Shri Balasaheb Mane Shikshan Prasarak Mandal's,
ASHOKRAO MANE GROUP OF INSTITUTIONS
NH – 4, Vathar Tarf Vadgaon, Tal: -Hatkanangale, Dist: - Kolhapur-416112
Website: www.amgoi.edu.in
An Autonomous Institute

Curriculum Structure and Evaluation Scheme for B. Tech. in Civil Engineering with Honor and Multidisciplinary Minor

(To be implemented for 2025-2029 Batch)

SHRI BALASAHEB MANE SHIKSHAN PRASARAK MANDAL'S ASHOKRAO MANE GROUP OF INSTITUTIONS
Dept. of CIVIL Engg

Dr. J. M. Shinde	Dr. (Mrs.) S. S. Patil	Dr. (Mrs.) S. R. Chougule
Head of Department	Dean Academics	Director

ABBREVIATIONS

- **L:** Lecture
- **T:** Tutorial
- **P:** Practical
- **ISE 1-** In Semester Evaluation 1
- **ISE 2-** In Semester Evaluation 2
- **MSE:** Mid Semester Exam
- **ESE:** End Semester Exam
- **BSC:** Basic Science Courses
- **ESC:** Engineering Science Courses
- **PCC**: Program Core Course
- **PEC**: Program Elective Course
- **OEC:** Open Elective Course
- **ELC:** Experiential Learning Course
- **MDM:** Multidisciplinary Minor Course
- **AEC:** Ability Enhancement Courses
- **IKS:** Indian Knowledge System
- **HMC:** Humanities & Management Course
- **VSEC:** Vocational and skill Enhancement Course
- **VEC:** Value Education Course
- **CC:** Co-curricular Courses

Department: Department of Applied Science & Humanities
Semester: I

Type of Course	Course Code	Course Name	Teaching Scheme				Evaluation Scheme			
			L	T	P	Cr	Components	Max	Min for Passing	
BSC	25ASH101	Engineering Mathematics-I	3	1	-	4	ISE-I	10		40
							MSE	30		
							ISE-II	10		
							ESE	50	20	
BSC	25ASH103	Engineering Chemistry	3	-	-	3	ISE-I	10		40
							MSE	30		
							ISE-II	10		
							ESE	50	20	
ESC	25ASH106	Fundamentals of Electronics	3	-	-	3	ISE-I	10		40
							MSE	30		
							ISE-II	10		
							ESE	50	20	
ESC	25ASH107	Engineering Graphics	3	-	-	3	ISE-I	10		40
							MSE	30		
							ISE-II	10		
							ESE	50	20	
IKS	25ASH109	Architecture and Town Planning	2	-	-	2	ISE-I	10		40
							MSE	30		
							ISE-II	10		
							ESE	50	20	
PCC	25ASH111E	Fundamental of Civil Engineering	2	-	-	2	ISE-I	10		40
							MSE	30		
							ISE-II	10		
							ESE	50	20	
BSC	25ASH113	Engineering Chemistry Laboratory	-	-	2	1	ISE	50	20	
ESC	25ASH116	Fundamentals of Electronics Laboratory	-	-	2	1	ISE	50	20	
							ESE	50	20	
ESC	25ASH117	Engineering Graphics Laboratory	-	-	2	1	ISE	50	20	
							ESE	50	20	
VSEC	25ASH119	Workshop Practices	-	-	2	1	ISE	50	20	
CC	25ASH121	Social Life Skills	1	-	-	1	ISE	50	20	
	Total		**17**	**01**	**08**	**22**		**950**		
Total Contact Hours- 26							**Total Credits- 22**			

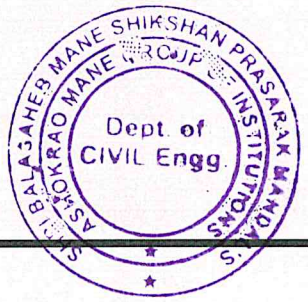
Dept of CIVIL Engg

Department: Department of Applied Science & Humanities
Semester: II

Type of Course	Course Code	Course Name	Teaching Scheme				Evaluation Scheme			
			L	T	P	Cr	Components	Max	Min for Passing	
BSC	25ASH201	Engineering Mathematics- II	3	1	-	4	ISE-I	10		40
							MSE	30		
							ISE-II	10		
							ESE	50	20	
BSC	25ASH202	Engineering Physics	3	-	-	3	ISE-I	10		40
							MSE	30		
							ISE-II	10		
							ESE	50	20	
ESC	25ASH204	Basic Electrical Engineering	3	-	-	3	ISE-I	10		40
							MSE	30		
							ISE-II	10		
							ESE	50	20	
ESC	25ASH205	Engineering Mechanics	3	-	-	3	ISE-I	10		40
							MSE	30		
							ISE-II	10		
							ESE	50	20	
VSEC	25ASH208	Programming in C	2	-	-	2	ISE-I	10		40
							MSE	30		
							ISE-II	10		
							ESE	50	20	
AEC	25ASH210	Communication Skills	1	-	-	1	ISE-I	5		20
							MSE	15		
							ISE-II	5		
							ESE	25	10	
BSC	25ASH212	Engineering Physics Laboratory	-	-	2	1	ISE	50	20	
ESC	25ASH214	Basic Electrical Engineering Laboratory	-	-	2	1	ISE	50	20	
ESC	25ASH215	Engineering Mechanics Laboratory	-	-	2	1	ISE	50	20	
							ESE	50	20	
VSEC	25ASH218	Programming in C Laboratory	-	-	2	1	ISE	50	20	
							ESE	50	20	
CC	25ASH220	Yoga & Meditation	-		2	1	ISE	50	20	
AEC	25ASH222	Communication Skills Laboratory	-	-	2	1	ISE	50	20	
	Total		**15**	**0**	**12**	**22**		**950**		
Total Contact Hours- 28							**Total Credits- 22**			

Department: Department of Civil Engineering
Semester: III

Type of Course	Course Code	Course Name	Teaching Scheme				Evaluation Scheme			
			L	T	P	Cr	Components	Max	Min for Passing	
PCC	25CE301	Fluid Mechanics	3	-	-	3	ISE-I	10		40
							MSE	30		
							ISE-II	10		
							ESE	50	20	
PCC	25CE302	Engineering Survey	3	-	-	3	ISE-I	10		40
							MSE	30		
							ISE-II	10		
							ESE	50	20	
PCC	25CE303	Applied Mathematics for Civil	3	1	-	4	ISE-I	10		40
							MSE	30		
							ISE-II	10		
							ESE	50	20	
MDM	25CE304	Multidisciplinary Minor – I	3	-	-	3	ISE-I	10		40
							MSE	30		
							ISE-II	10		
							ESE	50	20	
Entre. / Econo. / Mgt.	25CE305	Professional Skill Development	2	-	-	2	ISE-I	25	20	
							ISE-II	25		
VEC	25CE306	Universal Human Values	2	-	-	2	ISE-I	10		40
							MSE	30		
							ISE-II	10		
							ESE	50	20	
CEP/FP	25CE307	Mini Project – I	-	-	2	1	ISE-I	25	20	
							ISE-II	25		
PCC	25CE308	Fluid Mechanics Lab	-	-	2	1	ISE	50	40	
							ESE (POE)	50		
PCC	25CE309	Surveying Lab	-	-	2	1	ISE	50	40	
							ESE (POE)	50		
	Total		**16**	**01**	**06**	**20**		**800**		
Total Contact Hours - 23							**Total Credits - 20**			



Department: Department of Civil Engineering
Semester: IV

Type of Course	Course Code	Course Name	Teaching Scheme				Evaluation Scheme			
			L	T	P	Cr	Components	Max	Min for Passing	
PCC	25CE401	Strength of Materials	3	1	-	4	ISE-I	10		40
							MSE	30		
							ISE-II	10		
							ESE	50	20	
PCC	25CE402	Concrete Technology	2	-	-	2	ISE-I	10		40
							MSE	30		
							ISE-II	10		
							ESE	50	20	
PCC	25CE403	Building Planning and Design	3	-	-	3	ISE-I	10		40
							MSE	30		
							ISE-II	10		
							ESE	50	20	
MDM	25CE404	Multidisciplinary Minor – II	3	-	-	3	ISE-I	10		40
							MSE	30		
							ISE-II	10		
							ESE	50	20	
OE	25CE405	Open Elective – I	2	-	-	2	ISE-I	10		40
							MSE	30		
							ISE-II	10		
							ESE	50	20	
Entre. / Econo. / Mgt.	25CE406	Entrepreneurship Development	1	-	-	1	ISE-I	25	20	
							ISE-II	25		
AEC	25CE407	Quantitative Aptitude and Logical Reasoning - I	1	-	-	1	ISE-I	25	20	
							ISE-II	25		
VEC	25CE408	Constitution of India	2	-	-	2	ISE-I	25	20	
							ISE-II	25		
VSEC	25CE409	Auto CAD Software Lab	-	-	2	1	ISE-I	25	20	
							ISE-II	25		
PCC	25CE410	Strength of Materials Lab	-	-	2	1	ISE	50	40	
							ESE (POE)	50		
PCC	25CE411	Concrete Technology Lab	-	-	2	1	ISE	50	40	
							ESE (POE)	50		
	Total		**17**	**01**	**06**	**21**		**900**		
Total Contact Hours - 25							**Total Credits - 21**			

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Department: Department of Civil Engineering
Semester: V

Type of Course	Course Code	Course Name	Teaching Scheme				Evaluation Scheme			
			L	T	P	Cr	Components	Max	Min for Passing	
PCC	25CE501	Structural Mechanics	3	1	-	4	ISE-I	10		40
							MSE	30		
							ISE-II	10		
							ESE	50	20	
PCC	25CE502	Geotechnical Engineering	3	-	-	3	ISE-I	10		40
							MSE	30		
							ISE-II	10		
							ESE	50	20	
PCC	25CE503	Environmental Engineering	3	-	-	3	ISE-I	10		40
							MSE	30		
							ISE-II	10		
							ESE	50	20	
PEC	25CE504	Program Elective - I	3	-	-	3	ISE-I	10		40
							MSE	30		
							ISE-II	10		
							ESE	50	20	
MDM	25CE505	Multidisciplinary Minor – III	3	-	-	3	ISE-I	10		40
							MSE	30		
							ISE-II	10		
							ESE	50	20	
OE	25CE506	Open Elective – II	3	-	-	3	ISE-I	10		40
							MSE	30		
							ISE-II	10		
							ESE	50	20	
AEC	25CE507	Quantitative Aptitude and Logical Reasoning - II	1	-	-	1	ISE-I	25	20	
							ISE-II	25		
CEP/FP	25CE508	Mini Project – II	-	-	2	1	ISE-I	25	20	
							ISE-II	25		
PCC	25CE509	Geotechnical Engg. Lab	-	-	2	1	ISE	50	40	
							ESE (POE)	50		
PCC	25CE510	Environmental Engg. Lab	-	-	2	1	ISE	50	40	
							ESE (POE)	50		
	Total		**19**	**01**	**06**	**23**		**900**		
Total Contact Hours - 25							**Total Credits - 23**			

Dept. of CIVIL Engg.

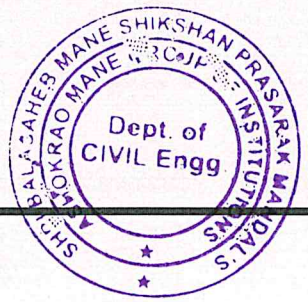
Department: Department of Civil Engineering
Semester: VI

Type of Course	Course Code	Course Name	Teaching Scheme				Evaluation Scheme			
			L	T	P	Cr	Components	Max	Min for Passing	
PCC	25CE601	Design of Reinforced Concrete Structures	3	-	-	3	ISE-I	10		40
							MSE	30		
							ISE-II	10		
							ESE	50	20	
PCC	25CE602	Transportation Engineering	3	-	-	3	ISE-I	10		40
							MSE	30		
							ISE-II	10		
							ESE	50	20	
PEC	25CE603	Program Elective - II	3	-	-	3	ISE-I	10		40
							MSE	30		
							ISE-II	10		
							ESE	50	20	
PEC	25CE604	Program Elective - III	3	-	-	3	ISE-I	10		40
							MSE	30		
							ISE-II	10		
							ESE	50	20	
MDM	25CE605	Multidisciplinary Minor – IV	3	-	-	3	ISE-I	10		40
							MSE	30		
							ISE-II	10		
							ESE	50	20	
OE	25CE606	Open Elective – III	3	-	-	3	ISE-I	10		40
							MSE	30		
							ISE-II	10		
							ESE	50	20	
PCC	25CE607	Structural Concrete Design & Drawing Lab	-	-	2	1	ISE	50	40	
							ESE (POE)	50		
PCC	25CE608	Transportation Engineering Lab	-	-	2	1	ISE	50	40	
							ESE (POE)	50		
VSEC	25CE609	Project Phase-I	-	-	4	2	ISE-I	25	20	
							ISE-II	25		
	Total		**18**	**-**	**08**	**22**		**850**		
Total Contact Hours - 26							**Total Credits - 22**			

SHRI BALASAHEB MANE SHIKSHAN PRASARAK MANDAL'S ASHOKRAO MANE GROUP OF INSTITUTIONS Dept. of CIVIL Engg.

Department: Department of Civil Engineering
Semester: VII

Type of Course	Course Code	Course Name	Teaching Scheme				Evaluation Scheme			
			L	T	P	Cr	Components	Max	Min for Passing	
PCC	25CE701	Design of Steel Structures	3	-	-	3	ISE-I	10		40
							MSE	30		
							ISE-II	10		
							ESE	50	20	
PCC	25CE702	Estimating, Costing & Valuation	3	-	-	3	ISE-I	10		40
							MSE	30		
							ISE-II	10		
							ESE	50	20	
PEC	25CE703	Program Elective - IV	3	-	-	3	ISE-I	10		40
							MSE	30		
							ISE-II	10		
							ESE	50	20	
PEC	25CE704	Program Elective - V	3	-	-	3	ISE-I	10		40
							MSE	30		
							ISE-II	10		
							ESE	50	20	
MDM	25CE705	Multidisciplinary Minor – V	2	-	-	2	ISE-I	10		40
							MSE	30		
							ISE-II	10		
							ESE	50	20	
PCC	25CE706	Structural Steel Design & Drawing Lab	-	-	2	1	ISE-I	25	20	
							ISE-II	25		
PCC	25CE707	Estimating & Valuation Lab	-	-	2	1	ISE	50	40	
							ESE (POE)	50		
Project	25CE708	Project Phase-II	-	-	8	4	ISE	50	20	60
							ESE (OE)	100	40	
	Total		**14**	**-**	**12**	**20**		**800**		
Total Contact Hours - 26							**Total Credits - 20**			



Department: Department of Civil Engineering
Semester: VIII

Type of Course	Course Code	Course Name	Teaching Scheme				Evaluation Scheme			
			L	T	P	Cr	Components	Max	Min for Passing	
PCC	25CE801	Water Resource Engineering	3	-	-	3	ISE-I	10		40
							MSE	30		
							ISE-II	10		
							ESE	50	20	
PEC	25CE802	Program Elective – VI	3	-	-	3	ISE-I	10		40
							MSE	30		
							ISE-II	10		
							ESE	50	20	
RM	25CE803	Research Methodology	3	1	-	4	ISE-I	10		40
							MSE	30		
							ISE-II	10		
							ESE	50	20	
Intern./ OJT	25CE804	*Internship	-	-	-	12	ISE	100	40	80
							ESE	100	40	
	Total		**9**	**1**	**-**	**22**		**500**		
Total Contact Hours - 10							**Total Credits - 22**			

***Student is expected to be in the industry for 24 weeks.**

MULTIDISCIPLINARY MINOR (MDM) BASKET

Important Note:

1. Students should select **any one basket** for the award of Minor Degree of their interest from the table below.
2. The student must complete **all five courses under the selected MDM Basket** to qualify for the Minor.
3. The credits earned under the Multidisciplinary Minor shall form part of the total **172 Credits** required for award of the degree.

MDM Basket Name	Sr. No.	Course Code	Course Name	Semester	Offered by the Department
Data Analyst	1	25AM304A	Data Structure	III	**Artificial Intelligence & Machine Learning** (To all UG Programs except UG AIML, AIDS, CSE, E&C Engg.)
	2	25AM404A	R-programming	IV	
	3	25AM505A	DBMS	V	
	4	25AM605A	Big Data Technologies	VI	
	5	25AM705A	Introduction to Machine Learning	VII	
Prompt Engineering	1	25AM304B	R-programming	III	**Artificial Intelligence & Machine Learning** (To all UG Programs except UG AIML, AIDS, CSE, E&C Engg.)
	2	25AM404B	Introduction to AI and ML	IV	
	3	25AM505B	IOT	V	
	4	25AM605B	Introduction to Blockchain Technology	VI	
	5	25AM705B	Prompt Engineering	VII	
Intelligent Data Systems	1	25AD304A	Computer Organization Architecture	III	**Artificial Intelligence & Data Science** (To all UG Programs except UG AIDS, AIML CSE, E&C Engg.)
	2	25AD404A	R-programming	IV	
	3	25AD505A	Data Manipulation, Analysis and Visualization	V	
	4	25AD605A	DBMS	VI	
	5	25AD705A	Big Data Technologies	VII	
Cognitive Computing	1	25AD304B	Computer Organization Architecture	III	**Artificial Intelligence & Data Science** (To all UG Programs except UG AIDS, AIML CSE, E&C Engg.)
	2	25AD404B	Introduction to Data Science	IV	
	3	25AD505B	Introduction to Machine Learning	V	
	4	25AD605B	Social Network Analysis	VI	
	5	25AD705B	Natural Language Processing	VII	
Essentials of	1	25CS304 A	Data Structures	III	**Computer Science**

Software Development	2	25CS404 A	Python Programming	IV	**& Engineering** (To all UG Programs except UG CSE, AIML, AIDS, E&C Engg.)
	3	25CS505 A	Computer Algorithms	V	
	4	25CS605 A	Database Management System	VI	
	5	25CS705 A	Software Engineering	VII	
Modern Computing Systems	1	25CS304 B	Data Structures	III	**Computer Science & Engineering** (To all UG Programs except UG CSE, AIML, AIDS, E&C Engg.)
	2	25CS404 B	Python Programming	IV	
	3	25CS505 B	Java Programming	V	
	4	25CS605 B	Artificial Intelligence & Machine Learning	VI	
	5	25CS705 B	Cloud Computing	VII	
Smart Energy Systems and Sustainability	1	25EE304A	Fundamentals of Energy Systems	III	**Electrical Engineering** (To all UG Programs except UG Electrical & E&TC Engg.)
	2	25EE404A	Solar and Wind Energy Technologies	IV	
	3	25EE505A	Fundamentals of Energy Management Systems	V	
	4	25EE605A	Energy Storage Systems	VI	
	5	25EE705A	Renewable Energy Integration in Smart Grids	VII	
Intelligent Electrical Systems	1	25EE304B	Introduction to Intelligent Electrical Systems	III	**Electrical Engineering** (To all UG Programs except UG Electrical & E&TC Engg.)
	2	25EE404B	IoT and IOV for Electrical Systems	IV	
	3	25EE505B	AI Applications in Electrical Systems	V	
	4	25EE605B	Automation and Control in Energy Systems	VI	
	5	25EE705B	Smart Grid and Intelligent Monitoring Systems	VII	
Communication System	1	25EC304A	Principles of Communication	III	**Electronics & Computer Engineering** (To all UG Programs except UG E&C, AIML, AIDS, CSE Engg.)
	2	25EC404A	Wireless and Mobile Communication	IV	
	3	25EC505A	Wireless Sensor Networks	V	
	4	25EC605A	Information theory and Coding	VI	
	5	25EC705A	Satellite and Radar Communication	VII	
Computing Solutions for Industry	1	25EC304B	Python programming	III	**Electronics & Computer Engineering** (To all UG Programs except
	2	25EC404B	Industry Analytics	IV	
	3	25EC505B	Cloud Computing	V	

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	4	25EC605B	Industrial Internet of Things (IIoT)	VI	UG E&C, AIML, AIDS, CSE Engg.)
	5	25EC705B	Power BI	VII	
Internet of Things (IoT)	1	25ET304A	Fundamentals of IoT	III	**Electronics & Telecommunication Engineering** (To all UG Programs except UG E&TC & Electrical Engg.)
	2	25ET404A	Technologies Enabling IoT	IV	
	3	25ET505A	IoT System Design	V	
	4	25ET605A	Industrial IoT	VI	
	5	25ET705A	Capstone Project	VII	
Embedded Systems	1	25ET304B	Digital Design	III	**Electronics & Telecommunication Engineering** (To all UG Programs except UG E&TC & Electrical Engg.)
	2	25ET404B	Microcontroller & Interfacing Techniques	IV	
	3	25ET505B	Embedded Systems Design	V	
	4	25ET605B	Real-Time Operating Systems	VI	
	5	25ET705B	Advanced Embedded Systems & Product Development	VII	
Product Development	1	25ME304A	Design Thinking Approach	III	**Mechanical Engineering** (To all UG Programs except UG Mech Engg.)
	2	25ME404A	Engineering Design Process	IV	
	3	25ME505A	Rapid Prototyping and Testing	V	
	4	25ME605A	Product Development	VI	
	5	25ME705A	Commercialization and Sustainability	VII	
Refrigeration and Air Conditioning	1	25ME304B	Fundamentals of Refrigeration	III	**Mechanical Engineering** (To all UG Programs except UG Mech Engg.)
	2	25ME404B	Refrigeration Components and Low Temperature Cycles	IV	
	3	25ME505B	Psychrometry and Air Conditioning Process	V	
	4	25ME605B	HVAC Systems and Emerging Technologies	VI	
	5	25ME705B	Application Based System Design	VII	
Planning and Execution of Projects	1	25CE304A	Building Construction Materials	III	**Civil Engineering** (To all UG Programs except UG Civil Engg.)
	2	25CE404A	Engineering Management	IV	
	3	25CE505A	Resource Management	V	
	4	25CE605A	Optimization Technique	VI	
	5	25CE705A	Construction Economics & Finance	VII	

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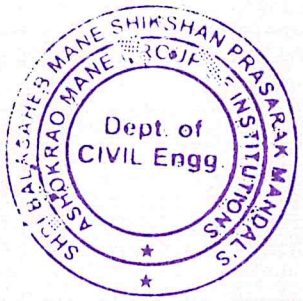
Building Interior Design and Home Automation	1	25CE304B	Introduction to Buildings and Spaces	III	**Civil Engineering** (To all UG Programs except UG Civil Engg.)
	2	25CE404B	Basics of Interior Building Design	IV	
	3	25CE505B	Building Interior Materials and Finishes	V	
	4	25CE605B	Smart Devices and Sensors for Home Automation	VI	
	5	25CE705B	Recent Techniques for Home Automation	VII	



OPEN ELECTIVE COURSES

(Students have to select any one Open Elective course, for each applicable semester, of their interest (other than open electives offered by his/her Department) from the table below)

Open Elective – I

Sr. No.	Course Code	Course Name	Offered by Department
1	25AM405A/ 25AD405A	E Commerce	Artificial Intelligence & Machine Learning & Artificial Intelligence & Data Science
2	25CE405B	Environmental Science	Civil Engineering
3	25CS405C	Human Computer Interaction	Computer Science & Engineering
4	25EE405D	Electrical Safety & Standards	Electrical Engineering
5	25EC405E/ 25ET405E	Sensor Technology	Electronics & Computer Engineering & Electronics & Telecommunication Engineering
6	25ME405F	Project Management	Mechanical Engineering

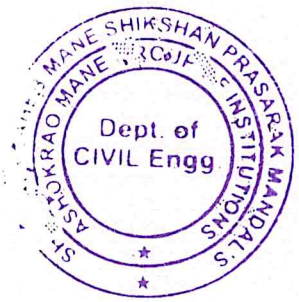
Open Elective – II

Sr. No.	Course Code	Course Name	Offered by Department
1	25AM506A/ 25AD506A	Design Thinking	Artificial Intelligence & Machine Learning & Artificial Intelligence & Data Science
2	25CE506B	Disaster Management	Civil Engineering
3	25CS506C	Cyber Security	Computer Science & Engineering
4	25EE506D	Energy Audit	Electrical Engineering
5	25EC506E/ 25ET506E	Drone Technology	Electronics & Computer Engineering & Electronics & Telecommunication Engineering
6	25ME506F	Startup and Business Strategy	Mechanical Engineering

Open Elective – III

Sr. No.	Course Code	Course Name	Offered by Department
1	25AM606A/ 25AD606A	Recommender System	Artificial Intelligence & Machine Learning & Artificial Intelligence & Data Science

2	25CE606B	Environmental Impact Assessment	Civil Engineering
3	25CS606C	Cyber Laws	Computer Science & Engineering
4	25EE606D	E-Mobility	Electrical Engineering
5	25EC606E/ 25ET606E	Engineering Economics	Electronics & Computer Engineering & Electronics & Telecommunication Engineering
6	25ME606F	Industrial Automation	Mechanical Engineering



PROGRAM ELECTIVE CORE COURSES

(Students have to select any one Program Elective Core course out of 03, for each applicable semester, of their interest, offered by the Department from the table below)

Program Elective Core – I

Sr. No.	Course Code	Domain	Course Name	Semester
1	25CE504A	Construction Management	Project Management	V
2	25CE504B	Environment	Solid Waste Management	
3	25CE504C	Structure	Advanced Structural Analysis	

Program Elective Core – II

Sr. No.	Course Code	Domain	Course Name	Semester
1	25CE603A	Construction Management	Town Planning	VI
2	25CE603B	Structure	Finite Element Method	
3	25CE603C	Geotechnical	Ground Improvement Techniques	

Program Elective Core – III

Sr. No.	Course Code	Domain	Course Name	Semester
1	25CE604A	Geotechnical	Foundation Engineering	VI
2	25CE604B	Construction Management	Construction Techniques	
3	25CE604C	Environment	Air Pollution Control	

Program Elective Core – IV

Sr. No.	Course Code	Domain	Course Name	Semester
1	25CE703A	Structure	Bridge Engineering	VII
2	25CE703B	Construction Management	Infrastructure Engineering	
3	25CE703C	Geotechnical	Advanced Soil Mechanics	

Program Elective Core – V

Sr. No.	Course Code	Domain	Course Name	Semester
1	25CE704A	Structure	Design of Pre-stressed Concrete Structures	VII

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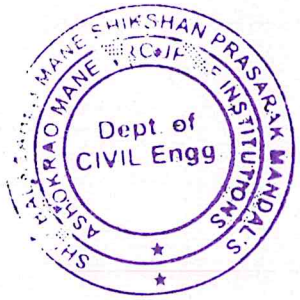
2	25CE704B	Construction Management	Construction Safety	
3	25CE704C	Basic Science	Applied Geology	

Program Elective Core – VI

Sr. No.	Course Code	Domain	Course Name	Semester
1	25CE802A	Structure	Earthquake Engineering	VIII
2	25CE802B	Construction Management	Maintenance and Repair of Structures	
3	25CE802C	Environment	Industrial Waste Management	



Exit Courses
(After First Year)

The candidate should pass following skill-based courses to qualify for Diploma.

Course Code	Course Name	Teaching Scheme				Evaluation Scheme			
		L	T	P	Cr	Components	Max	Min for Passing	
25ASH223B	Engineering/Architectural Graphics - Part I - Orthographic Projection	3	-	-	3	ISE-I	10		40
						MSE	30		
						ISE-II	10		
						ESE	50	20	
25ASH224B	Introduction to Civil Engineering Profession	3	-	-	3	ISE-I	10		40
						MSE	30		
						ISE-II	10		
						ESE	50	20	
25ASH225B	Field Training	-	-	4	2	ISE	50	40	
						ESE	50	40	
Total		**6**	**0**	**4**	**8**		**300**		
Total Contact Hours - 10					**Total Credits - 8**				

Exit Courses
(After Second Year)

The candidate should pass following skill-based courses to qualify for Diploma.

Course Code	Course Name	Teaching Scheme				Evaluation Scheme			
		L	T	P	Cr	Components	Max	Min for Passing	
25CE412	Remote Sensing & GIS for Civil Engineering Applications	3	-	-	3	ISE-I	10		40
						MSE	30		
						ISE-II	10		
						ESE	50	20	
25CE413	Building Construction Materials	3	-	-	3	ISE-I	10		40
						MSE	30		
						ISE-II	10		
						ESE	50	20	
25CE414	Field Training	-	-	4	2	ISE	50	40	
						ESE	50	40	
Total		**6**	**0**	**4**	**8**		**300**		
Total Contact Hours - 10					**Total Credits - 8**				

Exit Courses

(After Third Year)

The candidate should pass following skill-based courses to qualify for Diploma.

Course Code	Course Name	Teaching Scheme				Evaluation Scheme			
		L	T	P	Cr	Components	Max	Min for Passing	
25CE610	Fundamentals of Transportation Engineering	3	-	-	3	ISE-I	10		40
						MSE	30		
						ISE-II	10		
						ESE	50	20	
25CE611	Principles of Construction Management	3	-	-	3	ISE-I	10		40
						MSE	30		
						ISE-II	10		
						ESE	50	20	
25CE612	Internship	-	-	4	2	ISE	50	40	
						ESE	50	40	
Total		**6**	**0**	**4**	**8**		**300**		
Total Contact Hours - 10					**Total Credits - 8**				

General Instructions:

For Theory Courses:

1. Two components of **In Semester Evaluation** (ISE), one **Mid Semester Examination** (MSE) & one **End Semester Examination** (ESE).
2. **ISE-I** & **ISE-II** is based on online objective type examination / Assignments / Mini Projects / Quiz & Technical Puzzles / Surprise Test / Oral / Presentation / Seminar / Innovative approach to problem solving.
3. **MSE** will be conducted with **30%** weightage based on first **50%** syllabus.
4. **ESE** will be conducted on 100% course content having 30% weightage on first 50% course content & 70% weightage for remaining 50% syllabus.

For Laboratory Courses:

1. **ISE** assessment contains weightage like 20% for practical performances, 40% for Journal & 40% for Group Presentation / Oral / Quiz.
2. **ESE** assessment is based on oral examination / practical oral examination.

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HONOR Certification Courses

B.Tech. (Hons) in Advanced and Modern Civil Engineering

Course Code	Name of the Course	Credit
25CE3H	Modern Indian Architecture	3
25CE4H	Modern Construction Materials	3
25CE5H	Admixtures and Special Concretes	3
25CE6H	Advanced Soil Mechanics	3
25CE7H	Project Planning & Control	3
25CE8H	Urban Transportation Systems Planning	3
	Total	**18**

Guidelines for Honor Certification Courses

1. Students are required to complete six courses (each carrying 3 credits) through an online platform to earn a total of 18 credits under the Honor Certification scheme.
2. All six courses must be completed starting from the Second Year First Semester (Semester III) to the Final Year Second Semester (Semester VIII).
3. The student has to obtain all 18 credits by the last semester of the program.
4. While selecting the course platform, first preference must be given to SWAYAM/NPTEL.
5. Registration on platforms such as Coursera or Udemy is permitted only under the following conditions:
   a. The SWAYAM/NPTEL course schedule does not align with the academic calendar.
   b. The subsequent course in the learning sequence is not available on SWAYAM/NPTEL.
   c. Any other unavoidable circumstances arise.
   d. About 80% of the contents of the course should match with the SWAYAM/NPTEL courses.
6. Course selection must strictly adhere to the recommendations of the Chairman of Board of Studies (BOS).
7. Credits for the respective Honor courses will be awarded under the following conditions:
   a. For NPTEL courses, students must complete all assignments on time, pass the examination, and obtain the certificate.
   b. For Coursera or Udemy courses, students must obtain the course certificate and appear for the Online examination which will be conducted under the supervision of the Institute by Examination Cell
8. While selecting an online course, the following criteria must be ensured:
   a. The course should be of an advanced level, not basic or introductory.
   b. The course content must not overlap with subjects already included in the regular

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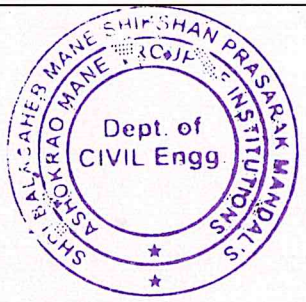
curriculum or listed under elective courses.

c. The duration of each course must be:

- Minimum 8/12 weeks for SWAYAM/NPTEL courses
- At least 30+ hours for Coursera/Udemy courses

Course Code	Name of the Course and SWAYAM/NPTEL Links	Credit
25CE3H	Modern Indian Architecture **Click here to join the course -** https://onlinecourses.nptel.ac.in/noc25_ar15/preview and **NPTEL URL** - https://nptel.ac.in/courses/124107161	3
25CE4H	Modern Construction Materials **Click here to join the course -** https://onlinecourses.nptel.ac.in/noc26_ce64/preview and **NPTEL URL** - https://nptel.ac.in/courses/105106053	3
25CE5H	Admixtures and Special Concretes **Click here to join the course -** https://onlinecourses.nptel.ac.in/noc25_ce93/preview and **NPTEL URL** - https://nptel.ac.in/courses/105106225	3
25CE6H	Advanced Soil Mechanics **Click here to join the course -** https://onlinecourses.nptel.ac.in/noc26_ce19/preview and **NPTEL URL** - https://nptel.ac.in/courses/105103207	3
25CE7H	Project Planning & Control **Click here to join the course -** https://onlinecourses.nptel.ac.in/noc25_ce91/preview and **NPTEL URL -** https://nptel.ac.in/courses/105106149	3
25CE8H	Urban Transportation Systems Planning **Click here to join the course -** https://onlinecourses.nptel.ac.in/noc26_ce48/preview **NPTEL URL -** https://nptel.ac.in/courses/105105208	3
	Total	**18**



Department: Department of Civil Engineering
Semester: III

Type of Course	Course Code	Course Name	Teaching Scheme				Evaluation Scheme			
			L	T	P	Cr	Components	Max	Min for Passing	
PCC	25CE301	Fluid Mechanics	3	-	-	3	ISE-I	10		40
							MSE	30		
							ISE-II	10		
							ESE	50	20	
PCC	25CE302	Engineering Survey	3	-	-	3	ISE-I	10		40
							MSE	30		
							ISE-II	10		
							ESE	50	20	
PCC	25CE303	Applied Mathematics for Civil	3	1	-	4	ISE-I	10		40
							MSE	30		
							ISE-II	10		
							ESE	50	20	
MDM	25CE304	Multidisciplinary Minor – I	3	-	-	3	ISE-I	10		40
							MSE	30		
							ISE-II	10		
							ESE	50	20	
Entre. / Econo. / Mgt.	25CE305	Professional Skill Development	2	-	-	2	ISE-I	25	20	-
							ISE-II	25		
VEC	25CE306	Universal Human Values	2	-	-	2	ISE-I	10		40
							MSE	30		
							ISE-II	10		
							ESE	50	20	
CEP/FP	25CE307	Mini Project – I	-	-	2	1	ISE-I	25	20	
							ISE-II	25		
PCC	25CE308	Fluid Mechanics Lab	-	-	2	1	ISE	50	40	
							ESE (POE)	50		
PCC	25CE309	Surveying Lab	-	-	2	1	ISE	50	40	
							ESE (POE)	50		
	Total		**16**	**01**	**06**	**20**		**800**		
Total Contact Hours - 23							**Total Credits - 20**			

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Course Name: **Fluid Mechanics**	L	T	P	Credits
Course Code: **25CE301**	**3**	**-**	**-**	**3**
Evaluation Scheme:	ISE-I	MSE	ISE-II	ESE
Marks:	**10**	**30**	**10**	**50**

Pre-Requisite: Engineering Mathematics, Engineering Mechanics, Engineering Physics

Course Objectives: The course aims,

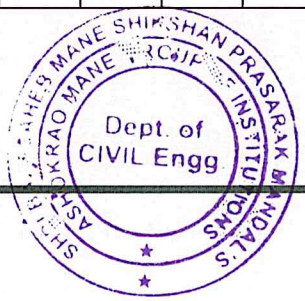
1	To introduce fundamental concepts and principles of fluid mechanics and open channel flow.
2	To develop the ability to analyze fluid flow problems involving energy, forces, and flow characteristics.
3	To understand the behavior of uniform, varied, and rapidly varied flows in open channels.
4	To familiarize students with flow measurement techniques, hydraulic machines, and their practical applications.

Course Outcomes: Students will be able to,	
CO1	Explain basic concepts and principles of fluid mechanics, including fluid properties and flow characteristics.
CO2	Apply analytical methods to solve problems involving pressure forces, floating bodies, flow systems, and pipe losses.
CO3	Identify functional relationships among fluid flow parameters using fundamental fluid mechanics principles.
CO4	Analyze fluid flow measurement and instrumentation using fundamental laws, equations, and standard laboratory practices.

CO – PO Mapping:

Correlation matrix of **Course Outcomes (CO)** with **Programme Outcomes (PO)** and **Program Specific Outcomes (PSO)** 1 = Low Correlation, 2 = Medium Correlation, 3 = High Correlation

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PSO1	PSO2	PSO3
CO1	3	1	-	-	-	-	-	-	-	-	-	-	-	-
CO2	3	3	1	-	-	-	-	-	-	-	-	-	-	-
CO3	2	3	2	-	-	-	-	-	-	-	-	-	-	-
CO4	2	2	-	-	-	-	-	-	-	-	-	-	-	-



Course Contents

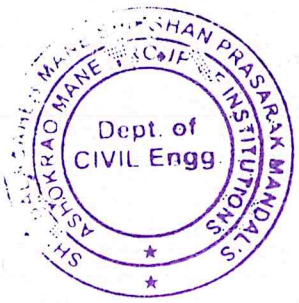
Unit No.	Contents	Hrs.
1	**Fluids Properties and Dimensional Analysis:** Introduction to Fluid Mechanics, Types of Fluids, Properties of Fluids, Density, Specific Weight, Specific Volume, Specific Gravity, Viscosity, Bulk modulus of elasticity, Compressibility, Surface Tension, Capillarity, Vapour Pressure and Cavitation. **Dimensional Analysis:** Dimensions and Dimensional Homogeneity, Importance and Use of Dimension Analysis, Buckingham Pi (π) Theorem, Dimensionless Numbers, Similitude, Types of Similarities	7
2	**Fluid Statics and Buoyancy Effect:** Types of Pressure, Pascal's Law, Hydrostatic Law, Pressure Measurement Devices, Concept of Pressure Diagram, Centre of Pressure, Forces on Plane and Curved Surfaces. **Buoyancy and Floatation:** Archimedes' Principle, Metacentre, Metacentric Height, Stability of Submerged and Floating Bodies.	7
3	**Fluid Kinematics:** Velocity and acceleration of fluid particle, Types of Flows, Stream Function and Velocity Potential Function, Continuity Equation in 3-D Cartesian Co-ordinates. **Laminar Flow and Turbulent Flow:** Reynolds Experiment, Critical Reynolds Number, Hazen Poiseuille's Equation for Viscous Flow through Circular Pipes, Introduction to Moody's.	7
4	**Fluid Dynamics and Flow through Pipes:** Euler's Equation along a Streamline, Bernoulli's Theorem, Bernoulli's Applications, Venturimeter (Horizontal and Vertical), Concept of HGL and TEL. **Flow through Pipes:** Pipes in Series, Parallel and Siphon, Concept of Water hammer, Surge Tanks Major and Minor Losses, Darcy-Weisbach Equation, Short and Long Pipe, Concept of Equivalent Pipe, Dupit's Equation. (Function, Location and Uses).	7
5	**Flow in Open Channels:** Introduction to open channel flow, types of channels and flows, geometric elements, velocity distribution, velocity measurement, weirs and spillways (sharp, broad, round crested), Chezy's and Manning's formula, Specific energy, specific force and specific discharge, gradually varied flow profiles, hydraulic jump, uses and types.	7
6	**Impact of Jet, Turbines & Pumps:** Impact of jet on flat and curved vanes (stationary and moving), impulse-momentum principle, velocity triangles, series of vanes; Turbines: importance of hydropower, classification, of turbines, draft tube, cavitation; Pumps: classification, centrifugal pump (construction, working, characteristics), pump selection, troubles and remedies, classification of pumps.	7

Text Books:

1. A Textbook of Fluid Mechanics and Hydraulic Machines, Dr. R. K. Bansal, Laxmi Publications, New Delhi.
2. A Textbook of Fluid Mechanics, R. K. Rajput, S. Chand and Company Pvt. Ltd., New Delhi.
3. Fluid Mechanics: Including Hydraulic Machines, A. K. Jain, Khanna Publishers, New Delhi.
4. Hydraulics and Fluid Mechanics, P. N. Modi and S. M. Seth, Standard Book House, New Delhi

Reference Books:

1. Introduction to Fluid Mechanics and Fluid Machines, S. K. Som, Gautam Biswas, Suman Chakraborty, Tata McGraw Hill Education Pvt. Ltd., New Delhi.
2. Fluid Mechanics, L. Victor, Streeter and E. Benjamin Wylie, Tata McGraw Hill.
3. Fluid Mechanics: Fundamentals and Applications, Yunus, A. Cengel and John M. Cimbala Adapted by S. Bhattacharya, Tata McGraw-Hill Publishing Company Ltd., New Delhi.



Course Name: **Engineering Survey**	L	T	P	Credits
Course Code: **25CE302**	**3**	**-**	**-**	**3**
Evaluation Scheme:	ISE-I	MSE	ISE-II	ESE
Marks:	**10**	**30**	**10**	**50**

Pre-Requisite: Fundamentals of Basic Civil Engineering, Engineering Mathematics

Course Objectives: The course aims,

1. To recall basic principles, list types and define the practice of surveying.
2. To determine the angular & linear measurements using theodolite
3. To demonstrate use of conventional and modern survey equipment's.
4. To prepare a map or plan to represent an area on a horizontal plan.

Course Outcomes: Students will be able to,	
CO1	Summarize the principles and purpose of basic levelling in surveying
CO2	Understand and read contour maps and compute areas and volumes.
CO3	Understand the principles of plane-table and theodolite for horizontal and vertical measurements.
CO4	Apply tools and techniques for Civil engineering works

CO – PO Mapping:

Correlation matrix of **Course Outcomes (CO)** with **Programme Outcomes (PO)** and **Program Specific Outcomes (PSO)** 1 = Low Correlation, 2 = Medium Correlation, 3 = High Correlation

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PSO1	PSO2	PSO3
CO1	3	-	-	-	-	-	-	-	-	-	-	-	-	-
CO2	3	2	-	-	-	-	-	-	-	-	-	-	-	-
CO3	3	2	-	-	-	-	-	-	-	-	-	-	-	-
CO4	3	2	-	-	-	-	-	-	-	-	-	-	-	-

Course Contents

Unit No.	Contents	Hrs.
1	**Fundamentals of Surveying:** Definition, principles and objectives of surveying. Classification of surveys based on instruments, purpose, scale and area. Errors in surveying and methods of elimination.	6
2	**Levelling and Contouring:** Terms and types of levelling, Spirit level - Sensitiveness, Bench marks - Temporary and	8

	permanent adjustments, Fly and Check leveling, equipment, calculation of elevation (RL) methods, corrections Contouring- Definition, characteristics contour interval, equivalent, uses and characteristics of contour lines, direct and indirect methods of contouring.	
3	**Plane Table Surveying & Planimeter:** Principles, significance, accessories, and adjustments of plane table Surveying. Methods of plane table survey and their applications. Planimeter-Types, Theory, concept of zero circle, Study of Digital Planimeter, Computation of Areas and Volumes, Trapezoidal rule, Simpson's rule.	7
4	**Theodolite Surveying:** Principles, systems of bearings, types of theodolites, measurement of horizontal and vertical angles, methods of repetition and reiteration, vertical angle, prolongation of a straight line, extending a line, measuring magnetic bearing of a line, concept of traversing, closing error, and calculation of latitudes and departures	8
5	**Advanced Surveying Techniques:** Surveying using Total Station (TS) -Working principle and use of Total station, Data observations in TS, Basics of Geographical information system (GIS) working principle, types and methodology. Analysis using raster and vector data, Open-source software	7
6	**Application of Surveying:** Setting out buildings, pipelines, and roads; Hydrographic Survey methods and sounding, civil engineering applications, Usage of minor instruments for preliminary and different surveys. Surveying for Road and Railway projects, Tunnel survey.	6

Text Books:

1 N. N. Basak, "Surveying and Levelling," Tata McGraw Hill, New Delhi 16th edition, 2016
2 Dr. B.C. Punmia, "Surveying Vol. I, II and III," Laxmi Publishers, New Delhi.
3 T.P. Kanetkar and S.V. Kulkarni, "Surveying and Levelling Vol. I and II," Pune Vidhyarthi Gruh.

Reference Books:

1 Clark D., 1944, "Plane and Geodetic Surveying", Vol. I & II, C.B.S. Pub. & Distri., N. Delhi, 6th edition.
2 Anderson J. M. and Mikhail E. M., 1986, "Introduction to Surveying", McGraw Hill Book Company
3 J. G. Olliver and J. Clendinning, "Principles of Surveying, Vol. I," Van Nostrand Reinhold.

Course Name: **Applied Mathematics for Civil**	L	T	P	Credits
Course Code: **25CE303**	**3**	**1**	**-**	**4**
Evaluation Scheme:	ISE-I	MSE	ISE-II	ESE
Marks:	**10**	**30**	**10**	**50**

Pre-Requisite: Knowledge of differential and integral calculus, and elementary differential equations.

Course Objectives: The course aims,

1. To introduce Laplace Transform techniques for solving integrals and differential equations arising in engineering problems.
2. To develop competence in inverse Laplace transforms and their application to linear differential equations.
3. To impart fundamental concepts of partial differential equations and their applications to heat and wave phenomena.
4. To familiarize students with analytic functions and integral theorems in complex variable theory.
5. To enable statistical analysis using correlation and regression techniques for interpretation of real-world data.

Course Outcomes: Students will be able to,	
CO1	Apply Laplace and inverse Laplace transforms techniques to evaluate integrals and solve linear differential equations.
CO2	Formulate and solve partial differential equations using separation of variables for heat and wave equations.
CO3	Analyze functions of complex variables using Cauchy–Riemann equations and residue theorem.
CO4	Analyze real-world data using correlation and linear regression methods for statistical interpretation.

CO – PO Mapping:

Correlation matrix of **Course Outcomes (CO)** with **Programme Outcomes (PO)** and **Program Specific Outcomes (PSO)** 1 = Low Correlation, 2 = Medium Correlation, 3 = High Correlation

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PSO1	PSO2	PSO3
CO1	3	2	-	-	-	-	-	-	-	-	-	-	-	-
CO2	3	2	-	-	-	-	-	-	-	-	-	-	-	-
CO3	3	2	-	-	-	-	-	-	-	-	-	-	-	-
CO4	3	2	-	-	1	-	-	-	-	-	1	-	-	-

Course Contents

Unit No.	Contents	Hrs.
1	**Laplace Transform:** Definition – Laplace Transform, conditions for existence ; Transforms of elementary functions ; Properties of Laplace transforms - Linearity property, first shifting property, second shifting property, transforms of functions multiplied by t^n property, scale change property, transforms of functions divided by t property, transforms of integral of functions property, transforms of derivatives ; Evaluation of integrals by using Laplace transform and Examples on Laplace Transformation Properties.	8
2	**Inverse Laplace Transform:** Introductory remarks; Inverse transforms of some elementary functions; General methods of finding inverse transforms; Partial fraction method and Convolution Theorem for finding inverse Laplace transforms; Applications to find the solutions of linear differential equations and Examples.	8
3	**Partial Differential Equations and their Applications:** Formation of Partial differential equations by eliminating arbitrary constants and functions; heat Equations solvable by direct integration; Method of separation of variables – applications to find solutions of one dimensional flow equation i.e. $(\frac{\partial u}{\partial t} = c^2 \frac{\partial^2 u}{\partial t^2})$and one dimensional wave equation i.e. $\frac{\partial^2 y}{\partial t^2} = c^2 \frac{\partial^2 y}{\partial x^2}$	7
4	**Functions of Complex Variables**: Analytic functions; Cauchy- Riemann equations in Cartesian and polar forms; Harmonic functions in Cartesian form; Cauchy's integral theorem; Cauchy's integral formula; Residues; Cauchy's residue theorem (All theorems without proofs).	7
5	**Correlation:** Introduction to types of correlation, correlation and causation, Methods of studying correlation, Karl Pearson's correlation coefficient and its examples, Spearman's rank correlation and its examples.	6
6	**Linear Regression Analysis** Introduction, Linear and non-linear regression, Lines of regression, Derivative of regression lines of y on x and x on y, Angle between the regression lines, Coefficients of regression and its examples.	6

Text Books:

1 *Higher Engineering Mathematics* - **B. S. Grewal**
2 *Advanced Engineering Mathematics* - ***Erwin Kreyszig***
3 *Advanced Engineering Mathematics* - ***R. K. Jain and S. R. K. Iyengar***
4 *Advanced Engineering Mathematics* - **H. K. Dass**

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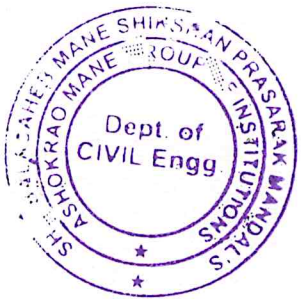
Reference Books:

1 *Advanced Engineering Mathematics – **M. D. Greenberg***
2 *Complex Variables and Applications- **Churchill & Brown***
3 *Fundamentals of Mathematical Statistics - **S. C. Gupta and V. K. Kapoor***
4 *Introduction to Probability and Statistics for Engineers and Scientists* - **Sheldon Ross**



MULTIDISCIPLINARY MINOR-I BASKET

Sr. No.	Course Code	Course Name	Semester	Offered by Department
1	25CE304A	Building Construction Materials	III	Civil Engineering
2	25CE304B	Introduction to Buildings and Spaces	III	Civil Engineering

Course Name: **Building Construction Materials**	L	T	P	Credits
Course Code: **25CE304A**	**3**	**-**	**-**	**3**
Evaluation Scheme:	ISE-I	MSE	ISE-II	ESE
Marks:	**10**	**30**	**10**	**50**

Pre-Requisite: Basic Civil Engineering

Course Objectives: The course aims,

1. To learn different building materials - stone, brick etc.
2. To learn masonry construction with reference to different building material
3. To learn various building components -lintel, doors & windows, roof etc.
4. To learn construction details of all components of RCC frame structures

Course Outcomes: Students will be able to,	
CO1	Identify the properties, uses, and applications of various building materials such as stone, brick, timber, steel, and concrete.
CO2	Describe different types of masonry construction using various building materials and recommend suitable materials for specific construction requirements.
CO3	Illustrate the construction details and functions of building components such as lintels, doors, windows, roofs, and floors.
CO4	Interpret construction details of RCC frame structures, including beams, slabs, columns, and foundations, as per standard practices.

CO – PO Mapping:

Correlation matrix of **Course Outcomes (CO)** with **Programme Outcomes (PO)** and **Program Specific Outcomes (PSO)** 1 = Low Correlation, 2 = Medium Correlation, 3 = High Correlation

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PSO1	PSO2	PSO3
CO1	3	-	-	-	-	-	-	-	-	-	-	-	-	2
CO2	3	2	-	-	-	-	-	-	-	-	-	-	-	2
CO3	3	-	-	-	-	-	-	-	-	-	-	-	-	-
CO4	3	-	-	-	-	-	-	-	-	-	-	-	-	-

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Course Contents

Unit No.	Contents	Hrs.
1	**Construction Materials:** Properties and applications of various materials viz. requirements of good building stone, uses of building stones, manufacturing of bricks, types of bricks and their engineering properties. fine aggregates and coarse aggregates – origin, types, particle size and shape, mechanical and physical properties, artificial sand, Aluminum, Timber, Glass, Flooring materials.	7
2	**Masonry Construction:** Stone masonry: Setting of stone, joints, Random rubble, un-coursed rubble, coursed rubble & ashlar, General principles observed in stone Masonry. Brick masonry: General principles observed in Brick masonry, Bonds – English bond, Flemish Bond Composite Masonry: types, Partition walls in brick, concrete block, timber, glass & aluminum, autoclaved blocks, fly ash bricks.	7
3	**Building Components:** Lintels: Necessity of lintels, types of lintels. Formwork: Requirements of formwork, economy of formwork. Materials used for formwork. Stairs: Technical terms, requirements of a good stair, uses, types, design of stairs, materials for construction. ramps, lifts and escalators. basic requirements of a building as a whole strength and stability, dimensional stability, comfort and convenience, damp prevention, waterproofing techniques, heat insulation, day lighting and ventilation, sound insulation, Anti-termite treatment.	7
4	**Roofs & Floors:** Terms used, types of roof, pitched roofs and their types, steer trusses types and their suitability; Roof covering materials and their selection, concept of proflex (truss less) roof and their selection; Timber floor, Timber floors supported on rolled steel joist, Concrete Flooring (Tremix Flooring), water proofing- materials and methods.	7
5	**Doors and Windows:** Doors - classification, types of doors like teak wood paneled, flush, aluminum glazed, steel and fixtures and fastening. Windows - classification, types of windows like teak wood, aluminum glazed, steel, UPVC and fixtures and fastening.	7
6	**Reinforced Cement Concrete:** Concrete: Ingredients of concrete, mix design, properties, tests, curing, mixing, Reinforcement specification etc. Footing: types like column footing, isolated and combined column footing, raft foundation, Types of Pile foundation – bearing, friction, sheet, anchor, batter, fender, compaction. Column, Slab & Beam: Construction detail, Reinforcement, Slab (one way & two way), Type of beams – simply supported, continuous, cantilever.	7

Text Books:

1 Rangwala, S. C., "Engineering Materials", Charator publisher, Ahmedabad.
2 S. P. Arora and Bindra, "Building Construction", Dhanpat Rai Publication, Delhi, 2010
3 Sushil Kumar, "Building Construction", Standard Publication, 2010.

Reference Books:

1 Dr. B.C. Punmia, "Building construction", Laxmi publications, 10th edition, 2016

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2	R.K. Rajput (S. Chand), "Engineering Materials" Handbook of Building Construction
3	"A to Z of Practical Building Construction and Its Management" - Sandeep Mantri.

Course Name: **Introduction to Buildings and Spaces**	L	T	P	Credits
Course Code: **25CE304B**	**3**	**-**	**-**	**3**
Evaluation Scheme:	ISE-I	MSE	ISE-II	ESE
Marks:	**10**	**30**	**10**	**50**

Pre-Requisite: Basic Civil Engineering

Course Objectives: The course aims,

1. To understand the fundamental concepts of buildings, spaces, and their interrelationship.
2. To identify various types of buildings and analyze their functional and spatial requirements.
3. To apply principles of planning, anthropometry, and ergonomics in building design.
4. To evaluate environmental, climatic, and aesthetic considerations in creating built spaces.

Course Outcomes: Students will be able to,	
CO1	Explain basic concepts of buildings, space organization, and planning principles.
CO2	Classify buildings based on function and analyze spatial needs.
CO3	Apply anthropometric data and ergonomic principles in designing spaces.
CO4	Analyze environmental factors and incorporate them into sustainable building design.

CO – PO Mapping:

Correlation matrix of **Course Outcomes (CO)** with **Programme Outcomes (PO)** and **Program Specific Outcomes (PSO)** 1 = Low Correlation, 2 = Medium Correlation, 3 = High Correlation

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PSO1	PSO2	PSO3
CO1	3	-	-	-	-	-	-	-	-	-	-	-	2	-
CO2	3	1	-	-	-	-	-	-	-	-	-	-	-	-
CO3	3	2	-	-	-	-	-	-	-	-	-	-	-	-
CO4	3	2	-	-	-	-	-	-	-	-	-	-	-	-

Course Contents

Unit No.	Contents	Hrs.
1	**Fundamentals of Buildings and Spaces:** Definition and scope of buildings and spaces, Importance of built environment in human life, Elements of space: form, scale, proportion, function; Relationship between indoor and outdoor	7

	spaces, Introduction to spatial organization, Role of architecture in society, Case studies of simple building layouts	
2	**Classification and Types of Buildings:** Residential buildings: types and planning considerations, Commercial buildings: offices, shops, malls, Institutional buildings: schools, hospitals, Industrial buildings: basic concepts, Public and semi-public buildings, Mixed-use developments, Functional requirements and space standards for different buildings.	7
3	**Principles of Space Planning:** Principles: aspect, prospect, privacy, grouping, circulation, Horizontal and vertical circulation (corridors, stairs, lifts), Zoning of spaces (public, private, service areas), Room layout planning and furniture arrangement, Efficiency and economy in planning, Building bye-laws and basic regulations, Practical exercises on space planning.	7
4	**Anthropometry and Ergonomics:** Definition and importance of anthropometry, Static and dynamic human dimensions, Space requirements for various activities, Ergonomics in residential and workplace design, Furniture design considerations, Universal design and accessibility, Application in real-life building planning.	7
5	**Environmental and Climatic Considerations:** Climate-responsive design principles, Building orientation and site planning, Sun-path diagram and solar control, Natural ventilation and air movement, Daylighting and artificial lighting basics, Thermal comfort and energy efficiency, Sustainable building concepts (green buildings).	7
6	**Building Components and Aesthetics:** Basic building components: foundation, plinth, walls, floors, roof, Openings: doors, windows, ventilators, finishing materials and their selection, Introduction to building services (water supply, drainage, electricity), Principles of aesthetics: balance, rhythm, harmony, proportion, Form vs function in architecture, Case studies of aesthetically designed buildings.	7

Text Books:

1 Architecture: Form, Space, and Order, John Wiley & Sons, New York, 2014.
2 S. V. Deodhar, "Building Science and Planning", Khanna Publishers, Delhi, 2013.
3 M. G. Shah, C. M. Kale and S. Y. Patki, "Building Drawing", Tata McGraw Hill Publishing Company Ltd., New Delhi, 2008.

Reference Books:

1 Architects' Data, Blackwell Publishing, Oxford, 2012.
2 Human Dimension and Interior Space, Watson-Guptill Publications, New York, 1979.
3 Spaces in Architecture: Areas, Distances, Dimensions, Wiley-Blackwell, 2012.

Course Name: **Professional Skill Development**	L	T	P	Credits
Course Code: **25CE305**	**2**	-	-	**2**
Evaluation Scheme:	ISE-I	MSE	ISE-II	ESE
Marks:	**25**	-	**25**	-

Pre-Requisite: Basic Concepts of Management

Course Objectives: The course aims,

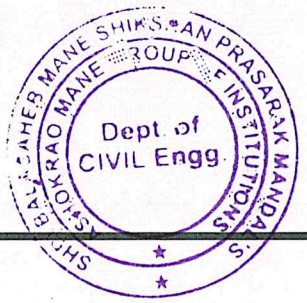
1. To students learn to acknowledge themselves, develop confidence, and take action without fear.
2. To students understand that dreams are realized through process, not talent or luck.
3. To acquiring Practical Task Management Skills
4. To students learn how to break goals into tasks, manage time, and sustain effort.

Course Outcomes: Students will be able to,	
CO1	Demonstrate self-awareness, self-esteem, and confidence through reflection and inner dialogue practices.
CO2	Formulate a clear personal vision and long-term goals by converting abstract dreams into structured plans.
CO3	Apply goal-setting, task breakdown, and time management techniques to plan and execute personal and academic tasks effectively.
CO4	Evaluate personal progress through reflection, feedback, and process improvement methods to develop resilience and continuous improvement habits.

CO – PO Mapping:

Correlation matrix of **Course Outcomes (CO)** with **Programme Outcomes (PO)** and **Program Specific Outcomes (PSO)** 1 = Low Correlation, 2 = Medium Correlation, 3 = High Correlation

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PSO1	PSO2	PSO3
CO1	1	-	-	-	-	-	-	3	1	1	-	-	-	-
CO2	1	2	-	-	-	-	-	2	--	1	-	-	-	-
CO3	2	2	2	-	1	-	-	-	1	2	-	-	-	-
CO4	1	2	2	2	-	-	-	2	2	2	1	-	-	-



Course Contents

Unit No.	Contents	Hrs.
1	**Self-Esteem and Inner Dialogue:** Meaning of self-esteem and its matter, the power of writing and reflection (core philosophy of KAMI-MEMO), Self-awareness and value clarification exercises.	5
2	**Visualizing the Future:** Designing a personal vision (5-year / 10-year future), Turning abstract dreams into concrete descriptions.	5
3	**Goal Setting and Task Breakdown:** Translating dreams into goals, SMART goals and milestone design, Weekly planning and prioritization	5
4	**Execution and Reflection:** Monitoring progress through written reflection, Understanding success and failure as data, Peer feedback and discussion.	5
5	**Process Improvement:** Reviewing and redesigning action plans, strengthening problem-solving and resilience, Creating a personal improvement cycle (PDCA).	5
6	**Final Presentation:** Presentation of personal growth portfolio, Reflection on mindset, behavior, and outcomes.	5

Reference Books:	
1	KAMI-MEMO Successful future will be ahead for you with the method of writing notes on a piece of paper (English Edition) Kindle Edition, English Edition by Kunio Hara (Author) Format: Kindle Edition.

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Course Name: **Universal Human Values**	L	T	P	Credits
Course Code: **25CE306**	**2**	**--**	**--**	**2**
Evaluation Scheme:	ISE-I	MSE	ISE-II	ESE
Marks:	**10**	**30**	**10**	**50**

Pre-Requisite: Basic knowledge of management, Communication Skill

Course Objectives: The course aims,

1. To develop clarity of human values to enable students to understand harmony at individual, family, society, and nature levels.
2. To help students identify their aspirations related to happiness and prosperity.
3. To enable students to evaluate ethical and moral issues in personal and professional life.
4. To promote responsible behavior, social commitment, and holistic development among engineering students.

Course Outcomes: Students will be able to,	
CO1	Demonstrate self-awareness, self-esteem, and confidence through reflection and inner dialogue practices.
CO2	Analyze the relationship between self, family, society, and nature for achieving harmony.
CO3	Apply universal human values in personal, social, and professional decision-making.
CO4	Demonstrate ethical conduct, social responsibility, and sustainable thinking as an engineer.

CO – PO Mapping:
Correlation matrix of **Course Outcomes (CO)** with **Programme Outcomes (PO)** and **Program Specific Outcomes (PSO)** 1 = Low Correlation, 2 = Medium Correlation, 3 = High Correlation

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PSO1	PSO2	PSO3
CO1	1	1	-	-	-	2	-	2	-	1	2	-	-	2
CO2	-	2	-	-	-	3	2	2	1	1	2	1	2	3
CO3	-	-	-	-	-	3	-	3	2	2	3	2	2	3
CO4	-	-	-	-	-	3	3	3	1	1	3	-	1	3

Course Contents

Unit No.	Contents	Hrs.
1	**Introduction to Universal Human Values:** Introduction to Value Education, Need and importance of Universal Human Values, Self-exploration and self-awareness, Natural acceptance, Right understanding, Relationship between values, skills, and knowledge.	5

2	**Understanding Happiness and Prosperity:** Concept of happiness and prosperity, Difference between happiness and pleasure, Short-term vs long-term happiness, Continuous happiness and prosperity, Role of values in achieving sustainable happiness.	**5**
3	**Harmony in the Individual (Self):** Human aspirations, Co-existence of self and body, Understanding needs of self and body, Right utilization of physical facilities, Holistic development of individual.	**5**
4	**Harmony in Family and Society:** Family as a basic unit of society, Values in family: trust, respect, affection, care, guidance, Reverence, Social harmony, Justice, equality, and mutual cooperation, Ethical human conduct.	**5**
5	**Harmony in Nature and Existence:** Relationship between human beings and nature, Mutual enrichment, Sustainable development, Environmental responsibility, Concept of co-existence, Role of engineers in environmental protection.	**4**
6	**Professional Ethics and Value-Based Engineering:** Ethical responsibilities of engineers, Professional ethics, Social accountability, Case studies related to ethical dilemmas in engineering practice, Value-based decision making.	**4**

Text Books:

1 Gaur, R. R., Sangal, R., and Bagaria, G. P., *A Foundation Course in Human Values and Professional Ethics*, Excel Books, New Delhi.
2 Tripathi, A. N., *Human Values*, New Age International Publishers.

Reference Books:

1 *Universal Human Values*, AICTE Model Curriculum.
2 *Ethics in Engineering*, Mike Martin and Roland Schinzinger, McGraw Hill.
3 *Professional Ethics and Human Values*, R. Subramanian, Oxford University Press.

MOOC/NPTEL Platform:

1 Sharma, A. K., *Exploring Human Values: Visions of Happiness and Perfect Society*, NPTEL, IIT Kanpur. https://nptel.ac.in/courses/109104068
2 Kapur, N. S., and Sreesailam, V., *Applied Ethics*, SWAYAM. https://onlinecourses.swayam2.ac.in/nou26_ge38/preview
3 Pandey, A., *Essential Values and Ethics: Cultivating Professional Excellence and Career Advancement*, SWAYAM. https://onlinecourses.swayam2.ac.in/imb26_mg88/preview

Course Name: **Mini Project – I**	L	T	P	Credits
Course Code: **25CE307**	-	-	**2**	**1**
Evaluation Scheme:	ISE-I	MSE	ISE-II	ESE
Marks:	**25**	-	**25**	-

Pre-Requisite: Basic and advanced knowledge of Project Management, Fundamentals, Functions and Techniques of construction management, Familiarity with research methodology and technical report writing.

Course Objectives: The course aims,

1. To identify and analyze engineering problems relevant to the Construction Management domain using foundational concepts.
2. To apply theoretical knowledge and engineering tools for the design, simulation, and implementation of management systems.
3. To foster self-directed learning, teamwork, and project management in a multidisciplinary engineering environment.
4. To build effective communication skills through documentation, report writing, and technical presentations.

Course Outcomes: Students will be able to	
CO1	Identify and analyze real-world engineering problems using domain-specific knowledge.
CO2	Design and implement electronic systems or subsystems using appropriate simulation tools and hardware platforms.
CO3	Demonstrate effective teamwork and project management in completing assigned tasks within deadlines.
CO4	Prepare well-structured technical reports and deliver oral presentations with clarity and professionalism.

CO – PO Mapping:

Correlation matrix of **Course Outcomes (CO)** with **Programme Outcomes (PO)** and **Program Specific Outcomes (PSO)** 1 = Low Correlation, 2 = Medium Correlation, 3 = High Correlation

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PSO1	PSO2	PSO3
CO1	--	2	--	--	--	--	--	--	2	--	--	--	--	--
CO2	--	2	2	--	2	--	--	--	--	--	--	--	--	--
CO3	--	--	3	--	2	--	--	--	2	--	--	--	--	--
CO4	--	--	3	--	--	--	--	--	--	--	--	--	--	--

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Course Contents

Sr. No.	Contents
1	**Activities Involved:** 1. Mini project should be undertaken in group. 2.Topic should be relevant to civil engineering with focus on problem solving, innovation, or application. 3. A detailed proposal should be submitted with problem statement, objectives, methodology, and timeline. 4. Regular progress reviews should be conducted (at least two internal reviews) 5. Implementation can be software-based (STAAD Pro, E Tabs, MSP, GIS, REVIT etc.) 6. Emphasis should be placed on originality, practical relevance, and feasibility. 7. Maintain a project logbook detailing weekly progress, issues faced, and resolutions. 8. Final submission must include a well-structured report, simulation/implementation files, and presentation 9. Presentation will be conducted to assess group as well as individual contribution and understanding.
2	**Format for Report (Spiral Bound & Soft Copy):** 1. Cover Page 2. Certificate (Guide + Head of Department) 3. Declaration 4. Acknowledgement 5. Abstract 6. Table of Contents 7. List of Figures/Tables (if applicable) 8. Chapters: **Introduction** **Literature Review** **Problem Statement** **Objectives** **Data Collection and Methodologies** **Implementation and Testing (if applicable)** **Results and Discussions** Conclusion and Future Work 9. References (IEEE format) 10. Appendix (if applicable)
3	**Deliverables:** Mini Project Proposal (hard copy & soft copy – before implementation begins) Weekly Progress Logbook signed by the guide Final Project Report in hard copy and PDF (as per the given format) Working Model/Simulation Output (if applicable) Presentation Slides (PPT) Final Viva & Demonstration before PRC Source Code/Design Files on CD/pen drive or shared via link

Course Name: **Fluid Mechanics Lab**	L	T	P	Credits
Course Code: **25CE308**	-	-	**2**	**1**
Evaluation Scheme:	ISE-I	MSE	ISE-II	ESE
Marks:	**25**	-	**25**	**50**

Pre-Requisite: Fluid Mechanics

Course Objectives: The course aims,

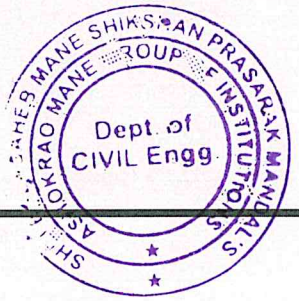
1	Provide practical understanding of fundamental fluid mechanics principles through laboratory experiments.
2	Develop skills to measure and analyze flow parameters such as discharge, pressure, and head losses.
3	Enable students to verify theoretical laws of fluid mechanics using experimental data.
4	Familiarize students with the performance evaluation of hydraulic machines like pumps and turbines.

Course Outcomes: Students will be able to,	
CO1	Determine discharge, pressure variation, and buoyancy characteristics in fluid systems using standard experimental methods.
CO2	Verify fundamental laws and principles of fluid mechanics such as Bernoulli's theorem, momentum principle, and energy conservation.
CO3	Evaluate head losses and flow behavior in pipes and open channels, including hydraulic jump and weir flow.
CO4	Analyze the performance of hydraulic machines such as pumps and turbines through experimental testing and performance curves.

CO – PO Mapping:

Correlation matrix of **Course Outcomes (CO)** with **Programme Outcomes (PO)** and **Program Specific Outcomes (PSO)** 1 = Low Correlation, 2 = Medium Correlation, 3 = High Correlation

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PSO1	PSO2	PSO3
CO1	3	2	-	2	1	-	-	-	1	-	-	-	-	-
CO2	3	2	-	2	-	-	-	-	1	-	-	-	-	-
CO3	2	3	-	3	1	-	-	-	1	-	-	-	-	-
CO4	2	3	-	3	2	-	-	-	1	1	-	-	-	-



Course Contents

Exp. No.	Experiment Title	Hrs.
1	Determination of Discharge by using various methods	2
2	Determination of pressure variation in a static fluid using piezometer / manometer	2
3	Determination of metacentric height of a floating body	2
4	Verification of Bernoulli's theorem	2
5	Determination of discharge using Venturimeter	2
6	Determination of major head loss in pipes using Darcy–Weisbach equation	2
7	Determination of minor losses in pipe fittings (bends, valves, expansions, contractions)	2
8	Calibration of rectangular / V-notch / triangular weir	2
9	Study of hydraulic jump and determination of energy loss	2
10	Study of impact of jet on flat and curved vanes	2
11	Performance test on centrifugal pump	2
12	Performance test on Pelton / Francis / Kaplan turbine	2

Note: *Minimum 10 practical / experiments will be completed.

Text Books:

1 A Textbook of Fluid Mechanics and Hydraulic Machines, Dr. R. K. Bansal, Laxmi Publications, New Delhi.
2 A Textbook of Fluid Mechanics, R. K. Rajput, S. Chand and Company Pvt. Ltd., New Delhi.
3 Fluid Mechanics: Including Hydraulic Machines, A. K. Jain, Khanna Publishers, New Delhi.
4 Hydraulics and Fluid Mechanics, P. N. Modi and S. M. Seth, Standard Book House, New Delhi

Reference Books:

1 Introduction to Fluid Mechanics and Fluid Machines, S. K. Som, Gautam Biswas, Suman Chakraborty, Tata McGraw Hill Education Pvt. Ltd., New Delhi.
2 Fluid Mechanics, L. Victor, Streeter and E. Benjamin Wylie, Tata McGraw Hill.
3 Fluid Mechanics: Fundamentals and Applications, Yunus, A. Cengel and John M. Cimbala Adapted by S. Bhattacharya, Tata McGraw-Hill Publishing Company Ltd., New Delhi.

Course Name: **Surveying Lab**	L	T	P	Credits
Course Code: **25CE309**	-	-	**2**	**1**
Evaluation Scheme:	ISE-I	MSE	ISE-II	ESE
Marks:	**25**	-	**25**	**50**

Pre-Requisite: Fundamentals of Basic Civil Engineering and Engineering Survey Theory

Course Objectives: The course aims,

1. To understand basic principles of surveying.
2. To use conventional and modern survey equipment's.
3. To analyze the field data.
4. To calculate area and volume from field data.

Course Outcomes: Students will be able to,	
CO1	Experiment and compute distance, height, area, volume and angular measurements.
CO2	Apply geometric and trigonometric principles of basic surveying calculations.
CO3	Apply field procedures in basic types of surveys, as part of a surveying team.
CO4	Summarize plans and sections for civil engineering projects.

CO – PO Mapping:

Correlation matrix of **Course Outcomes (CO)** with **Programme Outcomes (PO)** and **Program Specific Outcomes (PSO)** 1 = Low Correlation, 2 = Medium Correlation, 3 = High Correlation

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PSO1	PSO2	PSO3
CO1	3	2	-	-	-	-	-	2	-	-	-	-	-	-
CO2	3	2	-	-	-	-	-	2	-	-	-	-	-	-
CO3	3	2	-	-	-	-	-	2	-	-	-	-	-	-
CO4	3	2	-	-	-	-	-	2	-	-	-	-	-	-

Course Contents

Exp. No.	Experiment Title	Hrs.
1	Study of dumpy level, titling level, Auto level, digital level	2
2	Sensitivity of Bubble Tube using Dumpy Level.	2
3	Reciprocal leveling using Dumpy Level.	2
4	Calculate the elevations by Rise Fall & Collimation Plane method by using auto level	2
5	Plane table survey-Radiation, Intersection and Resection	2
6	Measurement of Area by Mechanical and Digital planimeter	2
7	Study & Measurement of Horizontal Angle by Repetition Method of theodolite	2

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8	Measurement of Horizontal Angle by Reiteration Method of theodolite	**2**
9	Measurement of Magnetic Bearing and Vertical Angle by Theodolite	**2**
10	Demonstration on measurements by using total station - angle, distance, elevation	**2**
11	Project - Block Contouring	**2**
12	Project - Radial Contouring	**2**
13	Project - Theodolite Traversing	**2**
14	Project - Road Survey	**2**

Note: *Minimum 10 practical / experiments will be completed.

Text Books:

1 N. N. Basak, "Surveying and Levelling," Tata McGraw Hill, New Delhi 16th edition, 2016
2 Dr. B.C. Punmia, "Surveying Vol. I, II and III," Laxmi Publishers, New Delhi.
3 T.P. Kanetkar and S.V. Kulkarni, "Surveying and Levelling Vol. I and II," Pune Vidhyarthi Gruh.

Reference Books:

1 Clark D., 1944, "Plane and Geodetic Surveying", Vol. I & II, C.B.S. Pub. & Distri., N. Delhi, 6th edition.
2 Anderson J. M. and Mikhail E. M., 1986, "Introduction to Surveying", McGraw Hill Book Company
3 J. G. Olliver and J. Clendinning, "Principles of Surveying, Vol. I," Van Nostrand Reinhold.

Department: Department of Civil Engineering
Semester: IV

Type of Course	Course Code	Course Name	Teaching Scheme				Evaluation Scheme			
			L	T	P	Cr	Components	Max	Min for Passing	
PCC	25CE401	Strength of Materials	3	1	-	4	ISE-I	10		40
							MSE	30		
							ISE-II	10		
							ESE	50	20	
PCC	25CE402	Concrete Technology	2	-	-	2	ISE-I	10		40
							MSE	30		
							ISE-II	10		
							ESE	50	20	
PCC	25CE403	Building Planning and Design	3	-	-	3	ISE-I	10		40
							MSE	30		
							ISE-II	10		
							ESE	50	20	
MDM	25CE404	Multidisciplinary Minor – II	3	-	-	3	ISE-I	10		40
							MSE	30		
							ISE-II	10		
							ESE	50	20	
OE	25CE405	Open Elective – I	2	-	-	2	ISE-I	10		40
							MSE	30		
							ISE-II	10		
							ESE	50	20	
Entre. / Econo. / Mgt.	25CE406	Entrepreneurship Development	1	-	-	1	ISE-I	25	20	
							ISE-II	25		
AEC	25CE407	Quantitative Aptitude and Logical Reasoning - I	1	-	-	1	ISE-I	25	20	
							ISE-II	25		
VEC	25CE408	Constitution of India	2	-	-	2	ISE-I	25	20	
							ISE-II	25		
VSEC	25CE409	Auto CAD Software Lab	-	-	2	1	ISE-I	25	20	
							ISE-II	25		
PCC	25CE410	Strength of Materials Lab	-	-	2	1	ISE	50	40	
							ESE (POE)	50		
PCC	25CE411	Concrete Technology Lab	-	-	2	1	ISE	50	40	
							ESE (POE)	50		
	Total		**17**	**01**	**06**	**21**		**900**		
Total Contact Hours - 25							**Total Credits - 21**			

Course Name: **Strength of Materials**	L	T	P	Credits
Course Code: **25CE401**	**3**	**1**	**-**	**4**
Evaluation Scheme:	ISE-I	MSE	ISE-II	ESE
Marks:	**10**	**30**	**10**	**50**

Pre-Requisite: Engineering Physics, Engineering Mathematics & Engineering Mechanics

Course Objectives: The course aims,

1. To develop an understanding of the basic principles of strength of materials.
2. To explain bending, shear and torsional stresses in beams of different cross-sections.
3. To explain the shear stress distribution for different sections.
4. To explain the concept of strain energy.

Course Outcomes: Students will be able to	
CO1	Analyze the section for various types of stresses and strains.
CO2	Construct shear force and bending moment diagrams for determinate beams.
CO3	Determine stresses (bending, shear and torsional) developed in the beam cross section.
CO4	Evaluate strain energy stored in a body due to various loading conditions.

CO – PO Mapping:

Correlation matrix of **Course Outcomes (CO)** with **Programme Outcomes (PO)** and **Program Specific Outcomes (PSO)** 1 = Low Correlation, 2 = Medium Correlation, 3 = High Correlation

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PSO1	PSO2	PSO3
CO1	3	3	2	-	-	-	-	-	-	-	1	2	-	-
CO2	3	3	2	-	-	-	-	-	-	-	1	2	-	-
CO3	3	3	2	-	-	-	-	-	-	-	1	2	-	-
CO4	3	3	1	-	-	-	-	-	-	-	1	2	-	-

Course Contents

Unit No.	Contents	Hrs.
1	**Simple Stresses, Strains and Elastic Constants:** Concept of stress and strain, Hooke's law, Stress-Strain behavior of materials, Deformations in composite sections under axial loading, compound bars and temperature stresses. Elastic constants and their relationships.	7
2	**Shear Force and Bending Moment:** Concept of shear force and bending moment for determinate beams for various loadings. Relation between shear force, bending moment and loading. Shear force and bending moment diagrams for various bound conditions and loadings.	7
3	**Bending and Shear Stresses:** Bending Stresses: Theory of simple/pure bending. Derivation for flexure formula. Bending stress distribution diagrams. Moment of Resistance, flitched beam	7

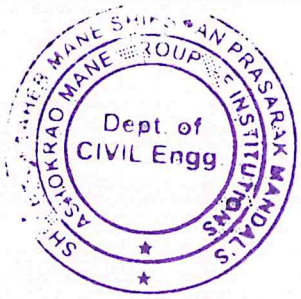
	Shear Stresses: Derivation of shear stress equation, Shear stress distribution of various shapes cross-sections, average and maximum shear stress.	
4	**Torsion:** Torsion of circular shafts: Theory of Torsion, assumptions, derivation of torsion formula. Stresses, strains and deformations in determinate shafts of hollow, solid subjected to twisting moments. Power transmitted through shafts.	7
5	**Principal Stresses:** Concept of principal planes and principal stresses, normal and shear stresses on an oblique plane, magnitude and orientation of principal stresses and maximum shear stress. Concept of Mohr's circle for plane stresses.	7
6	**Strain Energy:** Concept, expression of strain energy for axially loaded members under gradual, sudden and impact loads. Strain energy due to self weight, bending and torsion.	7

Text Books:

1 R. K. Bansal, "Strength of Material", Laxmi Publication(s) ltd.
2 Khurmi R. S.,"Strength of Material", S. Chand and Co., Edition revised 1968, New Delhi.
3 S. S. Bhavikatti, Strength of Materials, 2nd Edition Vikas Publications, New Delhi 2006
4 R. Subramanian, Strength of Materials, Oxford University Press 3rd edition 2016.

Reference Books:

1 Punmia B. C., "Mechanics of Materials" Laxmi Publications, revised edition, 2016
2 Subramanian R., "Strength of Materials" Oxford University Press, 2nd edition, New Delhi
3 F. L. Singer and Pytel, "Strength of Material" Harper and Row publication.



Course Name: **Concrete Technology**	L	T	P	Credits
Course Code: **25CE402**	**2**	**-**	**-**	**2**
Evaluation Scheme:	ISE-I	MSE	ISE-II	ESE
Marks:	**10**	**30**	**10**	**50**

Pre-Requisite: Fundamentals of Civil Engineering

Course Objectives: The course aims,

1. To explain the important engineering properties of Concrete materials.
2. To explain the behavior of Fresh and harden concrete.
3. To explain the behavior of special concrete
4. To explain the Concrete mix design

Course Outcomes: Students will be able to	
CO1	Explain the properties of various materials used in the manufacturing of different kinds of concrete.
CO2	Select materials for manufacturing concrete for the given requirement.
CO3	Explain the procedure for conducting various quality control tests on fresh & hardened concrete as per standard codes.
CO4	Design the concrete mix that fulfills the required properties for fresh and hardened concrete

CO – PO Mapping:

Correlation matrix of **Course Outcomes (CO)** with **Programme Outcomes (PO)** and **Program Specific Outcomes (PSO)** 1 = Low Correlation, 2 = Medium Correlation, 3 = High Correlation

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PSO1	PSO2	PSO3
CO1	3	1	-	-	-	-	-	-	-	-	-	-	-	2
CO2	3	-	-	-	-	-	-	-	-	-	-	-	-	2
CO3	3	-	-	-	-	-	-	-	-	-	-	-	-	3
CO4	3	3	-	-	-	-	-	-	-	-	-	-	-	-

Course Contents

Unit No.	Contents	Hrs.
1	**Concrete Materials:** Properties of cement- Fineness, consistency, setting time, soundness, compressive strength, specific gravity. Field testing of cement. Hydration of cement. Types of cement. Water: Specifications of water as per IS 456. Fine and Coarse Aggregates: Grading, fineness modulus, and specific gravity, silt content,	5

	moisture content, Bulking, Bulk density, shape, and surface texture,	
2	**Admixtures:** Chemical admixtures: Types of admixtures and their effects on the properties of concrete Mineral admixtures: Types of admixtures and their effects on the properties of concrete.	4
3	**Fresh Concrete:** Workability, factors affecting, measurement of workability, different tests for workability, segregation, bleeding, process of manufacture of concrete - batching, mixing, transportation, compaction, curing of concrete, curing methods	4
4	**Concrete Mix Design:** Nominal Mix Concrete, Objectives of mix design, 04 Factors governing mix design, Methods of expressing proportions. Mix design by IS code method as per 10262 & 456, ACI 211.1-91 method, Introduction of design mix for high-performance concrete.	5
5	**Hardened Concrete & NDT:** Hardened Concrete: Strength of concrete, w/c ratio, Gel-space ratio, effect of maximum size of aggregate, Factors affecting strength of concrete, Characteristic strength compressive, tensile, and flexural strength. Introduction to nondestructive testing of concrete. Introduction to the durability of concrete.	5
6	**Special Concrete:** Light-weight concrete, no-fines concrete, high-density concrete, fibre reinforced concrete, self-compacting concrete, high-strength concrete, high-performance concrete, manufacturing of ready-mix concrete, cold weather concreting, hot weather concreting, pavement quality Concrete, Green concrete, Testing of special concrete for various properties	5

Text Books:

1. Santakumar, A.R., Concrete Technology, Oxford University Press.
2. Shetty, M.S., Concrete Technology, S. Chand Publication.
3. Gambhir, M.L., Concrete Technology, Tata McGraw Hill

Reference Books:

1. Properties of concrete by A. M. Neville, Longman Publishers.
2. Concrete Technology by R.S. Varshney, Oxford and IBH.
3. Concrete technology by A. M. Neville, J.J. Brooks, Pearson.
4. Concrete Mix Design by A. P. Remideos, Himalaya Publishing House

Indian Standard (IS) Codes:

1. IS: 10262-2009, Recommended guidelines for Concrete Mix Design
2. IS: 456-2000, Indian Standard Plain and Reinforced Concrete

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Course Name: **Building Planning and Design**	L	T	P	Credits
Course Code: **25CE403**	**3**	**-**	**-**	**3**
Evaluation Scheme:	ISE-I	MSE	ISE-II	ESE
Marks:	**10**	**30**	**10**	**50**

Pre-Requisite: Fundamental of Civil Engineering

Course Objectives: The course aims,

1. To understand principles of planning & bye laws
2. To understand green building concept
3. To understand services like plumbing, drainage, electrification, air conditioning
4. To understand fire resistance & acoustics in building

Course Outcomes: Students will be able to,	
CO1	Plan buildings considering various principles of planning, green building & Anthropometry
CO2	Plan buildings considering various Bye laws of governing body
CO3	Understand various services like plumbing, electrification, ventilation
CO4	Understand fire resistance & Acoustics in building

CO – PO Mapping:
Correlation matrix of **Course Outcomes (CO)** with **Programme Outcomes (PO)** and **Program Specific Outcomes (PSO)** 1 = Low Correlation, 2 = Medium Correlation, 3 = High Correlation

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PSO1	PSO2	PSO3
CO1	3	-	2	-	2	-	-	-	-	-	-	-	2	-
CO2	3	-	2	-	2	-	-	-	-	-	-	-	2	-
CO3	3	-	-	-	-	-	-	-	-	-	-	-	-	-
CO4	3	-	-	-	-	-	-	-	-	-	-	-	-	-

Course Contents

Unit No.	Contents	Hrs.
1	**Building Planning & Bye Laws:** **Building Planning:** Principles, significance sun diagram, wind diagram, orientation, Design considerations for apartment, bungalow, row house & twin bungalow. **Building Bye laws:** Open space, height & size of rooms & building, parking, garden, toilet etc. **Anthropometry:** Study of Human dimensions, space required for various simple activities,	7

	Circulation spaces.	
2	**Plumbing & Electrification Systems:** **Plumbing:** Concept of plumbing & drainage plan, understanding details of drainage layout various types of traps, fittings, pipes, chambers, design of septic tank, **Electrification:** Lighting design with Lumen method, Lighting layout with furniture arrangement, wiring methods.	7
3	**Ventilation & Thermal Insulation:** **Ventilation:** Definition, necessity of ventilation, functional requirements, various system & selection criteria Artificial ventilation. **Air conditioning:** Purpose, classification, principles, working. **Thermal Insulation:** General concept, Principles, Materials, Methods Computation of Heat loss & heat gain in Buildings.	8
4	**Fire Resistant in Building:** Causes of fire, Rules & regulations for means of access, height, open space etc Fire zones, Fire loads, Fire resistance of various building materials. Fire-fighting equipment's – extinguishers, hydrants, sprinklers, wet riser, down comer etc Fire detection system, fire alarm system, Fire staircase, fire lift, fire door.	8
5	**Acoustics:** Absorption of sound, various materials, Sabine's formula, optimum reverberation time, conditions for good acoustics Sound insulation: Acceptable noise levels, noise prevention at its source, transmission of noise, Noise control-general considerations	7
6	**Low Cost Housing:** Materials & Methods (Conceptual Introduction only) **Maintenance, Repairs & Rehabilitation of Structures** (Conceptual Introduction only) **Green Building:** Concept, Applications & Rating System (Conceptual Introduction only)	5

Text Books:

1 Shah, Kale, Pataki, "Building Drawing", Tata McGraw- Hill
2 Sane Y. S., "Building Design and Drawing", Allied Book Stall, Pune
3 Jain V.K., "Handbook of Designing and Installation of Services in High Rise Building Complexes", Khanna Publishers, N. Delhi

Reference Books:

1 SP 7- National Building Code Group 1 to 5- B.I.S. New Delhi
2 I.S. 962 – 1989 Code for Practice for Architectural and Building Drawings
3 Jain A.K., "The Idea of Green Building" Khanna Publishers, N. Delhi

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MULTIDISCIPLINARY MINOR-II BASKET

Sr. No.	Course Code	Course Name	Semester	Offered by Department
1	25CE404A	Engineering Management	IV	Civil Engineering
2	25CS404B	Basics of Interior Building Design	IV	Civil Engineering

Course Name: **Engineering Management**	L	T	P	Credits
Course Code: **25CE404A**	**3**	**-**	**-**	**3**
Evaluation Scheme:	ISE-I	MSE	ISE-II	ESE
Marks:	**10**	**30**	**10**	**50**

Pre-Requisite: Basic Fundamental of Management

Course Objectives: The course aims,

1. To understand the evolution of management thought by studying classical, behavioral, and modern theories along with the systems approach to management.
2. To develop knowledge of core managerial functions including planning, organizing, leading, controlling, coordination, communication, and motivation for effective management practice.
3. To analyze and solve managerial decision-making problems under certainty, uncertainty, risk, and conflict using quantitative and optimization techniques.
4. To apply operations research, simulation, and material management concepts for efficient resource utilization, inventory control, and analysis of complex managerial systems.

Course Outcomes: Students will be able to	
CO1	Demonstrate the nuances of management functions.
CO2	Analyze the framework of a business organization.
CO3	Adopt an empirical approach toward business situations.
CO4	Apply various Management techniques.

CO – PO Mapping:

Correlation matrix of **Course Outcomes (CO)** with **Programme Outcomes (PO)** and **Program Specific Outcomes (PSO)** 1 = Low Correlation, 2 = Medium Correlation, 3 = High Correlation

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PSO1	PSO2	PSO3
CO1	3	2	-	-	-	-	-	-	-	-	-	-	-	-
CO2	3	2	-	-	-	-	-	-	-	-	-	-	-	-
CO3	3	2	-	-	-	-	-	-	-	-	-	-	-	-
CO4	3	2	-	-	-	-	-	-	-	-	-	-	-	-

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Course Contents

Unit No.	Contents	Hrs.
1	**Evolution of Management Thought:** Scientific, human behavior, system approach, introduction to elements of systems – input, output, process restriction, feedback, contingency approach, contributions by Taylor, Frank and Lillion, Gilbreth, Henry Fayol, Elton Mayo, McGregor (theory X and theory Y), H. L. Gantt, Maslow	7
2	**Functions of Management:** Planning – nature and purpose of planning, strategies and policies, management by objectives, formal and informal organization, centralization, decentralization, line, line and staff, functional organization, principles of site layout, leading and directing, controlling and coordination (introduction only), communication process, motivation	7
3	**Decision Making:** Importance of decision making, steps in decision making, analysis of decision, decision under certainty, uncertainty and decision under risk, criterion of optimism and regret, sensitivity of criteria and decision under conflict, expected monitory value, decision tree, theory of games (dominance pure and mixed strategy).	7
4	**Operations Research:** Linear programming, simple l-p model, simplex method - duality, sensitivity analysis, application of linear programming in transportation and assignment models	7
5	**Simulation Studies:** Monte-Carlo simulation, queuing or waiting line theory (simple problems), dynamic programming, introduction to emerging optimization techniques	7
6	**Material Management:** Material management – purchasing principles, stores, coding system function, responsibilities, record and accounting. Inventory control – an introduction, inventory cost, EOQ analysis, ABC analysis, safety stocks	7

Text Books:	
1	Deshpande S. H., *"Operation Research"*, S Chand & Co., 1st Edition, 1976
2	Gopal Krishnan, *"Material Management"*, Sudeshan, 1st Edition, 2015
3	Taha H. A., *"Operation Research: An Introduction"*, Pearson Education, 10th Edition, 2019
4	Banga and Sharma, *"Engineering Management"*, Khanna Publishers, 1st Edition, 2017

Reference Books:	
1	Stoner, *"Engineering Management"*, Pearson Education, 1st Edition, 2018
2	Davar, *"Principles of Management"*, Progressive Corporation Pvt. Ltd., 1st Edition, 1980
3	Kast and Rosenzweig, *"Management and Organization"*, Tata McGraw-Hill, 1st Edition, 1973
4	Zhamb L. C., *"Quantitative Techniques in Management"*, Everest Publication, 1st Edition, 1999

Course Name: **Basics of Interior Building Design**	L	T	P	Credits
Course Code: **25CE404B**	**3**	**-**	**-**	**3**
Evaluation Scheme:	ISE-I	MSE	ISE-II	ESE
Marks:	**10**	**30**	**10**	**50**

Pre-Requisite: Basic Civil Engineering & Building Construction

Course Objectives: The course aims,

1. To understand fundamental concepts of interior design and its relationship with building spaces.
2. To identify elements and principles used in interior design for functional and aesthetic spaces.
3. To apply anthropometric and ergonomic considerations in interior space planning.
4. To analyze materials, lighting, and environmental factors influencing interior design.

Course Outcomes: Students will be able to	
CO1	Explain basic concepts, elements, and principles of interior design.
CO2	Plan interior spaces considering human comfort and functional requirements.
CO3	Select appropriate materials, colors, and lighting for interior environments.
CO4	Develop simple interior layouts incorporating aesthetics and sustainability.

CO – PO Mapping:

Correlation matrix of **Course Outcomes (CO)** with **Programme Outcomes (PO)** and **Program Specific Outcomes (PSO)** 1 = Low Correlation, 2 = Medium Correlation, 3 = High Correlation

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PSO1	PSO2	PSO3
CO1	3	2	-	-	-	-	-	-	-	-	-	-	-	-
CO2	3	2	2	-	-	-	-	-	-	-	-	-	2	-
CO3	3	2	-	-	-	-	-	-	-	-	-	-	-	-
CO4	3	2	2	-	-	-	-	-	-	-	-	-	2	-

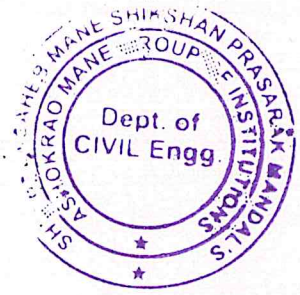
Course Contents

Unit No.	Contents	Hrs.
1	**Introduction to Interior Design:** Definition and scope of interior design, Importance of interior spaces in buildings, Role of interior designer, Relationship between architecture and interior design, Types of interior spaces (residential, commercial, institutional), Design process: concept to execution, Case studies of basic interiors.	7
2	**Elements of Interior Design:** Space: positive and negative space, Line: horizontal, vertical, dynamic, Form and shape, Color theory and psychology, Texture and patterns, Light as a design element, Application of elements	7

	in interiors.	
3	**Principles of Interior Design:** Balance (symmetrical, asymmetrical), Rhythm and repetition, Emphasis and focal point, harmony and unity, Proportion and scale, Contrast and variety, Application through examples.	7
4	**Space Planning and Ergonomics:** Space planning concepts and zoning, Circulation and furniture layout, Anthropometry and human dimensions, Ergonomics in interior design, Space standards for different rooms, Universal design and accessibility, Practical layout exercises.	7
5	**Materials, Finishes, and Lighting:** Interior materials: wood, glass, metal, plastics, finishes: flooring, wall finishes, ceilings, Selection criteria for materials, Natural and artificial lighting, Types of lighting (ambient, task, accent), Colour schemes and combinations, Sustainable materials and eco-friendly design.	7
6	**Interior Services and Aesthetics:** Basic services: electrical, plumbing, HVAC basics, Furniture design and selection, Soft furnishings (curtains, carpets, upholstery), Interior styling and decoration, Principles of aesthetics in interiors, Introduction to green interiors, Case studies of well-designed interiors.	7

Text Books:	
1	Interior Design Illustrated, John Wiley & Sons, New York, 2012.
2	Human Dimension and Interior Space, Watson-Guptill Publications, New York, 1979.
3	Building Construction, Dhanpat Rai Publications, New Delhi, 2010.

Reference Books:	
1	Architects' Data, Blackwell Publishing, Oxford, 2012.
2	Time-Saver Standards for Interior Design and Space Planning, McGraw Hill, New York, 2001.
3	Residential Interior Design: A Guide to Planning Spaces, Wiley, 2016.



OPEN ELECTIVE COURSES

(Students have to select any one Open Elective course, for each applicable semester, of their interest (other than open electives offered by his/her Department) from the table below)

Open Elective – I

Sr. No.	Course Code	Course Name	Offered by Department
1	25AM405A	E Commerce	Artificial Intelligence & Machine Learning & Artificial Intelligence & Data Science
2	25CE405B	Environmental Science	Civil Engineering
3	25CS405C	Human Computer Interaction	Computer Science & Engineering
4	25EE405D	Electrical Safety & Standards	Electrical Engineering
5	25EC405E	Sensor Technology	Electronics & Computer Engineering & Electronics & Telecommunication Engineering
6	25ME405F	Project Management	Mechanical Engineering

Course Name: **Environmental Science**	L	T	P	Credits
Course Code: **25CE405B**	**2**	**-**	**-**	**2**
Evaluation Scheme:	ISE-I	MSE	ISE-II	ESE
Marks:	**10**	**30**	**10**	**50**

Pre-Requisite: Basic concept of environment

Course Objectives: The course aims,

1. To study the importance and scope of environmental studies.
2. To discuss the importance of public awareness on environmental problems
3. To study about natural resources and biodiversity.
4. To discuss scientific, technological and economic solutions to environmental problems.

Course Outcomes: Students will be able to	
CO1	Explain the importance and scope of Environmental Studies in sustainable development.
CO2	Discuss the role of public awareness in addressing environmental problems.
CO3	Describe natural resources and biodiversity and their importance in environmental conservation.
CO4	Analyze scientific, technological and economic solutions for solving environmental problems.

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CO – PO Mapping:

Correlation matrix of **Course Outcomes (CO)** with **Programme Outcomes (PO)** and **Program Specific Outcomes (PSO)** 1 = Low Correlation, 2 = Medium Correlation, 3 = High Correlation

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PSO1	PSO2	PSO3
CO1	2	1	-	-	-	2	3	-	-	-	-	-	-	-
CO2	1	2	-	-	-	3	3	-	-	-	-	-	-	-
CO3	2	2	-	-	-	2	3	-	-	-	-	-	-	-
CO4	2	3	-	-	-	2	3	-	-	-	-	-	-	-

Course Contents

Unit No.	Contents	Hrs.
1	**Nature of Environmental Studies Natural Resources and Associated Problems:** Definition, Scope and Importance Multidisciplinary nature of environmental Studies **Forest Resources:** Use and over-exploitation, deforestation, dams and their effects on forests and tribal people. **Water Resources:** Use and over-utilization of surface and groundwater, floods, drought, conflicts over water, dams – benefits and problems. **Mineral Resources:** Usage and exploitation. Environmental effects of extracting and using mineral resources. **Food Resources:** World food problem, changes caused by agriculture, effect of modern agriculture, fertilizer-pesticide problems. **Energy Resources:** Growing energy needs, renewable and non-renewable energy resources, use of alternate energy sources such as solar energy, biomass energy and nuclear energy. **Land resources:** Land as a resource, land degradation, man-induced landslides, soil erosion and desertification. Role of an individual in conservation of natural resources.	5
2	**Ecosystems:** Concept of an ecosystem. Structure and function of an ecosystem consumers decomposers, Energy flows in the ecosystem, Ecological succession, Food chains, food webs and ecological pyramids. Introduction, types, characteristics features, structure and function of the following ecosystem: Forest ecosystem, Grassland ecosystem, Desert ecosystem, Aquatic ecosystems (ponds, streams, lakes, rivers, oceans, estuaries)	5
3	**Biodiversity and its conservation:** Introduction: Definition: genetic, species and ecosystem diversity. Biogeographical classification of India, Value of biodiversity: consumptive use, productive use, social, ethical, aesthetic and option values Biodiversity at global, National and local levels. India as a mega-diversity nation, Hot-spots of biodiversity. Threats to biodiversity: habitat loss, poaching of wildlife,	5
4	**Environmental Pollution:** Definition, Causes, effects and control measures of Air pollution, Water pollution, Soil pollution, Marine pollution, Noise pollution, Thermal pollution. Nuclear hazards Solid waste Management: Causes, effects and control measures of urban and industrial wastes. Role of an individual in prevention of pollution.	5

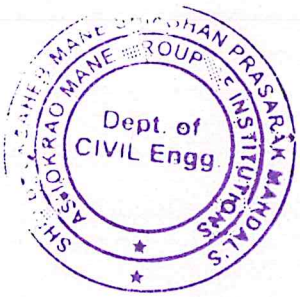
5	**Social Issues and the Environment:** Disaster Management: Flood, Earthquake, Cyclone, tsunami, landslide. urban problem related to energy. Water conservation, Rain water harvesting, watershed management, Environmental Ethics, Issue, Global Warming, Acid rain, ozone layer depletion, nuclear accident.	5
6	**Environmental Protection:** From Unsustainable to Sustainable development, Environment Protection Act, Air (prevention &protection Act) Water (Prevention and control of Pollution) Act, Wildlife Protection Act Forest Conservation Act, population growth and human health.	5

Text Books:

1 Raman Sivakumar, Principals of Environmental Science and Engineering, Ceagage learning Singapore, Edition-2, 2005
2 P. Meenakshi, Elements of Environmental Science and Engineering, Prentice Hall of India Private Limited, New Delhi, Edition-1,2006
3 G. Tyler Miller Jr, Environmental Science - working with the Earth, Thomson Brooks /Cole Edition-11, 2006

Reference Books:

1 Dr. B. S. Chauhan, Environmental Studies, University Science Press, New Delhi, Edition-1,2008
2 Dr. P. D. Raut, Environmental Studies, S. U. Kolhapur, Edition-1, 2011.
3 *W.P. Cunningham & M.A. Cunningham, Principles of Environmental Science*



Course Name: **Entrepreneurship Development**	L	T	P	Credits
Course Code: **25CE406**	**1**	**-**	**-**	**1**
Evaluation Scheme:	ISE-I	MSE	ISE-II	ESE
Marks:	**25**	**-**	**25**	**-**

Pre-Requisite: Basic Knowledge of Management

Course Objectives: The course aims,

1. To introduce the concept of entrepreneurship and its significance in economic development.
2. To develop entrepreneurial competencies and motivation
3. To familiarize with business planning and project management
4. To create awareness about startup ecosystem, government schemes, and legal frameworks

Course Outcomes: Students will be able to,	
CO1	Understand entrepreneurship concepts, start-up ecosystem, and ethical responsibilities in engineering enterprises.
CO2	Analyze market opportunities and feasibility of technology-driven business ideas.
CO3	Develop a basic business plan considering sustainability, project planning, and teamwork.

CO – PO Mapping:

Correlation matrix of **Course Outcomes (CO)** with **Programme Outcomes (PO)** and **Program Specific Outcomes (PSO)** 1 = Low Correlation, 2 = Medium Correlation, 3 = High Correlation

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PSO1	PSO2	PSO3
CO1	–	–	–	–	–	2	–	3	–	–	2	–	–	2
CO2	–	3	2	–	–	–	–	–	–	–	–	–	2	2
CO3	–	–	3	–	–	–	2	–	2	2	–	–	–	3
CO4	–	–	–	–	–	2	–	3	–	–	2	–	–	2

Course Contents

Unit No.	Contents	Hrs.
1	**Introduction to Entrepreneurship:** Definition, Importance, Entrepreneur vs. Manager, Entrepreneurial motivation and Barriers, Classification of Entrepreneurship, Theory of Entrepreneurship, Concept of Entrepreneurship.	3
2	**Corporate Entrepreneurship:** Introduction, Flavors of corporate entrepreneurship, Corporate venturing, Entrepreneurship, organizational transformation, Industry rule bending, Need for corporate entrepreneurship, domain of corporate entrepreneurship.	4

3	**Business Plan and Project Management:** Idea generation, Screening and Project Identification, Creative Performance, feasibility study, market survey, business plan elements, TRL.	4
4	**Family and Non-Family Entrepreneur & Women entrepreneurs:** Role of Professionals, Professionalism vs. family entrepreneurs, Role of Woman entrepreneur, Factors influencing women entrepreneur, Challenges for women entrepreneurs, Growth and development of women entrepreneurs in India	4

Text Books:

1. Vasant Desai, Dynamics of Entrepreneurial Development and Management, Himalaya Publishing
2. S.S. Khanka, Entrepreneurial Development, S. Chand
3. P. Saravanavel, Entrepreneurship Development, Ess Pee Kay Publishing House

Reference Books:

1. C.B. Gupta & N.P. Srinivasan, Entrepreneurial Development, Sultan Chand & Sons
2. Hisrich, Peters & Shepherd, Entrepreneurship, McGraw Hill
3. David H. Holt, Entrepreneurship: New Venture Creation, Prentice Hall of India

MOOC/NPTEL Platform:

1. Entrepreneurship Prof. S. S. S. Kumar (IIT Madras) https://nptel.ac.in/courses/110106141
2. Entrepreneurship and Innovation Prof. V. Gopal (IIT Roorkee) https://nptel.ac.in/courses/110107094
3. Developing Soft Skills and Personality Prof. T. Ravichandran (IIT Kanpur) https://nptel.ac.in/courses/109104115

Course Name: **Quantitative Aptitude and Logical Reasoning - I**	L	T	P	Credits
Course Code: **25CE407**	**1**	**-**	**-**	**1**
Evaluation Scheme:	ISE-I	MSE	ISE-II	ESE
Marks:	**25**	**-**	**25**	**-**

Pre-Requisite: Basic Mathematical Knowledge, Language Proficiency and Analytical Readiness.

Course Objective: The course aims,

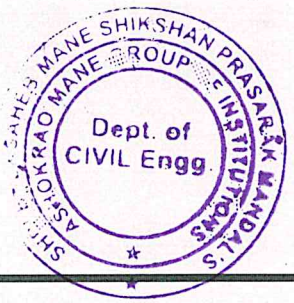
1. To develop the ability to recall and explain fundamental principles, enabling learners to build a strong conceptual foundation for quantitative and reasoning skills.
2. To gain proficiency in applying methods and techniques to solve structured problems and practical scenarios with accuracy and confidence.
3. To cultivate analytical thinking by examining relationships, patterns, and logical structures, thereby enhancing decision-making and problem validation skills.
4. To integrate diverse approaches and create effective strategies, supporting innovation and adaptability in academic, professional, and real-world contexts.

Course Outcomes: At the end of the course, students will be able to,	
CO1	Recall key concepts of Mathematics for placements and business applications.
CO2	Apply quantitative methods to solve structured numerical problems in exams and entrepreneurial contexts.
CO3	Analyse logical reasoning problems to identify patterns and enhance reasoning skills.
CO4	Evaluate alternative solution approaches for efficiency and create integrated solutions supporting innovation and adaptability.

CO – PO Mapping:

Correlation matrix of **Course Outcomes (CO)** with **Programme Outcomes (PO)** and **Program Specific Outcomes (PSO)** 1 = Low Correlation, 2 = Medium Correlation, 3 = High Correlation

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PSO1	PSO2	PSO3
CO1	3	3	-	-	-	-	-	-	-	-	-	-	-	-
CO2	2	3	2	-	-	-	-	-	-	-	2	-	-	-
CO3	3	-	-	3	-	-	-	-	3	-	-	-	-	-
CO4	-	-	3	-	1	-	2	-	-	1	-	-	-	-



Course Contents

Unit No.	Contents	Hrs.
1	**Foundations of Quantitative Aptitude:** **Number Systems:** Basics, Base System, Exponents, Numerical Analogy-Basics, Relation between two numbers. **Percentage:** numerical Percentage Understand Conversion, Single change, Successive change, Product Stability, Applications of percentage. **Ratios and Fractions-** Comparison of Ratio & fraction, Properties of Ratio & Proportion, Mean Proportion., Joint ratio.	3
2	**Averages, Profit & Loss, and Interest Calculations:** **Average:** Average, Allegations Weighted average, Concept of average speed & allegation, Applications of Average & mixture allegation. **Profit & Loss:** Same selling price different Cost Price, Same cost price different selling price, Concept of false scale. **Simple and Compound Interest:** Basics, Difference between SI CI, Conversion Periods, Depreciation.	3
3	**Advanced Quantitative Methods:** **LCM and HCF:** LCM and HCF, Factors, Cyclicity, Different Methods to find LCM-HCF, HCF-LCM relation, Applications of HCF-LCM. **TRW:** Time, Rate and Work-Unitary Method, LCM Method, Calculation of remuneration. **Pipes & Cisterns**: Concept of negative work, LCM Method.	3
4	**Logical Reasoning Essentials:** **Blood Relations** -Symbols, generation of tree diagram, types of questions-pointing towards person, tree based, coded blood relation. **Coding Decoding:** Letter-Letter, Letter- Number, Number-Number, Letter-Symbol, Mixed Coding. **Direction Sense and Time Numerical:** Basics, shadow-based concept, Concept of local time zone (IST, GMT, Longitude, Latitude), Problems on local time difference, Coded direction sense.	3
5	**Pattern Recognition and Analytical Series:** **Series Completion:** Types of series, Number series pattern, Letter series, Alphanumeric series. **Pattern, Step Completion:** Image completion, Mirror images, Water images, input-Output. **Syllogism:** Basics, Types of Statements, Different diagram for different statements, Types of Questions-Based on Conclusion, Based on Statements.	3

Reference Books:

1 R. S. Aggarwal, "Quantitative Aptitude", S Chand Publishing, New Delhi.
2 R. S. Aggarwal, "Logical Reasoning", S Chand Publishing, New Delhi.
3 Arun Sharma, "Quantitative Aptitude", McGraw Hill Publishing, New Delhi.
4 Arun Sharma, "Logical Reasoning", McGraw Hill Publishing, New Delhi.

Course Name: **Constitution of India**	L	T	P	Credits
Course Code: **25CE408**	**2**	**--**	**--**	**2**
Evaluation Scheme:	ISE-I	MSE	ISE-II	ESE
Marks:	**25**	**-**	**25**	**-**

Pre-Requisite: Basic knowledge of Indian History

Course Objective: The course aims to,

1. Introduction to the historical and legal foundations of the Indian Constitution and its key features.
2. Understanding of the structure and functioning of Union, State, and local governments.
3. Familiarization with fundamental rights, duties, directive principles, and constitutional bodies.
4. Promotion of responsible citizenship and active participation in a democratic society.

Course Outcomes: At the end of the course, students will be able to,	
CO1	Understand and explain the historical and legal foundations of the Indian Constitution along with its key features.
CO2	Describe the structure, functions, and governance mechanisms of Union, State, and local governments, including the roles of constitutional bodies, Fundamental Rights, Duties, and Directive Principles.
CO3	Demonstrate an understanding of responsible citizenship and actively participate in a democratic society through constitutional values and practices.

CO – PO Mapping:

Correlation matrix of **Course Outcomes (CO)** with **Programme Outcomes (PO)** and **Program Specific Outcomes (PSO)** 1 = Low Correlation, 2 = Medium Correlation, 3 = High Correlation

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PSO1	PSO2	PSO3
CO1	–	–	–	–	–	2	2	–	1	–	1	–	–	–
CO2	–	–	–	–	–	2	2	–	1	–	1	–	–	–
CO3	–	–	–	–	–	2	2	–	1	–	1	–	–	–

Course Contents

Unit No.	Contents	Hrs.
1	**Introduction to the Constitution:** Historical background of the Indian Constitution, Framing of the Constitution and the Constituent Assembly, Features of the Indian Constitution, Preamble and its significance, Citizenship: Types and constitutional provisions.	5

2	**Fundamental Rights and Duties:** Fundamental Rights: Definition, types, and limitations, Directive Principles of State Policy (DPSP), Fundamental Duties of Indian citizens, Relationship between Fundamental Rights and DPSP.	5
3	**Union Government Structure:** Parliament: Lok Sabha and Rajya Sabha – composition and functions President: Powers, election, and role, Prime Minister and Council of Ministers, Judiciary: Supreme Court – structure, powers, and independence.	5
4	**State Government and Local Governance:** State legislature and Governor, Chief Minister and State Council of Ministers, High Courts and Subordinate Courts, Panchayati Raj System and Municipalities – 73rd & 74th Amendments.	5
5	**Constitutional Bodies and Amendments:** Different types of Constitutional Bodies, Constitutional amendment process (Article 368), Major constitutional amendments (42nd, 44th, 73rd, 74th, 86th).	5
6	**Important Provisions and Current Developments:** Emergency provisions: National, State, and Financial, Official language and special provisions, Center-State relations: Legislative, administrative, financial, Recent constitutional and legal developments, Role of citizens and engineers in democracy and governance.	5

Text Books:

1. M. Laxmikanth, Indian Polity, McGraw-Hill Education.
2. D.D. Basu, Introduction to the Constitution of India, LexisNexis.
3. J. N. Pandey, Constitutional Law of India, Central Law Agency.

Reference Books:

1. Subhash C. Kashyap, Our Constitution: An Introduction to India's Constitution and Constitutional Law, National Book Trust.
2. V. N. Shukla, Constitution of India, Eastern Book Company.
3. Brij Kishore Sharma, Introduction to the Constitution of India, Pearson Education.

MOOC/NPTEL Platform:

1. NPTEL Course: Constitution of India, Prof. M.K. Bhandari (Rajasthan Technical University) https://nptel.ac.in/courses/109/104/109104074.
2. Indian Government and Politics, Prof. R. Sudarshan (IIT Delhi) https://nptel.ac.in/courses/109/104/109104068.

Course Name: **Auto CAD Software Lab**	L	T	P	Credits
Course Code: **25CE409**	--	--	**2**	**1**
Evaluation Scheme:	ISE-I	MSE	ISE-II	ESE
Marks:	**25**	-	**25**	-

Pre-Requisite: Principles of building and building bye-laws

Course Objectives: The course aims,

1. To learn basic 2D commands.
2. To develop plans for residential building.
3. To develop municipal drawings and working drawings.

Course Outcomes: Students will be able to	
CO1	Describe Auto CAD commands.
CO2	Draw 2D Auto CAD drawing of residential building.
CO3	Draw municipal drawings and working drawings.

CO – PO Mapping:

Correlation matrix of **Course Outcomes (CO)** with **Programme Outcomes (PO)** and **Program Specific Outcomes (PSO)** 1 = Low Correlation, 2 = Medium Correlation, 3 = High Correlation

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PSO1	PSO2	PSO3
CO1	2	-	-	-	2	-	-	-	-	-	-	-	2	-
CO2	1	-	-	-	2	-	-	-	-	-	-	-	2	-
CO3	-	-	-	-	1	-	-	-	-	-	-	-	2	-

Course Contents

Exp. No.	Experiment Title	Hours
1	AutoCAD interface and navigation	2
2	Settings like units, limits, grid, snap etc.	2
3	Basic commands practice like point, line, circle, ellipse, and polygon.	2
4	Drawing simple shapes with modify tools	2
5	Dimensioning, text and annotation	2
6	Title block creation	2
7	Layer creation and management	2
8	Draw a plan or layout of residential building	2
9	Draw elevation and section views	2
10	Draw electrification & furniture layout	2
11	Draw plumbing layout (elevation and top views)	2

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12	Applying materials and visual styles	2
13	Rendering and view control	2
14	Complete municipal drawings and working drawings of residential building.	2

Note: *Minimum 10 practical / experiments will be completed.

Reference Books:	
1	AutoCAD, David Frey, BPB Sybex Publications
2	AutoCAD, George Omura

Course Name: **Strength of Materials Lab**	L	T	P	Credits
Course Code: **25CE410**	--	--	**2**	**1**
Evaluation Scheme:	ISE-I	MSE	ISE-II	ESE
Marks:	**25**	**-**	**25**	**50**

Pre-Requisite: Engineering Mechanics

Course Objectives: The course aims,

1. To understand the fundamental mechanical properties of engineering materials.
2. To perform standard tests on materials.
3. To correlate theoretical concepts with experimental results.
4. To develop practical skills in handling testing equipment.

Course Outcomes: Students will be able to	
CO1	Perform standard laboratory tests to determine mechanical properties of materials.
CO2	Analyze experimental data related to stress, strain, bending, and torsion.
CO3	Compare experimental results with theoretical values and identify errors.
CO4	Prepare clear laboratory reports while following safety and teamwork practices.

CO – PO Mapping:

Correlation matrix of **Course Outcomes (CO)** with **Programme Outcomes (PO)** and **Program Specific Outcomes (PSO)** 1 = Low Correlation, 2 = Medium Correlation, 3 = High Correlation

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PSO1	PSO2	PSO3
CO1	3	2	-	2	2	-	-	-	1	-	1	-	-	-
CO2	3	3	-	3	2	-	-	-	-	-	1	-	-	-
CO3	2	2	-	2	1	-	-	-	-	-	1	-	-	-
CO4	1	-	-	-	-	-	-	2	3	3	2	-	-	-

Course Contents

Exp. No.	Experiment Title	Hrs.
1	Introduction to Strength of Materials Lab.	**2**
2	Study of Universal Testing Machine.	**2**
3	Tensile test on Mild Steel / Tor Steel.	**2**
4	Compression test on Mild Steel / Cast Iron.	**2**
5	Compression test on Concrete Cube.	**2**
6	Direct shear test on different metals.	**2**
7	Charpy Impact test on different metals.	**2**
8	Izod Impact test on different metals.	**2**

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9	Bending test on M.S. Bar / Timber Beam.	2
10	Water absorption test on Burnt Bricks.	2
11	Compression test on burnt bricks.	2
12	Hardness test on metals. (Brinell Hardness Test)	2
13	Hardness test on metals. (Rockwell / Vickers Test)	2
14	Torsion Test on Mild Steel / Circular Shaft	2

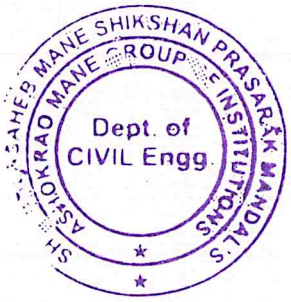
Note: ***Minimum 10 practical / experiments will be completed.**

Text Books:

1 R.K.Bansal, "Strength of Material", Laxmi Publication(s) ltd.
2 Khurmi R.S.,"Strength of Material", S. Chand and Co., Edition revised 1968, New Delhi.
3 S.S.Bhavikatti, Strength of Materials, 2nd Edition Vikas Publications, New Delhi 2006
4 R.Subramanian, Strength of Materias, Oxford University Press 3rd edition 2016.

Reference Books:

1 Punmia B. C., "Mechanics of Materials" Laxmi Publications, revised edition, 2016
2 Subramanian R., "Strength of Materials" Oxford University Press, 2nd edition, New Delhi
3 F. L. Singer and Pytel, "Strength of Material" Harper and Row publication.



Course Name: **Concrete Technology Lab**	L	T	P	Credits
Course Code: **25CE411**	--	--	**2**	**1**
Evaluation Scheme:	ISE-I	MSE	ISE-II	ESE
Marks:	**25**	**-**	**25**	**50**

Pre-Requisite: Fundamentals of Civil Engineering

Course Objectives: The course aims,

1. To explain the important engineering properties of Concrete materials.
2. To explain the behavior of Fresh and hardened concrete.
3. To explain the Concrete mix design.
4. To explain the significance of NDT tests.

Course Outcomes: Students will be able to	
CO1	Explain standard procedures for testing properties of various ingredients of concrete and concrete mixes/specimens
CO2	Perform tests on ingredients of concrete and on fresh and hardened concrete to determine their properties using standard procedures
CO3	Design the concrete mix for a given grade of concrete using the guidelines of IS code
CO4	Evaluate the quality of concrete specimens/elements using NDT equipment

CO – PO Mapping:

Correlation matrix of **Course Outcomes (CO)** with **Programme Outcomes (PO)** and **Program Specific Outcomes (PSO)** 1 = Low Correlation, 2 = Medium Correlation, 3 = High Correlation

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PSO1	PSO2	PSO3
CO1	-	2	-	-	-	-	-	-	1	-	-	-	-	3
CO2	-	3	-	-	-	-	-	-	1	-	-	-	-	3
CO3	-	3	-	-	2	-	-	-	2	-	-	-	-	1
CO4	-	3	-	-	-	-	-	-	2	-	-	-	-	2

Course Contents

Exp. No.	Experiment Title	Hours
1	Tests on Cement Fineness, Sp. Gravity, Consistency,	2
2	Tests on Cement Initial and Final setting time, Soundness test	2
3	Tests on Cement Compressive Strength Test	2
4	Tests on Fine Aggregates	2

	Fine Aggregates: Sieve Analysis, Sp. Gravity, Bulk Density,	
5	Tests on Fine Aggregates Water Absorption, Moisture Content, bulking of sand, silt content	2
6	Tests on Coarse Aggregates Coarse Aggregates: Sieve Analysis, Sp. Gravity, Bulk Density,	2
7	Tests on Coarse Aggregates Water Absorption, Moisture Content, Flakiness & Elongation Index	2
8	Tests on Fresh Concrete: Workability Tests: Slump, Compaction factor.	2
9	Tests on Hardened Concrete: Compressive Strength on Cube & Cylinder,	2
10	Tests on Hardened Concrete: Flexural Test, Split Tensile Strength Test.	2
11	Non-Destructive Tests: Rebound Hammer, UPV, Concrete Scanner, Carbonation test.	2
12	Concrete Mix Design: IS Code method of mix design	2

Note: *Minimum 10 practical / experiments will be completed.

Text Books:

1. Santakumar, A.R., Concrete Technology, Oxford University Press.
2. Shetty, M.S., Concrete Technology, S. Chand Publication.
3. Gambhir, M.L., Concrete Technology, Tata McGraw Hill

Reference Books:

1. Properties of concrete by A. M. Neville, Longman Publishers.
2. Concrete Technology by R.S. Varshney, Oxford and IBH.
3. Concrete technology by A. M. Neville, J.J. Brooks, Pearson.
4. Concrete Mix Design by A. P. Remideos, Himalaya Publishing House

Indian Standard (IS) Codes:

1. IS: 10262-2009, Recommended guidelines for Concrete Mix Design
2. IS: 456-2000, Indian Standard Plain and Reinforced Concrete

Exit Courses
(After First Year)

The candidate should pass following skill-based courses to qualify for Diploma.

Course Code	Course Name	Teaching Scheme				Evaluation Scheme			
		L	T	P	Cr	Components	Max	Min for Passing	
25ASH223B	Engineering/Architectural Graphics - Part I - Orthographic Projection	3	-	-	3	ISE-I	10		40
						MSE	30		
						ISE-II	10		
						ESE	50	20	
25ASH224B	Introduction to Civil Engineering Profession	3	-	-	3	ISE-I	10		40
						MSE	30		
						ISE-II	10		
						ESE	50	20	
25ASH225B	Field Training	-	-	4	2	ISE	50	40	
						ESE	50	40	
	Total	**6**	**0**	**4**	**8**		**300**		
Total Contact Hours - 10						**Total Credits - 8**			

Course Name: **Engineering/Architectural Graphics – Part I - Orthographic Projection**	L	T	P	Credits
Course Code: **25ASH223B**	**3**	-	-	**3**
Evaluation Scheme:	ISE-I	MSE	ISE-II	ESE
Marks:	**10**	**30**	**10**	**50**

MOOC/NPTEL Platform:

1 **Click here to join the course -** https://onlinecourses.nptel.ac.in/noc26_ar11/preview
NPTEL URL - https://nptel.ac.in/courses/124107157

Course Name: **Introduction to Civil Engineering Profession**	L	T	P	Credits
Course Code: **25ASH224B**	**3**	-	-	**3**
Evaluation Scheme:	ISE-I	MSE	ISE-II	ESE
Marks:	**10**	**30**	**10**	**50**

MOOC/NPTEL Platform:

1 **Click here to join the course -** https://onlinecourses.nptel.ac.in/noc26_ce61/preview
NPTEL URL - https://nptel.ac.in/courses/105106201

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Exit Courses

(After Second Year)

The candidate should pass the following skill-based courses to qualify for Diploma.

Course Code	Course Name	Teaching Scheme				Evaluation Scheme			
		L	T	P	Cr	Components	Max	Min for Passing	
25CE412	Remote Sensing & GIS for Civil Engineering Applications	3	-	-	3	ISE-I	10		
						MSE	30		
						ISE-II	10		
						ESE	50	20	40
25CE413	Modern Construction Materials	3	-	-	3	ISE-I	10		
						MSE	30		
						ISE-II	10		
						ESE	50	20	40
25CE414	Field Training	-	-	4	2	ISE	50	40	
						ESE	50	40	
Total		**6**	**0**	**4**	**8**		**300**		
Total Contact Hours - 10					**Total Credits - 8**				

Course Name: **Remote Sensing & GIS for Civil Engineering Applications**	L	T	P	Credits
Course Code: **25CE412**	**3**	-	-	**3**
Evaluation Scheme:	ISE-I	MSE	ISE-II	ESE
Marks:	**10**	**30**	**10**	**50**

Pre-Requisite: Engineering Survey

Course Objectives: The course aims,

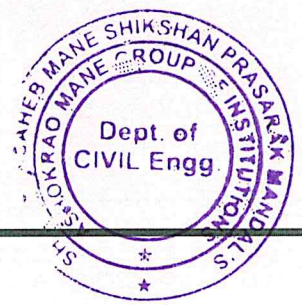
1. To introduce the fundamental principles, components, and historical development of remote sensing and GIS technologies.
2. To develop an understanding of data acquisition systems, platforms, sensors, and types of remote sensing.
3. To enable students to use GIS tools and digital elevation models for data processing and map creation.
4. To explore civil engineering applications of RS & GIS in water resources, environmental studies, and infrastructure planning.

Course Outcomes: Students will be able to,	
CO1	Define basic concepts, terminologies, and components of remote sensing and GIS.
CO2	Describe the working principles of remote sensing platforms and GIS data structures.
CO3	Apply remote sensing and GIS techniques to prepare and interpret spatial and attribute data.
CO4	Analyze spatial information for applications in watershed management, flood monitoring, and infrastructure planning

CO – PO Mapping:

Correlation matrix of **Course Outcomes (CO)** with **Programme Outcomes (PO)** and **Program Specific Outcomes (PSO)** 1 = Low Correlation, 2 = Medium Correlation, 3 = High Correlation

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PSO1	PSO2	PSO3
CO1	3	-	-	-	-	-	-	-	-	-	-	2	-	-
CO2	3	-	-	-	-	-	-	-	-	-	-	3	-	-
CO3	3	-	-	-	-	-	-	-	-	-	-	3	-	-
CO4	3	-	-	-	-	-	-	-	-	-	-	3	-	-



Course Contents

Unit No.	Contents	Hrs.
1	**Principles of Remote Sensing:** **Definition** and scope, History and development of remote sensing technology, Electromagnetic Energy, Electromagnetic radiation spectrum, EMR interaction with atmosphere and earth surface; Principle and stages of remote sensing, Classification of remote sensing - Active & Passive.	5
2	**Space System:** Remote Sensing Platforms- Various types of platforms, different types of aircraft, manned and unmanned spacecrafts used for data acquisition - characteristics of different types of platforms, Airborne and Spaceborne Remote Sensing, Ideal Remote Sensing System, Characteristics of Real Remote Sensing Systems, Satellite: types, Characteristics of satellite orbits, Introduction to Remote sensing satellite programs.	5
3	**Photographic Remote Sensing & Digital Elevation Model:** **Types of** resolutions, Concept of color and Color Composites, Types of Models, Definition of a DEM, Types of DEMs, Sources of digital elevation	5
4	**Geographical Information System:** **Definition** of GIS, History and development of GIS, Elements and Components of GIS, Hardware and software, Common terms in GIS, Maps – Types of Maps – Types of Projection - Data Input – Digitizer, Scanner – Editing – Raster and Vector data structures – Representation of Geographic features in Raster and Vector data model: Advantages and Disadvantages, Comparison of Raster and Vector data structure, Free and open source GIS software and applications.	5
5	**Application of RS and G.I.S in Water Resources and Environmental Studies:** **Geomorphologic** aspects - Drainage analysis, Drainage patterns, Drainage density and Drainage frequency, Watershed management, Water resources mapping, Estimation of watershed physiographic parameters, Estimation of hydrological and meteorological variables, Surface water delineation, Flood monitoring	5
6	**Application of RS and G.I.S in other Civil Engineering fields:** Study and selection of site or hydraulic structures, Urban and regional planning, Identification of geothermal energy sources, Assessment of snow cover and water equivalent, Groundwater studies, Earthquake studies.	5

Text Books:

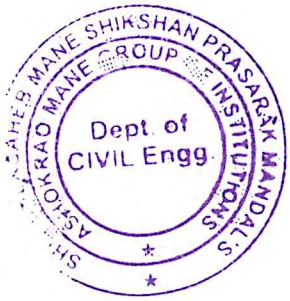
1 Lillesand, T.M., Kiefer, R.W., and Chipman, J.W. (2007): Remote Sensing and Image Interpretation (6th Ed.). Wiley, New Jersey
2 Reddy, M.A. (2008): Textbook of Remote Sensing and Geographical Information System (3rd Ed.), BS Publications, Hyderabad
3 Introduction to geomatics–QGIS user guide – Mr. C. V. Nishinkanth, Mrs. Annu Nishinkanth, Dr. S. S. Vasudevan, Dr. P. Ramkumar Publishers

Reference Books:

1 Remote sensing in Civil Engineering – T. J. M. Kennie and M. C. Mathews, Surry University press, London
2 Principles of Remote Sensing- P. N. Patel and Surendra Singh, Scientific Publishers, Jodhpur
3 Remote Sensing of the Environment – John R. Jensen, Pearson Education Inc

MOOC/NPTEL Platform:

1 **Click here to join the course -** https://onlinecourses.nptel.ac.in/noc26_ce71/preview
2 **Click here to join the course -** https://onlinecourses.nptel.ac.in/noc26_ce70/preview



Course Name: **Modern Construction Materials**	L	T	P	Credits
Course Code: **25CE413**	**3**	**-**	**-**	**3**
Evaluation Scheme:	ISE-I	MSE	ISE-II	ESE
Marks:	**10**	**30**	**10**	**50**

Pre-Requisite: Knowledge of civil engineering or architecture, Building Construction Materials

Course Objectives: The course aims,	
1	To understand the development of construction materials.
2	To understand the innovation research for construction engineering.
3	To understand the marketing, decision making, and specification related to construction materials
4	To design concepts of various structures, materials, repair and rehabilitation of systems.

Course Outcomes: Students will be able to,	
CO1	Identify the types of concrete, metals etc. and their constituents and properties.
CO2	Interpret various composite materials, their properties and applications.
CO3	Understand the concept of water proofing and identify the purpose of flooring materials.
CO4	Design and develop smart intelligent buildings.

CO – PO Mapping:
Correlation matrix of **Course Outcomes (CO)** with **Programme Outcomes (PO)** and **Program Specific Outcomes (PSO)** 1 = Low Correlation, 2 = Medium Correlation, 3 = High Correlation

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PSO1	PSO2	PSO3
CO1	2	-	-	-	-	-	-	-	-	-	-	-	-	1
CO2	2	-	-	-	-	-	-	-	-	-	-	-	-	1
CO3	2	-	-	-	-	-	-	-	-	-	-	-	-	1
CO4	2	-	2	-	-	-	-	-	-	-	-	-	-	1

Course Contents

Unit No.	Contents	Hrs.
1	**Special Concretes:** Concretes, Behaviour of concretes - High Strength and High-Performance Concrete – Fiber Reinforced Concrete, Self-compacting concrete, Alternate Materials to concrete	7
2	**Metals:** Steels - New Alloy Steels – Aluminum and its Products –Coatings to reinforcement –	7

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	Applications.	
3	**Composites:** Plastics –Reinforced Polymers – FRP – Applications	7
4	**Other Materials 1:** Water Proofing Compounds – Non-weathering Materials – Flooring and Façade Materials, Waterproofing Materials, Polymer Floor Finishes, Anchors	7
5	**Other Materials 2:** Rheology & Thermal properties, Review of Const. Materials & Criteria for Selection Bituminous Materials, Wood and Wood Products	7
6	**Smart and Intelligent Materials:** Smart and Intelligent Materials for intelligent buildings - Special features	7

Text Books:

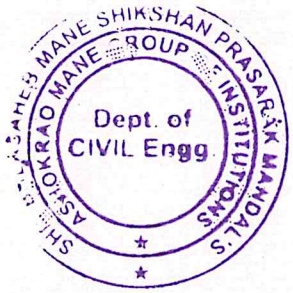
1. Building Materials, P.C. Varghese, Prentice-Hall India, 2555.
2. Shetty M. S, Concrete Technology: Theory and Practice, S. Chand & Company Ltd., 2005.
3. Shan Somayaji, Civil Engineering Materials, Prentice Hall Inc., 2001

Reference Books:

1. Materials Science and Engineering: An introduction, W.D. Callister, John Wiley, 1994.
2. Engineering Materials 1: An introduction to their properties & applications, M.F. Ashby and D.R.H. Jones, Butterworth Heinemann, 2553.
3. Concrete: Microstructure, properties and materials, P.K. Mehta and P.J.M. Monteiro, McGraw Hill, 2556.

MOOC/NPTEL Platform:

1. **Click here to join the course -** https://onlinecourses.nptel.ac.in/noc26_ce64/preview and **NPTEL URL -** https://nptel.ac.in/courses/105106053



Course Name: **Field Training**	L	T	P	Credits
Course Code: **25CE414**	-	-	**4**	**2**
Evaluation Scheme:	ISE-I	MSE	ISE-II	ESE
Marks:	**25**	-	**25**	**50**

Course Objectives: The course aims,

1. To provide practical exposure to construction processes.
2. To enhance understanding of on-site safety protocols.
3. To develop skills in project supervision and coordination.
4. To familiarize trainees with construction equipment, materials, and quality control practices.

Course Outcomes: Students will be able to,	
CO1	Improve practical knowledge of construction activities.
CO2	Interpret and apply construction drawings and specifications.
CO3	Understand the safety and quality standards of construction sites.
CO4	Develop the effective communication and teamwork skills in a real-world project environment

CO – PO Mapping:

Correlation matrix of **Course Outcomes (CO)** with **Programme Outcomes (PO)** and **Program Specific Outcomes (PSO)** 1 = Low Correlation, 2 = Medium Correlation, 3 = High Correlation

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PSO1	PSO2	PSO3
CO1	3	-	-	-	-	-	-	-	2	-	-	-	-	2
CO2	-	2	-	-	-	-	-	-	2	-	-	-	2	-
CO3	3	-	-	-	-	-	-	-	2	-	2	-	-	-
CO4	-	-	-	-	-	-	-	2	2	-	-	-	-	-

Course Contents

Sr. No.	Contents
1	Visit the construction site of a Residential Building (G+1) and collect information regarding the current status of construction activities.
2	Study and understand the various items of work involved in the project and the methods of execution adopted at site.
3	Gain knowledge about the types of construction materials used at the site along with their specifications and applications.
4	Understand the billing and accounting methods, including measurement, documentation, and payment processes followed at the site.
5	Prepare the Daily Progress Report (DPR) based on the actual site activities and manpower

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	deployment.
6	Prepare and submit a construction site visit report documenting observations, work progress, and learning outcomes.