestive Activities	Marks Assigned
Institute Level* (C1)	Participation in Institute level technical events such as quizzes, extemporary, debate, student volunteers, seminar, professional society local chapters (IET, IEEE, ISTE, IETE), NCC etc.	(02 Marks for each participation) Marks=Number of activities (C1) x 2
State Level* (C2)	Participation in State level technical events such as Robotics, Coding challenge, Cultural cum technical fest, technical symposium, volunteers, hackathon, sports etc.	(Maximum marks in this category 06) 03 marks for each participation Number of Marks=Number of activities (C2) x 3
National level* (C3)	Participate in National level events such as hands on workshop, national level seminar, national conference, Entrepreneurship, model making, techno culture fest, national youth festival, research conclave, project competition, volunteers, sports festival etc.	(Maximum marks in this category 09) 05 marks for each participation (Maximum 15) Marks=Number of activities (C3) x 5
MOOC's*** (C4)	Successfully completed technical certification course in any MOOC's platform such as (NPTEL/SWAYAM/EdX/Coursera/Class Central etc)	(Maximum marks in this category 15) 10 marks for each course (Maximum 20) Marks= Number of certificates (C4) x 10
Evaluation in VIII Semester		
Formula		Marks Scored (Out of 50)
(C1x2 + C2x3 + C3x5 + C4x10) =		

In addition to the above, if a student or group of students win a competition in the above three categories (Institute level/State level/National level etc.) then maximum marks in the respective category will be awarded to such students.

Note: * Student must produce a certificate as a proof for each activity.

** Courses for which credits are already earned (for DE/OC/Honours or Minor Specialization from I to VIII semester) through MOOCs by the student during academics will not be counted.

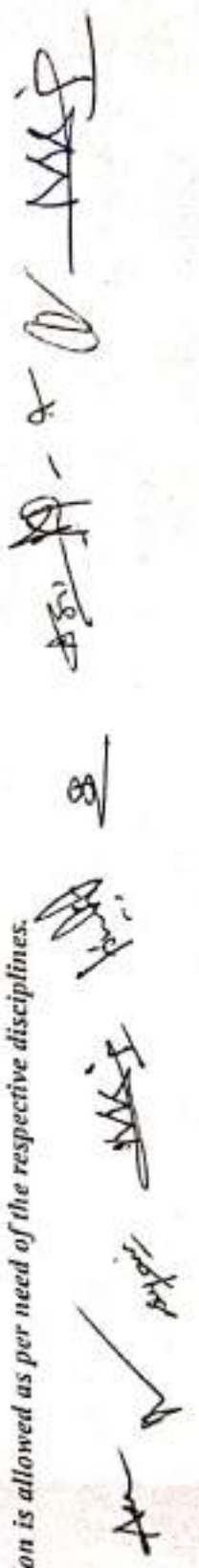
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MADHAV INSTITUTE OF TECHNOLOGY & SCIENCE, GWALIOR
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Structure of Undergraduate Engineering program:

S. No.	Category	Suggested Breakup of Credits (Total 160) (as proposed by AICTE)	Component wise credit allotment	No. of Courses
1	Humanities and Social Sciences including Management Courses (HSMC)	12**	12	04
2	Basic Science Courses (BSC)	26**	20	05
3	Engineering Science courses including workshop, drawing, basics of electrical/mechanical/computer etc. (ESC)	29**	20	06
4	Departmental Core Courses (DC)	47**	56	14
5	Departmental Elective Courses relevant to specialization/branch (DE)	23**	16	05
6	Open Category- Electives from other technical and /or emerging subjects (OC)	11**	15	05
7	Project work, seminar and internship in industry or appropriate work place/ academic and research institutions (DLC/SWAYAM/NPTEL/MOOC-Practical Slot)	12**	22	12
8	Mandatory Courses (MC) and Professional Development		9	04
	Total	160**	170	55

**Minor variation is allowed as per need of the respective disciplines.



MADHAV INSTITUTE OF TECHNOLOGY & SCIENCE, GWALIOR
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Scheme of Examination

GROUP B: I Semester

B. Tech. I Semester (Civil Engineering)

For batches admitted in academic session 2018 - 19 onwards

S. No.	Subject Code	Category Code	Subject Name	Maximum Marks Allotted						Total Marks			Contact Hours per Week			Total Credits
				Theory Slot			Practical Slot			Total Marks	L	T	P			
				End Sem.	Mid Sem.	Quiz/ Assignment	End Sem.	Lab work / Sessional								
1.	100101	BSC	Engineering Chemistry (BSC-1)	70	20	10	30	20	150	3	-	2	4			
2.	100102	BSC	Engineering Mathematics -I (BSC-2)	70	20	10	-	-	100	3	1	-	4			
3.	100103	HSMC	Technical English (HSMC-1)	70	20	10	30	20	150	3	-	2	4			
4.	100104	ESC	Basic Electrical & Electronics Engineering (ESC-1)	70	20	10	30	20	150	3	-	2	4			
5.	100105	ESC	Engineering Graphics (ESC-2)	70	20	10	30	20	150	2	-	2	3			
6.	100106	ESC	Manufacturing Practices (ESC-3)	-	-	-	30	20	50	-	-	2	1			
			Total	350	100	50	150	100	750	14	1	10	20			
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.													Qualifier			
NSS / NCC																

GROUP A: (Electrical, Electronics, Computer Science, Information Technology, Electronics & Telecommunication)

GROUP B: (Civil, Mechanical, Chemical, Biotech, Automobile)

01 Theory Period=1 Credit; 01 Tutorial Period = 1 Credit; 02 Practical Periods = 1 Credit

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

For batches admitted in academic session 2018 - 19 onwards

S. No.	Subject Code	Category Code	Subject Name	Maximum Marks Allotted					Contact Hours per Week			Total Marks	Contact Hours per		Total Credits
				Theory Slot		Practical Slot		L	T	P					
				End Sem.	Mid Sem.	Quiz/ Assignment	End Sem.				Lab work / Sessional				
1.	100201	BSC	Engineering Physics (BSC-3)	70	20	10	30	20	2	1	2	150	2	2	4
2.	100202	HSMC	Energy, Environment, Ecology & Society (HSMC-2)	70	20	10	-	-	3	-	-	100	3	-	3
3.	100203	ESC	Basic Computer Engineering (ESC-4)	70	20	10	30	20	3	-	2	150	3	2	4
4.	100204	ESC	Basic Mechanical Engineering (ESC-5)	70	20	10	30	20	3	-	2	150	3	2	4
5.	100205	ESC	Basic Civil Engineering & Mechanics (ESC-6)	70	20	10	30	20	3	-	2	150	3	2	4
6.	100206	HSMC	Language Lab. & Seminars (HSMC-3)	-	-	-	30	20	-	-	4	50	-	4	2
			Total	350	100	50	150	100	14	1	12	750	14	12	21

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

NSS / NCC

Qualifier

GROUP A: (Electrical, Electronics, Computer Science, Information Technology, Electronics & Telecommunication)

Scheme of Examination

B. Tech. III Semester (Civil Engineering)

For batches admitted in academic session 2018 – 19 onwards

S. No.	Subject Code	Category Code	Subject Name	Maximum Marks Allotted				Total Marks			Contact Hours per Week			Total Credits
				Theory Slot		Practical Slot		Total Marks	L	T	P			
				End Sem.	Mid Sem.	Quiz/Assignment	End Sem.					Lab Work / Sessional		
1.	100001	BSC	Engineering Mathematics-II (BSC-4)	70	20	10	-	-	100	3	1	-	4	
2.	110302	DC	Building Planning & Design (DC-1)	70	20	10	-	-	100	3	1	-	4	
3.	110303	DC	Building Materials & Construction (DC-2)	70	20	10	30	20	150	3	-	2	4	
4.	110304	DC	Surveying (DC-3)	70	20	10	30	20	150	3	-	2	4	
5.	110305	DC	Strength of Materials (DC-4)	70	20	10	30	20	150	3	-	2	4	
6.	110306	DLC	Software Lab (DLC-1)*	-	-	-	30	20	50	-	-	2	1	
7.	110307	Seminar / Self Study	Self Learning/Presentation (Through Swyam/NPTEL/MOOC)*	-	-	-	-	25	25	-	-	2	1	
8.	110308	DLC	Summer Internship Project - I (Institute Level) (Evaluation)	-	-	-	25	-	25	-	-	4	2	
Total				350	100	50	145	105	750	15	2	14	24	
NSS / NCC				Qualifier										

*Compulsory registration for one online course using SWAYAM/NPTEL/MOOC, evaluation through attendance, assignment and presentation.
*Virtual Lab to be conducted along with traditional Lab.

GROUP A: (Electrical, Electronics, Computer Science, Information Technology, Electronics & Telecommunication)

GROUP B: (Civil, Mechanical, Chemical, Biotech, Automobile)

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

For batches admitted in academic session 2018 - 19 onwards

S. No.	Subject Code	Category Code	Subject Name	Maximum Marks Allotted					Contact Periods per Week			Total Credits	
				Theory Slot		Practical Slot			Total Marks	L	T		P
				End Sem.	Mid Sem.	Quiz/Assignment	End Sem.	Lab Work / Sessional					
1.	100003	BSC	Engineering Mathematics - III (BSC-5)	70	20	10	-	-	100	2	2	-	4
2.	110402	DC	Geotechnical Engineering (DC-5)	70	20	10	30	20	150	2	1	2	4
3.	110403	DC	Fluid Mechanics - I (DC-6)	70	20	10	30	20	150	2	1	2	4
4.	110404	DC	Structural Analysis (DC-7)	70	20	10	-	-	100	3	1	-	4
5.	110406	DC	Water Resources Engineering (DC-8)	70	20	10	-	-	100	3	1	-	4
6.	100004	MC	Cyber Security (MC)	70	20	10	-	-	100	2	1	-	3
7.	110407	DLC	Survey Practice Lab (DLC-2)*	-	-	-	30	20	50	-	-	6	3
Total				420	120	60	90	60	750	14	7	10	26
8.	100002 ³	MC	Biology for Engineers (Audit Course) (MC)	70	20	10	-	-	100	3	-	-	-
NSS/NCC				Qualifier									
Summer Internship Project - II (Soft Skills Based)				for two weeks duration: Evaluation in V Semester									

¹ This course will run for Group B in IV-III semester respectively. (This is a non-credit course and it is optional to appear & pass in the end semester examination. However, a separate mark sheet will be issued to those who will qualify)

² Virtual Lab to be conducted along with traditional Lab.

GROUP A: (Electrical, Electronics, Computer Science, Information Technology, Electronics & Telecommunication)
GROUP B: (Civil, Mechanical, Chemical, Biotech, Automobile)

M. S. Sarda
M. S. Sarda
M. S. Sarda

MADHAV INSTITUTE OF TECHNOLOGY & SCIENCE, GWALIOR
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Scheme of Examination

B. Tech. V Semester (Civil Engineering)

For batches admitted in academic session 2018 – 19 onwards

S. No.	Subject Code	Category Code	Subject Name	Maximum Marks Allotted						Contact Periods per Week			Total Credits	
				Theory Slot			Practical Slot			Total Marks	L	T		P
				End Sem.	Mid Sem.	Quiz/Assignment	End Sem.	Lab work / Sessional						
1.	110501	DC	Estimating, Costing & Contracting (DC-9)	70	20	10	-	-	-	100	3	1	-	4
2.	110502	DC	Structural Design & Drawing (RCC) (DC-10)	70	20	10	-	-	-	100	3	1	-	4
3.	110503	DC	Fluid Mechanics – II (DC-11)	70	20	10	30	20	20	150	2	1	2	4
4.	110504	DC	Environmental Engineering (DC-12)	70	20	10	30	20	20	150	2	1	2	4
5.	110505	DC	Transportation Engineering (DC-13)	70	20	10	30	20	20	150	2	1	2	4
6.	110506	DLC	Minor Project – I* (DLC-3)	-	-	-	30	20	20	50	-	-	2	1
7.	110507	DLC	Summer Internship Project – II (Evaluation) (DLC-4)	-	-	-	25	-	-	25	-	-	6	3
8.	110508	Seminar / Self Study	Self Learning/ Presentation (Through Swayam/NPTEL/MOOC)*	-	-	-	-	-	25	25	-	-	2	1
Total				350	100	50	145	105	750	12	5	16	25	
Department Level activity / workshop / awareness programme to be conducted; certificate of compliance to be submitted by HoD to the Exam controller through Dean Academics														
9.	Additional Courses for obtaining Honours or Minor Specialization by desirous students			Permitted to opt for maximum 02 additional courses for the award of Honours or Minor Specialization										

** The Minor Project – I may be evaluated by an internal committee for awarding sessional marks.

*Compulsory registration for one online course using SWAYAM / NPTEL / MOOC, evaluation through attendance, assignment and presentation.

GROUP A: (Electrical, Electronics, Computer Science, Information Technology, Electronics & Telecommunication)

GROUP B: (Civil Mechanical, Chemical, Biotech, Automobile)

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

For batches admitted in academic session 2018 - 19 onwards

S. No.	Subject Code	Category Code	Subject Name	Maximum Marks Allotted					Contact Periods per Week			Total Credits	
				Theory Slot		Practical Slot		Total Marks	L	T	P		
				End Sem.	Mid Sem.	Quiz/ Assignment	End Sem.						Lab work / Sessional
1.	100005*	HSMC	Ethics, Economics, Entrepreneurship & Management (HSMC-4)	70	20	10	-	-	100	3	-	-	3
2.	110602	DC	Structural Design & Drawing (Steel) (DC-14)	70	20	10	-	-	100	3	1	-	4
3.		DE	(DE-1)*	70	20	10	-	-	100	3	1	-	4
4.		DE	(DE-2)*	70	20	10	-	-	100	3	1	-	4
5.		OC	(OC-1)*	70	20	10	-	-	100	2	1	-	3
6.	100007	MC	Disaster Management (MC)	70	20	10	-	-	100	3	-	-	3
7.	110607	DLC	Minor Project - II (DLC-5)	-	-	-	100	50	150	-	-	4	2
8.	100006*	MC	Total Indian Constitution & Traditional Knowledge (Audit Course) (MC)	420	120	60	100	50	750	17	4	4	23
9.			Additional Courses for obtaining Honours or Minor Specialization by desirous students	70	20	10	-	-	100	3	-	-	-

Permitted to opt for maximum 02 additional courses for the award of Honours or Minor Specialization
Summer Internship Project - III (On Job Training) for Four Weeks Duration : Evaluation in VII Semester

*This course will run for Group B-A in VI^A semester respectively.

† This course will run for Group B-A in VI^A semester respectively. (This is a non-credit course and it is optional to appear & pass in the end semester examination. However, a separate mark sheet will be issued to those who will qualify)

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

GROUP A: (Electrical, Electronics, Computer Science, Information Technology, Electronics & Telecommunication)

GROUP B: (Civil, Mechanical, Chemical, Biotech, Automobile)

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Scheme of Examination

B. Tech. VII Semester (Civil Engineering)

For batches admitted in academic session 2018 – 19 onwards

S. No.	Subject Code	Category Code	Subject Name	Maximum Marks Allotted						Contact Periods per Week			Total Credits	
				Theory Slot		Practical Slot		Total Marks	L	T	P			
				End Sem.	Mid Sem.	Quiz / Assignment	End Sem.					Lab Work / Sessional		
1.		DE	(DE-3)*	70	20	10	-	-	-	100	3	-	-	3
2.		DE	(DE-4)*	70	20	10	-	-	-	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.	110706	DLC	Software Application for Solving Civil Engineering Problems (DLC -6)	-	-	-	50	50	-	100	-	-	4	2
7.	110707	DLC	Summer Internship Project - III (04 weeks) (Evaluation) (DLC -7)	-	-	-	50	50	-	100	-	-	4	2
8.	110708	DLC	Creative Problem Solving (Evaluation) (DLC -8)	-	-	-	25	25	-	50	-	-	2	1
Total				350	100	50	125	125	-	750	12	1	10	18
9.	Additional Courses for obtaining Honours or Minor Specialization by desirous students			Permitted to opt for maximum 02 additional courses for the award of Honours or Minor Specialization										

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

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 Anshu - NK Mishra
 Dr. J. K. Singh
 Dr. R. K. Singh

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

For batches admitted in academic session 2018 – 19 onwards

S.No.	Subject Code	Category Code	Subject Name	Maximum Marks Allotted						Total Marks	Contact Periods per Week			Total Credits
				Theory Slot			Practical Slot				L	T	P	
				End Sem.	Mid Sem.	Quiz / Assignment	End Sem.	Lab Work / Sessional						
1.		DE	(DE-5)*	70	20	10	-	-	-	100	3	-	-	3
2.		OC	(OC-4)*	70	20	10	-	-	-	100	3	-	-	3
3.		OC	(OC-5)*	70	20	10	-	-	-	100	3	-	-	3
4.	110804	DLC	Internship / Project (D.I.C.-9)	-	-	-	250	150	-	400	-	-	6	3
5.	110805	-	Professional Development*	-	-	-	-	50	-	50	-	-	2	1
Total				210	60	30	250	200	200	750	9	-	8	13
6.	Additional Courses for obtaining Honours or Minor Specialization by desirous students			Permitted to opt for maximum 02 additional courses for the award of Honours or Minor Specialization										

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

* Evaluation will be based on participation/laurels brought by the students to the institution in national/state level technical and other events during the complete tenure of the UG program/participation in professional chapter activities, club activities, cultural events, sports, personality development activities, collaborative events, MOOCs and technical events)

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Civil Engineering Semester wise Credit Distribution

S.No.	Semesters	Credit Distribution
1	Semester - I	20
2	Semester -II	21
3	Semester -III	24
4	Semester -IV	26
5	Semester -V	25
6	Semester -VI	23
7	Semester -VII	18
8	Semester -VIII	13
Total		170



 The above credit distribution is correct and approved.

 Date: 15/11/2023

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ANNEXURE - XI

Course Code: 11040#6 MKP

Course Name: Water Resources Engineering

L	T	P	Credit
3	1	0	4

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.

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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.

Unit - V

Hydrographs & Hyetographs, Hydrographs analysis, Unit Hydrographs, Methods of constructing, Unit Hydrographs, S-curve Hydrograph, Synthetic unit Hydrograph, Flood and its estimation by different methods.

Course Outcomes:

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

- CO 1: Analyse various requirements for an efficient irrigation project.
- CO 2: Design different components of irrigation system using different theories.
- CO 3: Plan an efficient, economical & safe irrigation system.
- CO 4: Explain the concept of hydrology and hydrograph
- CO 5: Apply basic principles for measurement & forecasting of rainfall & runoff.
- CO 6: Analyse runoff hydrograph by various methods.

Text Books:

1. Engineering Hydrology, K. Subramanya, Tata McGraw Hill Publ. Co. 4th edition, 2013
2. Hydrology & Water Resources Engineering, S. K. Garg, Khanna Publishers, 2016
3. Irrigation Engineering & Hydraulic Structures, Santosh Kumar Garg, Khanna Publishers, 2017
4. Irrigation, Water Power & Water Resources Engg., K.R. Arora, Standard Publishers Distributors, 2010

Reference Books:

1. Engineering Hydrology, J. NEMEC, Prentice Hall, 1972
2. Hydrology for Engineers, Linsley, Kohler, Paulnus, Tata Mc GrawHill, 2014
3. Engineering Hydrology, H. M. Raghunath, New Age International Publishers, 5th edition, 2015.
4. Irrigation, Water Resources & Water Power, Dr. P.N. Modi, Standard Book House, 9th edition, 2014
5. Irrigation Engineering by Varshney & Gupta, Vol I & II, Nem chand Publishers, 2007.

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ANNEXURE – XII

Course Code: 110503

Course Name: Fluid Mechanics - II

L	T	P	Credit
2	1	2	4

Course Objectives:

- 1) To develop an understanding of fluid flow patterns and learn to use boundary layer theory and drag.
- 2) To apply theories of laminar & turbulent flow to solve typical pipe flow problems in the field.
- 3) To apply boundary layer theory to estimate drag & lift for various shapes of the objects.
- 4) To classify the types of flows in open channel and also to design open channel sections in a most economical fashion with minimum wetted perimeter and learn about critical flows.
- 5) To study about non uniform flows in open channel and longitudinal slopes in open channel and also to learn about the characteristics of hydraulic jump.
- 6) To understand design philosophy of various types of pumps & turbines.

Syllabus:

Unit-I

Turbulent Flow: Laminar and turbulent boundary layers and laminar sub layer, hydro dynamically rough boundaries, velocity distribution in turbulent flow, Resistance of smooth and artificially roughened pipes, Commercial pipes, aging of pipes.

Pipe Flow Problems: Losses due to sudden expansion and contraction, losses in pipe fittings and valves, Concepts of equivalent length, Hydraulic and energy gradient lines, Siphon, Pipes in series, in parallel, Branching of pipes. (Hardy Cross method)

Pipe Network: Water hammer (only quick closure case) transmission of power.

Unit - II Forces on immersed bodies:

Introduction, Force Exerted by a flowing fluid on a stationary body, Expression for Drag & Lift, Drag on a sphere, Terminal velocity of a Body, Drag on a cylinder, Introduction to Development of Lift on a Circular Cylinder and an Airfoil

Unit - III Uniform Flow in open Channels:

Channel geometry and elements of channel section, Velocity distribution, Energy in open channel flow, Specific energy, Types of flow, Critical flow and its computations, Uniform flow and its computations, Chezy's and Manning's formulae, Determination of normal depth and velocity, Normal and critical slopes, Economical sections.

Unit - IV Gradually varied flow

Basic assumptions and dynamic equations of gradually varied flow, characteristics analysis and computations of flow profiles, rapidly varied flow-hydraulic jump in rectangular channels and its basic characteristics, Surges in open channels, Energy Dissipators.

Unit - V Introduction to Fluid Machinery: Turbines & Pumps

Turbines: Classifications, definitions, Similarity laws, Specific speed and unit quantities, Pelton turbine - their construction and settings, Speed regulation, Dimensions of various elements. Action of jet, Torque, Power and efficiency for ideal case, Characteristics curves. Reaction turbines construction

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& setting, Draft tube theory, Runaway speed, Simple theory of design and characteristic curves, Cavitation.

Pumps: Principle of working & criteria for selection of different types of pump, viz. Centrifugal, Reciprocating.

Course Outcomes:

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

- CO 1:** Differentiate different types of fluid flow & fluid machinery.
- CO 2:** Describe principles of analysis of fluid flow problem.
- CO 3:** Explain basic principles for measurement of different forces acting on fluid body.
- CO 4:** Analyse pipe flow, open channel flow problems & various characteristics of hydraulic machines.
- CO 5:** Design open & closed conduit systems.

Text Books:

1. Fluid Mechanics, Modi & Seth, Standard Book house, Delhi, 21st edition, 2017
2. Open Channel Flow, K. Subramanya, Tata McGraw Hill, New Delhi, 5th edition, 2019

Reference Books:

1. Open Channel Flow, Rangaraju, Tata McGraw Hill Publishing Comp. Ltd., New Delhi, 1st edition, 2001
2. Fluid Mechanics, A.K. Jain, Khanna Publishers, Delhi, 1988
3. Fluid Mechanics, Hydraulics & Hydraulic Mechanics, K.R. Arora, Standard Publishers, 2009
4. Open Channel Hydraulics, Chow V.T., McGraw Hill, New York, 5th edition, 2009

List of Experiments:

1. To determine the performance characteristics of Pelton Wheel.
2. To determine the performance characteristics of Francis Turbine.
3. To determine the performance characteristics of Kaplan Turbine.
4. Calibration of multistage (Two) Pump & Study of characteristics of variable speed pump.
5. To determine the coefficient of discharge for rectangular notches.
6. To determine the coefficient of discharge for triangular notches.
7. To determine the characteristics of the Reciprocating pump at variable speed.
8. To prepare the calibration curve for rotameter.

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

- CO 1:** Differentiate between turbines & pumps.
- CO 2:** Select the efficient turbines by studying the performance characteristics of various turbines.
- CO 3:** Distinguish the performance characteristics of various pump.



MADHAV INSTITUTE OF TECHNOLOGY & SCIENCE, GWALIOR
 (A Govt. Aided UGC Autonomous & NAAC Accredited Institute affiliated to RGPV, Bhopal)

[For batch admitted in Academic Session 2017-18]

Semester-Wise Scheme & Guidelines For Flexible Curriculum

Abbreviations used	
L	Lecture
T	Tutorial
P	Practical
HSMC	Humanities and Social Sciences including Management Courses
BSC	Basic Science Courses
ESC	Engineering Science Courses
DC	Departmental Core Courses
DE	Departmental Elective Courses
OC	Open Category Courses
DLC	Departmental Laboratory Courses
MC	Mandatory Courses
PD	Professional Development
MOOC	Massive Open Online Courses

Definition of Credit:

1 Hr. Lecture (L) per week	1 credit
1 Hr. Tutorial (T) per week	1 credit
2 Hours Practical(Lab)/week	1 credit

Handwritten notes:
 1 Hr. Lecture (L) per week = 1 credit
 1 Hr. Tutorial (T) per week = 1 credit
 2 Hours Practical(Lab)/week = 1 credit

MADHAV INSTITUTE OF TECHNOLOGY & SCIENCE, GWALIOR
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General Guidelines for Flexible Curriculum
(For batch admitted in 2017-18)

- For the award of basic Under Graduate (UG) Degree in Engineering/Technology (without Honours/Honours with Minor Specialization), it is required to earn **170 Credits**. For the B. Architecture Degree the total credit requirement is **260**.
- The students can opt up to **34 credits out of these 170** from recognized MOOC (Massive Open Online Courses) platforms against Departmental & Open elective courses (DE/OC). Each such Course must be of minimum 2 credits.
- There is a provision for interested students to opt for **additional 20 credits** to obtain **Honours or Honours with Minor Specialization in chosen field**. These additional courses can be selected and opted from the list of courses approved by the department through their recognized bodies.
- In the flexible curriculum there is a provision of **03 Mandatory Credit Courses on Cyber Security, Disaster Management, & Intellectual Property Rights**.
- In the flexible curriculum presently there is a provision of **02 Audit Courses on (i) Biology for Engineers & (ii) Indian Constitution & Traditional Knowledge**. Auditing a course allows a student to take a class without the benefit of a grade or credit, for the sole purposes of self-enrichment and academic exploration.
- The students have to undergo three **Mandatory Summer Internship Programme/Projects (SIPs)** after their I, II and III year and their evaluation will reflect in III, V & VII semester examination results, respectively.
- Credit will be given for **"Professional Development"** of students in order to bring their all kinds of personality and skill development activities into the orbit and to encourage student participation in professional chapter activities, club activities, cultural events, sports, technical events, hackathons, personality development activities etc.
- The marks for **"Professional Development"** will be awarded to students in VIII semester on the basis of their participation and achievements in extra & co-curricular activities, sports, performance in MOOCs etc. right from I year.

MADHAV INSTITUTE OF TECHNOLOGY & SCIENCE, GWALIOR
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Guidelines for students opting additional courses for (i) B.Tech. Honours degree or (ii) B.Tech. Honours degree with Minor Specialization

- For getting an (i) B.Tech Honours in parent discipline or (ii) B.Tech Honours with Minor Specialization in other interdisciplinary areas/fields of Engineering, Technology, Applied Science, Management etc. which are offered by the Institute, the additional Credit requirement is 20 for Engineering & Technology students i.e. Total $170 + 20 = 190$ credits needed by the end of VIII semester.
- For students desirous of achieving additional credits for Honours/Honours with Minor Specialization, there is a provision of selecting maximum 02 courses per semester from V semester onwards. Each such Course must be of minimum 2 credits.
- These additional courses can be selected only from the pool of courses specified by the department from recognized SWAYAM/NPTEL/MOOC platforms.

Credit Requirements & Guidelines for MOOCs

- Up to 34 Credits out of total 170 for Engineering/Technology students & 52 credits out of total 260 credits for B. Architecture students can be earned through SWAYAM/NPTEL/MOOC platform based learning for the award of UG degree in Engineering/Technology & Architecture respectively (without Honours/Honours with Minor Specialization).
- To obtain Honours or Honours with Minor Specialization 20 credits additionally can be acquired through SWAYAM/NPTEL/MOOC platform based learning.
- In this manner, students aspiring for Honours or Honours with Minor Specialization during the tenure of B. Tech programme can opt for a total of 54 (34+20) Credits and the students of the B. Architecture programme can earn up to 72 (52+20) credits through SWAYAM/NPTEL/MOOC platform based learning.
- For the courses opted under MOOC, the equivalent credit weightage will be given to the students, for the credits earned in online examination on SWAYAM/NPTEL platform and other similar platforms as approved by the authorized bodies (BoS, AC etc.), in the credit plan of the program.
- Policy for credit equivalence and transfer for the courses opted from SWAYAM/NPTEL/University of Central Florida (UCF)/RGPV Bhopal/Institutional (MITS) MOOC/other MOOC (Massive Open Online Courses) platforms, is as follows:

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MADHAV INSTITUTE OF TECHNOLOGY & SCIENCE, GWALIOR
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Duration of MOOC	Credit Transfer
04 week course	01*
06 week course	02**
08 week course	03**
12 week course	04**

* The 01 credit courses can be opted only under seminar/self-study/professional development purposes.
 ** The 02, 03 & 04 credit courses can be opted under DEs/OCs and additional courses (for Honours/Honours with Minor Specialization).

- The guidelines regarding "credit transfer from MOOCs" by All India Council of Technical Education (AICTE) and the affiliating university, i.e. RGPV Bhopal, as issued from time to time will be binding on the institute.

Guidelines for Departmental Elective (DEs) and Open Category Courses (OCs)

- The list of Departmental/Open Elective Courses (DEs/OCs) will be prepared well in advance and make the list public among the students, possibly in the previous semester itself for preference based registration process.
- The list of courses which the students can opt from the SWAYAM/NPTEL/MOOC platform against DE & OC courses in the scheme will be approved by authorized bodies (BoS, AC etc.) and displayed/communicated to students on the website well in advance, (in September/October & April/May for even and odd semesters respectively) so that students can select the courses of their choice. Each such Course must be of minimum 2 credits.
- The Open Category (OC) course will be open for students of departments other than the offering (parent) department. Moreover, there will be no pre-requisite for Open Category Courses.
- The allotment of DE/OC Courses will be based on First Come First Serve (FCFS) basis.
- The weightage of continuous assessment (Mid Semester Exam, Quiz, Assignment etc.) for DE/OC courses which are opted from MOOCs will be considered from the score obtained towards assignment work/test etc. conducted by the course offering agency
- For matching the credit requirement with the curricular/scheme requirements, more than one MOOC course can also be selected against an Elective Course, provided that the collective credits are equal to or more than the credit requirement; however each such selected course must be of minimum 2 credits.



MADHAV INSTITUTE OF TECHNOLOGY & SCIENCE, GWALIOR
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Mandatory Summer Internship Programme

- The students have to undergo three Mandatory Summer Internship Programme/Projects (SIPs) after the I, II and III year and their evaluation will reflect in III, V, & VII semester examination results.
- In case, a student fails to appear (due to valid cause)/acquire minimum score, the Head of Concerning Department may schedule the re-conduction of internship program for such students and the same will be monitored and reviewed by the Dean Student Welfare. Such students are required to fill the examination form for III/V semester in order to get the marks/credits reflected in their mark-sheet, which will also clearly indicate the year of completion of Internship.
- The promotion to successive semesters/years will not be affected for students who are not able to complete these requirements in time. However, they will not be awarded the degree until they complete these mandatory Summer Internship programs (SIPs).

Provision of Internship/Project

- All the courses offered in VIII semester are DE (Departmental Elective) and OC (Open Category) courses, which will run through online learning platform under the mentorship of faculty members.
- The students can opt for internship/project in the VIII Semester by either making a project or by doing internship in an industry after formal approval of the Institute as well as the concerned industry.

Awareness about Ethics & Academic Integrity

Criteria for accepting similarity index for the submission of UG project report/PG dissertation/Thesis

- The overall similarity index up to 15-20% is acceptable (using turnitin plagiarism check software).
- The highest similarity percentage from any one source is not greater than 4-6%.
- In case of self plagiarism, the permissible percentage may be slightly higher, say at 7-10%.

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Guidelines for evaluating "Professional Development"

PERFORMANCE METRICS		
Categories	Suggestive Activities	Marks Assigned
Institute Level* (C1)	Participation in Institute level technical events such as quizzes, extemporary, debate, student volunteers, seminar, professional society local chapters (IET, JEEE, ISTE, IETE), NCC etc.	(02 Marks for each participation) Marks=Number of activities (C1) x 2 (Maximum marks in this category 06)
State Level* (C2)	Participation in State level technical events such as Robotics, Coding challenge, Cultural cum technical fest, technical symposium, volunteers, hackathon, sports etc.	03 marks for each participation Number of Marks=Number of activities (C2) x 3 (Maximum marks in this category 09)
National level* (C3)	Participate in National level events such as hands on workshop, national level seminar, national conference, Entrepreneurship, model making, techno culture fest, national youth festival, research conclave, project competition, volunteers, sports festival etc.	05 marks for each participation (Maximum 15) Marks=Number of activities (C3) x 5 (Maximum marks in this category 15)
MOOC's** (C4)	Successfully completed technical certification course in any MOOC's platform such as (NPTEL, SWAYAM/EdX/Coursera/Class Central etc)	10 marks for each course (Maximum 20) Marks= Number of certificates (C4) x 10 (Maximum marks in this category 20)
Evaluation in VIII Semester		
Formula		Marks Scored (Out of 50)
$(C1 \times 2 + C2 \times 3 + C3 \times 5 + C4 \times 10) =$		

In addition to the above, if a student or group of students win a competition in the above three categories (Institute level/State level/National level etc.) then maximum marks in the respective category will be awarded to such students.

Note: * Student must produce a certificate as a proof for each activity.

** Courses for which credits are already earned (for DE/OC/Honours or Minor Specialization from I to VIII semester) through MOOCs by the student during academics will not be counted.



MADHAV INSTITUTE OF TECHNOLOGY & SCIENCE, GWALIOR
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Structure of Undergraduate Engineering program:

S. No.	Category	Suggested Breakup of Credits (Total 160) (as proposed by AICTE)	Component wise credit allotment	No. of Courses
1	Humanities and Social Sciences including Management Courses (HSMC)	12**	14	04
2	Basic Science Courses (BSC)	26**	25	05
3	Engineering Science courses including workshop, drawing, basics of electrical/mechanical/computer etc. (ESC)	29**	31	06
4	Departmental Core Courses (DC)	47**	49	14
5	Departmental Elective Courses relevant to specialization/branch (DE)	23**	10	05
6	Open Category- Electives from other technical and /or emerging subjects (OC)	11**	12	05
7	Project work, seminar and internship in industry or appropriate work place/ academic and research institutions (DLC/SWAYAM/NPTEL/MOOC-Practical Slot)	12**	21	12
8	Mandatory Courses (MC) and Professional Development		8	04
	Total	160**	170	55

**Minor variation is allowed as per need of the respective disciplines.



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

GROUP B: I Semester & Group A: II Semester [For batch admitted in Academic Session 2017-18]

Subject wise distribution of marks and corresponding credits

S.No.	Subject Code	Category Code	Subject Name	Maximum Marks Allotted						Total Marks	Contact Periods per week			Total Credits
				Theory Slot			Practical Slot				L	T	P	
				End Sem	Mid Sem	Quiz/Assignment	End Sem	Lab work/ sessional						
1.	100101	BSC	Engineering Chemistry (BSC-1)	70	20	10	30	20	150	4	1	2	6	
2.	100102	BSC	Engineering Mathematics - I (BSC-2)	70	20	10	-	-	100	4	1	-	5	
3.	100103	HSMC	Technical English (HSMC-1)	70	20	10	30	20	150	4	1	2	6	
4.	100104	ESC	Basic Electrical & Electronics Engineering (ESC-1)	70	20	10	30	20	150	4	1	2	6	
5.	100105	ESC	Engineering Graphics (ESC-2)	70	20	10	30	20	150	4	1	2	6	
6.	100106	ESC	Manufacturing Practices (ESC-3)	-	-	-	30	20	50	-	-	2	1	
Total				350	100	50	150	100	750	20	5	10	30	

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

GROUP A: (Electrical, Electronics, Computer Science, Information technology, Electronics & telecommunication)

GROUP B: (Civil, Mechanical, Chemical, Biotech, Automobile)

01 Theory Period = 1 Credit; 02 Practical Periods = 1 Credit

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

GROUP A: I Semester & GROUP B: II Semester [For batch admitted in Academic Session 2017-18]

Subject wise distribution of marks and corresponding credits

S.No.	Subject Code	Category Code	Subject Name	Maximum Marks Allotted					Total Marks	Contact Periods per week			Total Credits
				Theory Slot		Practical Slot		L		T	P		
				End Sem	Mid Sem	Quiz/Assignment	End Sem					Lab work/ sessional	
1.	100201	BSC	Engineering Physics (BSC-3)	70	20	10	30	20	4	1	2	6	
2.	100202	HSMC	Energy, Environment, Ecology & Society (HSMC-2)	70	20	10	-	-	4	1	-	5	
3.	100203	ESC	Basic Computer Engineering (ESC-4)	70	20	10	30	20	4	1	2	6	
4.	100204	ESC	Basic Mechanical Engineering (ESC-5)	70	20	10	30	20	4	1	2	6	
5.	100205	ESC	Basic Civil Engineering & Mechanics (ESC-6)	70	20	10	30	20	4	1	2	6	
6.	100206	HSMC	Language Lab. & Seminars (HSMC-3)	-	-	-	30	20	-	-	2	1	
Total				350	100	50	150	100	750	20	5	10	30
Summer Internship Project -I (Institute Level) (Qualifier): Minimum two-week duration : Evaluation in III Semester.													

GROUP A: (Electrical, Electronics, Computer Science, Information technology, Electronics & telecommunication)

GROUP B: (Civil, Mechanical, Chemical, Biotech, Automobile)

01 Theory Period = 1 Credit; 02 Practical Periods = 1 Credit

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

[For batch admitted in Academic Session 2017-18]

S. No.	Subject Code	Category Code	Subject Name	Maximum Marks Allotted					Total Marks			Contact Hours per Week			Total Credits
				Theory Slot		Practical Slot		End Sem.	Total Marks	L	T	P			
				End Sem.	Mid Sem.	Quiz/ Assignment	End Sem.						Lab Work / Sessional		
1.	100001	BSC	Engineering Mathematics-II (BSC-4)	70	20	10	-	-	100	3	1	-	4		
2.	110302	DC	Building Planning & Design (DC-1)	70	20	10	-	-	100	3	1	-	4		
3.	110303	DC	Building Materials & Construction (DC-2)	70	20	10	30	20	150	3	-	2	4		
4.	110304	DC	Surveying (DC-3)	70	20	10	30	20	150	3	-	2	4		
5.	110305	DC	Strength of Materials (DC-4)	70	20	10	30	20	150	3	-	2	4		
6.	110306	DLC	Software Lab (DLC-1)*	-	-	-	30	20	50	-	-	2	1		
7.	110307	Seminar / Self Study	Self Learning/Presentation (Through Swayam/NPTEL/MOOC)*	-	-	-	-	25	25	-	-	2	1		
8.	110308	DLC	Summer Internship Project - I (Institute Level) (Evaluation)	-	-	-	25	-	25	-	-	4	2		
Total				350	100	50	145	105	750	15	2	14	24		
				NSS / NCC					Qualifier						

*Compulsory registration for one online course using SWAYAM / NPTEL / MOOC, evaluation through attendance, assignment and presentation.
*Virtual Lab to be conducted along with traditional Lab.

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GROUP A: (Electrical, Electronics, Computer Science, Information Technology, Electronics & Telecommunication)

GROUP B: (Civil, Mechanical, Chemical, Biotech, Automobile)

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

[For batch admitted in Academic Session 2017-18]

S. No.	Subject Code	Category Code	Subject Name	Maximum Marks Allotted					Contact Periods per Week			Total Credits	
				Theory Slot		Practical Slot			Total Marks	L	T		P
				End Sem.	Mid Sem.	Quiz/ Assignment	End Sem.	Lab Work / Sessional					
1.	100003	BSC	Engineering Mathematics – III (BSC-5)	70	20	10	-	-	100	2	2	-	4
2.	110402	DC	Geotechnical Engineering (DC-5)	70	20	10	30	20	150	2	1	2	4
3.	110403	DC	Fluid Mechanics – I (DC-6)	70	20	10	30	20	150	2	1	2	4
4.	110404	DC	Structural Analysis (DC-7)	70	20	10	-	-	100	3	1	-	4
5.	110405	DC	Engineering Hydrology (DC-8)	70	20	10	-	-	100	3	1	-	4
6.	100004	MC	Cyber Security (MC)	70	20	10	-	-	100	2	1	-	3
7.	110407	DLC	Survey Practice Lab (DLC-2)*	-	-	-	30	20	50	-	-	4	2
Total				420	120	60	90	60	750	14	7	8	25
8.	100002*	MC	Biology for Engineers (Audit Course) (MC)	70	20	10	-	-	100	3	-	-	-
NSS/NCC				Qualifier									
Summer Internship Project – II (Soft Skills Based) for two weeks duration: Evaluation in V Semester													

* This course will run for Group B/A in IV/III semester respectively. (Passing is optional, however a separate marksheet will be issued to those who qualify).

*Virtual Lab to be conducted along with traditional Lab.

GROUP A: (Electrical, Electronics, Computer Science, Information Technology, Electronics & Telecommunication)

GROUP B: (Civil, Mechanical, Chemical, Biotech, Automobile)

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

[For batch admitted in Academic Session 2017-18]

S. No.	Subject Code	Category Code	Subject Name	Maximum Marks Allotted					Total Marks			Contact Periods per Week			Total Credits
				Theory Slot		Practical Slot		End Sem.	Quiz/ Assignment	End Sem.	Lab work / Sessional	L	T	P	
				End Sem.	Mid Sem.	End Sem.	Lab work / Sessional								
1.	110501	DC	Estimating, Costing & Contracting (DC-9)	70	20	10	-	-	-	100	2	-	-	2	
2.	110502	DC	Structural Design & Drawing (RCC) (DC-10)	70	20	10	-	-	-	100	2	1	-	3	
3.	110503	DC	Fluid Mechanics – II (DC-11)	70	20	10	30	30	20	150	2	-	2	3	
4.	110504	DC	Environmental Engineering – I (DC-12)	70	20	10	30	30	20	150	2	-	2	3	
5.	110505	DC	Transportation Engineering (DC-13)	70	20	10	30	30	20	150	2	-	2	3	
6.	110506	DLC	Minor Project – I** (DLC-3)	-	-	-	30	20	20	50	-	-	4	2	
7.	110507	DLC	Summer Internship Project – II (Evaluation) (DLC-4)	-	-	-	25	-	-	25	-	-	4	2	
8.	110508	Seminar / Self Study	Self Learning/ Presentation (Through Swayam/NPTEL/MOOC)*	-	-	-	-	-	25	25	-	-	2	1	
Total				350	100	50	145	105	750	10	1	16	19		

Dean Academics

Department Level activity / workshop / awareness programme to be conducted; certificate of compliance to be submitted by HoD to the Exam controller through Specialization

9. Permitted to opt for maximum 02 additional courses for the award of Honours or Minor

** The Minor Project – I may be evaluated by an internal committee for awarding sessional marks.
* Compulsory registration for one online course using SWAYAM / NPTEL / MOOC, evaluation through attendance, assignment and presentation.

GROUP A: (Electrical, Electronics, Computer Science, Information Technology, Electronics & Telecommunication)
GROUP B: (Civil, Mechanical, Chemical, Biotech, Automobile)

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

[For batch admitted in Academic Session 2017-18]

S. No.	Subject Code	Category Code	Subject Name	Maximum Marks Allotted					Contact Periods per Week			Total Credits	
				Theory Slot		Practical Slot		Total Marks	L	T	P		
				End Sem.	Mid Sem.	Quiz/Assignment	End Sem.						Lab work / Sessional
1.	100005*	HSMC	Ethics, Economics, Entrepreneurship & Management (HSMC-4)	70	20	10	-	-	100	2	-	-	2
2.	110602	DC	Structural Design & Drawing (Steel) (DC-14)	70	20	10	-	-	100	2	1	-	3
3.		DE	(DE-1)*	70	20	10	-	-	100	2	-	-	2
4.		DE	(DE-2)*	70	20	10	-	-	100	2	-	-	2
5.		OC	(OC-1)*	70	20	10	-	-	100	2	-	-	2
6.	100007	MC	Disaster Management (MC)	70	20	10	-	-	150	-	-	4	2
7.	110607	DLC	Minor Project - II (DLC-5)	-	-	-	100	50	150	-	-	4	2
			Total	420	120	60	100	50	750	12	1	4	15
8.	100006*	MC	Indian Constitution & Traditional Knowledge (Audit Course) (MC)	70	20	10	-	-	100	3	-	-	-
9.			Additional Courses for obtaining Honours or Minor Specialization by desirous students	Permitted to opt for maximum 02 additional courses for the award of Honours or Minor Specialization									
			Summer Internship Project - III (On Job Training) for Four Weeks Duration : Evaluation in VII Semester	Permitted to opt for maximum 02 additional courses for the award of Honours or Minor Specialization									

* This course will run for Group B in VI semester respectively.
 * This course will run for Group B in VII semester respectively. (Passing is optional, however a separate marksheet will be issued to those who qualify).
 * At least one of these courses must be run through SWAYAM / NPTEL / MOOC.

GROUP A: (Electrical, Electronics, Computer Science, Information Technology, Electronics & Telecommunication)
GROUP B: (Civil Mechanical, Chemical, Biotech, Automobile)

SEMESTER - VI

DE - I	DE - 2 (Through SWAYAM/NPTEL)	OC - I
110611. Wastewater Engineering	110651. Maintenance & Repair of Concrete Structures.	1. Building Physics
110612. Solid Waste Management	110652. Geotechnical Engineering II (Foundation Engineering).	2. Prefabricated Construction Technology
110613. Construction Planning & Management	110653. Energy Efficiency, Acoustics & Day Lighting in Building.	

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

[For batch admitted in Academic Session 2017-18]

S. No.	Subject Code	Category Code	Subject Name	Maximum Marks Allotted					Contact Periods per Week			Total Credits	
				Theory Slot		Quiz / Assignment	End Sem.	Practical Slot Lab Work / Sessional	Total Marks	L	T		P
				End Sem.	Mid Sem.								
1.		DE	(DE-3)*	70	20	10	-	-	100	2	-	-	2
2.		DE	(DE-4)*	70	20	10	-	-	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.	110706	DLC	Software Application for Solving Civil Engineering Problems (DLC-6)	-	-	-	50	50	100	-	-	4	2
7.	110707	DLC	Summer Internship Project - III (04 weeks) (Evaluation) (DLC-7)	-	-	-	50	50	100	-	-	4	2
8.	110708	DLC	Creative Problem Solving (Evaluation) (DLC-8)	-	-	-	25	25	50	-	-	2	1
Total				350	100	50	125	125	750	11	1	10	17
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.

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**PROPOSED LIST OF DEPARTMENTAL ELECTIVE COURSES TO BE OFFERED BY CIVIL
ENGINEERING DEPARTMENT IN VII SEMESTER**

DE - 3	DE - 4 (Through SWAYAM/NPTEL)
110711. Irrigation Engineering	110751. Environmental Geotechnics.
110712. Railway, Airport & Tunnel Engineering	110752. Concrete Technology.
110713. Advanced Structural Design (R.C.C.)	110753. Photogeology in Terrain Evaluation.

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MADHAV INSTITUTE OF TECHNOLOGY & SCIENCE, GWALIOR
(A Govt. Aided UGC Autonomous & NAAC Accredited Institute affiliated to RGPV, Bhopal)

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

[For batch admitted in Academic Session 2017-18]

S.No.	Subject Code	Category Code	Subject Name	Maximum Marks Allotted						Contact Periods per Week			Total Credits	
				Theory Slot			Practical Slot			Total Marks	L	T		P
				End Sem.	Mid Sem.	Quiz / Assignment	End Sem.	Lab Work / Sessional						
1.		DE	(DE-5)*	70	20	10	-	-	-	100	2	-	-	2
2.		OC	(OC-4)*	70	20	10	-	-	-	100	2	-	-	2
3.		OC	(OC-5)*	70	20	10	-	-	-	100	2	-	-	2
4.	110804	DLC	Internship / Project (DLC-9)	-	-	-	250	150	-	400	-	-	6	3
5.	110805	PD	Professional Development*	-	-	-	-	50	-	50	-	-	2	1
Total				210	60	30	250	200	750	6	-	8	10	
6.	Additional Courses for obtaining Honours or Minor Specialization by desirous students			Permitted to opt for maximum 02 additional courses for the award of Honours or Minor Specialization										

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

*Evaluation will be based on participation/laurels brought by the students to the institution in national/state level technical and other events during the complete tenure of the UG program (participation in professional chapter activities, club activities, cultural events, sports, personality development activities, collaborative events, MOOC's and technical events)

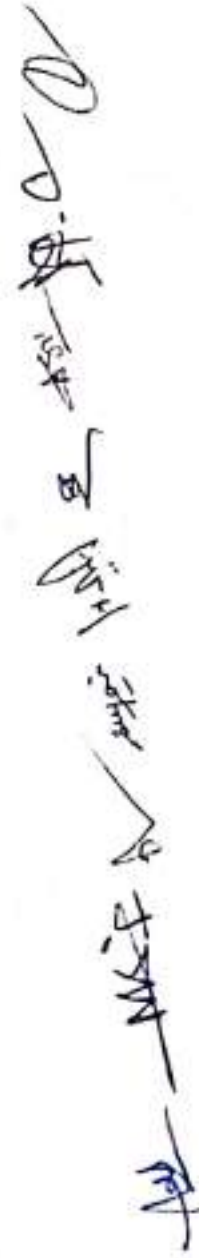


 Aug - 2018

MADHAV INSTITUTE OF TECHNOLOGY & SCIENCE, GWALIOR
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Civil Engineering Semester wise Credit Distribution

S.No.	Semesters	Credit Distribution
1	Semester -I	30
2	Semester -II	30
3	Semester -III	24
4	Semester -IV	25
5	Semester -V	19
6	Semester -VI	15
7	Semester -VII	17
8	Semester -VIII	10
Total		170


 Date: _____

DEPARTMENT OF CIVIL ENGINEERING

SYLLABUS B.Tech Civil Engineering

2017 ADMITTED BATCH ONLY

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SEMESTER- I/II

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Course Code: 100205

Course Name: Basic Civil Engineering & Mechanics

L	T	P	Credit
4	1	2	6

Course Objectives:

1. To understand the utility of various types of building materials.
2. To understand the location, construction detail and suitability of various building elements.
3. To determine the location of object on ground surface.
4. To stabilize the position of various object.
5. To understand the effects of system of forces on rigid body in static conditions.
6. Analysis of determinate structure (beam & truss)

Syllabus:

Unit-I

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

Unit- II

Surveying & Positioning: Introduction to surveying, Survey stations, Measurement of distances- conventional and EDM methods, Measurement of directions by different methods, Measurement of elevations by different methods, reciprocal leveling.

Unit- III

Mapping & Sensing: Mapping details and contouring, Plane tables and related devices. Introduction of theodolite. Measurement of areas and volumes, application of measurements in quantity computations, Introduction of remote sensing and its applications.

Unit- IV

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

Unit -V

Centre of Gravity and moment of Inertia: Centroid and Centre of Gravity, Moment of Inertia of Composite section, Radius of Gyration, Introduction to product of Inertia and Principle Axes. Support Reactions, Shear force and bending moment diagram for cantilever & simply supported beam with concentrated, distributed load and Couple.

Course Outcomes:

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

CO 1: Explain concepts and terminologies of building materials, surveying and mechanics.

CO 2: Apply various methods for surveying and mechanics.

CO 3: Determine the location, area and volume of objects on ground surface.

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CO 4: Solve the problems of surveying and mechanics by using various methods.

CO 5: Analyse the effects of system of forces on rigid bodies in static conditions.

Text Books:

1. Surveying, Vol - 1, Punmia B.C., Laxmi Publications, 17th edition, 2016
2. Building Material, B. C. Punmia, Laxmi Publications, 2016
3. A textbook of Engineering Mechanics, D. S. Kumar, Katsons Publications, 2013

Reference Books:

1. Basic Civil Engineering, S. Ramamrutam & R. Narayan, Dhanpat Rai Pub., 3rd edition, 2013
2. Applied Mechanics, Prasad I.B., Khanna Publication 17th edition, 1996
3. Surveying, Duggal, Tata McGraw Hill New Delhi, 4th edition, 2013
4. Engineering Mechanics - Statics & Dynamics, R.C. Hibbler, Pearson Publications, 14th edition, 2015
5. Engineering Mechanics - statics dynamics, A. Borezi & Schmidt, Cengage learning, 1st edition, 2008.
6. Applied Mechanics, R.K. Rajput, Laxmi Publications, 3rd edition, 2016

List of Experiments:

1. Study of various types of chain and tapes.
2. Measurement of distance involving direct and indirect ranging.
3. Chain and tape survey of given area
4. Study of prismatic and surveyors compass
5. Measurement of direction by prismatic compass
6. Calculation of distance between two in accessible points by prismatic compass
7. Study of dumpy level, levelling staff and level field book
8. Exercise of differential levelling and flying levelling
9. Study of various types of a transits theodolite
10. Measurements of horizontal angle by repetition method.
11. Determining the resultants force of coplanar concurrent and non-concurrent system of forces by graphical method
12. Determine forces in members of a perfect frame by graphical method.

Upon completion of the practical 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 the horizontal distances, difference in elevation and angles of various points

CO 4: Detect measurement errors and accordingly suggest corrections

CO 5: Interpret survey data and compute areas

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SEMESTER-III

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Course Code: 110302
Course Name: Building Planning & Design

L	T	P	Credit
3	1	0	4

Course Objectives:

1. To make aware the student with sustainability aspects of building.
2. To impart knowledge to students about significance of building bye-laws & rules & regulation regarding building planning.
3. To impart knowledge to students regarding specific consideration required to be considered under Indian condition for planning & designing of building.
4. To appraise students about the rules & consideration to get adequate ventilation, lighting & Sound insulation for improved energy efficiency of building.
5. To make students understand about various essential requirements of different type of building.
6. To make aware students about green building rating for enhanced sustainability.

Syllabus:

Unit I

Natural Environment & Built environment, Ecology, Ecosphere - sustainable development, Dimensions of sustainability. Built Environment & liveability, integrated approach in design, challenges in sustainable development. Green environment, expectations from green building, IGBC, USGBC, LEED - GRIHA, SVA, GRIHA.

Unit II

Building Bye - laws, Functions of local authority, Terminology i.e. (Building line, control line, FAR, light plane etc.) Principles underlying building bye- laws, classification of building, requirements of parts of Buildings, site section of building, orientation, factors affecting orientation, orientation criteria's for Indian conditions. Provisions of NBC.

Unit III

Principles of planning of buildings (Aspects, prospect, Furniture requirement, rooming, grouping, privacy circulation etc.), Principles of architectural composition (Unity, contrast, scale, proportion, balance, Rhythm, character, etc.), Massing, Sun and the Building, Sun path, Sun shading & devices, Design of sun shades.

Unit IV

Thermal insulation, Heat transfer in building, Thermal insulation materials, methods of thermal insulation ventilation: natural & artificial, necessity & functional requirement of ventilation, system of ventilation, types of mechanical ventilation, air conditioning, functional requirement of air conditioning, Essentials of air conditioning, acoustic and sound insulation, Behavior of sound acoustical defects. Sabine formula, acoustical design of various spaces, sound insulation methods & materials, illumination (natural & artificial).

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Unit V

Design and planning consideration for various types of building i.e. Residential Building, Education buildings, Hospitals & Dispensaries, Hotels, Commercial building, recreational buildings, government offices & other, standards specified by Bye-laws, various aspects of sustainability & energy efficiency applied to various types of Building, green building concept applied to various types of building.

Course Outcomes:

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

- CO 1: Explain basics of building planning & design.
- CO 2: Describe sustainability principle, by laws & characteristics of thermal and sound insulation.
- CO 3: Apply sustainability concepts & principles in planning & design of buildings.
- CO 4: Evaluate environmental, sustainable & safety aspects of a building.
- CO 5: Plan different types of buildings as per by laws & codal provisions.

Text Books:

1. Building Drawing (Built Environment), Sah, Kale and Pathi, Tata McGraw hill, 4th edition, reprint 2007
2. Building Planning, Designing and Scheduling, Gurucharan Singh, Standard Publisher, distribution, 2009
3. Building Design and Drawing, Mallik and Meo, Computech Publication Ltd New Asian; 5th edition 2009

Reference Books:

1. Building Design and drawing, Y S Sane, Standard Publisher, 2006
2. National Building Codes (Latest Edition), 2016 by Bureau of Indian Standards (Third Revision)
3. Building Construction, B.C. Punmia, Laxmi Publication, 11th edition, 2016

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Course Code: 110303

Course Name: Building Materials & Construction

L	T	P	Credit
3	0	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 & non ferrous 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-I

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:

CO 1: Explain the basic elements of buildings, engg. materials & construction.

CO 2: Evaluate the properties of various materials like cement, aggregate, concrete, admixture, brick, stone etc.

CO 3: Distinguish the suitability of building materials in the construction of elements of buildings.

CO 4: Evaluate various types of concrete in building construction accordingly.

CO 5: 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, sand & aggregate.
2. Determination of workability of concrete by slump test.
3. Determination of workability of concrete by compacting factor apparatus.
4. Determination of workability by Vee Bee consistometer.

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5. Water absorption & efflorescence of brick.
6. Field testing on bricks.
7. 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.

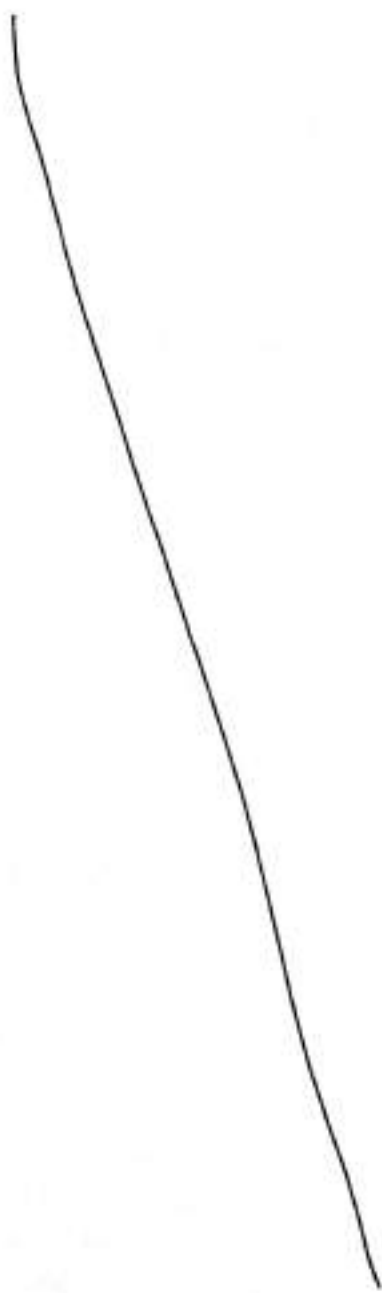
CO 2: Determine the workability of concrete for suitability of concrete mix in different construction works.

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

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Course Code: 110304
Course Name: Surveying

L	T	P	Credit
3	0	2	4

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 photographic surveying & GIS.

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, precise traversing.

Unit V: Photographic Surveying & GIS:

Principles of photographic surveying – aerial photography, tilt and height distortions, uses. Basics of GIS & GPS.

Course Outcomes:

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

- CO 1: Explain the techniques used for linear & angular measurements in surveying.
- CO 2: Analyse different geodetic methods of survey such as triangulation, trigonometric levelling, tachometry, photographic survey & GIS.
- CO 3: Apply methods in control surveys.
- CO 4: Apply tachometry in traverse computations.
- CO 5: 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, Mc Graw 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

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 by Trigonometrical levelling.
4. Determination of R.L. of a point whose base is inaccessible by Trigonometrical levelling.
5. Determination of tachometric contents in field.
6. Determination of height & distance by using Tangential tachometry
7. Determination of height & distance by Stadia method of tachometry.
8. Measurement of base line by using Substance Bar.
9. Setting out of a simple circular curve by using Rankine's method.
10. Setting out of a simple circular curve by using Offset from the chord produced or deflection distance.
11. Determination of horizontal & vertical position of a point by Total Station.
12. Traversing by Total Station.

Upon completion of practical 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 tacheometry.
- CO 5: Create a simple circular curve by using Rankine's method for alignment

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Course Code: 110305
Course Name: Strength of Materials

L	T	P	Credit
3	0	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:

CO 1: Explain the concepts of stress, strains, bending, deflection, buckling & torsion.

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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.

CO 4: Evaluate the stresses in bending, shear and torsion.

CO 5: Analyse various sections for stresses, strain, bending, torsion, buckling & deflections.

Text Books:

1. Strength of Materials, Sadhu Singh, Khanna Publishing, 1st edition 2016
2. Strength of Materials, S. Ramamrutham, R. Narayanan, Dhanpat Rai Publishing Company, 18th edition 2014
3. Strength of Materials, R. K. Bansal, Laxmi Publication; 6th edition 2018

Reference Books:

1. Strength of Materials, Timoshenko, Publisher CBS, 3rd edition 2004
2. Strength of Materials, Higdon Style, Publisher Wiley, 3rd edition 1978
3. Strength of Materials Vol. I & II, B. C. Punmia, Laxmi Publication, 10th edition 2018
4. Mechanics of Materials, R.C. Hibbler, Pearson Publication, 2016
5. Mechanics of Materials, J. M. Gere & B.J. Goodno, Cengage Publisher, 8th edition 2014

List of Experiments:

1. Impact Test
2. Brinell Hardness Test
3. Behaviour of columns with Different End Conditions
4. Tensile test
5. Compression test
6. Flexure test
7. Shear test

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

CO 1: Evaluate properties of material by impact test.

CO 2: Evaluate properties of material by hardness test.

CO 3: Evaluate properties of material by tensile test.

CO 4: Determine compressive & flexural strength of materials.

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S. K. Singh, AKSP, H. S. Singh, A. S. Singh, P. S. Singh, T. S. Singh

Course Code: 110306
Course Name: Software 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/two room residential building (Common to all students)
5. Drawing sheets one each of residential building using AutoCAD
6. One Drawing sheet of Institutional / Commercial building / Hospital etc. using AutoCAD
7. Sketches of various building components i.e. masonry, brick / stone, floors, roof & roof covering

Course Outcomes:

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

- CO 1: Attempt to draw different components of a building.
- CO 2: Produce plan, elevation & section of various components of a residential and institutional building.
- CO 3: Use AutoCAD software in civil engineering drawing.
- CO 4: Prepare drawing sheets of various types of buildings like residential, institutional, commercial etc

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Course Code: 110307

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:

- CO 1: Analyze contemporary issues in civil engineering & its allied areas through literature survey.
- CO 2: Distinguish state of art & relevance of the topic in national & international arena.
- CO 3: Demonstrate good oral & written communication skills.
- CO 4: Develop poster and power point presentations for effective communication.
- CO 5: Display lifelong learning.

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Course Code: 110308

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:

- CO 1: Observe various activities in field.
- CO 2: Examine the utility of general and specific equipments for construction.
- CO 3: Differentiate the construction projects individually and in team.
- CO 4: Develop the writing and communication skills for various engineering problems.
- CO 5: Adapt lifelong learning for benefit of society.

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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. Calibration of Venturimeter
2. Determination of C_c , C_d , C_v of Circular Orifice
3. Calibration of Mouthpiece
4. Calibration of Orifice Meter
5. Reynolds experiment for demonstration of stream lined & turbulent flow
6. Determination of Friction Factor for a pipe
7. Verification of Stoke's law.

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.

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SEMESTER-IV

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Course Code: 110402
Course Name: Geotechnical Engineering

L	T	P	Credit
2	1	2	4

Course Objectives:

- 1) 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.
- 2) To develop an understanding of the relationships between physical characteristics and mechanical properties of soils by experimentally measuring them.
- 3) To explain role of water in soil behaviour and how soil stresses, permeability and quantity of seepage including flow net are estimated.
- 4) To determine shear parameters and stress changes in soil due to foundation loads & estimate the magnitude and time-rate of settlement due to consolidation.
- 5) To apply the principles of soil mechanics in stability analysis of slopes and settlement calculations.
- 6) To explain various types of foundations.

Syllabus:

Unit-I Basic Definitions & Index Properties:

Introduction-Types of soils, their formation and deposition. Definitions: soil mechanics, soil engineering, rock mechanics, geotechnical engineering. Scope of soil engineering. Basic Definitions and their relationships - Soil as three-phase system, Index properties and their determination. Consistency limits. Classification systems based on particle size and consistency limits. Clay mineralogy & their Influence on engineering behavior, Expansive soils, their Characteristics & Challenges.

Unit-II Permeability, Seepage and Consolidation:

Darcy's law & its validity, Determination of coefficient of permeability: Laboratory methods: constant-head & falling-head method. Effective and total stresses, Effect of water table & capillary action. Seepage pressure, Quick sand condition. Compressibility and consolidation, Relationship between pressure and void ratio, Theory of one-dimensional consolidation. Consolidation tests, Fitting of curves. Normally and over consolidated clays. Determination of consolidation pressure settlement analysis. Calculation of total settlement.

Unit-III Stress Distribution in Soils and Shear Strength of Soils:

Stress distribution beneath loaded areas by Boussinesq and Westergaard's analysis. Newmark's influence chart. Contact pressure distribution. Mohr - Coulomb's theory of shear failure of soils, Mohr's stress circle, Measurement of shear strength, Shear box test, Triaxial compression test, unconfined compression test, Value shear test, Measurement of pore pressure, pore pressure parameters, critical void ratio, Liquefaction.

Unit - IV Stability of Slopes & Earth Pressure:

Infinite and finite slopes. Types of slope failure, Stress path. Stability curves. Effect of ground water, Analytical and graphical methods of stability analysis.

Earth Pressure at active, passive and at rest conditions. Rankine, Coulomb, Terzaghi and Culmann's

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theories. Analytical and graphical methods of determination of earth pressures on cohesionless and cohesive soils. Effect of surcharge, water table etc

Unit - V Soil Foundations

Shallow Foundation - Types of foundations. Bearing capacity of foundation on cohesionless and cohesive soils. General & local shear failures. Factors affecting bearing capacity. Theories of bearing capacity - Terzaghi, Vesic, Skempton, Meyerhof and I.S. code on bearing capacity.

Deep Foundation - Pile foundation. Types of piles, estimation of individual and group capacity of piles in cohesionless and cohesive soils. Static and dynamic formulae. Settlement of pile group. Negative skin friction. Under Ream Piles, Plate load test

Course Outcomes:

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

- CO 1: Evaluate different properties of soil, types of foundations and its classification.
- CO 2: Examine the flow and shear parameters & their effects on various types of soil.
- CO 3: Determine the stress distribution & shear strength parameters of soil by various methods.
- CO 4: Analyse the stability of slopes, earth pressures & retaining walls using analytical methods.
- CO 5: Evaluate suitable foundation system for various site conditions.

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 & ASR Rao, New Age International Publisher, 2016

Reference Books:

1. Modern Geotech Engg., Dr. Aram Singh, IBT Publishers, Delhi, 8th edition, 2016
2. Geotech Engg., C. Venkatramaiah, New Age International Publishers, Delhi, 16th edition, 2018
3. Soil Testing for Engg., T.W. Lambe, John Wiley & Sons. Inc., 1969

List of Experiments:

1. Moisture Content Determination. Oven Drying Method.
2. Grain Size Analysis - Mechanical Method.
3. Grain Size Analysis - Hydrometer Method.
4. Liquid & Plastic 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 (Demonstration)

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.

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Course Code: 110403
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-pie 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.

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.

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Course Code: 110404
Course Name: Structural Analysis

L	T	P	Credit
3	1	0	4

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, 2009

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2. Intermediate structural analysis, Wang C.K., McGraw Hill, New York, 1984
3. Structural Analysis, Aslam Kassimali, C. L. Publisher, 2014
4. Structural Analysis, R. C. Hibbler, Pearson Publication, 2017

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Course Code: 110405
Course Name: Engineering Hydrology

L	T	P	Credit
3	1	0	4

Course Objectives:

- 1) To develop an understanding of various components of hydrological cycle, their behaviors & factors affecting it & solve problems on measurement on rainfall, infiltration, evaporation.
- 2) To understand concepts of Hydrometry & ground water hydrology.
- 3) 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.
- 4) To develop an understanding of various methods of flood estimation in general & flood frequency in detail.
- 5) To develop the concept of flood routing through reservoir & channel and its application in flood forecasting & flood control.

Syllabus:

Unit - I

Hydrology: Hydrological cycle, Precipitation and its measurement, Recording and non recording rain gauges, Estimating missing rainfall data, Rain gauge net works, Mean depth of precipitation over a drainage area, Mass rainfall curves, Intensity - duration curves, Depth - Area Duration curve, Infiltration and infiltration indices, Evaporation, evaporimeters, evapotranspiration & estimation.

Unit - II

Hydrometry and Ground Water: Methods of Stream gauging, Direct and Indirect methods, Area - velocity method, Dilution technique methods, Ultrasonic method, Stage - Discharge Relationship (Rating curves).

Forms of subsurface water, Aquifer properties, Geological formations as aquifers, Hydraulics of wells, Steady flow into a well, Well loss, Introductions to ground water recharge methods and Rain water harvesting.

Unit - III

Hydrographs: Runoff, Flow duration curve, Flow mass curve, Estimation of runoff, Rainfall - Runoff relationship, Hydrograph and its analysis, Unit hydrograph and its derivation for isolated and complex storms, S-curve hydrograph, Instantaneous unit hydrograph, Synthetic unit hydrograph.

Unit - IV

Floods: Floods and its estimation by different methods, Design flood by Unit hydrograph and Design Storm, Flood frequency studies: Gumbel's Method, Log Pearson Types - III Distribution, Lognormal distribution, Limitations of Frequency studies.

Unit - V

Floods Routing: Hydrologic Routing: Reservoir Routing - Modified Pul's method, Goodrich method. Channel Routing - Muskingum method

Hydraulic Routing: Numerical methods. Introduction to Time series models, Flood control measures.

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Course Outcomes:

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

- CO 1: Explain the basics of surface, subsurface flow, floods & hydrograph.
- CO 2: Describe various methods of hydrological studies.
- CO 3: Apply basic principles for measurement & forecasting of rainfall & runoff.
- CO 4: Analyse runoff hydrograph by various methods.
- CO 5: Evaluate various hydrological analysis methods.
- CO 6: Formulate the solutions to complex hydrological problems.

Text Books:

1. Engineering Hydrology, K. Subramanya, Tata McGraw Hill Publ. Co. 4th edition, 2013
2. Hydrology & Water Resources Engineering, S. K. Garg, Khanna Publishers, 2016

Reference Books:

1. Engineering Hydrology, J. NEMEC, Prentice Hall, 1972
2. Hydrology for Engineers, Linsley, Kohler, Paulmus, Tata Mc GrawHill, 2014
3. Engineering Hydrology, H. M. Raghunath, New Age International Publishers, 5th edition, 2015.

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Course Code: 110407
Course Name: Survey Practlce Lab

L	T	P	Credit
0	0	4	2

Syllabus:

Field Work:

- 1 Profile leveling & cross sectioning
- 2 Prepare contour map by using Tachometric method
- 3 Locating details by Plane Table surveying
- 4 Setting out of simple circular curves
- 5 Triangulation – Adjustment of quadrilateral by least square method
- 6 Use of Total Station in surveying

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

- CO 1: Observe topographical characteristics.
CO 2: Differentiate methods to perform ground survey.
CO 3: Prepare longitudinal & cross section profiles
CO 4: Develop contour map by using tachometer & total station.
CO 5: Prepare the details of features using Plane table surveying.
CO 6: Produce a simple circular curve by using Rankine's method for alignment.

Reference Books:

1. Surveying Vol. I, II, III, B.C. Punmia, Laxmi Publications New Delhi, 2015
2. Surveying Vol. I & II, K.R. Arora, Standard book House, New Delhi, 2015
3. Surveying theory & Practice, R.E. Devise, Mc Graw Hill, NewYork, 1997
4. Fundamentals of surveying, S.K. Roy, Prentice Hall of India New Delhi, 2nd edition, 2010

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SEMESTER-V

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Course Code: 110501

Course Name: Estimating Costing & Contracting

L	T	P	Credit
2	0	0	2

Course Objectives:

- 1) To work out the quantities of various items of civil works like buildings, culverts including steel girders etc.
- 2) To compute earthwork.
- 3) To understand detailed specifications and carry out analysis of rates.
- 4) To understand various methods of carrying out estimation.
- 5) To understand valuation process & fixation of rent.
- 6) To understand contracting procedures.

Syllabus:

Unit I Introduction of Estimating:

Purpose and importance of estimates, principles of estimating, methods of taking out quantities of items of work. Mode of measurement, measurement sheet and abstract sheet, bill of quantities. Types of estimate, plinth area rate, cubical content rate, preliminary, original, revised and supplementary estimates for different projects.

Unit II: Details of Items:

Specifications of materials and works: Types of Specifications, General specifications for Class A, B & C type of building, Detailed specifications of important items of work.

Rate Analysis: Task for average artisan, various factors involved in the rate of item, material and labour requirement for various trades, preparation for rates of important items of work, current schedule of rates (C.S.R)

Unit III: Estimates

Preparing detailed estimates of various types of buildings, R.C.C Works, Culverts, earth work calculations for roads and Canals, contingencies and work charge establishment, use of computational tools for preparing estimates.

Unit IV: Valuation

Purposes, depreciation, sinking fund, scrap value, year's purchase, gross and net income, dual rate of interest, methods of valuation, rent fixation of buildings

Unit V: Contracting

Contract, Types of engineering contract, essentials documents of engineering Contract, Conditions of contract, Earnest Money Deposit, Security Deposit, Responsibility of Engineer, Contractor & Client.

Course Outcomes:

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

CO 1: Explain the fundamentals of quantity estimation, costing & contracting.

CO 2: Apply methods to estimate area, volume & cost.

CO 3: Evaluate mathematical & numerical models for rate & quantity estimation.

CO 4: Determine rates & value.

CO 5: Classify different rates of items, contracts & measurement techniques.

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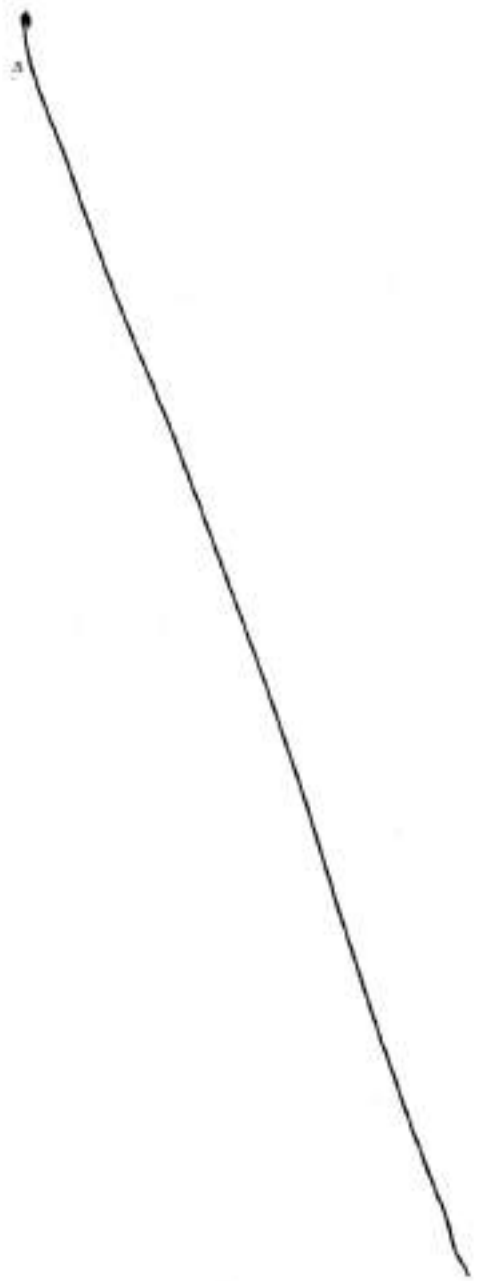
Text Books:

1. Estimating & costing in civil engineering, B.N. Dutta, UBS Publishers, 28th revised edition 2016
2. Estimating & Costing, S.C. Rangwala, Charotar Publishing House, 17th edition 2017

Reference Books:

1. Estimating & Costing for Civil Engg., G.S. Birdie, Dhanpat Rai Publications, 6th edition 2014
2. Estimating & Costing specification & valuation in civil engineering, M. Chakraborti, 2006

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Course Code: 110502

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

L	T	P	Credit
2	1	0	3

Course Objectives:

- 1) To understand the behavior of reinforced concrete components & systems subjected to gravity loads.
- 2) To study the stress strain behavior of steel and concrete.
- 3) To understand the concept of working stress & limit state method.
- 4) To provide knowledge on limit state design of beams, design for flexure, shear, torsion, bond & anchorage as per relevant IS codes.
- 5) To provide knowledge on design of slabs, columns, footings & staircases as per relevant IS codes.

Syllabus:

Unit-I Basic Principles of Structural Design:

Mechanism of load transfer, Introduction to working stress limit state and ultimate load methods of design. Introduction of IS Codes 456, 13920.

Design of Beams: Analysis and design of singly reinforced rectangular beams, Lintel, Cantilever, Simply supported and continuous beams.

Unit-II Design of Beams:

Doubly reinforced and Flanged Beam. Design for Shear and design for bond.

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:

Short and long columns. Columns subjected to axial loads and bending moments (section with no tension). Isolated and combined footings, Strap footing. Raft foundation.

Unit-V Staircases:

Staircases with waist slab having equal and unequal flights with different support conditions, Tread-riser staircase.

Course Outcomes:

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

- CO 1: Compare various design principles as applicable for design of RCC structures.
- CO 2: Apply the concepts of working stress method & limit state method on RCC structures.
- CO 3: Apply recommendations of SP 34 for detailing
- CO 4: Analyse a given section of RCC structural elements using limit state method.
- CO 5: Design different elements of RCC structures like beam, slab, column, footing, staircase using IS codes.

Text Books:

1. Reinforced Concrete Limit State Design, A.K. Jain, Nem Chand Pub., 7th edition, 2012

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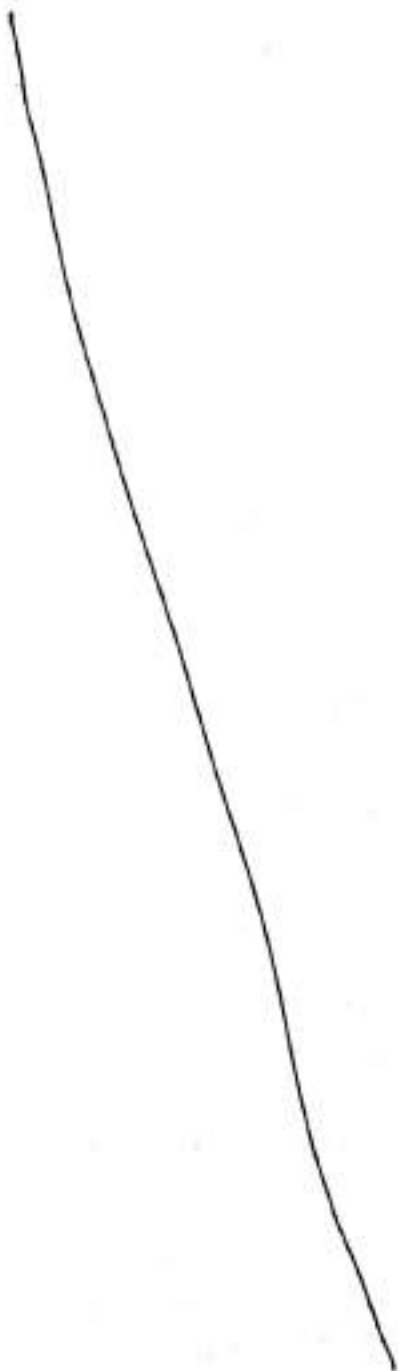
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2. Reinforced Concrete, Pillai & Menon, Tata McGraw Hill, New Delhi, 3rd edition, 2017
3. Limit State Design, P.C. Varghese, Prentice Hall of India, New Delhi, 2nd edition, 2008
4. RCC Design, Neelam Sharma, Katson Publishers, 2014

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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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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Course Code: 110503
Course Name: Fluid Mechanics - II

L	T	P	Credit
2	0	2	3

Course Objectives:

- 1) To develop an understanding of fluid flows patterns and learn to use boundary layer theory and drag.
- 2) To apply theories of laminar & turbulent flow to solve typical pipe flow problems in the field.
- 3) To apply boundary layer theory to estimate drag & lift for various shapes of the objects.
- 4) To classify the types of flows in open channel and also to design open channel sections in a most economical fashion with minimum wetted perimeter and learn about critical flows.
- 5) To study about non uniform flows in open channel and longitudinal slopes in open channel and also to learn about the characteristics of hydraulic jump.
- 6) To understand design philosophy of various types of pumps & turbines.

Syllabus:

Unit-I

Turbulent Flow: Laminar and turbulent boundary layers and laminar sub layer, hydro dynamically rough boundaries, velocity distribution in turbulent flow, Resistance of smooth and artificially roughened pipes, Commercial pipes, aging of pipes.

Pipe Flow Problems: Losses due to sudden expansion and contraction, losses in pipe fittings and valves, Concepts of equivalent length, Hydraulic and energy gradient lines, Siphon, Pipes in series, in parallel, Branching of pipes. (Hardy Cross method)

Pipe Network: Water hammer (only quick closure case) transmission of power.

Unit - II Forces on Immersed bodies:

Introduction, Force Exerted by a flowing fluid on a stationary body, Expression for Drag & Lift, Drag on a sphere, Terminal velocity of a Body, Drag on a cylinder. Introduction to Development of Lift on a Circular Cylinder and an Airfoil

Unit - III Uniform Flow in open Channels:

Channel geometry and elements of channel section, Velocity distribution, Energy in open channel flow, Specific energy, Types of flow, Critical flow and its computations, Uniform flow and its computations, Chezy's and Manning's formulae, Determination of normal depth and velocity, Normal and critical slopes, Economical sections.

Unit - IV Gradually varied flow

Basic assumptions and dynamic equations of gradually varied flow, characteristics analysis and computations of flow profiles, rapidly varied flow-hydraulic jump in rectangular channels and its basic characteristics, Surges in open channels.

Unit - V Introduction to Fluid Machinery: Turbines & Pumps

Turbines: Classifications, definitions, Similarity laws, Specific speed and unit quantities, Pelton turbine - their construction and settings, Speed regulation, Dimensions of various elements. Action of jet, Torque, Power and efficiency for ideal case, Characteristics curves. Reaction turbines construction & setting, Draft tube theory, Runaway speed, Simple theory of design and characteristic curves, Cavitation.

Pumps: Principle of working & criteria for selection of different types of pump, viz. Centrifugal, Reciprocating.

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Course Outcomes:

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

- CO 1: Differentiate different types of fluid flow & fluid machinery.
- CO 2: Describe principles of analysis of fluid flow problem.
- CO 3: Explain basic principles for measurement of different forces acting on fluid body.
- CO 4: Analyse pipe flow, open channel flow problems & various characteristics of hydraulic machines.
- CO 5: Design open & closed conduit systems.

Text Books:

1. Fluid Mechanics, Modi & Seth, Standard Book house, Delhi, 21st edition, 2017
2. Open Channel Flow, K. Subramanya, Tata McGraw Hill, New Delhi, 5th edition, 2019

Reference Books:

1. Open Channel Flow, Rangaraju, Tata Mc Graw Hill Publishing Comp. Ltd., New Delhi, 1st edition, 2001
2. Fluid Mechanics, A.K. Jain, Khanna Publishers, Delhi, 1988
3. Fluid Mechanics, Hydraulics & Hydraulic Mechanics, K.R. Arora, Standard Publishers, 2009
4. Open Channel Hydraulics, Chow V.T., McGraw Hill, New York, 57th edition, 2009

List of Experiments:

1. To determine the performance characteristics of Pelton Wheel.
2. To determine the performance characteristics of Francis Turbine.
3. To determine the performance characteristics of Kaplan Turbine.
4. Calibration of multistage (Two) Pump & Study of characteristics of variable speed pump.
5. To determine the coefficient of discharge for rectangular notches.
6. To determine the coefficient of discharge for triangular notches.
7. To determine the characteristics of the Reciprocating pump at variable speed.
8. To prepare the calibration curve for rotameter.

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

- CO 1: Differentiate between turbines & pumps.
- CO 2: Select the efficient turbines by studying the performance characteristics of various turbines.
- CO 3: Distinguish the performance characteristics of various pumps.

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Course Code: 110504

Course Name: Environmental Engineering – I

L	T	P	Credit
2	0	2	3

Courses Objectives:

Students will be able to understand

- 1) The structure of drinking water supply systems, including water transport, treatment and distribution.
- 2) Water quantity and water quality criteria and standards, and their relation to public health.
- 3) Operation and maintenance of water supply system components.
- 4) How to estimate water requirement of a city
- 5) How to design water treatment plant for urban & rural areas
- 6) How to design water distribution network including pipe & appurtenances.

Syllabus:

Unit-I

Water demand (types variation, factors affecting it), Design period, population forecasting methods, underground water quality & quantity, Pumping test, recuperation test, Tube wells (Types, development) yield of tube well, Thiem's-formula, Dupuit's formula.

Unit-II

Intake structures (location, types& design), conduits for transporting water, forces on conduits, types of pressure pipe, joints, corrosion of pipe (causes & control), pipe appurtenances (design), pumping of water (numerical problems), pumps character, types of pumps , Economical diameter of rising main (numerical), characteristics of water (laboratory method & effects) , water born diseases, standards for drinking water.

Unit-III

Water treatment flow diagram, design, construction, working of (Aerators, screens, plain sedimentation tank, tube settlers), coagulants & coagulation, flocculation, feeding and mixing of coagulants, optimum dose of coagulants, design & working of clarifloculator, filtration (Theory & types), Design, operation & construction of slow sands & Rapid sand gravity filters, pressure filters.

Unit-IV

Disinfectants (types) & disinfection method of disinfection, chlorine & chlorine compounds, types of chlorination, Hardness (Causes & types), various methods of softening, Recarbonation, calculation of chemical requirements, Removal of colour, odor Taste Iron & manganese, algae removal, fluoridation / defluoridation, desalination, latest treatment techniques.

Unit-V

Requirement of good distribution system, layout of distribution, methods of distribution, Distribution reservoir and calculation of its capacity, fixing size of pipe, Analysis of pipe networks (Hardy cross method, Equivalent pipe method), appurtenances used in distribution networks, water supply & plumbing system in building, Rural water supply.

Courses Outcomes:

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

CO 1: Explain the concepts of water supply engineering.

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CO 2: Determine the requirements for safe supply of water.

CO 3: Apply suitable water treatment technique based upon the available data.

CO 4: Analyse a given water supply scheme.

CO 5: Design a water supply system based upon the needs of society.

Text Books:

1. Water Supply Engg., B. C. Punmia, Laxmi Publication (P) Ltd. New Delhi, 2016
2. Water Supply Engg., S. K. Garg, Khanna Publishers New Delhi, 2017

Reference Books:

1. Water Supply & Sanitary Engg., G.S. Birdie, Dhanpat Rai Publishing Company, 2014
2. Water & Waste Water Technology, Mark J Hammer, Prentice Hall of India, 6th edition, 2008
3. Environmental Engineering, Peavy, Rowe & Tchobanoglous, McGraw Hill Publication, 2017
4. Manual of Water Supply and Treatment by CPIHEEO, GOI, 2009

List of Experiments:

1. Determination of pH of a given water sample.
2. Determination of Total Solids, Dissolved Solids and Suspended Solids of water sample.
3. Determination of Chloride concentration in water sample.
4. Determination of turbidity of water sample using turbidity meter.
5. Determination of acidity of the water sample.
6. Determination of alkalinity of the water sample.
7. Determination of Hardness of the water sample.
8. Determination of D.O concentration of a given water sample.
9. Determination of optimum dose of coagulants required for the treatment of a given water sample.
10. Determination of MPN of the given water sample.
11. Determination of Sulphate of a given water sample.
12. Determination of Nitrate of a given water sample.

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

CO 1: Follow sampling procedure & other guidelines for sampling & analysis of water samples.

CO 2: Check various water quality parameters.

CO 3: Improve the water quality by suggesting suitable corrective measures.

CO 4: Train others on various ways of improving the quality of water.

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Course Code: 110505
Course Name: Transportation Engineering

L	T	P	Credit
2	0	2	3

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.

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.

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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, F.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.


Upon completion of the 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.



Course Code: 110506
Course Name: Minor Project - I

L	T	P	Credit
0	0	4	2

Course Objectives:

- 1) To develop an appreciation of civil engineering problems & have a feel of real life situations in planning & execution of projects.
- 2) To impart training of handling various types of civil engineering problems by use of conventional methods as well as software's
- 3) To utilize the expertise in engineering to solve industry's technological problems.
- 4) To become innovative and professional in technology development, and system implementation.
- 5) To be able to function in their profession with social awareness and responsibility.
- 6) To be able to interact with their peers in industry and society as engineering professionals and leaders & inculcate a habit of working in a group.
- 7) Enable students to prepare professional reports for design projects and data presentation skill and to use computers and some computer graphics.

Syllabus:

Each candidate shall work on an approved project of a public building or any other civil engineering work and shall submit design and a set of drawings.

OR

Shall submit a detailed report of experimental work / software package on any specific problem of importance.

Course Outcomes:

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

- CO 1: Recognize various engineering problems and techniques to solve them.
- CO 2: Reproduce the solution of the problems upon the need of society.
- CO 3: Cooperate to work within group.
- CO 4: Develop the writing and communication skills for various engineering problems.
- CO 5: Display lifelong learning.



Course Code: 110507

Course Name: Summer Internship Project - II

L	T	P	Credit
0	0	4	2

Course Objectives:

- 1) To make student acquire good oral & written communication skills.
- 2) To promote the habit of lifelong learning.
- 3) To prepare students develop adequate soft skills to be able to present their topic effectively to listeners.

Syllabus:

Each candidate shall have to undergo 15 days inhouse summer internship related to soft skills at the institute after the completion of their 4th Semester exams (in summer vacations) 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:

CO 1: Develop the writing and communication skills for various engineering problems.

CO 2: Adapt lifelong learning for benefit of society.

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Course Code: 110508

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:

- CO 1: Analyze contemporary issues in civil engineering & its allied areas through literature survey.
- CO 2: Distinguish state of art & relevance of the topic in national & international arena.
- CO 3: Demonstrate good oral & written communication skills
- CO 4: Develop poster and power point presentations for effective communication.
- CO 5: Display lifelong learning.

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SEMESTER-VI

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Course Code: 110602
Course Name: Structural Design & Drawing (Steel)

L	T	P	Credit
2	1	0	3

Course Objectives:

- 1) To learn IS 800-2007 code of practice for the design of Compression, Tension and Flexural members using various cross-sections.
- 2) To understand the behavior of steel structural components subjected to gravity loads.
- 3) To study the design of bolted and welded connections.
- 4) To study the behaviour and design of compression and tension members using simple and built-up sections.
- 5) To understand behaviour of flexural members and the design laterally restrained & unrestrained beams.
- 6) To design plate girders & stiffeners.

Syllabus:

Unit-I

Various loads, Partial Load factors, Structural properties of steel, Design of structural connections – Bolted and Welded connections, eccentric connection. Codal provision.

Unit-II

Design of Tension members, Codal provision. Lug angles & Tension splices.

Unit-III

Design of Compression member, Design of columns-simple and compound, Lacings & Battens. Design of footings for steel structures, Slab base, gusseted base. Codal provision.

Unit-IV

Design of built up beams, web buckling and crippling, curtailment of flanges. Design of Laterally supported and unsupported beams, web buckling and crippling. Codal provision.

Unit-V

Design of plate girder. Curtailment of flanges, Design of stiffeners (bearing, Vertical and horizontal), Codal provision.

Course Outcomes:

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

CO 1: Explain the principles of steel structural design using relevant IS Codes.

CO 2: Evaluate structural behaviour of different steel structural elements.

CO 3: Analyse a given section of steel structural element using IS codes.

CO 4: Design different elements of steel structure under various loading conditions using relevant IS codes.

CO 5: Design a structure/ component to meet desired needs within realistic constraints such as economy, safety, viable construction & its sustainability as per codal provisions.

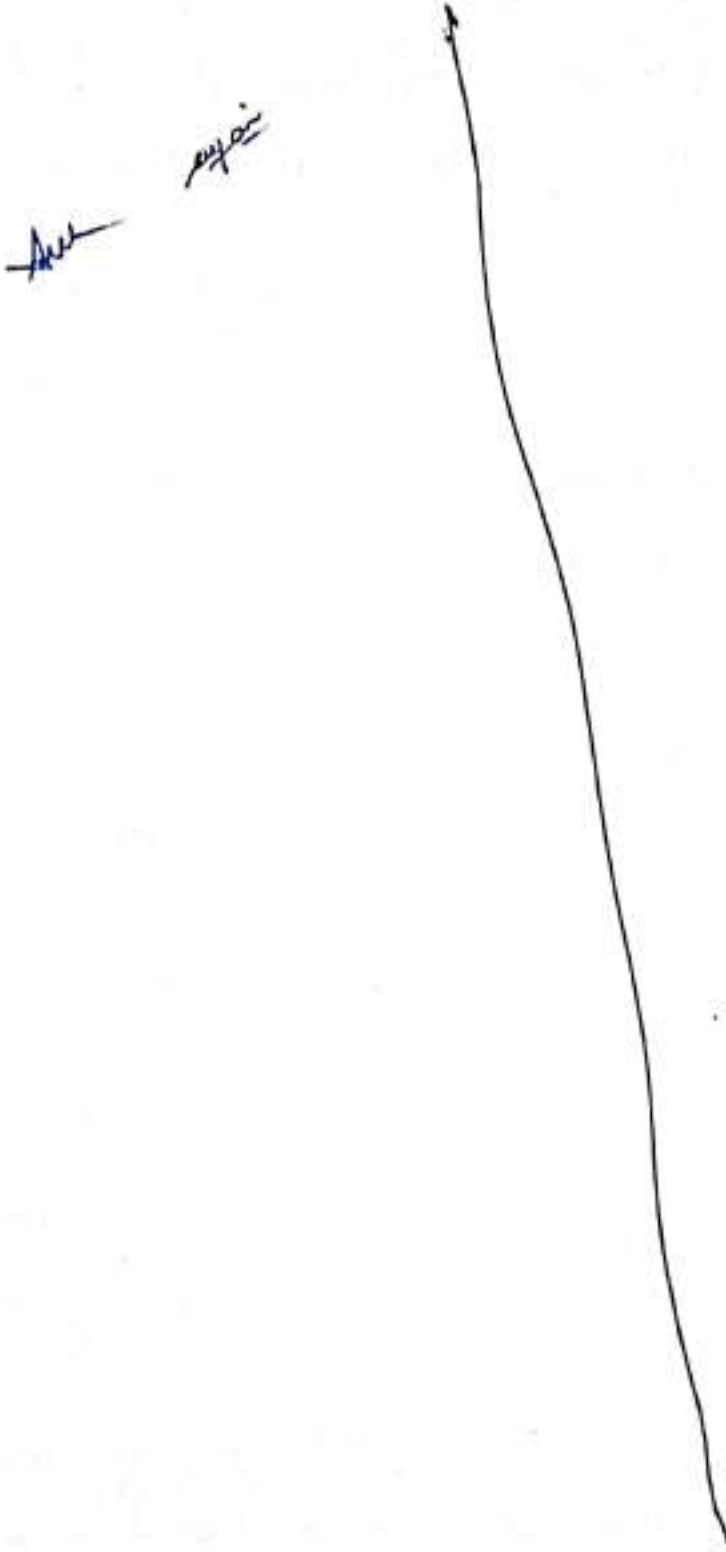
Text Books:

1. Limit State Design of Steel Structures, S. K. Duggal, McGraw Hill Publication, 3rd edition, 2017

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Reference Books:

1. Design of Steel Structures, S. S. Bhavikatti, International Publishing House, 2014
2. Design of Steel Structures, N. Subramanian, Oxford University Press India, 2008



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Course Code: 110611
Course Name: Wastewater Engineering

L	T	P	Credit
2	0	0	2

Course Objectives:

- 1) To impart basic knowledge on sewerage system including estimation of sewage quantity & design of sewers.
- 2) To provide a broad knowledge on sewage composition & its characteristics.
- 3) To provide information on disposal standards of effluents & also about various methods of sewage disposal.
- 4) To provide broad knowledge on various techniques of sewage treatment including advanced processes.

Syllabus:

Unit - I

Sewerage schemes & sewerage system and their importance, collection & conveyance of sewage, Estimation of and sewage storm water quantity, fluctuation in sewage flow, Flow through sewer, Design of sewer, Construction & maintenance of sewer, Testing of sewer, Sewer appurtenances, Pumps & pumping stations (numerical problems).

Unit - II

Characteristics and analysis of wastewater (Physical, chemical & biological parameters). Cycles of decomposition, Oxygen demand i.e. BOD & COD, TOC, TOD, ThOD, relative Stability, Population equivalent, Instrumentation involved in analysis, Natural methods of waste water disposal i.e. by land treatment & by dilution, Self-purification capacity of stream, Oxygen sag analysis (numerical problems).

Unit-III

Unit operations for waste water treatment, Preliminary treatment such as screens, grit chamber, floatation tank, sedimentation etc. and chemical clarification, Role of micro-organism in biological treatment, Sewage filtration - theory & design. Trickling filter its design & constructions, modifications in trickling filter.

Unit-IV

Methods of Biological Treatment (Theory & Design) - Activated Sludge Process, Oxidation ditch, Stabilization Ponds, Aerated Lagoon, Anaerobic Lagoons, Septic Tank & Imhoff tank, Rotating Biological contactor Sources & treatment of sludge, sludge thickening and digestion, sludge drying beds, sludge disposal.

Unit-V

Advanced Waste Water treatment - Need of advanced treatment, Diatomaceous earth filters, Ultra filtration, Adsorption by activated carbon, Phosphorus removal, Nitrogen removal, Physico chemical waste water treatment. Sewage treatment plants using MBBR and SBR technology.

Course Outcomes:

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

CO 1: Explain the concepts of waste water engineering.

CO 2: Determine the requirements for safe disposal of sewage.

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CO 3: Apply suitable techniques for sewage treatment & disposal based upon the available data.

CO 4: Analyse a given sewerage system.

CO 5: Design sewage system for safe disposal of sewage.

Text Books:

1. Waste Water Engg. B. C. Punmia, Laxmi Publication (P) Ltd. New Delhi, 2016
2. Sewage Disposal and Air Pollution Engineering, S. K. Garg, Khanna Publishers, 2017

Reference Books:

1. Water Supply & Sanitary Engg. G. S. Bhole, Dhanraj Rao Publishing Company, 2014
2. Environmental Engg. M. L. Datta & D. A. Chaudhri, Mc Graw Hill Companies, 1st edition 2012
3. Environmental Engg. K. V. Prasad & T. S. Ramesh Babu, Tata McGraw Hill Publications, 2017
4. Water & Waste Water Technology, Mark J. Hammer, Prentice Hall of India, 6th edition 2004
5. Waste Water Engineering, Muralid & Eshp, Mc Graw Hill Book Company New Delhi, 4th edition 2005
6. CPHEEO Manual on Sewage & Sewage Treatment System, COE, 2013

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Course Code: 110612
Course Name: Solid Waste Management

L	T	P	Credit
2	0	0	2

Course Objectives:

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

Syllabus:

Unit I:

Functional Elements of Solid Waste Management, Objective of Solid Waste Management, Principle of Municipal Solid Waste Management, Classification of solid waste, composition, Physical, chemical & biological properties of municipal solid waste, Quantity of solid waste, Sampling & analysis of solid waste.

Unit II:

Collection, conveyance, separation & recycling of solid waste: Types of collection system, Collection routes, equipment's, transfer station, transport methods, material separation & recycling of MSW.

Unit III:

Disposal of solid waste by Land fill method; Classification, type, method, site consideration composition and control of gases, Leachate control inland fills, surface water management, landfill operation & care. Remediation of old landfill sites.

Unit IV:

Disposal of solid waste by other methods: Thermal conversion technologies, Incineration, Pyrolysis gasification, environmental control system. Biological & Chemical conversion technologies, aerobic composting, anaerobic digestion, other biological and chemical transformation.

Unit V:

Solid waste Management — legislative trend and planning issues: Major legislations, government agencies, future trend in planning. Hazardous solid waste management, handling & Disposal. Disposal of Biomedical Waste, Demolition waste, E-Waste & Plastic Waste etc.

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 in collecting the waste.
- CO 3: Apply various techniques of reducing the waste.
- CO 4: Apply various techniques in disposal of waste.
- CO 5: 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

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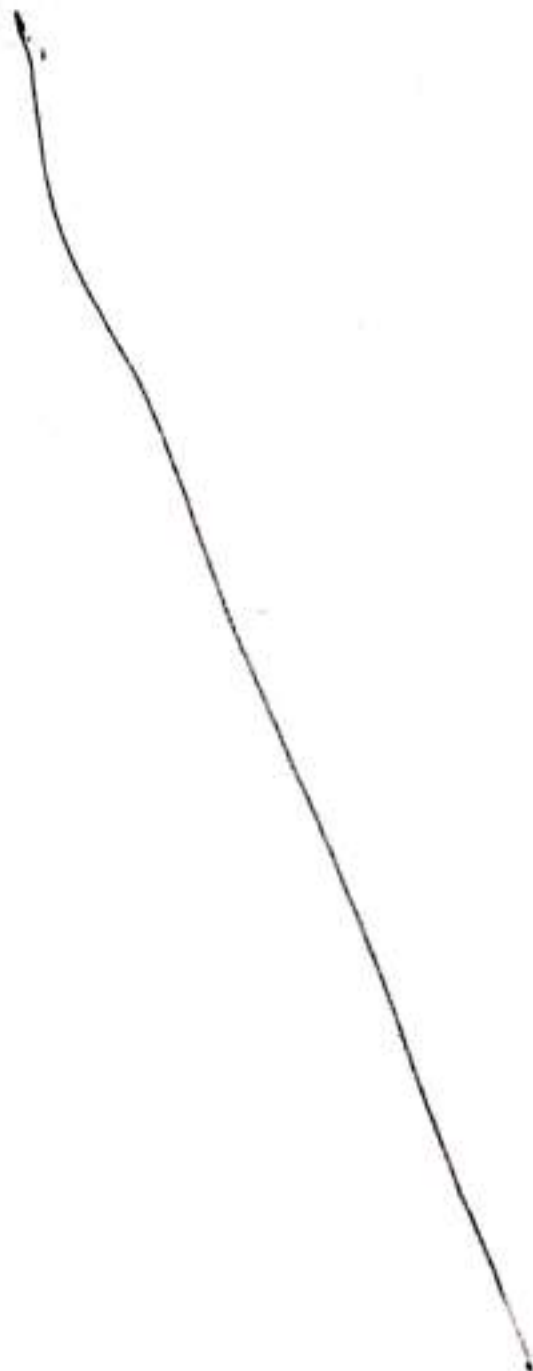
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- 2 Integrated Solid Waste Management, Hilary Theisen and Samuel A. Vigil, George Tchobanoglous, McGraw Hill New York, 1993

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

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Course Code: 110613
Course Name: Construction Planning & Management

L	T	P	Credit
2	0	0	2

Course Objectives:

- 1) To make student conversant with the concepts and importance of the subject of construction planning & management.
- 2) To provide a broad knowledge on how to make bar chart, work break structure of a project, schedules.
- 3) To provide a broad knowledge on how to analyze a problem using various techniques of project management like CPM, PERT & optimization of time & cost of a project.
- 4) To provide an insight into various types of machinery used in construction works & various concepts of man & material management.

Syllabus:

Unit I

Modern management techniques: An overview of planning process, planning through Bar Charts and Milestone charts, Network techniques, Basic concept of network preparations, CPM and PERT techniques with network analysis.

Unit II

Construction management: Principles of construction management, Planning for Job Layout, Advantages of Job Layout, Scheduling Techniques of Construction Project.

Unit III

Construction equipment's: Factors affecting selection, investment and operating cost, Efficiency and capacity rating of various equipment's, study of equipment's required for various jobs such as earthwork, dredging, conveyance, concreting, hoisting, pile driving, compaction and grouting Equipment Management.

Unit IV

Time & Cost Optimization using Network Techniques: Time computations using CPM & PERT, Probability of achieving completion time, Project cost, Direct & Indirect cost, Cost vs. Time curves, Total project cost & optimum duration, Contracting the network for cost optimization, Time cost optimization

Unit V

Site Organization & Manpower management: Introduction of site organization, types of organization, organization chart & manuals, Manpower Management, Labour laws (Compensation Act etc.) & Human relations, Welfare facilities, Safety Management

Course Outcomes:

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

CO 1: Explain the concepts of construction planning & management process.

CO 2: Describe various techniques used in construction planning & management.

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CO 3: Apply techniques of project planning & management.

CO 4: Analyze various problems of time & cost optimization using network techniques like CPM & PERT.

CO 5: Plan effectively for manpower & material management in a project along with suitable safety measures.

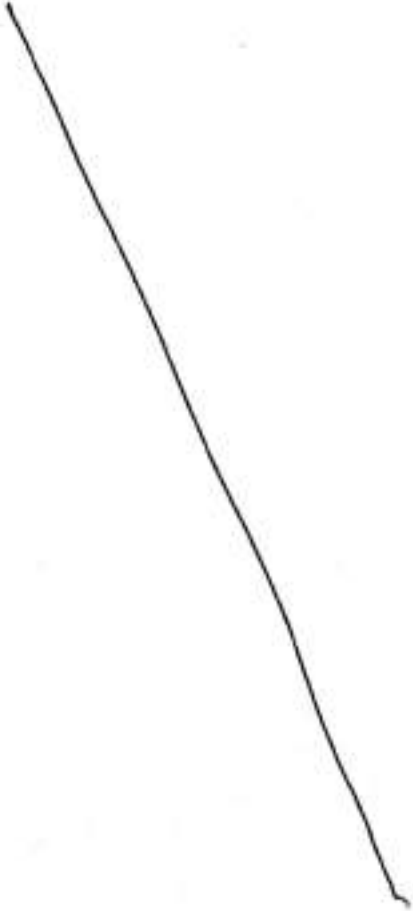
Text Books:

- 1) K. K. Chitkara, Construction Project Management, McGraw Hill International Publishers.
- 2) B. C. Punmia & K. K. Khandelwal, Project Planning & Control with PERT & CPM, Laxmi Publishers.
- 3) U.K. Shrivastava, Construction Planning & Management.
- 4) Neeraj Kumar Jha, Construction Project Management, Pearson Publishers.

Reference Books:

- 1) Gahlot & Dhir, Construction Management, New Age International Publishers.
- 2) L.S. Srinath, PERT & CPM – Principles & Applications, East West Press.
- 3) Sengupta & Guha, Construction Management & Planning. McGraw Hill Publishers.
- 4) Peurify, Construction Equipment.

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Course Name: Building Physics

L	T	P	Credit
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Course Objectives:

1. To emphasize on green systems and the environment, energy technology and efficiency, and sustainability and society.
2. To introduce concepts of Eco Friendly building materials and alternative methods of building construction and energy efficient construction
3. To know about the basics of acoustics in building, and protection against noise.
4. To understand the response of building to thermal environment.
5. To learn about the day lighting of buildings and their design principles.
6. To learn about the environmental impact of building materials and energy efficient materials.
7. To expose the students to the concepts functional design of building for thermal aspects and energy efficiency; especially in tropical climates i.e. in Indian context.
8. To perform fenestration design for natural ventilation and day lighting & design of space for external and internal noise control.

Syllabus:

Unit-I Energy Efficiency in buildings:

Need of energy in buildings. Role of building design and building services to evaluate the energy performance in buildings. Study of Climate and its influence in building design for energy requirement, Principles of energy conscious design of buildings, Building Envelope, Orientation, Building Configuration, Structural control and design for energy efficiency: Selection of envelope elements, Orientations, shape, Glasses and shading devices;

Unit-II

Response of building to thermal environment: Processes of heat exchange of building with environment; Effect of solar radiation; Thermal properties of material and sections and their influence; Natural ventilation: Purpose of ventilation, Mechanisms, Fenestration Design for natural ventilation.

Unit-III Acoustics of a building:

Basic requirements for good acoustics, Reverberation, Absorption and transmission of sound, Factors affecting the architectural acoustics

Noise and Building: Basic acoustics and noise, Planning, Sound in free field, protection against external noise; Internal noise sources and protection against air borne & structure borne noise.

Unit-IV Energy Efficient Materials:

Environmental impact of building materials, Eco Friendly building materials, their composition, production and recycling, physical properties etc. Embodied energy of materials like bamboo, soil blocks, thatch, steel, fly-ash bricks, gypsum, eco-boards etc, Life Cycle assessment of materials
Need of Alternative materials, Green Materials, Biomaterials, Natural and synthetic Polymers, Photovoltaic (PV) thin films for solar cells; Organic Solar Cells, dye sensitized solar cells; Lithium batteries: Current technologies and future trends. Thermoelectric materials for conversion of heat to electricity.

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Unit-V Day-lighting In buildings:

Basic Principles of Day-lighting and fundamentals; Sky, Indian sky, daylight prediction and design of fenestration; Embodied Energy of Building Materials, design guidelines, Commercial Buildings, Industrial buildings, Residential buildings, integration of emerging technologies. Study of thermal environment and visual environment. Novel illumination sources for efficient lighting, Energy saving in buildings, Materials and techniques for energy harvesting.

Course Outcomes:

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

- CO 1: Explain the significance of saving energy while designing and planning the building.
- CO 2: Apply the principles of day lighting while designing a building
- CO 3: Analyse different types of energy efficient and eco-friendly materials available in building construction to reduce the energy consumption.
- CO 4: Analyse the thermal impact on buildings due to changing environment and their remedial measures
- CO 5: Apply the concept of acoustics while design a building.

Text Books:

1. Energy Efficient building in India. Mih Majumdar, TERI, 2009
2. Building Climate And Energy, Markus T. A. & Morris E.N., Pitman publishing limited, 1980
3. Air conditioning And Ventilation of Buildings Vol-I., Croome J. D. & Roberts B.M., Pergamon press.
4. Noise Building And People, Croome J.D., Pergamon press.

Reference Books:

1. Handbook on Energy Conscious Buildings, J.K. Nayak & J.A. Prajapati, 1st edition, 2006
2. Energy Economic, ParagDiwan, Pentagon Press, 2008
3. Energy Sources & Policies in India, Rishi Muni Dwivedi, New Century Publications, 2011
4. Bureau of Indian Standards, "Hand Book of Functional Requirements Of Buildings, (SP-41 & SP- 32)", BIS 1987 and 1989
5. Manual of Tropical Housing And Building Part-I Climatic Design, Koenigsberger, O.H. et al, Orient Longman, 1973
6. Energy Simulation In List of reference materials/books/ Optional use of open source free software such as "eQUEST", Energy plus etc. 2 building Design, Clarke, J.A., Adam Hilger Ltd 1985
7. Sound Analysis and Noise Control, Foreman, J.E.K., Van Nostrand Reinhold 1990
Environmental and Architectural Acoustics, Mackawa Z. and Lord, P., E & F N Spon. 1994

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Course Name: Prefabricated Construction Technology

L	T	P	Credit
2	0	0	2

Syllabus:

Unit I Introduction

Introduction to Prefabricated construction. Necessity to adopt prefabrication. Classification advantages and disadvantages.

Unit II Prefabricated Components and Systems

Waffle slab, wall panel, shear wall, Beams, Columns. Large panel system, Frame system, lift slab system.

Unit III Modular Coordination

Introduction to modular coordination aims and objectives, basic principles and standard rules. Modular Grid. Different types of grids. Notation and symbols. Definitions of module, basic module, Multi-module. Vertical coordination, sub modular increment. Advantages and disadvantages of modular coordination.

Unit IV Joints in Structural Members

Joints for Different Structural Members - Dimensions and Detailing: Allowance for joint deformation. Connection between vertical elements. Rigid connection between horizontal and vertical elements, two horizontal elements.

Unit V Pre-engineered construction

Introduction to Pre-engineered buildings, Components of pre-engineered buildings. Pre-engineered conventional buildings. Applications.

Course Outcomes:

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

- CO 1: Explain the concepts of prefabricated construction.
- CO 2: Apply the concepts of prefabrication in various components of building construction.
- CO 3: Explain the concept of modular coordination.
- CO 4: Analyze joints in structural members.
- CO 5: Apply the concept of pre-engineered construction.

Text Books:

1. Prefabrication with concrete by A.S.G. Bruggeling and G.F. Huyghe Pub. AABalkema Publisher, USA

Reference Books:

1. Precast Concrete Structures by Kim. S. Elliott, CRC Press
2. Building Construction with Precast Concrete Structural elements by WaiKwongLAV An empirical study in Hong Kong. Lambert Academic Publishing.
3. Construction and Design Manual Prefabricated Housing by Philipp Mueser, Dum Publisher.

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Course Code: 100007

Course Name: Disaster Management

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Course Objectives:

- i) To understand basic concepts in Disaster Management
- ii) To understand Definitions and Terminologies used in Disaster Management
- iii) To understand Types and Categories of Disasters
- iv) To understand the Challenges posed by Disaster
- v) To understand Impact of Disasters key skills

Syllabus:

Unit 1: Introduction to disaster management, concepts and definitions: disaster, vulnerability, risk severity, frequency and details, capacity impact, prevention, mitigation.

Unit 2: Disasters – Disasters classification, demographic aspects (gender, age, special needs); hazard locations; global and national disaster trends, hazard and vulnerability profile of India.

Unit 3: Disaster Impacts – Disaster impact (environmental, physical, social, ecological, economic, political, etc.); health, psycho-social issues, impact of natural disasters (floods, draught, cyclones, volcanoes, earthquakes, tsunami, landslides etc.), impact of manmade disasters (industrial pollution, artificial flooding in urban areas, urban disasters, transportation accidents etc.).

Unit 4: Disaster Risk Reduction (DRR) - Disaster management cycle- its phases; prevention, mitigation, preparedness, relief and recovery; structural and non- structural measures; risk analysis, vulnerability and capacity assessment; early warning systems, Post disaster environmental response. Roles and responsibilities of government, community, local institutions, NGOs and other stakeholders: Policies and legislation for disaster management. DRR programmes in India and the activities of National Disaster Management Authority.

Unit 5: Disasters, Environment and Development – Factors affecting vulnerability such as impact of development projects and environmental modifications (including of dams, land use changes, urbanization etc.), sustainable and environmental friendly recovery; reconstruction and development methods.

Course Outcomes:

After successful completion of the course, the students will be able to

- CO1: Identify disaster prevention and mitigation approaches.
- CO2: Classify global and national disasters, their trends and profiles.
- CO3: Determine the impacts of various disasters.
- CO4: Apply Disaster Risk Reduction in management.
- CO5: Infer the linkage between disasters, environment and development.

Text Books:

- 1. Pradeep Sahni, 2004, Disaster Risk Reduction in South Asia, Prentice Hall.

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2. Ghosh G K., 2006, Disaster Management, APH Publishing Corporation
3. Srivastava H.H. & Gupta G.D., Management of Natural Disasters in developing countries, Daya Publishers Delhi, 2006

Reference Books:

1. <http://ndma.gov.in> (Home page of National Disaster Management Authority)
2. <http://www.ndmndia.nic.in> (National Disaster Management in India)
3. Singh B K., 2008, Handbook of Disaster Management: Techniques & Guidelines, Rajat Publication.
4. National Disaster Management Policy, 2009, GOI
5. Inter Agency Standing Committee (IASC) (Feb. 2007), IASC Guidelines on Mental Health and Psychosocial Support in Emergency Setting, Geneva, IASC

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Course Code: H0607
Course Name: Minor Project - II

L	T	P	Credit
0	0	4	2

Course Objectives:

- 1) To develop an appreciation of civil engineering problems & have a feel of real life situations in planning & execution of projects.
- 2) To impart training of handling various types of civil engineering problems by use of conventional methods as well as software's.
- 3) To utilize the expertise in engineering to solve industry's technological problems.
- 4) To become innovative and professional in technology development, and system implementation.
- 5) To be able to function in their profession with social awareness and responsibility.
- 6) To be able to interact with their peers in industry and society as engineering professionals and leaders & inculcate a habit of working in a group.
- 7) Enable students to prepare professional reports for design projects and data presentation skill and to use computers and some computer graphics.

Syllabus:

Each candidate shall work on an approved project of a public building or any other civil engineering work and shall submit design and a set of drawings.

OR

Shall submit a detailed report of experimental work / software package on any specific problem of importance.

Course Outcomes:

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

- CO 1: Recognize various engineering problems and techniques to solve them.
- CO 2: Reproduce the solution of the problems upon the need of society.
- CO 3: Cooperate to work within group.
- CO 4: Develop the writing and communication skills for various engineering problems.
- CO 5: Display lifelong learning.

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MADHAV INSTITUTE OF TECHNOLOGY & SCIENCE, GWALIOR
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DEPARTMENT OF CIVIL ENGINEERING

SCHEME OF STUDY B.Tech Civil Engineering

2018 ADMITTED BATCH ONLY

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MADHAV INSTITUTE OF TECHNOLOGY & SCIENCE, GWALIOR
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Scheme Structure & Semester-wise credit distribution (under flexible curriculum design)

[For batches admitted in Academic Session 2018-19 onwards]

Semester-Wise Scheme & Guidelines for Flexible Curriculum

Abbreviations used

L	Lecture
T	Tutorial
P	Practical
HSMC	Humanities and Social Sciences including Management Courses
BSC	Basic Science Courses
ESC	Engineering Science Courses
DC	Departmental Core
DE	Departmental Elective
OC	Open Category
DLC	Departmental Laboratory Courses
MC	Mandatory Course
PD	Professional Development
MOOC	Massive Open Online Courses

Definition of Credit :

1 Hour Lecture (L) per week	1 credit
1 Hour Tutorial (T) per week	1 credit
2 Hours Practical (Lab) per week	1 credit

MADHAV INSTITUTE OF TECHNOLOGY & SCIENCE, GWALIOR

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General Guidelines for Flexible Curriculum

(For batch admitted in 2018-19)

- For the award of basic Under Graduate (UG) Degree in Engineering Technology (without Honours/Honours with Minor Specialization), it is required to earn **170 Credits**. For the B. Architecture Degree the total credit requirement is **260**.
- The students can opt up to **34 credits out of these 170 from recognized MOOC (Massive Open Online Courses) platforms** against Departmental & Open elective courses (DE OC). Each such Course must be of minimum 2 credits.
- There is a provision for interested students to opt for **additional 20 credits to obtain Honours or Honours with Minor Specialization in chosen field**. These additional courses can be selected and opted from the list of courses approved by the department through their recognized bodies.
- In the flexible curriculum there is a provision of **03 Mandatory Credit Courses on Cyber Security, Disaster Management, & Intellectual Property Rights**.
- In the flexible curriculum presently there is a provision of **02 Audit Courses on (i) Biology for Engineers & (ii) Indian Constitution & Traditional Knowledge**. Auditing a course allows a student to take a class without the benefit of a grade or credit, for the sole purposes of self-enrichment and academic exploration.
- The students have to undergo three **Mandatory Summer Internship Programme/Projects (SIPs)** after their I, II and III year and their evaluation will reflect in III, V & VII semester examination results, respectively.
- Credit will be given for **"Professional Development"** of students in order to bring their all kinds of personality and skill development activities into the orbit and to encourage student participation in professional chapter activities, club activities, cultural events, sports, technical events, hackathons, personality development activities etc.
- The marks for **"Professional Development"** will be awarded to students in VIII semester on the basis of their participation and achievements in extra & co-curricular activities, sports, performance in MOOCs etc. right from I year.

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MADHAV INSTITUTE OF TECHNOLOGY & SCIENCE, GWALIOR

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Guidelines for students opting additional courses for (i) B.Tech. Honours degree or (ii) B.Tech. Honours degree with Minor Specialization

- For getting an (i) B.Tech. Honours in parent discipline or (ii) B.Tech. Honours with Minor Specialization in other interdisciplinary areas fields of Engineering, Technology, Applied Science, Management etc. which are offered by the Institute, the additional Credit requirement is 20 for Engineering & Technology students i.e. Total $170 + 20 = 190$ credits needed by the end of VIII semester.
- For students desirous of achieving additional credits for Honours/Honours with Minor Specialization, there is a provision of selecting maximum 02 courses per semester from V semester onwards. Each such Course must be of minimum 2 credits.
- These additional courses can be selected only from the pool of courses specified by the department from recognized SWAYAM/NPTEL/MOOC platforms.

Credit Requirements & Guidelines for MOOCs

- Up to 34 Credits out of total 170 for Engineering/Technology students & 52 credits out of total 260 credits for B. Architecture students can be earned through SWAYAM/NPTEL/MOOC platform based learning for the award of UG degree in Engineering/Technology & Architecture respectively (without Honours/Honours with Minor Specialization).
- To obtain Honours or Honours with Minor Specialization 20 credits additionally can be acquired through SWAYAM/NPTEL/MOOC platform based learning.
- In this manner, students aspiring for Honours or Honours with Minor Specialization during the tenure of B. Tech programme can opt for a total of 54 (34+20) Credits and the students of the B. Architecture programme can earn up to 72 (52+20) credits through SWAYAM/NPTEL/MOOC platform based learning.
- For the courses opted under MOOC, the equivalent credit weightage will be given to the students, for the credits earned in online examination on SWAYAM/NPTEL platform and other similar platforms as approved by the authorized bodies (BoS, AC etc.), in the credit plan of the program.
- Policy for credit equivalence and transfer for the courses opted from SWAYAM/NPTEL/University of Central Florida (UCF)/RGPV Bhopal/Institutional (MITS) MOOC/other MOOC (Massive Open Online Courses) platforms, is as follows :

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MADHAV INSTITUTE OF TECHNOLOGY & SCIENCE, GWALIOR
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Duration of MOOC	Credit Transfer
04 week course	01*
06 week course	02**
08 week course	03**
12 week course	04**

* The 01 credit courses can be opted only under seminar/self-study/professional development purposes.

** The 02, 03 & 04 credit courses can be opted under DEs/OCs and additional courses (for Honours/Honours with Minor Specialization).

- The guidelines regarding "credit transfer from MOOCs" by All India Council of Technical Education (AICTE) and the affiliating university, i.e. RGPV Bhopal, as issued from time to time will be binding on the institute.

Guidelines for Departmental Elective (DEs) and Open Category Courses (OCs)

- The list of Departmental/Open Elective Courses (DEs/OCs) will be prepared well in advance and make the list public among the students, possibly in the previous semester itself for preference based registration process.
- The list of courses which the students can opt from the SWAYAM/NPTEL/MOOC platform against DE & OC courses in the scheme will be approved by authorized bodies (BoS, AC etc.) and displayed/communicated to students on the website well in advance, (in September/October & April/May for even and odd semesters respectively) so that students can select the courses of their choice. Each such Course must be of minimum 2 credits.
- The Open Category (OC) course will be open for students of departments other than the offering (parent) department. Moreover, there will be no pre-requisite for Open Category Courses.
- The allotment of DE/OC Courses will be based on First Come First Serve (FCFS) basis.
- The weightage of continuous assessment (Mid Semester Exam, Quiz, Assignment etc.) for DE/OC courses which are opted from MOOCs will be considered from the score obtained towards assignment work/test etc. conducted by the course offering agency.
- For matching the credit requirement with the curricular/scheme requirements, more than one MOOC course can also be selected against an Elective Course, provided that the collective credits are equal to or more than the credit requirement; however each such selected course must be of minimum 2 credits.

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MADHAV INSTITUTE OF TECHNOLOGY & SCIENCE, GWALIOR
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Mandatory Summer Internship Programme

- The students have to undergo three Mandatory Summer Internship Programme/Projects (SIPs) after the I, II and III year and their evaluation will reflect in III, V, & VII semester examination results.
- In case, a student fails to appear (due to valid cause)/acquire minimum score, the Head of Concerning Department may schedule the re-conduction of internship program for such students and the same will be monitored and reviewed by the Dean Student Welfare. Such students are required to fill the examination form for III/V semester in order to get the marks credits reflected in their mark-sheet, which will also clearly indicate the year of completion of Internship.
- The promotion to successive semesters/years will not be affected for students who are not able to complete these requirements in time. However, they will not be awarded the degree until they complete these mandatory Summer Internship programs (SIPs).

Provision of Internship/Project

- All the courses offered in VIII semester are DE (Departmental Elective) and OC (Open Category) courses, which will run through online learning platform under the mentorship of faculty members.
- The students can opt for internship/project in the VIII Semester by either making a project or by doing internship in an industry after formal approval of the Institute as well as the concerned industry.

Awareness about Ethics & Academic Integrity

Criteria for accepting similarity index for the submission of UG project report/PG dissertation/Thesis

- The overall similarity index up to 15-20% is acceptable (using turnitin plagiarism check software).
- The highest similarity percentage from any one source is not greater than 4-6%.
- In case of self plagiarism, the permissible percentage may be slightly higher, say at 7-10%.

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Guidelines for evaluating "Professional Development"

PERFORMANCE METRICS		
Categories	Suggestive Activities	Marks Assigned
Institute Level* (C1)	Participation in Institute level technical events such as quizzes, extemporary, debate, student volunteers, seminar, professional society local chapters (IET, IEEE, ISTE, IETE), NCC etc.	102 Marks for each participation Marks=Number of activities (C1) x 2 (Maximum marks in this category 06)
State Level* (C2)	Participation in State level technical events such as Robotics, Coding challenge, Cultural cum technical fest, technical symposium, volunteers, hackathon, sports etc.	03 marks for each participation Number of Marks=Number of activities (C2) x 3 (Maximum marks in this category 09)
National level* (C3)	Participate in National level events such as hands on workshop, national level seminar, national conference, Entrepreneurship, model making, techno culture fest, national youth festival, research conclave, project competition, volunteers, sports festival etc.	05 marks for each participation (Maximum 15) Marks=Number of activities (C3) x 5 (Maximum marks in this category 15)
MOOCs** (C4)	Successfully completed technical certification course in any MOOC's platform such as NPTEL, SWAYAM EdX, Coursera/Class Central etc)	10 marks for each course (Maximum 20) Marks= Number of certificates (C4) x 10 (Maximum marks in this category 20)
Formula		Marks Scored (Out of 50)
$(C1 \times 2 + C2 \times 3 + C3 \times 5 + C4 \times 10) =$		

In addition to the above, if a student or group of students win a competition in the above three Categories (Institute level/State level/National level etc.) then maximum marks in the respective category will be awarded to such students.

Note: * Student must produce a certificate as a proof for each activity.

** Courses for which credits are already earned (for DE/OC/Honours or Minor Specialization from I to VIII semester) through MOOCs by the student during academics will not be counted.

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MADHAV INSTITUTE OF TECHNOLOGY & SCIENCE, GWALIOR
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Structure of Undergraduate Engineering program:

S. No.	Category	Suggested Breakup of Credits (Total 160) (as proposed by AICTE)	Component wise credit allotment	No. of Courses
1	Humanities and Social Sciences including Management Courses (HSMC)	12**	12	04
2	Basic Science Courses (BSC)	26**	20	05
3	Engineering Science courses including workshop, drawing, basics of electrical/mechanical computer etc (ESC)	29**	20	06
4	Departmental Core Courses (DC)	47**	56	14
5	Departmental Elective Courses relevant to specialization branch (DE)	23**	16	05
6	Open Category- Electives from other technical and /or emerging subjects (OC)	11**	15	05
7	Project work, seminar and internship in industry or appropriate work place/ academic and research institutions (DIC SWAYAM NPTEL MOOC-Practical Slot)	12**	22	12
8	Mandatory Courses (MC) and Professional Development		9	04
	Total	160**	170	55

**Minor variation is allowed as per need of the respective disciplines.



MADHAV INSTITUTE OF TECHNOLOGY & SCIENCE, GWALIOR
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Scheme of Examination

GROUP B: I Semester
B. Tech. I Semester (Civil Engineering)

For batches admitted in academic session 2018 - 19 onwards

S. No.	Subject Code	Category Code	Subject Name	Maximum Marks Allotted						Contact Hours per Week			Total Credits	
				Theory Slot			Practical Slot			Total Marks	L	T		P
				End Sem.	Mid Sem.	Quiz/Assignment	End Sem.	Lab work / Sessional						
1.	100101	BSC	Engineering Chemistry (BSC-1)	70	20	10	30	20	150	3	-	2	4	
2.	100102	BSC	Engineering Mathematics -I (BSC-2)	70	20	10	-	-	100	3	1	-	4	
3.	100103	HSMC	Technical English (HSMC-1)	70	20	10	30	20	150	3	-	2	4	
4.	100104	ESC	Basic Electrical & Electronics Engineering (ESC-1)	70	20	10	30	20	150	3	-	2	4	
5.	100105	ESC	Engineering Graphics (ESC-2)	70	20	10	30	20	150	2	-	2	3	
6.	100106	ESC	Manufacturing Practices (ESC-3)	-	-	-	30	20	50	-	-	2	1	
			Total	350	100	50	150	100	750	14	1	10	20	
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.														
NSS / NCC											Qualifier			

GROUP A: (Electrical, Electronics, Computer Science, Information Technology, Electronics & Telecommunication)

GROUP B: (Civil, Mechanical, Chemical, Biotech, Automobile)

01 Theory Period = 1 Credit; 01 Tutorial Period = 1 Credit; 02 Practical Periods = 1 Credit

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

For batches admitted in academic session 2018 – 19 onwards

S. No.	Subject Code	Category Code	Subject Name	Maximum Marks Allotted						Contact Hours per Week			Total Credits	
				Theory Slot			Practical Slot			Total Marks	L	T		P
				End Sem.	Mid Sem.	Quiz/ Assignment	End Sem.	Lab work / Sessional						
1.	100201	BSC	Engineering Physics (BSC-3)	70	20	10	30	20	150	2	1	2	4	
2.	100202	HSMC	Energy, Environment, Ecology & Society (HSMC-2)	70	20	10	-	-	100	3	-	-	3	
3.	100203	ESC	Basic Computer Engineering (ESC-4)	70	20	10	30	20	150	3	-	2	4	
4.	100204	ESC	Basic Mechanical Engineering (ESC-5)	70	20	10	30	20	150	3	-	2	4	
5.	100205	ESC	Basic Civil Engineering & Mechanics (ESC-6)	70	20	10	30	20	150	3	-	2	4	
6.	100206	HSMC	Language Lab. & Seminars (HSMC-3)	-	-	-	30	20	50	-	-	4	2	
			Total	350	100	50	150	100	750	14	1	12	21	
Summer Internship Project – I (Institute Level) (Qualifier): Minimum two-week duration; Evaluation in III Semester.														
NSS / NCC												Qualifier		

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GROUP A: (Electrical, Electronics, Computer Science, Information Technology, Electronics & Telecommunication)

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MADHAV INSTITUTE OF TECHNOLOGY & SCIENCE, GWALIOR
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Scheme of Examination

B. Tech. III Semester (Civil Engineering)

For batches admitted in academic session 2018 – 19 onwards

S. No.	Subject Code	Category Code	Subject Name	Maximum Marks Allotted					Contact Hours per Week			Total Credits	
				Theory Slot		Practical Slot		Total Marks	L	T	P		
				End Sem.	Mid Sem.	Quiz/ Assignment	End Sem. / Sessional						Lab Work / Sessional
1.	100001	BSC	Engineering Mathematics-II (BSC-4)	70	20	10	-	-	100	3	1	-	4
2.	110302	DC	Building Planning & Design (DC-1)	70	20	10	-	-	100	3	1	-	4
3.	110303	DC	Building Materials & Construction (DC-2)	70	20	10	30	20	150	3	-	2	4
4.	110304	DC	Surveying (DC-3)	70	20	10	30	20	150	3	-	2	4
5.	110305	DC	Strength of Materials (DC-4)	70	20	10	30	20	150	3	-	2	4
6.	110306	DLC	Software Lab (DLC-1)*	-	-	-	30	20	50	-	-	2	1
7.	110307	Seminar / Self Study	Self Learning/Presentation (Through Swayam/NPTEL/MOOC)*	-	-	-	-	25	25	-	-	2	1
8.	110308	DLC	Summer Internship Project - I (Institute Level) (Evaluation)	-	-	-	25	-	25	-	-	4	2
Total				350	100	50	145	105	750	15	2	14	24
				NSS / NCC					Qualifier				

*Compulsory registration for one online course using SWAYAM / NPTEL / MOOC, evaluation through attendance, assignment and presentation.
*Virtual Lab to be conducted along with traditional Lab.

GROUP A: (Electrical, Electronics, Computer Science, Information Technology, Electronics & Telecommunication)

GROUP B: (Civil, Mechanical, Chemical, Biotech, Automobile)

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Scheme of Examination

B. Tech. IV Semester (Civil Engineering)

For batches admitted in academic session 2018 - 19 onwards

S. No.	Subject Code	Category Code	Subject Name	Maximum Marks Allotted				Contact Periods per Week			Total Credits	
				Theory Slot		Practical Slot		Total Marks	L	T		P
				End Sem.	Mid Sem. Assignment	Quiz/ Assignment	End Sem.					
1.	100003	BSC	Engineering Mathematics - III (BSC-5)	70	20	10	-	-	2	2	-	4
2.	110402	DC	Geotechnical Engineering (DC-5)	70	20	10	30	20	2	1	2	4
3.	110403	DC	Fluid Mechanics - I (DC-6)	70	20	10	30	20	2	1	2	4
4.	110404	DC	Structural Analysis (DC-7)	70	20	10	-	-	3	1	-	4
5.	110406	DC	Water Resources Engineering (DC-8)	70	20	10	-	-	3	1	-	4
6.	100004	MC	Cyber Security (MC)	70	20	10	-	-	2	1	-	3
7.	110407	DLC	Survey Practice Lab (DLC-2)*	-	-	-	30	20	-	-	6	3
Total				420	120	60	90	60	14	7	10	26
8.	100002*	MC	Biology for Engineers (Audit Course) (MC)	70	20	10	-	-	3	-	-	-
NSS/NCC				Qualifier								
Summer Internship Project - II (Soft Skills Based) for two weeks duration: Evaluation in V Semester												

*This course will run for Group B-A to IV-III semester respectively. (This is a non-credit course and it is optional to appear & pass in the end semester examination. However, a separate mark sheet will be issued to those who will qualify)

*A Virtual Lab to be conducted along with traditional Lab.

GROUP A: (Electrical, Electronics, Computer Science, Information Technology, Electronics & Telecommunication)

GROUP B: (Civil, Mechanical, Chemical, Biotech, Automobile)

M. Jaiswal
DEAN (ACADEMICS)
GWALIOR

Dr. A. K. Mishra
Dr. P. K. Mishra
Dr. S. K. Mishra

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

[For batches admitted in academic session 2018 – 19 onwards]

S. No.	Subject Code	Category Code	Subject Name	Maximum Marks Allotted						Contact Periods per Week			Total Credits	
				Theory Slot		Practical Slot		Total Marks			L	T		P
				End Sem.	Mid Sem.	Quiz/ Assignment	End Sem.	Lab work/ Sessional	Total Marks					
1.	110501	DC	Estimating, Costing & Contracting (DC-9)	70	20	10	-	-	-	100	3	1	-	4
2.	110502	DC	Structural Design & Drawing (RCC) (DC-10)	70	20	10	-	-	-	100	3	1	-	4
3.	110503	DC	Fluid Mechanics – II (DC-11)	70	20	10	30	20	20	150	2	1	2	4
4.	110504	DC	Environmental Engineering (DC-12)	70	20	10	30	20	20	150	2	1	2	4
5.	110505	DC	Transportation Engineering (DC-13)	70	20	10	30	20	20	150	2	1	2	4
6.	110506	DLC	Minor Project – I ² (DLC-3)	-	-	-	30	20	20	50	-	-	2	1
7.	110507	DLC	Summer Internship Project – II (Evaluation) (DLC-4)	-	-	-	25	-	-	25	-	-	6	3
8.	110508	Seminar / Self Study	Self Learning/ Presentation (Through Swayam/NPTEL/MOOC)*	-	-	-	-	25	-	25	-	-	2	1
Total				350	100	50	145	105	750	12	5	16	25	
Department Level activity / workshop / awareness programme to be conducted; certificate of compliance to be submitted by HoD to the Exam controller through Dean Academics														
9.	Additional Courses for obtaining Honours or Minor Specialization by desirous students			Permitted to opt for maximum 02 additional courses for the award of Honours or Minor Specialization										

** The Minor Project – I may be evaluated by an internal committee for awarding sessional marks.

* Compulsory registration for one online course using SWAYAM / NPTEL / MOOC, evaluation through attendance, assignment and presentation.

GROUP A: (Electrical, Electronics, Computer Science, Information Technology, Electronics & Telecommunication)

GROUP B: (Civil, Mechanical, Chemical, Biotech, Automobile)

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Scheme of Examination

B. Tech. VI Semester (Civil Engineering)

For batches admitted in academic session 2018 – 19 onwards

S. No.	Subject Code	Category Code	Subject Name	Maximum Marks Allotted					Contact Periods per Week			Total Credits	
				Theory Slot		Practical Slot		Total Marks	L	T	P		
				End Sem.	Mid Sem.	Quiz/ Assignment	End Sem.						Lab work / Sessional
1.	100005*	HSMC	Ethics, Economics, Entrepreneurship & Management (HSMC-4)	70	20	10	-	-	100	3	-	-	3
2.	110602	DC	Structural Design & Drawing (Steel) (DC -14)	70	20	10	-	-	100	3	1	-	4
3.	DE	DE	(DE-1)*	70	20	10	-	-	100	3	1	-	4
4.	DE	DE	(DE-2)*	70	20	10	-	-	100	3	1	-	4
5.	OC	OC	(OC-1)*	70	20	10	-	-	100	2	1	-	3
6.	100007	MC	Disaster Management (MC)	70	20	10	-	-	100	3	-	-	3
7.	110607	DLC	Minor Project – II (DLC-5)	-	-	-	100	50	150	-	-	4	2
			Total	420	120	60	100	50	750	17	4	4	23
8.	100006*	MC	Indian Constitution & Traditional Knowledge (Audit Course) (MC-1)	70	20	10	-	-	100	3	-	-	-
9.			Additional Courses for obtaining Honours or Minor Specialization by desirous students	Permitted to opt for maximum 02 additional courses for the award of Honours or Minor Specialization									
			Summer Internship Project – III (On Job Training) for Four Weeks Duration : Evaluation in VII Semester										

* This course will run for Group B-A in VII semester respectively.

† This course will run for Group B-A in VII semester respectively. (This is a non-credit course and it is optional to appear & pass in the end semester examination. However, a separate mark sheet will be issued to those who will qualify)

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

GROUP A: (Electrical, Electronics, Computer Science, Information Technology, Electronics & Telecommunication)

GROUP B: (Civil Mechanical, Chemical, Biotech, Automobile)

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 Groupa - *Sharma*
 Groupb - *Sharma*
 Date - *27/11/2018*
 Page - *136*

MADHAV INSTITUTE OF TECHNOLOGY & SCIENCE, GWALIOR
(A Govt. Aided IGC Autonomous Institute affiliated to RGPV, Bhopal)

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

[For batches admitted in academic session 2018 - 19 onwards]

S. No.	Subject Code	Category Code	Subject Name	Maximum Marks Allotted						Total Marks	Contact Periods per Week			Total Credits
				Theory Slot		Practical Slot		Total Marks	L		T	P		
				End Sem.	Mid Sem.	Quiz / Assignment	End Sem.						Lab Work / Sessional	
1.	DE	(DE-3)*		70	20	10	-	-	100	3	-	-	3	
2.	DE	(DE-4)*		70	20	10	-	-	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.	110706	DLC	Software Application for Solving Civil Engineering Problems (SAC-6)	-	-	-	50	50	100	-	-	-	2	
7.	110707	DLC	Summer Internship Project - III (04 weeks) (Evaluation) (DI C-7)	-	-	-	50	50	100	-	-	-	2	
8.	110708	DLC	Creative Problem Solving (Evaluation) (DI C-8)	-	-	-	25	25	50	-	-	-	1	
Total				350	100	50	125	125	750	12	1	19	38	

Additional Courses for obtaining Honours or Minor Specialization by desirous students
Permitted to opt for maximum 02 additional courses for the award of Honours or Minor Specialization

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

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MADHAV INSTITUTE OF TECHNOLOGY & SCIENCE, GWALIOR
(A Govt. Aided UGC Autonomous Institute affiliated to RGPV, Bhopal)

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

For batches admitted in academic session 2018 – 19 onwards

S.No.	Subject Code	Category Code	Subject Name	Maximum Marks Allotted					Contact Periods per Week			Total Credits	
				Theory Slot		Practical Slot		Total Marks	L	T	P		
				End Sem.	Mid Sem.	Quiz / Assignment	End Sem.						Lab Work / Sessional
1.		DE	(DE-5)*	70	20	10	-	-	100	3	-	-	3
2.		OC	(OC-4)*	70	20	10	-	-	100	3	-	-	3
3.		OC	(OC-5)*	70	20	10	-	-	100	3	-	-	3
4.	110804	DLC	Internship / Project (DLC-9)	-	-	-	250	150	400	-	-	6	3
5.	110805	-	Professional Development*	-	-	-	-	50	50	-	-	2	1
Total				210	60	30	250	200	750	9	-	8	13
6.			Additional Courses for obtaining Honours or Minor Specialization by desirous students	Permitted to opt for maximum 02 additional courses for the award of Honours or Minor Specialization									

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

* Evaluation will be based on participation/laurels brought by the students to the institution in national/state level technical and other events during the complete tenure of the UG program; participation in professional chapter activities, club activities, cultural events, sports, personality development activities, collaborative events, MOOC's and technical events)



MADHAV INSTITUTE OF TECHNOLOGY & SCIENCE, GWALIOR

(A Govt. Aided UGC Autonomous Institute affiliated to RGPV, Bhopal)

Civil Engineering Semester wise Credit Distribution

S.No.	Semesters	Credit Distribution
1	Semester - I	20
2	Semester -II	21
3	Semester -III	24
4	Semester -IV	26
5	Semester -V	25
6	Semester -VI	23
7	Semester -VII	18
8	Semester -VIII	13
Total		170

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DEPARTMENT OF CIVIL ENGINEERING

SYLLABUS B.Tech Civil Engineering

2018 ADMITTED BATCH ONLY

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SEMESTER- I/II

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Course Code: 100205
Course Name: Basic Civil Engineering & Mechanics

L	T	P	Credit
3	0	2	4

Course Objectives:

1. To understand the utility of various types of building materials.
2. To understand the location, construction detail and suitability of various building elements.
3. To determine the location of object on ground surface.
4. To stabilize the position of various object.
5. To understand the effects of system of forces on rigid body in static conditions.
6. Analysis of determinate structure (beam & truss)

Syllabus:

Unit- I

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

Unit- II

Surveying & Positioning: Introduction to surveying, Survey stations, Measurement of distances- conventional and EDM methods, Measurement of directions by different methods, Measurement of elevations by different methods, reciprocal leveling.

Unit- III

Mapping & Sensing: Mapping details and contouring, Plane tables and related devices. Introduction of theodolite. Measurement of areas and volumes, application of measurements in quantity computations, Introduction of remote sensing and its applications.

Unit- IV

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

Unit -V

Centre of Gravity and moment of Inertia: Centroid and Centre of Gravity, Moment of Inertia of Composite section, Radius of Gyration, Introduction to product of Inertia and Principle Axes. Support Reactions, Shear force and bending moment diagram for cantilever & simply supported beam with concentrated, distributed load and Couple.

Course Outcomes:

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

- CO1: Explain concepts and terminologies of building materials, surveying and mechanics.
- CO 2: Apply various methods for surveying and mechanics.
- CO 3: Determine the location, area and volume of objects on ground surface.

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- CO4: Solve the problems of surveying and mechanics by using various methods.
 CO5: Analyse the effects of system of forces on rigid bodies in static conditions.

Text Books:

1. Surveying, Vol. - I, Punmia B.C., Laxmi Publications, 17th edition, 2016
2. Building Material, B. C. Punmia, Laxmi Publications, 2016
3. A textbook of Engineering Mechanics, D. S. Kumar, Krishna Publications, 2013

Reference Books:

1. Basic Civil Engineering, S. Ramasubramanian & Narayan, CharupadaPub., 5th edition, 2011
2. Applied Mechanics, Prasad I.M., Krishna Publications 1st edition, 1998.
3. Surveying, Duggal, Tata McGraw Hill New Delhi, 4th edition, 2011
4. Engineering Mechanics - Statics & Dynamics, R.C. Hibbler, Pearson Publications, 14th edition, 2017
5. Engineering Mechanics - statics dynamics, A. Beer & Cornwell, Cengage Learning, 1st edition, 2008.
6. Applied Mechanics, R.K. Rajput, Laxmi Publications, 7th edition, 2016

List of Experiments:

1. Study of various types of chain and tapes.
2. Measurement of distance involving head and tailshot ranging.
3. Chain and tape survey of given area.
4. Study of prismatic and surveying compass.
5. Measurement of distance by prismatic compass.
6. Calculation of distance between two or more points by prismatic compass.
7. Study of survey level, levelling staff and level book.
8. Exercise of differential levelling and flying levelling.
9. Study of various types of a transit theodolite.
10. Measurements of horizontal angle by repetition method.
11. Determining the resultant force of coplanar concurrent and non-concurrent system of forces by graphical method.
12. Determine forces in members of a perfect frame by graphical method.

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

- CO1. Follow the guidelines for best surveying.
 CO2. Follow the working principles of survey instruments for measurements.
 CO3. Measure the horizontal distance, difference in elevation and angles of various points.
 CO4. Detect measurement errors and accordingly suggest corrections.
 CO5. Interpret survey data and compute area.

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SEMESTER-III

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Course Code: 110302
Course Name: Building Planning & Design

L	T	P	Credit
3	1	0	4

Course Objectives:

1. To make aware the student with sustainability aspects of building.
2. To impart knowledge to students about significance of building bye-laws & rules & regulation regarding building planning.
3. To impart knowledge to students regarding specific consideration required to be considered under Indian condition for planning & designing of building.
4. To appraise students about the rules & consideration to get adequate ventilation, lighting & Sound insulation for improved energy efficiency of building.
5. To make students understand about various essential requirements of different type of building.
6. To make aware students about green building rating for enhanced sustainability.

Syllabus:

Unit I

Natural Environment & Built environment, Ecology, Ecosphere - sustainable development, Dimensions of sustainability. Built Environment & liveability, integrated approach in design, challenges in sustainable development. Green environment, expectations from green building, IGBC, USGBC, LEED- GRIHA, SVA, GRIHA.

Unit II

Building Bye - laws, Functions of local authority, Terminology i.e. (Building line, control line, FAR, light plane etc.) Principles underlying building bye- laws, classification of building, requirements of parts of Buildings, site section of building, orientation, factors affecting orientation, orientation criteria's for Indian conditions. Provisions of NBC.

Unit III

Principles of planning of buildings (Aspects, prospect, Furniture requirement, rooming, grouping, privacy circulation etc.), Principles of architectural composition (Unity, contrast, scale, proportion, balance, Rhythm, character, etc.), Massing, Sun and the Building, Sun path, Sun shading & devices, Design of sun shades.

Unit IV

Thermal insulation, Heat transfer in building, Thermal insulation materials, methods of thermal insulation ventilation: natural & artificial, necessity & functional requirement of ventilation, system of ventilation, types of mechanical ventilation, air conditioning, functional requirement of air conditioning, Essentials of air conditioning, acoustic and sound insulation, Behavior of sound acoustical defects. Sabine formula, acoustical design of various spaces, sound insulation methods & materials, illumination (natural & artificial).

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Unit V

Design and planning consideration for various types of building i.e. Residential Building, Education buildings, Hospitals & Dispensaries, Hotels, Commercial building, recreational buildings, government offices & other, standards specified by Bye-laws, various aspects of sustainability & energy efficiency applied to various types of Building, green building concept applied to various types of building.

Course Outcomes:

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

- CO1: Explain basics of building planning & design.
- CO2: Describe sustainability principle, by laws & characteristics of thermal and sound insulation.
- CO3: Apply sustainability concepts & principles in planning & design of buildings.
- CO4: Evaluate environmental, sustainable & safety aspects of a building.
- CO5: Plan different types of buildings as per by laws & codal provisions.

Text Books:

1. Building Drawing (Built Environment), Sah, Kale and Pathi, Tata McGraw hill, 4th edition, reprint 2007
2. Building Planning, Designing and Scheduling, Gurucharan Singh, Standard Publisher, distribution, 2009
3. Building Design and Drawing, Mallik and Meo, Computech Publication Ltd New Asian; 5th edition 2009

Reference Books:

1. Building Design and drawing, Y.S.Sane, Standard Publisher, 2006
2. National Building Codes (Latest Edition), 2016 by Bureau of Indian Standards (Third Revision)
3. Building Construction, B.C. Punmia, Laxmi Publication, 11th edition, 2016

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Course Code: 110303

Course Name: Building Materials & Construction

L	T	P	Credit
3	0	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-I

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

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Course Code: 110304
Course Name: Surveying

L	T	P	Credit
3	0	2	4

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, precise traversing.

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

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 by Trigonometrical levelling.
4. Determination of R.L. of a point whose base is inaccessible by Trigonometrical levelling.
5. Determination of tachometric constants in field.
6. Determination of height & distance by using Tangential tachometry
7. Determination of height & distance by Stadia method of tachometry.
8. Measurement of base line by using Substance Bar.
9. Setting out of a simple circular curve by using Rankine's method.
10. Setting out of a simple circular curve by using Offset from the chord produced or deflection distance.
11. Determination of horizontal & vertical position of a point by Total Station.
12. Traversing by Total Station.

Upon completion of practical 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 tacheometry.
- CO 5: Create a simple circular curve by using Rankine's method for alignment

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Course Code: 110305
Course Name: Strength of Materials

L	T	P	Credit
3	0	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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CO4: Evaluate the stresses in bending, shear and torsion.

CO5: Analyse various sections for stresses, strain, bending, torsion, buckling & deflections.

Text Books:

1. Strength of Materials, Sadhu Singh, Khanna Publishing, 1st edition 2016
2. Strength of Materials, S. Ramamrutham, R. Narayanan, Dhanpat Rai Publishing Company, 18th edition 2014
3. Strength of Materials, R. K. Bansal, Laxmi Publication; 6th edition 2018

Reference Books:

1. Strength of Materials, Timoshenko, Publisher CBS, 3rd edition 2004
2. Strength of Materials, Higdon Style, Publisher Wiley, 3rd edition 1978
3. Strength of Materials Vol. I & II, B.C. Punmia, Laxmi Publication, 10th edition 2018
4. Mechanics of Materials, R.C. Hibbler, Pearson Publication, 2016
5. Mechanics of Materials, J. M. Gere & B.J. Goodno, Cengage Publisher, 8th edition 2014

List of Experiments:

1. Impact Test
2. Brinell Hardness Test
3. Behaviour of columns with Different End Conditions
4. Tensile test
5. Compression test
6. Flexure test
7. Shear test
8. Spring test
9. Torsion test
10. Verification of Maxwell's Reciprocal Theorem.
11. Bending of Beam (One Point loading only).
12. Bending of Beam (Two Point loading only).

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

CO1: Evaluate properties of material by impact test.

CO2: Evaluate properties of material by hardness test.

CO3: Evaluate properties of material by tensile test.

CO4: Determine compressive & flexural strength of materials.

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Course Code: 110306
Course Name: Software 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. masonry, brick / stone
11. Sketches of various building components i.e. floors, roof & roof covering
12. 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

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Course Code: 110307

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: 110308
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 published in articles, literatures
- 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.

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SEMESTER-IV

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Course Code: 110402
Course Name: Geotechnical Engineering

L	T	P	Credit
2	1	2	4

Course Objectives:

- 1) 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.
- 2) To develop an understanding of the relationships between physical characteristics and mechanical properties of soils by experimentally measuring them.
- 3) To explain role of water in soil behaviour and how soil stresses, permeability and quantity of seepage including flow net are estimated.
- 4) To determine shear parameters and stress changes in soil due to foundation loads & estimate the magnitude and time rate of settlement due to consolidation.
- 5) To apply the principles of soil mechanics in stability analysis of slopes and settlement calculations.
- 6) To explain various types of foundations.

Syllabus:

Unit-I Basic Definitions & Index Properties:

Introduction Types of soils, their formation and deposition, Definitions: soil mechanics, soil engineering, rock mechanics, geotechnical engineering. Scope of soil engineering. Basic Definitions and their relationships - Soil as three-phase system, Index properties and their determination, Consistency limits. Classification systems based on particle size and consistency limits. Clay mineralogy & their influence on engineering behavior, Expansive soils, their Characteristics & Challenges.

Unit-II Permeability, Seepage and Consolidation:

Darcy's law & its validity, Determination of coefficient of permeability: Laboratory methods: constant-head & falling-head method. Effective and total stresses, Effect of water table & capillary action. Seepage pressure, Quick sand condition. Compressibility and consolidation, Relationship between pressure and void ratio, Theory of one-dimensional consolidation. Consolidation tests, Fitting of curves. Normally and over consolidated clays. Determination of consolidation pressure settlement analysis. Calculation of total settlement.

Unit-III Stress Distribution in Soils and Shear Strength of Soils:

Stress distribution beneath loaded areas by Boussinesq and Westergaard's analysis, Newmark's influence chart. Contact pressure distribution, Mohr - Coulomb's theory of shear failure of soils, Mohr's stress circle, Measurement of shear strength, Shear box test. Triaxial compression test, unconfined compression test, Vane shear test, Measurement of pore pressure, pore pressure parameters, critical void ratio, Liquefaction.

Unit - IV Stability of Slopes & Earth Pressure:

Infinite and finite slopes, Types of slope failure, Stress path, Stability curves. Effect of ground water, Analytical and graphical methods of stability analysis. Earth Pressure at active, passive and at rest conditions, Rankine, Coulomb, Terzaghi and Culmann's

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theories. Analytical and graphical methods of determination of earth pressures on cohesionless and cohesive soils. Effect of surcharge, water table etc

Unit – V Soil Foundations

Shallow Foundation - Types of foundations. Bearing capacity of foundation on cohesionless and cohesive soils. General & local shear failures. Factors affecting bearing capacity. Theories of bearing capacity - Terzaghi, Vesic, Skempton, Meyerhof and I.S. code on bearing capacity.

Deep Foundation - Pile foundation, Types of piles, estimation of individual and group capacity of piles in cohesionless and cohesive soils. Static and dynamic formulae. Settlement of pile group. Negative skin friction, Under Ream Piles, Plate load test

Course Outcomes:

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

- CO 1: Evaluate different properties of soil, types of foundations and its classification.
- CO 2: Examine the flow and shear parameters & their effects on various types of soil.
- CO 3: Determine the stress distribution & shear strength parameters of soil by various methods.
- CO 4: Analyse the stability of slopes, earth pressures & retaining walls using analytical methods.
- CO 5: Evaluate suitable foundation system for various site conditions.

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 Publisher, 2016

Reference Books:

1. Modern Geotech Engg., Dr. Aram Singh, IBT Publishers, Delhi, 8th edition, 2016
2. Geotech Engg., C. Venkatramaiah, New Age International Publishers, Delhi, 16th edition, 2018
3. Soil Testing for Engg., T.W. Lambe, John Wiley & Sons. Inc., 1969

List of Experiments:

1. Moisture Content Determination. Oven Drying Method.
2. Grain Size Analysis – Mechanical Method.
3. Grain Size Analysis – Hydrometer Method.
4. Liquid & Plastic 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 (Demonstration)
12. Vane Shear 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.

ASV

Sub

Dr. Aram Singh

Dr. C. Venkatramaiah

Dr. T.W. Lambe

Dr. Aram Singh

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Course Code: 110403
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, Batch 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_e , 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.

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.

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Course Code: 110404
Course Name: Structural Analysis

L	T	P	Credit
3	1	0	4

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, 2009

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Ramesh K.

2. Intermediate structural analysis, Wang C.K., McGraw Hill, New York, 1984
3. Structural Analysis, Aslam Kassimali, C. L. Publisher, 2014
4. Structural Analysis, R. C. Hibbler, Pearson Publication, 2017

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Course Code: HD406
Course Name: Water Resources Engineering

L	T	P	Credit
1	1	0	4

Course Objectives:

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

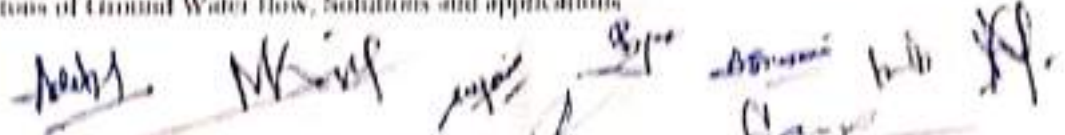
Unit III Diversion works and Canal Regulation Structures

Elements of diversion works, Type of weirs and barrages, Weir design for surface and sub-surface flow, High'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, Hydraulics, 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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Unit - V

Hydrographs & Hyetographs, Hydrographs analysis, Unit Hydrographs, Methods of constructing, Unit Hydrographs, S-curve Hydrograph, Synthetic unit Hydrograph, Flood and its estimation by different methods.

Course Outcomes:

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

- CO 1: Analyse various requirements for an efficient irrigation project.
- CO 2: Design different components of irrigation system using different theories.
- CO 3: Plan an efficient, economical & safe irrigation system.
- CO 4: Explain the concept of hydrology and hydrograph
- CO 5: Apply basic principles for measurement & forecasting of rainfall & runoff.
- CO 6: Analyse runoff hydrograph by various methods.

Text Books:

1. Engineering Hydrology, K. Subramanya, Tata McGraw Hill Publ. Co, 4th edition, 2013
2. Hydrology & Water Resources Engineering, S. K. Garg, Khanna Publishers, 2016
3. Irrigation Engineering & Hydraulic Structures, Santosh Kumar Garg, Khanna Publishers, 2017
4. Irrigation, Water Power & Water Resources Engg., K.R. Arora, Standard Publishers Distributors, 2010

Reference Books:

1. Engineering Hydrology, J. NEMEC, Prentice Hall, 1972
2. Hydrology for Engineers, Linsley, Kohler, Paulhus, Tata Mc GrawHill, 2014
3. Engineering Hydrology, H. M. Raghunath, New Age International Publishers, 5th edition, 2015.
4. Irrigation, Water Resources & Water Power, Dr. P.N. Modi, Standard Book House, 9th edition, 2014
5. Irrigation Engineering by Varshney & Gupta, Vol I & II, Nemeland Publishers, 2007.

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Course Code: 110407
Course Name: Survey Practice Lab

L	T	P	Credit
0	0	6	3

Syllabus:

Field Work:

- 1 Profile leveling & cross sectioning of road.
- 2 Method of Reciprocal Levelling
- 3 Prepare contour map by Grid Pattern Method
- 4 Prepare contour map by using Tachometric method
- 5 Locating details by Plane Table surveying
- 6 Resection by Two point problem
- 7 Resection by Three point problem
- 8 Setting out of simple circular curves by Rankine's Method
- 9 Setting out of simple curves by offset from chord procedure.
- 10 Triangulation – Adjustment of quadrilateral by least square method
- 11 Determination of coordinates of a location using Total Station
- 12 Levelling using Total Station

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

- CO 1:** Observe topographical characteristics.
CO 2: Differentiate methods to perform ground survey.
CO 3: Prepare longitudinal & cross section profiles
CO 4: Develop contour map by using tachometer & total station.
CO 5: Prepare the details of features using Plane table surveying.
CO 6: Produce a simple circular curve by using Rankine's method for alignment.

Reference Books:

1. Surveying Vol. I, II, III, B.C. Punna, Laxmi Publications New Delhi, 2015
2. Surveying Vol. I & II, K.R. Arora, Standard book House, New Delhi, 2015
3. Surveying theory & Practice, R.E. Devise, McGrawHill, NewYork, 1997
4. Fundamentals of surveying, S.K. Roy, Prentice Hall of India New Delhi, 2ndedition, 2010

Subir *MS* *DP* *Shivani* *Anil*
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