An Autonomous Institute

Shree Warana Vibhag Shikshan Mandal's

Tatyasaheb Kore Institute of Engineering And Technology, Warananagar

NBA Accredited Institute

Department of Civil Engineering

B. Tech. in Civil Engineering

Syllabus Structure and Curriculum under Autonomy as per the NEP 2020

Tatyasaheb Kore Institute of Engineering and Technology, Warananagar

An Autonomous Institute

Department of Civil Engineering

❖ VISION

To become an academy of excellence in technical education and human resource development.

❖ MISSION

- To develop engineering graduates of high repute with professional ethics.
- To excel in academics and research through innovative techniques.
- To facilitate the employability, entrepreneurship along with social responsibility.
- To collaborate with industries and institutes of national recognition.
- To inculcate lifelong learning and respect for the environment.

❖ QUALITY POLICY

To promote excellence in academic and training activities by inspiring students for becoming competent professionals to cater industrial and social needs.

Tatyasaheb Kore Institute of Engineering and Technology, Warananagar

An Autonomous Institute

Department of Civil Engineering

❖ PROGRAM EDUCATIONAL OBJECTIVES

Graduates will be able to,

1. To Impart quality technical education and graduate the students for employment in civil engineering and related professions.
2. To provide students with solid foundation in mathematical and analytical subjects so as to solve civil engineering problems and also to pursue higher studies.
3. To develop the ability among the students to organize the data, synthesize data and technical concepts which will helps them to solve problems relevant to the general practice of various civil engineering disciplines.
4. To inculcate with the student the expertise of using computer tools to solve problems, for presentations works, acquaint them with professional level software for planning, analysis, and design purpose
5. To provide an experience in surveying work, site investigations, familiarity with the real issues of civil engineering including ethics, economy, management, and emerging technologies
6. To provide an opportunity for the students to work in team by organizing various curricular and professional activities resulting in the improvement of technical and soft skills.

❖ PROGRAM OUTCOMES

After completion of the Program, graduates will,

1. Demonstrate knowledge in mathematics, basic sciences, & civil engineering
2. Identify, formulate, and solve civil engineering problems
3. Prepare structural design such that fulfills design specification, durability, economy, & safety.
4. Design and conduct experiment, analyze data & also interpret result to provide conclusion.
5. Use appropriate engineering techniques and software tools to analyze civil engineering problems.
6. Apply civil engineering knowledge for construction site in all respect like planning, execution, and supervision.
7. Sensitive towards ethical, societal, and environmental issue along with professional work
8. Exhibit understanding of professional & ethical responsibility.
9. Ability to function as a leader of multidisciplinary team.
10. Communicate effectively in both verbal & written form
11. Develop engineering research ability & project management skill.
12. Possess confidence for self-education & ability for lifelong learning.

❖ PROGRAM SPECIFIC OUTCOMES

1. Plan and Design, Maintain and execute smart infrastructural projects.
2. Assess and analyze environmental impact of civil engineering projects and take corrective action for sustainable development.
3. Use leadership and communication abilities to optimally integrate the 4Ms Viz.-Men, Money, Material and Machine

SWVSM'S

Tatyasaheb Kore Institute of Engineering andTechnology, Warananagar

An Autonomous Institute

Abbreviations

Sr. No.	Acronym	Definition
1	ISE	In-Semester Examination
2	ISE-I	In-Semester Examination-I
3	ISE-II	In-Semester Examination-II
4	ESE	End Semester Examination
5	ISA	In-Semester Assessment (Term Work)
6	L	Lecture
7	T	Tutorial
8	P	Practical
9	CH	Contact Hours
10	C	Credit

Course/ Subject Categories

Sr. No.	Acronym	Definition
1	BSC	Basic Science Course
2	HSC	Humanity Science Course
3	ESC	Engineering Science Course
4	PCC	Professional Core Course
5	OEC	Open Elective Course
6	MC	Mandatory Course
7	PEC	Professional Elective Course
8	PW	Project Work (Mini and Major Project)
9	II	Industrial Internship

Course/ Subject Code

C	E	7	0	1
Branch Code		Semester	Course Number	

Course Term work and POE Code

C	E	3	0	1	T / P / A
Branch Code		Semester	Course Number		T- Term work P- POE A- Audit Course

Tatyasaheb Kore Institute of Engineering andTechnology, Warananagar
An Autonomous Institute

Semester wise Credit Distribution for
B.Tech. Civil Engineering Program

Sem.	I	II	III	IV	V	VI	VII	VIII	Total
Credits	21	21	21	21	21	21	21	21	168

Honor Program in under Civil Engineering

Sem.	V	VI	VII	VIII	Total
Credits	5	5	5	5	20

Second Year B. Tech. in Civil Engineering

Proposed Structure and Syllabus Under Autonomy as per the NEP Policy 2020

Tatyasaheb Kore Institute of Engineering and Technology, Warananagar

Second Year B. Tech. (Civil Engineering)

Semester-III

(To be implemented from 2024 - 25)

Credit Scheme as per NEP Policy

S. Y. B. Tech. Civil Engineering Sem -III

Sr. No.	Category	Sub Category	Course Code	Name of Course	Teaching Scheme			C	CH	Examination & Evaluation Scheme			
					L	T	P			Component	Marks	Min for Passing	
1	Program Course	PCC	23UGPCC-CE301	Strength of Materials	3*	--	--	2	3	ESE	60	24	40
										ISE	40	16	
2		PCC	23UGPCC-CE302	Surveying	3*	--	--	2	3	ESE	60	24	40
										ISE	40	16	
3		PCC	23UGPCC-CE303	Fluid Mechanics	3*	--	--	2	3	ESE	60	24	40
										ISE	40	16	
4		PCC	23UGPCC-CE304	Engg. Mathematics for Civil Engineering	2	--	--	2	2	ESE	60	24	40
										ISE	40	16	
5		PCC	23UGPCC-CE305	Building Construction and Drawing	3*	--	--	2	3	ESE	60	24	40
										ISE	40	16	
6	Multi-disciplinary Courses	MDM-1	23UGMDM1-CE306T	Construction Materials	1	1	--	2	2	ISA	50	20	20
7	Humanities Social Science and Management	Entrepreneurship/Economics/ Management Courses	23UGEEC1-CE307	Professional Leadership & Interpersonal Skills	2	--	--	2	2	ISA	25	10	10
8		Value Education Course (VEC)	23UGVEC1-CE308	Personal Values and Ethics	1	1	--	2	2	ISA	25	10	10
9	Experiential Learning Courses	Comm. Engg. Project (CEP)/Field Project (FP)	23UGFP-CE302 LP	Field Project (Surveying)	--	--	4	2	4	ISA	25	10	20
										POE	25	10	
10	Programme Course	PCC	23UGPCC-CE301 LP	Strength of Materials	--	--	2	1	2	ISA	25	10	20
										POE	25	10	
11		PCC	23UGPCC-CE303 LP	Fluid Mechanics	--	--	2	1	2	ISA	25	10	20
										POE	25	10	
12		PCC	23UGPCC-CE305 L	Building Construction and Drawing	--	--	2	1	2	ISA	50	20	20
13	Audit Course	A	23UGPCC-CE309 A	Audit Course – III (Environmental Studies)	--	--	--	--	--	--	--	--	--
					18	**2**	**10**	**21**	**30**	--	**800**	**320**	**320**

Note: In theory examination, there will be separate passing of ESE and ISE.

***Indicates the extra lectures provided for the course**

Tatyasaheb Kore Institute of Engineering and Technology, Warananagar

Second Year B. Tech. (Civil Engineering)

Semester-IV

(To be implemented from 2024 - 25)

Credit Scheme as per NEP Policy

S. Y. B. Tech. Civil Engineering Sem - IV

Sr. No.	Category	Sub Category	Course Code	Name of Course	Teaching Scheme			C	CH	Examination & Evaluation Scheme			
					L	T	P			Component	Marks	Min for Passing	
1	Program Course	PCC	23UGPCC-CE401	Mechanics of Structures	3*	--	--	2	3	ESE	60	24	40
										ISE	40	16	
2		PCC	23UGPCC-CE402	Advanced Surveying	3*	--	--	1	3	ESE	60	24	40
										ISE	40	16	
3		PCC	23UGPCC-CE403	Concrete Technology	2	--	--	2	2	ESE	60	24	40
										ISE	40	16	
4		PCC	23UGPCC-CE404	Hydraulics	2	--	--	1	2	ESE	60	24	40
										ISE	40	16	
5	Multidisciplinary Courses	MDM-2	23UGMDM2-CE405T	Disaster Management	1	1	--	2	2	ISA	50	20	20
6		OE - I	23UGOE1-CE406	Energy & Environment	2	--	--	2	2	ESE	60	24	40
										ISE	40	16	
7	Skill Courses	Vocational and Skill Enhancement Course (VSEC)	23UGVSEC-CE407 L	Computer Aided Design and Drawing	1	--	2	2	3	ISA	25	10	10
	Humanities Social Science and Management	Ability Enhancement Course	23UGAEC1-CE408 L	Modern Indian Language	1	--	2	2	3	ISA	25	10	10
8		Entrepreneurship/Economics/ Management Courses	23UGEEC2-CE409	Human Resource Management	2	--	--	2	2	ISA	25	10	10
9		Value Education Course (VEC)	23UGVEC2-CE410	Ethics and Moral Philosophy	2	--	--	2	2	ISA	25	10	10
10	Program Course	PCC	23UGPCC-CE402 LP	Advanced Surveying	--	--	2	1	2	ISA	25	10	20
										POE	25	10	
11		PCC	23UGPCC-CE403 LP	Concrete Technology	--	--	2	1	2	ISA	25	10	20
										POE	25	10	
12		PCC	23UGPCC-CE404 LP	Hydraulics	--	--	2	1	2	ISA	25	10	20
										POE	25	10	
13	Audit Course	A	23UGPCC-CE411 A	Audit Course – IV (General Proficiency as per the need of Industry depending on Program & no repetition from the course)	--	--	--	--	--	--	--	--	--
					19	**1**	**10**	**21**	**30**	**--**	**800**	**320**	**320**

Note: In theory examination, there will be separate passing of ESE and ISE.

***Indicates the extra lectures provided for the course**

Humanities Social Science and Management (HSSM) Course Basket Sem -III			
Entrepreneurship / Economics Course (EEC-I)			
Category	**Sub Category**	**Course Code**	**Name of Course**
Humanities Social Science and Management	**EEC - I**	23UGEEC1-CE307	Leadership & Management
			Entrepreneurship
			Professional Leadership & Interpersonal Skills
Value Education Course (VEC-I)			
Category	**Sub Category**	**Course Code**	**Name of Course**
Humanities Social Science and Management	**VEC-I**	23UGVEC1-CE308	**Personal Values and Ethics**
			Respect and Empathy
			Leadership and Ethical Decision Making

Humanities Social Science and Management (HSSM) Course Basket Sem -IV			
Ability Enhancement Course (AEC-I)			
Category	**Sub Category**	**Course Code**	**Name of Course**
Humanities Social Science and Management	**AEC -I**	23UGAEC1-CE408L	Professional Communication Skills
			Critical Thinking and Problem Solving
			Modern Indian Language (Marathi, Hindi, Sanskrit, Kanada)
Entrepreneurship / Economics Course (EEC-II)			
Category	**Sub Category**	**Course Code**	**Name of Course**
Humanities Social Science and Management	**EEC - II**	23UGEEC2-CE409	**Human Resource Management**
			Project Management
			Plumbing and Electrical Skill
Value Education Course (VEC-II)			
Category	**Sub Category**	**Course Code**	**Name of Course**
Humanities Social Science and Management	**VEC-II**	23UGVEC2-CE410	**Ethics and Moral Philosophy**
			Social Responsibility and Citizenship
			Values in Education Policies and Practice

Multidisciplinary Courses (MDM) Course Basket Sem -IV			
Open Elective – OE - I			
Category	**Sub Category**	**Course Code**	**Name of Course**
Multidisciplinary Courses	**Open Elective - OE**	23UGOE1-CE406	**Energy and Environment**
			Engineering Geology

Third Year B. Tech. in Civil Engineering

Proposed Structure and Syllabus Under Autonomy as per the NEP Policy 2020

Tatyasaheb Kore Institute of Engineering and Technology, Warananagar

Third Year B. Tech. (Civil Engineering)

Semester-V

(To be implemented from 2025 - 26)

Credit Scheme as per NEP Policy

T. Y. B. Tech. Civil Engineering Sem -V

Sr. No.	Category	Sub Category	Course Code	Name of Course	Teaching Scheme			C	CH	Examination & Evaluation Scheme			
					L	T	P			Component	Marks	Min for Passing	
1	Program Course	PCC	23UGPCC-CE501	Soil Mechanics	3	--	--	3	3	ESE	60	24	40
										ISE	40	16	
2		PCC	23UGPCC-CE502	Theory of Structure	3	--	--	3	3	ESE	60	24	40
										ISE	40	16	
3		PCC	23UGPCC-CE503	Water Resource Engineering	3*	--	--	2	3	ESE	60	24	40
										ISE	40	16	
4		PEC-1	23UGPEC1 - CE504	Environmental Engineering	3	--	--	3	3	ESE	60	24	40
										ISE	40	16	
5	Multidisciplinary Courses	MDM-3	23UGMDM3-CE505	Solid Waste Management	3	1	--	4	4	ESE	60	24	40
										ISE	40	16	
6	Multidisciplinary Courses	OE-II	23UGOE2-CE506	Optimization Technique	2	--	--	1	2	ESE	60	24	40
										ISE	40	16	
7	Program Course	PCC	23UGPCC-CE501 LP	Soil Mechanics	--	--	2	1	2	ISA	25	10	20
										POE	25	10	
8		PCC	23UGPCC-CE503 LP	Water Resource Engg.	--	--	2	1	2	ISA	25	10	20
										POE	25	10	
9		PCC	23UGPCC-CE 504 LP	Environmental Engineering	--	--	2	1	2	ISA	25	10	20
										POE	25	10	
10		PCC	23UGPCC-CE502 L	Theory of Structure	--	--	2	1	2	ISA	25	10	10
11	Multidisciplinary Courses	OE-II	23UGOE2-CE506 L	Optimization Technique	--	--	2	1	2	ISA	25	10	10
					17	**1**	**10**	**21**	**28**	**--**	**800**	**320**	**320**

Note: In theory examination, there will be separate passing of ESE and ISE.

***Indicates the extra lectures provided for the course**

Tatyasaheb Kore Institute of Engineering and Technology, Warananagar

Third Year B. Tech. (Civil Engineering)

Semester-VI

(To be implemented from 2025 - 26)

Credit Scheme as per NEP Policy

T. Y. B. Tech. Civil Engineering Sem -VI

Sr. No.	Category	Sub Category	Course Code	Name of Course	Teaching Scheme			C	CH	Examination & Evaluation Scheme			
					L	T	P			Component	Marks	Min for Passing	
1	Program Course	PCC	23UGPCC-CE601	Reinforced Concrete Structures	3*	--	--	2	3	ESE	60	24	40
										ISE	40	16	
2		PCC	23UGPCC-CE602	Building Planning & Design	3	--	--	2	3	ESE	60	24	40
										ISE	40	16	
3		PCC	23UGPCC-CE603	Design of Steel Structures	3*	--	--	3	3	ESE	60	24	40
										ISE	40	16	
4		PEC-2	23UGPEC2- CE604	Advance Foundation Engg.	3	--	--	3	3	ESE	60	24	40
										ISE	40	16	
5		PEC-3	23UGPEC3- CE605	Construction Mang.	3*	--	--	2	3	ESE	60	24	40
										ISE	40	16	
6	Multidisciplinary Courses	MDM-4	23UGMDM4 - CE606L	Town Planning	2	--	--	2	2	ISA	50	20	20
7	Skill Courses	Vocational and Skill Enhancement Course (VSEC)	23UGVSEC2-CE607	Civil Software	1	--	2	2	3	ISA	50	20	20
8	Program Course	PCC	23UGPCC-CE601 LP	Reinforced Concrete Structures	--	--	2	1	2	ISA	25	10	20
										POE	25	10	
9		PCC	23UGPCC-CE608 LP	Structural Design & Drawing-I	--	--	2	1	2	ISA	25	10	20
										POE	25	10	
10		PEC-2	23UGPEC2-CE604 LP	Advance Foundation Engg.	--	--	2	1	2	ISA	25	10	20
										POE	25	10	
11		PCC	23UGPCC-CE602 L	Building Planning & Design	--	--	2	1	2	ISA	25	10	
12		PEC-3	23UGPEC3-CE605 L	Construction Mangt.	--	--	2	1	2	ISA	25	10	
					18	**0**	**12**	**21**	**30**	**0**	**800**	**320**	**320**

Note: In theory examination, there will be separate passing of ESE and ISE.

***Indicates the extra lectures provided for the course**

Multidisciplinary Courses (MDM) Course Basket Sem -V			
Open Elective – OE - II			
Category	**Sub Category**	**Course Code**	**Name of Course**
Multidisciplinary Courses	**Open Elective - OE**	23UGOE2-CE506	**Optimization Techniques** Maintenance, Retrofitting, Rehabilitation of Structure

Skill Courses (SC) Course Basket Sem -VI			
Vocational and Skill Enhancement Course (VSEC)			
Category	**Sub Category**	**Course Code**	**Name of Course**
Skill Courses	Vocational and Skill Enhancement Course (VSEC)	23UGVSEC-CE607	Civil Software Course – STAD Pro Civil Software Course – ETABS ACE – Aptitude &Competitive Examinations

Program Electives Courses (PEC) Basket

PEC - 1			
Category	**Sub Category**	**Course Code**	**Name of Course**
Program Course	**PEC - 1**	23UGPEC1-CE504	**Environmental Engineering** Industrial Waste Treatment

Program Electives Courses (PEC) Basket

PEC - 2			
Category	**Sub Category**	**Course Code**	**Name of Course**
Program Course	**PEC - 2**	23UGPEC2-CE604	**Advance Foundation Engineering** Advance Design of Concrete Structures

Program Electives Courses (PEC) Basket

PEC - 3			
Category	**Sub Category**	**Course Code**	**Name of Course**
Program Course	**PEC - 3**	23UGPEC3-CE605	**Construction Management** Advanced Construction Techniques

Final Year B. Tech. in Civil Engineering

Proposed Structure and Syllabus Under Autonomy as per the NEP Policy 2020

Tatyasaheb Kore Institute of Engineering and Technology, Warananagar

Final Year B. Tech. (Civil Engineering)

Semester-VII

(To be implemented from 2026 - 27)

Credit Scheme as per NEP Policy

Final Year B. Tech. Civil Engineering Sem -VII

Sr. No	Category	Sub Category	Course Code	Name of Course	Teaching Scheme			C	CH	Examination & Evaluation Scheme			
					L	T	P			Component	Marks	Min for Passing	
1	Program Course	PCC	23UGPCC-CE701	Design of Concrete Structures	3	--	--	2	3	ESE	60	24	40
										ISE	40	16	
2		PCC	23UGPCC-CE702	SDFRS	3*	--	--	2	3	ESE	60	24	40
										ISE	40	16	
3		PEC-4	23UGPEC4-CE703	Earthquake Engineering	3*	--	--	2	3	ESE	60	24	40
										ISE	40	16	
4		PEC-5	23UGPEC5-CE704	Quantity Surveying and Valuation	2*	--	--	2	2	ESE	60	24	40
										ISE	40	16	
5	Multidisciplinary Courses	MDM-5	23UGMDM5-CE 705L	Smart Cities and Sustainable Development	2	--	--	2	2	ISA	50	20	20
6	Experiential Learning Courses	ELC	23UGELC-CE706	Research Methodology	3	--	--	3	3	ESE	60	24	40
										ISE	40	16	
7	Program Course	PCC	23UGPCC-CE701 L	Design of Concrete Structures	--	1	--	1	1	ISA	25	10	10
8		PEC-4	23UGPEC4-CE 703 L	Earthquake Engineering	--	1	--	1	1	ISA	25	10	10
9		PEC-5	23UGPEC 704 LP	Quantity Surveying and Valuation	--	--	2	1	2	ISA	25	10	20
										POE	25	10	
10		PCC	23UGPCC-CE 707 LP	Structural Design and Drawing-II	--	--	2	1	2	ISA	25	10	20
										POE	25	10	
11	Experiential Learning Courses	PCC	23UGPCC-CE708 LP	Project	--	--	4	4	8	ISA	50	20	20
										POE	50	20	20
12	Audit Course – VII	A	23UGPCC-CE 709A	Audit Course – Field Training	--	--	--	--	--	--	--	--	--
					16	**2**	**8**	**21**	**30**	**0**	**800**	**320**	**320**

Note: In theory examination, there will be separate passing of ESE and ISE.

***Indicates the extra lectures provided for the course**

Tatyasaheb Kore Institute of Engineering and Technology, Warananagar

Final Year B. Tech. (Civil Engineering)

Semester-VIII

(To be implemented from 2026 - 27)

Credit Scheme as per NEP Policy

Final Year B. Tech. Civil Engineering Sem -VIII

Sr. No	Category	Sub Category	Course Code	Name of Course	Teaching Scheme			C	CH	Examination & Evaluation Scheme			
					L	T	P			Component	Marks	Min for Passing	
1	Program Course	PCC	23UGPCC-CE801	Legal Aspects in Civil Engineering	3*	--	--	1	3	ESE	60	24	40
										ISE	40	16	
2		PCC	23UGPCC-CE802	Design of Bridges	3*	--	--	2	3	ESE	60	24	40
										ISE	40	16	
4		PEC-6	23UGPEC6-CE803	Adv. Construction Tech	2	--	--	2	2	ESE	60	24	40
										ISE	40	16	
5	Multidisciplinary Courses	MDM-6	23UGMDM6-CE804L	Construction Practices	2	--	--	2	2	ISA	50	20	20
6	Experiential Learning Courses	Internship/ OJT	23UGELC-CE805LP	Industrial Internship	--	--	16	8	16	ISA	100	40	40
										POE	100	40	40
7	Program Course	PCC	23UGPCC-CE 802L	Design of Bridges	--	--	2	1	2	ISA	50	20	20
8		PEC-6	23UGPEC6-CE 803 LP	Adv. Construction Tech	--	--	2	1	2	ISA	25	10	10
										POE	25	10	10
9	Experiential Learning Courses	PCC	23UGPCC-CE806LP	Project	--	--	8	4	8	ISA	75	20	20
										POE	75	20	20
10	Audit Course – VIII	A	23UGPCC-CE807A	Paper Presentation/ Publication	--	--	--	--	--	--	--	--	--
					10	**0**	**28**	**21**	**38**	**0**	**800**	**320**	**320**

Program Electives Courses (PEC) Basket

PEC - 4			
Category	**Sub Category**	**Course Code**	**Name of Course**
Program Course	**PEC - 4**	23UGPEC4-CE703	**Earthquake Engineering**
			Dynamics of Structures
			Finite Element Methods

Program Electives Courses (PEC) Basket

PEC - 5			
Category	**Sub Category**	**Course Code**	**Name of Course**
Program Course	**PEC - 5**	23UGPEC5-CE704	**Quantity Surveying and Valuation**
			Water Power Engineering
			Maintenance, Retrofitting, Rehabilitation of Structure

Program Electives Courses (PEC) Basket

PEC - 6			
Category	**Sub Category**	**Course Code**	**Name of Course**
Program Course	**PEC - 6**	23UGPEC6-CE803	**Advance Construction Techniques**
			Site Investigation Methods and Practices
			Optimization Techniques

National Education Policy (NEP) 2020 Structure
Multidisciplinary Courses Basket
Branch: Civil Engineering
Open Electives Basket offered by Department of Civil Engineering

Sr. No.	Semester	Course Code	Category	Name of Course	Teaching Scheme			Examination & Evaluation Scheme		
					L	T	P	Component	Marks	Min for Passing
1	IV	23UGOE1-CE 406	OE-1	Energy and Environment	2	--	--	ESE	60	24
								ISE	40	16
2	IV	23UGOE1-CE 406	OE-1	Engineering Geology	2	--	--	ESE	60	24
								ISE	40	16
1	V	23UGOE2-CE 506	OE-2	Optimization Technique	3	--	--	ESE	60	24
								ISE	40	16
2	V	23 UGOE2-CE 506	OE-2	Maintenance, Retrofitting, Rehabilitation of Structure	3	--	--	ESE	60	24
								ISE	40	16
					5	--	--		**200**	**80**

National Education Policy (NEP) 2020 Structure
Multidisciplinary Minor (MDM) Courses Basket

Branch: Civil Engineering

Sr. No.	Sem	Course Code	Category	Name of Course	Teaching Scheme			C	H	Examination & Evaluation Scheme			
					L	T	P			Component	Marks	Min for Passing	
1	III	23UGMDM1-CE 306T	MDM-1	Construction Materials	1	1	--	2	2	ISA	50	20	20
2	IV	23UGMDM2-CE 405T	MDM-2	Disaster Management	1	1	--	2	2	ISA	50	20	20
3	V	23UGMDM3-CE505	MDM-3	Solid Waste Management	3	1	--	4	4	ESE	60	24	40
										ISE	40	16	
4	VI	23UGMDM4-CE606L	MDM-4	Town Planning	2	--	--	2	2	ISA	50	20	20
5	VII	23UMDM5-CE705L	MDM-5	Smart Cities and Sustainable Development	2	--	--	2	2	ISA	50	20	20
6	VIII	23UGMDM6-CE 804L	MDM-6	Construction Practices	2	--	--	2	2	ISA	50	20	20
					11	**2**	**2**	**14**	**15**		**350**	**140**	**140**

National Education Policy (NEP) 2020 Structure

Branch: Civil Engineering

Exit Option to Qualify Certification after First Year, Diploma after Second Year and B. Tech. Voc. After Third Year

Exit Option to Qualify Certification completion of F. Y. B. Tech.: Any Three (03) Skill based Courses

Sr. No.	Category	Sub Category	Course Code	Name of Course	Teaching Scheme			C	CH	Examination & Evaluation Scheme		
					L	T	P			Component	Marks	Min for Passing
1	**Skill Courses**	**Vocational and Skill Enhancement Course (VSEC)**		Building Services (Compulsory)	2	--	4	2	6	ISA	50	20
2	**Program Course**	**PCC**	Any Two	Construction Materials	2	--	2	3	4	ISA	50	20
3		**PCC**		Basics of Surveying	2	--	2	3	4	ISA	50	20
4		**PCC**		Auto CAD	2	--	2	3	4	ISA	50	20
					8	**0**	**10**	**11**	**18**	**0**	**200**	**80**

Exit Option to Qualify Diploma completion of S. Y. B. Tech.: Any Two (02) Skill based Courses of 6 credits

Sr. No	Category	Sub Category	Course Code	Name of Course	Teaching Scheme					Examination & Evaluation Scheme		
					L	T	P	C	CH	Component	Marks	Min for Passing
1	**Program Course**	**PCC**	Any One	Building Planning and Drawing	2	--	2	3	4	ISA	50	20
2		**PCC**		Introduction to Foundation Engineering	2	--	2	3	4	ISA	50	20
3	**Experiential Learning Courses**	**Project**		Mini Project (Compulsory)	--	--	6	3	6	ISA	50	20
					4	**0**	**10**	**9**	**14**	**0**	**200**	**80**

Exit Option to Qualify B. Tech. Vocational completion of T. Y. B. Tech.: Any Two (02) Skill based Courses of 6 credits

Sr. No	Category	Sub Category	Course Code	Name of Course	Teaching Scheme			C	CH	Examination & Evaluation Scheme		
					L	T	P			Component	Marks	Min for Passing
1	**Program Course**	**PCC**	Any One	Structural Design and Drawing	2	--	2	3	4	ISA	50	20
2		**PCC**		Quantity Surveying and Valuation	1	--	4	3	5	ISA	50	20
3	**Experiential Learning Courses**	**Project**		Mini Project (Compulsory)	--	--	6	3	6	ISA	50	20
					3	**0**	**12**	**9**	**15**	**0**	**150**	**60**

Tatyasaheb Kore Institute of Engineering and Technology, Warananagar

Honor Degree Course in Infrastructure Engineering (Civil Engineering)

(To be implemented from 2026-27)

Credit Scheme as per NEP 2020 Policy

Course Code	CourseTitle	Semester	Category	Teaching and CreditScheme					Examination& EvaluationScheme			
				L	P	T	C	CH	Components	Marks	Min forPassing	
UGCE-H-501	Airport Engineering	V	ESC	4	--	--	4	4	ESE	60	24	40
									ISE	40	16	
UGCE-H-601	Railway Engineering	VI	ESC	4	--	--	4	4	ESE	60	24	40
									ISE	40	16	
UGCE-H-701	Metro Transportation Systems	VII	ESC	4	--	--	4	4	ESE	60	24	40
									ISE	40	16	
UGCE-H-801	Dock & Harbor Engineering	VIII	ESC	4	--	--	4	4	ESE	60	24	40
									ISE	40	16	
UGCE-H-501T	Airport Engineering	V	ESC	--	--	--	1	2	ISA	25	10	10
UGCE-H-601T	Railway Engineering	VI	ESC	--	--	--	1	2	ISA	25	10	10
UGCE-H-701T	Metro Transportation Systems	VII	ESC	--	--	--	1	2	ISA	25	10	10
UGCE-H-801T	Dock & Harbor Engineering	VIII	ESC	--	--	--	1	2	ISA	25	10	10
				16	--	--	20	24	--	500	--	--

Note: In theory examination, there will be separate passing of ESE and ISE.

23UGPCC-CE301-STRENGTH OF MATERIALS

Lectures	**:**	3 Hrs/Week	**Evaluation Scheme**	
Credit	**:**	2	**ISE**	**:** 40 Marks
Tutorials	**:**	---	**ESE**	**:** 60 Marks

Course Objectives: The objective of the course is to

1. To develop an understanding of the basic principles of Structural Analysis.
2. Study the internal effects and deformations caused by the applied loads.
3. Understand the analysis and design aspects of structural engineering.

Course Outcomes:

COs	At the end of successful completion of the course, the student will be able to	Blooms Taxonomy
CO1	Evaluate the response of elastic body for external actions and compute design forces	Understand
CO2	Use different engineering properties and behaviour of the materials like ductility, toughness etc.	Understand
CO3	Understand the Different forces in trusses	Understand
CO4	Analyze bending stresses for different shape of the flexural member	Understand
CO5	Justify Shear Stress under different cross section	Apply Evaluate
CO6	Exhibit combined effect of moment, torque and axial thrust, variation in stress distribution and nature of failure due torque.	Apply

Description:

Strengths of Material is focused on analyzing stresses and deflections in materials under load. Knowledge of stresses and deflections allows for the safe design of structures that are capable of supporting their intended loads. Life of the Civil Components is greatly influenced by the Load and material properties So analysis of load and mechanical properties identification is very important task to select the appropriate material, One should know about required properties for specified task. This course deals with different engineering material and their properties. And several analysis methods

Prerequisites:	1:	Basics of Engineering Mechanics
	2:	Resultant and moment Calculation
	3:	Moment of Inertia

Section – I

Unit 1	**Simple Stress & Strain:**	
	Engineering properties of different materials,Simple stress and strain, Hooke's law, elastic behavior of the body under external actions. Composite sections under axial loading, Temperature stresses and strains, Elastic constants, Normal stresses and strains in three dimensions.	**6 Hrs**
Unit 2	**Shear force diagram & bending moment diagram for determinate beams:**	
	Concept of Determinate structure, Fundamentals of Shear force & Bending Moment, Relationship between SFD, BMD & load, SFD & BMD due to point load, UDL, UVL & moments/couples.	**6 Hrs**

Unit 3	**Analysis of perfect trusses**	
	Introduction to truss. Types of Truss, Assumptions made in analysis of truss, Analysis of pin jointed truss using method of joints & method of sections.	**6 Hrs**
Section – II		
Unit 4	**Bending stresses:**	
	Introduction to bending stresses, Theory of pure bending. Derivation of flexural formula. Bending stresses for symmetrical & unsymmetrical section.	**6 Hrs**
Unit 5	**Shear stresses in beam:**	
	Fundamentals of Shear stresses, Shear stress distribution diagrams of standard section, Shear stress distribution for symmetrical & unsymmetrical section.	**6 Hrs**
Unit 6	**Torsion of circular shaft:**	
	Analysis of circular shaft subjected to torsion. Power transmitted to circular shaft. Shafts subjected to combined bending, torsion & axial thrust	**6 Hrs**

Mapping of POs & COs:

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	If applicable		
													PSO1	PSO2	PSO3
CO1	1	2			1	--	--	---	--	--	--	--	--	--	--
CO2	1	2	1	2		--	--	--	--	--	--	--	--	--	--
CO3	1	2				--	--	--	--	--	--	--	--	--	--
CO4			2	2	2	--	--	--	--	--	--	--	--	--	--
CO5	1	2	2			--	--	--	--	--	--	--	--	--	--
CO6	1	2			1	--	--	--	--	--	--	--	--	--	--

References:

Text Books	
1	"Strength of Materials" - R.K.Bansal., Laxmi Publications.
2	"Strength of Materials" - S Ramamrutham, DhanapatRai Publications.
3	"Structural Analysis" - Bhavikatti S.S, Vikas Publications house New Dehli.
4	"Strength of Materials" - R.K.Rajput., S.Chand Publications.
Reference Books	
1	"Mechanics of Materials" - Gere and Timoshenko, CBS publishers.
2	"Strength of Material" - F. L. Singer and Pytel, Harper and Row publication.
3	"Mechanics of Material" - Beer and Johnston, M.

23UGPCC-CE302-SURVEYING

Lectures	**:**	*3 Hrs/Week	**Evaluation Scheme**		
Credit	**:**	2	**ISE**	**:**	40 Marks
Tutorials	**:**	---	**ESE**	**:**	60 Marks

Course Objectives: The objective of the course is to

1. To obtain a full understanding of the methods of measurement, errors to be expected, and their control.
2. To know the basics of levelling and theodolite survey in elevation and angular measurements.
3. To find out area and volumes using various instruments.
4. To study the significance of plane table surveying in plan making.
5. To be able to use minor instruments with efficiency.
6. To understand the importance of surveying in the field of civil engineering.

Course Outcomes:

COs	**At the end of successful completion of the course, the student will be able to**	**Blooms Taxonomy**
CO1	Evaluate linear and angular measurements and find out various contour lines	Knowledge Understand
CO2	Analyze how to find out areas and volumes of irregular figures	Understand
CO3	Understand various Methods and applications of plane table survey	Understand Apply
CO4	Interpret the various uses of thedolite and application of trigonometrical levelling	Understand Appply
CO5	Apply the basic methods used to trace the traverse and find out omitted measurements	Apply Evaluate
CO6	Exhibit use of minor instruments and apply various methods of hydrographic and tunnel survey	Apply

Description:

Surveying is an engineering operation that involves assessing and recording details about an area of land. These observations can then be used to help plan construction projects. The main purpose of surveying in civil engineering is to determine the three-dimensional relationships between different locations. Surveys are used to collect data about landforms, natural features, and man-made structures. This data is then used to create maps and plans for projects like bridges, roads, and tunnels.

Prerequisites:	1:	Basics of Basic Civil Engineering
	2:	Area and Volume calculation
	3:	Use of Chain & Tape

Section – I

	Levelling and Contouring:

Unit 1	Introduction to levelling. Permanent Adjustments of dumpy level. Reciprocal levelling, Sensitivity of bubble tube, Corrections – curvature and refraction Contouring – methods and applications	**6 Hrs**
Unit 2	**Areas and volumes:**	
	Digital Planimeter. Area- Trapezoidal, Simpsons rule, Mid - ordinate rule, Average ordinate. Volume- Trapezoidal and Simpsons Rule, Capacity contouring	**6 Hrs**
Unit 3	**Plane Table Surveying:**	
	Principles, accessories, significance and adjustments. Methods and applications of plane table survey	**6 Hrs**
Section – II		
Unit 4	**Theodolite:**	
	Vernier theodolite – components, uses and adjustments. Applications – Trigonometrical levelling	**6 Hrs**
Unit 5	**Theodolite Traversing:**	
	Objectives, traverse table, plotting. Omitted measurements	**6 Hrs**
Unit 6	**Applications:**	
	Usage of minor instruments- Hand Level, Abney Level, Ghat Tracer and Box Sextant. Hydrographic survey. Tunnel survey	**6 Hrs**

Mapping of POs & COs:

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	If applicable		
													PSO1	PSO2	PSO3
CO1	1	2			1	--	--	---	--	--	--	--	--	--	--
CO2	1	2	1	1		--	--	--	--	--	--	--	--	--	--
CO3	1	1				--	--	--	--	--	--	--	--	--	--
CO4			2	1	2	--	--	--	--	--	--	--	--	--	--
CO5	1	2	1			--	--	--	--	--	--	--	--	--	--
CO6	1	1			1	--	--	--	--	--	--	--	--	--	--

References:

Text Books	
1	Surveying and Levelling Vol. I and Vol. II - T. P. Kanetkar and S.V.Kulkarni, Pune Vidyarthi Griha Prakashan
2	Surveying Vol. I & II - Dr. B. C. Punmia, Ashok K. Jain, Arun K.Jain, Laxmi Publications.
3	Surveying and Levelling-N. N. Basak, Tata McGrawHill.

4	Surveying, Vol. I & II - S. K. Duggal, TataMcGrawHill.
5	Surveying and Levelling - R. Agor, Khanna Publishers.
Reference Books	
1	Plane Surveying - A. M. Chandra, New Age International Publishers.
2	Surveying Vol. I & II - Dr. K. R. Arora, Standard Book House
3	Surveying and Levelling - Subramanian, Oxford University Press

23UGPCC-CE303-FLUID MECHANICS

Lectures	**:** 3 Hrs/Week	**Evaluation Scheme**	
Credit	**:** 2	**ISE**	**:** 40 Marks
Tutorials	**:** ---	**ESE**	**:** 60 Marks

Course Objectives: The objective of the course is to

1. To study processes and science of fluid and their properties.
2. To study pressure measuring devices and pressure diagram.
3. To apply basic principles in fluid flow problems.
4. To identify the losses in pipes.

Course Outcomes:

COs	At the end of successful completion of the course, the student will be able to	Blooms Taxonomy
CO1	Study the basic properties of fluids and their behavior under application of various force systems.	Knowledge Understand
CO2	Discuss the basic concepts and principles in fluid statics, fluid kinematics and fluid dynamics with their applications in fluid flow problems.	Understand
CO3	Recognize the principles of continuity, momentum and energy as applied to fluid in motion.	Understand
CO4	Apply the equations to analyze problems by making proper assumptions and learn systematic engineering methods to solve practical fluid mechanics problems	Apply Evaluate

Description:

Without Fluid survival of Living Organism is highly impossible. Whole Engineering sector is greatly influenced by Fluid. Fluid Mechanics helps to understand the behavior of fluid under various forces and at different atmospheric conditions, and to select proper fluid for various applications. In this course students will learn about fundamentals, properties, principles and governing equations of fluid behavior in statics and in motion. Students willget new problem solving approaches like control volume concept, streamline patterns and fluid flow analysis. This course has six units namely i) Fluid Properties ii) Fluid Statics iii) Fluid Kinematics iv) Fluid Kinetics v) Impact of jet v) Losses in pipes

Prerequisites:	1:	Applied Mechanics
	2:	Engineering Mathematics
	3:	Engineering Physics
	4:	Basic Civil Engineering

Section – I

Unit 1	**Properties of fluid:**	
	Introduction: Physical Properties of Fluids (Density, Specific Weight, Specific Volume, Specific Gravity, Viscosity: Dynamic and Kinematic Viscosity, Compressibility, Surface tension, Capillary Effect, Vapour Pressure and Cavitation), Newton's law of viscosity, Types of Fluids. Pressure, Types of Pressure, Pascal's Law, Hydrostatic Law.	**7Hrs**
	Fluid Statics:	

Unit 2	A. Pressure Measuring Devices, Pressure Head, Pressure Diagram, Total Pressure and Centre of Pressure, Forces on Plane Surfaces. Forces on vertical walls, gates and dams. B. Buoyancy and Floatation: Archimedes's Principle, Metacentre, Stability of Submerged and Floating Bodies.	**6 Hrs**
Unit 3	**Fluid Kinematics:**	
	Types of Flows, Stream lines, Streak Line, Path Line, Stream Tube, Stream Bundle, Equipotential lines, velocity and acceleration of fluid, Stream Function and Velocity Potential Function, Flow Net- (Properties and Uses), Continuity Equation (3-D Cartesian Form).	**6 Hrs**
Section – II		
Unit 4	**Fluid Kinetics:**	
	Forces Acting on Fluid in Motion, Euler's Equation along a Streamline, Bernoulli's equations, Bernoulli's Theorem assumptions, Limitations and modifications. Bernoulli's Applications: Venturimeter (Horizontal), Orificemeter, Orifices, Time required for Emptying the Tank, Concept of HGL and TEL. Introduction of mouthpiece and Rotameter.	**7Hrs**
Unit 5	**Impact of Jet :**	
	Impulse Momentum Principle, Impact of Jet on Vanes- Flat (Stationary and Moving), Impact of Jet on flat Inclined plate (Stationary and Moving). Practical examples. Series of Vanes Mounted on Wheel.	**5Hrs**
Unit 6	**Losses in Pipes:**	
	A. Major and Minor Losses, Darcy-Wiesbach Equation, Concept of Equivalent Pipe, Dupit's Equation. B. Pipes in Series and Parallel and Syphon pipe, Two Reservoir Problems, Concept of Water hammer. Surge Tanks (Function, Location and Uses).	**5Hrs**

Mapping of POs & COs:

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	If applicable		
													PSO1	PSO2	PSO3
CO1	1	2		1		2	--	---	--	--	--	--	--	--	--
CO2		2	1	2		1	--	--	--	--	--	--	--	--	--
CO3	2	1		1		--	--	--	--	--	--	--	--	--	--
CO4		2			1	1	--	--	--	--	--	--	--	--	--

References:

Text Books	
1	Fluid Mechanics – A.K. Jain – Khanna Pub., Delhi.
2	Fluid Mechanics – Hydraulic and Hydraulic Mechanics -Modi/Seth – Standard Book House, Delhi.

3	Fluid Mechanics and hydraulic machine-R.K.Bansal, Laxmi Pubication.
4	Fluid Mechanics – Garde-Mirajgaonkar – Nemchandand Bros., Roorkee.
5	Fluid Mechanics – S. Nagrathanam – Khanna Pub., Delhi.
Reference Books	
1	Fluid Mechanics – Streeter-McGraw-Hill International Book Co., Auckland.
2	Elementary Fluid Mechanics – H. Rouse – Toppan C. Ltd. Tokyo.
3	Fundamentals of Fluid Mechanics, Munson, Young, Okiishi, Huebesch, Wiley Publication
4	Fluid Mechanics – Shames - McGraw-Hill International Book Co., Auckland

23UGPCC-CE304-ENGINEERING MATHEMATICS FOR CIVIL ENGINEERING

Lectures	**:** 2 Hrs/Week	**Evaluation Scheme**	
Credit	**:** 2	**ISE**	**:** 40 Marks
Tutorials	**:**	**ESE**	**:** 60 Marks

Course Objectives: The objective of the course is to

1. Develop mathematical skills and enhance thinking power of students.
2. Give the knowledge to the students of Linear Differential Equations, Vector Differential Calculus, Statistics and Probability, Numerical methods of solving Algebraic and Transcendental equations with an emphasis on the application of solving engineering problems.
3. Prepare students to formulate a mathematical model using engineering skills & interpret the solution in real world.

Course Outcomes:

COs	At the end of successful completion of the course, the student willbe able to	Blooms Taxonomy
CO1	Solve Linear Differential Equation of higher order	Understand
CO2	Use numerical techniques to find values of derivative numerically.	Apply
CO3	Use numerical methods methods of solving algebraic and transcendental equations of one variable and value of definite integral.	Apply
CO4	Calculate divergence, curl, gradient and directional derivative of a vector and scalar point function	Understand
CO5	Use Binomial, Poisson and Normal distributions to calculate probabilities	Apply
CO6	Find rank of matrix , eigen values and eigen vectors of square matrix.	Understand

Description:

Mathematics for Civil Engineering contains Mathematical methods and techniques that are used to solve complex Civil engineering problems. This course has six units namely i) Linear Differential equation, ii) Numerical Differentiation iii) Numerical Solution of Algebraic and Transcendental Equations iv) Vector Differential Calculus v) Probability Distribution and vi) Linear Algebra

Prerequisites:	1:	Trigonometric identities and Logarithmic identities
	2:	Differentiation and integration formulae
	3:	Probability.

Section – I

Unit 1	**Linear Differential Equations with constant Coefficients**	
	Linear Differential Equation with constant coefficients-Definition, Rules to find complementary function. Methods to find Particular Integrals (e^{ax} , $\sin ax$ and $\cos ax$, x^m, $e^{ax}x^m$, $e^{ax}\sin ax$, $e^{ax}\cos ax$)	**5 Hrs**
	Numerical Differentiation	

Unit 2	Introduction, Newton's forward difference interpolation formula, Newton's backward difference interpolation formula, Sterling's central difference interpolation formula, Newton's divided difference formula.	**4 Hrs**
Unit 3	**Numerical Methods**	
	1. Bisection method 2. Newton-Raphson method. 3. Trapezoidal Rule 4. Simpson Rule	**4 Hrs**
Section – II		
Unit 4	**Vector Differential Calculus**	
	Differentiation of vectors. Gradient of scalar point function. Directional derivative. Divergence of vector point function. Curl of a vector point function. Irrotational, Solenoidal and Scalar potential function of a vector field.	**5 Hrs**
Unit 5	**Probability Distribution**	
	Random variables, Discrete Probability distribution, Continuous probability distribution. Binomial Distribution. Poisson Distribution. Normal Distribution	**4 Hrs**
Unit 6	**Linear Algebra**	
	Rank of matrix, Echelon form, Solution of System of linear Equations Eigen values and Eigen Vector	**4 Hrs**

Mapping of POs & COs:

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	If applicable		
													PSO1	PSO2	PSO3
CO1	2	1	--	--	--	--	--	---	--	--	--	--	--	--	--
CO2	2	1	--	--	--	--	--	--	--	--	--	--	--	--	--
CO3	2	1	--	--	--	--	--	--	--	--	--	--	--	--	--
CO4	2	1	--	--	--	--	--	--	--	--	--	--	--	--	--
CO5	2	1	--	--	--	--	--	--	--	--	--	--	--	--	--
CO6	2	1	--	--	--	--	--	--	--	--	--	--	--	--	--

References:

Text Books	
1	Higher Engineering Mathematics, Dr. B. S. Grewal, S. Chand and Company, 40th Edition.
2	Advanced Engineering Mathematics, H. K. Das, S. Chand Publication, 8th Edition.
Reference Books	
1	Higher Engineering Mathematics, B. V. Ramana, Tata Mc Graw Hill, New Delhi

2	A Text Book of Applied Mathematics, Vol. I and II, P. N.Wartikar and J. N. Wartikar, Vidyarthi Griha Prakashan, Pune.
3	A textbook of Engineering Mathematics, N. P. Bali, Iyengar, Laxmi Publications (P) Ltd, New Delhi
4	Advanced Engineering Mathematics,Erwin Kreyszig, Wiley India Pvt. Ltd

Web Links/ Video Lectures

1. **https://nptel.ac.in/courses/111104521**
2. **https://nptel.ac.in/courses/111107105**
3. **https://nptel.ac.in/courses/111106112**
4. **https://nptel.ac.in/courses/111107062**
5. **https://nptel.ac.in/courses/111107107**
   https://nptel.ac.in/courses/111108066

23UGPCC-CE305-BUILDING CONSTRUCTION AND DRAWING

Lectures	**:** 3 Hrs/Week	**Evaluation Scheme**	
Credit	**:** 2	**ISE**	**:** 40 Marks
Tutorials	**:** ---	**ESE**	**:** 60 Marks

Course Objectives: The objective of the course is to

1. To understand concept of Civil engineering drawing.
2. To describe requirements and draw components of building.
3. To develop basics for planning and design of building.

Course Outcomes:

COs	At the end of successful completion of the course, the student will be able to	Blooms Taxonomy
CO1	Define and illustrate types and components of Civil Engineering drawing.	Remember Understand
CO2	Illustrate the procedure and prepare perspective drawing of various objects.	Apply
CO3	Define basic requirements of building and Demonstrate different types of masonry.	Understand
CO4	State and produce drawings of lintel and arches.	Remember Apply
CO5	State and prepare drawings of doors and windows.	Remember Apply
CO6	Describe and sketch different types of staircase.	Understand Apply

Description:

Building Construction is one of the important sectors of Civil engineering. Basic need of Building construction is to get versed with its various components along with basics of civil engineering drawing. The Knowledge of Building construction, its components and basics of civil engineering drawing forms basis of planning and design of buildings and preparation of standard drawings.

Prerequisites:	1:	Components of building.
	2:	Building Construction materials.
	3:	Technical Drawing Concepts.

Section – I

Unit 1	**Basics of Civil Engineering Drawing:**	
	Civil Engineering Drawing : Necessity, Types(Submission, Working, Architectural) Components :concept of Plan, Elevation, Section related to building Lettering, symbols, type of lines and Dimensioning as per standards.	**6 Hrs**
Unit 2	**Perspective Drawing:**	
	Perspective Drawing: Terminology, Types Rules for drawing perspective. Procedure of drawing Parallel perspective and angular perspectives of simple objects	**6 Hrs**
	Building: Basic requirements, Masonry for construction	

Unit 3	Basic requirements of a building as a whole: Strength and stability, Dimensional stability, comfort and convenience, damp prevention, water-proofing techniques, heat insulation, day lighting and ventilation. Sound insulation and anti-termite treatment. Masonry: Stone, Brick and Composite	**6 Hrs**
Section – II		
Unit 4	**Lintels and Arches:**	
	Lintel: Necessity, Materials (wood, stone, brick, steel, R.C.C. and reinforced brick lintels.) Arches: Technical terms, types of arches based on number of center, Shape and Material used.	**6 Hrs**
Unit 5	**Doors and Windows:**	
	Doors**:** Technical terms, Specification for door, Types, fixtures and fastening. Windows: Technical terms, Specification for door, Types, fixtures and fastening.	**6 Hrs**
Unit 6	**Stairs, Ramps, Lifts and Escalators:**	
	Necessity of Stairs, Ramps, Lifts and Escalators Stairs: Technical terms, requirements of a good stair, classification according to shape and materials for construction. Design of stairs (Dog Legged, quarter turn and Open Well), Introduction to Ramps, Lifts and Escalator	**6 Hrs**

Mapping of POs & COs:

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	If applicable		
													PSO1	PSO2	PSO3
CO1	2	-	-	-	-	2	-	1	1	2	-	2	1	1	-
CO2	2	-	-	-	-	2	-	-	-	2	-	1	-	-	-
CO3	2	-	-	-	-	3	1	1	1	2	-	2	1	1	-
CO4	2	-	-	-	-	3	1	1	1	2	-	2	1	1	-
CO5	2	1	1	-	-	3	1	1	1	2	-	2	1	1	-
CO6	2	1	1	-	-	3	1	1	1	2	-	2	1	1	-

References:

Text Books	
1	"A Text Book of Building Construction" - S.P. Arora, S.P. Bindra, Dhanpat Rai Publications.
2	"Building Construction" - B.C.Punmia, Er.A.K.Jain, Dr. A.K.Jain, Laxmi Publications.
3	"Building Construction" – Rangwala, Charotar Publicatins.
4	"Civil Engineering Drawing" - M. Chakraborty.
5	"A Course in Civil Engineering Drawing" - V.B.Sikka, S.K.Kataria and Sons.
Reference Books	
1	"A to Z of Practical Building Construction and Its Management"- Sandeep Mantri Satya Prakashan, New Delhi.

2	“Handbook of Building Construction” – M. M. Goyal (Amrindra Consultancy).
3	“Practical Handbook – Buiding baandhkam Va dekhrekh Part I and II”, Pramod Beri, DIT publication, third edition. (Marathi Language).
4	I.S. 962 – 1989 Code for Practice for Architectural and Building Drawings.
Web Links/ Video Lectures	
1	Engineering Drawing: https://nptel.ac.in/courses/112103019
2	Building Materials and construction: https://nptel.ac.in/courses/105102088
3	Building Materials : https://archive.nptel.ac.in/courses/105/106/105106206/#

23UGMDM1-CE306T–CONSTRUCTION MATERIALS

Lectures : 1 Hrs/Week
Credit : 2
Tutorials : 1 Hrs/Week

Evaluation Scheme
ISA : 50 Marks

Course Objectives: The objective of the course is to
1. Know the building Materials. 2. Describe properties and suitability of various building materials.. 3. Produce drawings of different building components.

Course Outcomes:		
COs	**At the end of successful completion of the course the student will be able to**	**Blooms Taxonomy**
CO1	Selecting suitable materials for buildings and adopting suitable construction techniques	Understand, Create, Apply
CO2	Exhibiting the knowledge of building finishes.	Understand, Apply
CO3	Solving the problems of environmental issues concerned to building materials and cost-effective building technologies.	Evaluate, Apply
CO4	Recommending various types of alternative building materials and technologies and designing an energy-efficient building by considering local climatic conditions and building materials.	Apply

Description:

Life of the Civil Components is greatly influenced by the Load and material properties So analysis of load and mechanical properties identification is very important task to select the appropriate material, One should know about required properties for specified task. This course deals with different engineering material and their properties. And several analysis methods

Prerequisites:		
	1:	Basics civil engineering.
	2:	Building Material, Construction & Drawings.

Section – I		
Unit 1	**Concrete:** Used for foundations, walls, floors, and structural elements. **Steel:** Used for beams, columns, reinforcement, and structural frames. **Bricks**: Used for walls, facades, and decorative elements.	**3 Hrs**
Unit 2	**Blocks:** Used for walls, partitions, and foundations. **Wood:** Used for doors, windows, furniture, and decorative elements. **Glass:** Used for windows, doors, facades, and decorative elements.	**2 Hrs**
Unit 3	**Roofing materials:** Tiles, Slate, AC sheet, Metal sheets, Asphalt shingles, Concept of Proflex (truss less) roof.	**2 Hrs**

Section – II		
Unit 4	**Insulation materials:** Fiberglass, Rock wool, Polyurethane foam, Reflective insulation, **Finishing materials:** Paint, Wallpaper, Ceramic tiles, Carpet, Flooring materials (hardwood, laminate, etc.)	**3 Hrs**
Unit 5	**Plumbing materials:** Pipes (copper, PVC, etc.), Fittings (elbows, tees, etc.), Valves, Fixtures (sinks, toilets, etc.)	**2Hrs**
Unit 6	**Electrical materials:** Wires , Cables, Switches, Outlets, Lighting fixtures	**2Hrs**

Mapping of POs & COs:

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	If applicable		
													PSO1	PSO2	PSO3
CO1	1	1	1	1	1	2	2	--	--	--	1	--	1	--	--
CO2	1	2	2	1	--	--	--	--	--	--	--	--	--	1	--
CO3	1	3	3	1	1	3	--	--	--	--	--	--	--	1	--
CO4	1	2	3	3	1	2	3	2	--	--	1	1	--	--	3

References:

Text Books	
1	"Building Materials" by S. S. Bhavikatti
2	"Construction Materials" by P. C. Varghese
3	"Building Materials and Construction" by R. P. Gupta
4	"Materials for Civil Engineering" by R. W. McDowell
5	"Construction Materials: Their Nature and Behaviour" by J. M. Illston
6	"Building Materials: Science and Technology" by S. V. Patankar
7	“Construction Materials and Processes" by A. K. Mukherjee
8	"Building Materials and Construction Techniques" by A. R. Sampath
9	"Materials of Construction" by A. M. Neville
10	"Building Materials and Components" by J. R. Smith
11	"Building Materials" by M L Gambhir & Neha Jamwal

23UGEEC1-CE307-PROFESSIONAL LEADERSHIP AND INTERPERSONAL SKILLS

Lectures	**:**	2 Hrs/Week	**Evaluation Scheme**
Credit	**:**	2	**ISA :** 25 Marks
Tutorials	**:**	---	

Course Objectives: The objective of the course is to

1. To develop essential skills to influence and motivate others.
2. Create and maintain leadership traits, emotional and social intelligence.
3. To inculcate ethics and moral values to make balanced personality.

Course Outcomes:

COs	At the end of successful completion of the course, the student will be able to	Blooms Taxonomy
CO1	Explain the traits of leadership with real world example.	Knowledge Understand
CO2	Analyze and solve the problems related to conflicts and time management.	Understand
CO3	Exhibit interpersonal communication skill.	Apply and Evaluate
CO4	Demonstrate skills needed to be a effective employee in industry.	Apply

Description:

This subject provides a key way to become proficient in various aspects of work life. Further it focuses on important aspects like leadership and interpersonal relations to be inculcate in order to become a good employee and human being .

Prerequisites:	1:	Good Reading and Understanding skills
	2:	Ability to speak English moderately

Section – I		
Unit 1	Leadership Skills and types , SMART Goal Setting , SWOC Analysis, Self Management,Motivating People.	**6 Hrs**
Unit 2	Conflict management, Decision Making , Time Management ,Critical Thinking (Discussion on Real world examples of each point with task).	**6 Hrs**
Section – II		
Unit 3	Importance of interpersonal skills, Active listening and Communication, Empathy, teamwork, Networking and collaboration, Creativity and Problem	**6 Hrs**

	solving. Understanding Maslow's Need hierarchy theory. (All points need to be supported with Classroom Activity).	
Unit 4		
	Digital Literacy :Social Media literacy and Internet surfing skills, Positive thinking ,Body Language ,Business etiquettes, Emotional intelligence.	**6 Hrs**

Mapping of POs & COs:

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	If applicable		
													PSO1	PSO2	PSO3
CO1	1	1	-	-	-	--	--	---	--	--	--	--	--	--	--
CO2	-	1	1	-	-	---	--	--	--	--	--	--	--	--	--
CO3	-	-	1	1	-	--	--	--	--	--	--	--	--	--	--
CO4	-	-	-	1	1	--	--	--	--	--	--	--	--	--	--
CO5	-	-	1	1	-	--	--	--	--	--	--	--	--	--	--
CO6	-	-	-	-	-	1	--	--	--	--	--	--	--	--	--

References:

Reference Books.	
1	Krishna Mohan and Meera Banerjee, *Developing Communication Skills* ,MacMillan India Ltd,New Delhi.
2	Masters,L.Ann et.al,*Persoal Development of Life and Work* ,New Delhi ,Cengage Learning.
3	Jeff Butterfield, *Soft skills for Everyone* ,Cengage Learning India Private Ltd.
4	Gopalswamy Ramesh et al.,The ACE of Soft Skills : Attitude ,communication and Etiquette for Success.
5	Northouse, P. G. (2018). Leadership: Theory and practice. Sage publications.
6	Personality Development and Soft Skills by Barun K. Mitra.
Web Links/ Video Lectures	
1	NPTEL Lecture Series.

23UGVEC1-CE308-PERSONAL VALUES AND ETHICS

Course Details: Value Education Course (VEC)					
Teaching Scheme			**Evaluation Scheme**		
Lectures	**:**	1 Hr per week	**ISE**	**:**	--
Credits	**:**		**ESE**	**:**	--
Tutorial	**:**	1 Hr per week	**ISA**	**:**	25 Marks
Credits	**:**	2	**POE**	**:**	--
Total Credits	**:**	2	**Total Marks**	**:**	25 Marks

Course Objectives: The objective of the course is to

1. Development of a positive character, empathetic human being, responsible citizen, a compassionate and empathetic being.
2. Introducing the professional ethics and its implementation in professional work.
3. To understand and follow the ethical practices in engineering.

Course Outcomes:

Cos	**At the end of successful completion of the course the student will be able to**	**Blooms Taxonomy**
CO1	To understand the moral values that ought to guide the engineering profession.	Understand
CO2	To create an awareness on Engineering Ethics and Human Values	Create
CO3	To inspire Moral and Social Values and Loyalty.	Analyze
CO4	To understand harmony in the self.	Understand

Description:

This course explores the integration of values in engineering practices. It covers theoretical foundations, policy analysis, and practical applications in professional carrier. Students will critically examine how values influence professional decisions and outcomes, and develop strategies to implement value-driven carrier.

Unit 1	**Introduction to Value Education:** Right Understanding; Relationship and Physical Facility; Understanding Value Education; Self-exploration as the Process for Value Education, Continuous Happiness and Prosperity –the Basic Human Aspiration-Current Scenario and Method to Fulfill the Basic Human Aspirations.
Unit 2	**Introduction to Professional Ethics**: Basic Concepts, Governing Ethics, Personal & Professional Ethics, Ethical Dilemmas, Life Skills, Emotional Intelligence, Thoughts of Ethics, Value Education, Dimensions of Ethics, Profession and professionalism, Professional Associations, Professional Risks, Professional Accountabilities, Professional Success, Ethics and Profession.
Unit 3	**Professional Practices in Engineering:** Professions and Norms of Professional Conduct, Norms of Professional Conduct vs. Profession; Responsibilities, Obligations and Moral Values in Professional Ethics, Professional codes of ethics, the limits of predictability and responsibilities of the engineering profession.

	Central Responsibilities of Engineers – The Centrality of Responsibilities of Professional Ethics.
Unit 4	**Harmony in the Human Being:** Understanding Human being as the Co-existence of the Self and the Body, distinguishing between the Needs of the Self and the Body, The Body as an Instrument of the Self, Understanding Harmony in the Self, Harmony of the Self with the Body, Programme to ensure self-regulation and Health.

References:

Text Books	
1	Human Values, A.N. Tripathi, New Age Intl. Publishers, New Delhi, 2004.
2	Professional Ethics: R. Subramanian, Oxford University Press, 2015.
3	Ethics in Engineering Practice & Research, Caroline Whitbeck, 2nd edition, Cambridge University Press 2015.
4	Human Values and Professional ethics, Jayashree Suresh, B.S. Raghavan, S. Chand Publications, 3rd revised edition 2009.
Reference Books	
1	Engineering Ethics, Concepts Cases: Charles E Harris Jr., Michael S Pritchard, Michael J Rabins, 4th edition, Cengage learning, 2015.
2	Business Ethics concepts & Cases: Manuel G Velasquez, 6th edition, PHI, 2008.

CO-PO MAPPING

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	-	-	-	-	-	3	-	3	-	1	-	3
CO2	-	-	-	-	-	3	-	3	-	1	-	3
CO3	-	-	-	-	-	3	-	3	-	1	-	3
CO4	-	-	-	-	-	2	-	2	-	1	-	3

Rating 1: Lower Level Rating 2: Medium Level Rating Level 3: Higher Level

23UGFP-CE302 LP-FIELD PROJECT (SURVEYING)

Practicals: 4 hrs / week
Credits: 2

Examination Scheme:
ISA: 25 Marks
POE: 25 Marks

Course Objectives: The objective of the course is to
1) To familiarize the students with the use of equipments to determine length, Area, volume, angles etc. 2) To familiarize the students with various types of Surveying Methods.

Course Outcomes:		
COs	**At the end of successful completion of the course the student will be able to**	**Blooms Taxonomy**
CO1	Understand Concept of levelling	Knowledge, Apply
CO2	Analysis of horizontal & Vertical angles	Analyze
CO3	Analyze various plane table methods	Analyze
CO4	Explain the concept of Contouring & Traversing	Understand Analyze

Practicals:

Sr. No.	**Practical/ Experiment/Tutorial Topic**	**Hrs.**	**Bloom's Taxonomy**
1	Differential and reciprocal levelling, by Auto or Dumpy Level	4	Apply
2	Two Peg Method	4	Knowledge Apply
3	Sensitivity of bubble tube	4	Apply
4	Methods of plane table survey – any two methods	4	Knowledge, Analyze
5	Measurement of horizontal angles by any two methods	8	Knowledge
6	Trigonometrical levelling- when base is accessible.	4	Analyze
7	Block contouring project for at least 100m x 100m- By Auto Level	8	Apply
8	Theodolite traverse Project –Pentagon	8	Apply

Mapping of POs & COs:

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	If applicable		
													PSO1	PSO2	PSO3
CO1	2	1	1	1	--	--	--	---	--	--	---	--	--	---	--
CO2	2	1	2	1	--	--	--	---	--	--	---	--	--	---	--
CO3	--	2	2	--	--	--	--	---	--	--	---	--	--	---	--
CO4	--	1	--	--	--	--	--	---	--	--	---	--	--	---	--

References:

Text Books	
1	Surveying and Levelling Vol. I and Vol. II - T. P. Kanetkar and S.V.Kulkarni, Pune Vidyarthi Griha Prakashan
2	Surveying Vol. I & II - Dr. B. C. Punmia, Ashok K. Jain, Arun K.Jain, Laxmi Publications.
3	Surveying and Levelling-N. N. Basak, Tata McGrawHill.
4	Surveying, Vol. I & II - S. K. Duggal, TataMcGrawHill.
5	Surveying and Levelling - R. Agor, Khanna Publishers.
Reference Books	
1	Plane Surveying - A. M. Chandra, New Age International Publishers.
2	Surveying Vol. I & II - Dr. K. R. Arora, Standard Book House
3	Surveying and Levelling - Subramanian, Oxford University Press

23UGPCC-CE301 LP-STRENGTH OF MATERIAL LAB

Practicals: 2 hrs / week
Credits: 1

Examination Scheme:
ISA: 25 Marks
POE: 25 Marks

Course Objectives: The objective of the course is to
1) To familiarize the students with the use equipments to determine mechanical properties of materials to acquire the knowledge in Material Testing. 2) To familiarize the students with various Types of load and material behaviour.

Course Outcomes:		
COs	**At the end of successful completion of the course the student will be able to**	**Blooms Taxonomy**
CO1	Determine different properties like strength, elongation, toughness, hardness by doing tests like Tensile test, Impact test, Hardness test.	Knowledge Apply
CO2	Understand Behavior of Member under different loading conditions	Understand
CO3	Determine load carrying capacity of different material	Apply
CO4	Explain the concept of Hardness and strain energy	Understand

Practicals:

Sr. No.	**Practical/ Experiment/Tutorial Topic**	**Hrs.**	**Bloom's Taxonomy**
1	Study of Universal testing machine	2	Apply
2	Tensile test on Mild steel.	2	Knowledge Apply
3	Compression test on mild steel	2	Apply
4	Double Shear test of on mild steel	2	Knowledge, Analyze
5	Water absorption and compressive strength of burnt brick	2	Knowledge
6	Study of Impact testing (Izod and Charpy) on Mild Steel.	2	Analyze
7	Hardness testing (Brinell) on Mild steel, Alluminium and brass	2	Analyze

Mapping of POs & COs:

	PO1	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**	**PO11**	**PO12**	**If applicable**		
													PSO1	**PSO2**	**PSO3**
CO1	2	1	1	1	--	--	--	---	--	--	---	--	--	---	--
CO2	2	1	2	2	--	--	--	---	--	--	---	--	--	---	--

CO3	--	2	2	--	--	--	--	---	--	--	---	--	--	---	--
CO4	--	2	--	--	--	--	--	---	--	--	---	--	--	---	--

References:

Text Books	
1	"Strength of Materials" - R.K.Bansal., Laxmi Publications.
2	"Strength of Materials" - S Ramamrutham, DhanapatRai Publications.
3	"Structural Analysis" - Bhavikatti S.S, Vikas Publications house New Dehli.
Reference Books	
1	"Mechanics of Materials" - Gere and Timoshenko, CBS publishers.
2	"Strength of Material" - F. L. Singer and Pytel, Harper and Row publication.
3	"Mechanics of Material" - Beer and Johnston, M.

23UGPCC-CE303 LP–FLUID MECHANICS LAB

Practicals: 2 hrs / week
Credits: 1

Examination Scheme:
ISA: 25 Marks
P**OE:** 25 Marks

Course Objectives: The objective of the course is to
1) To study processes and science of fluid and their properties. 2) To study pressure measuring devices and pressure diagram. 3) To apply basic principles in fluid flow problems. 4) To identify the losses in pipes.

Course Outcomes:		
COs	**At the end of successful completion of the course, the student will be able to**	**Blooms Taxonomy**
CO1	Study the basic properties of fluids and their behavior under application of various force systems.	Knowledge Understand
CO2	Discuss the basic concepts and principles in fluid statics, fluid kinematics and fluid dynamics with their applications in fluid flow problems.	Understand
CO3	Recognize the principles of continuity, momentum and energy as applied to fluid in motion.	Understand
CO4	Apply the equations to analyze problems by making proper assumptions and learn systematic engineering methods to solve practical fluid mechanics problems	Apply Evaluate

Practicals:

Sr. No.	**Practical/ Experiment/Tutorial Topic**	**Hrs.**	**Bloom's Taxonomy**
1	Measurement of Discharge.	2	Apply
2	Study of Pressure Measuring Devices.	2	Knowledge Apply
3	Determination of Metacentric Height for Floating Bodies.	2	Apply
4	Verification of Bernoulli's Theorem.	2	Knowledge, Analyze
5	Calibration of Venturimeter.	2	Knowledge
6	Calibration of Orificemeter.	2	Analyze
7	Determination of Hydraulic Coefficients of Orifice.	2	Analyze
8	Reynold's Experiment.	2	Knowledge, Analyze
9	Determination of Friction Factor for Given Pipe.	2	Analyze
10	Determination of Minor Losses in a Given Pipe.	2	Analyze

11	Study of Moody's Chart.	2	Analyze

Mapping of POs & COs:

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	If applicable		
													PSO1	PSO2	PSO3
CO1	1	2		1		2	--	---	--	--	--	--	--	--	--
CO2		2	1	2		1	--	--	--	--	--	--	--	--	--
CO3	2	1		1		--	--	--	--	--	--	--	--	--	--
CO4		2			1	1	--	--	--	--	--	--	--	--	--

References:

Text Books	
1	Fluid Mechanics – A.K. Jain – Khanna Pub., Delhi.
2	Fluid Mechanics – Hydraulic and Hydraulic Mechanics -Modi/Seth – Standard Book House, Delhi.
3	Fluid Mechanics and hydraulic machine-R.K.Bansal, Laxmi Pubication.
4	Fluid Mechanics – Garde-Mirajgaonkar – Nemchandand Bros., Roorkee.
5	Fluid Mechanics – S. Nagrathanam – Khanna Pub., Delhi.
Reference Books	
1	Fluid Mechanics – Streeter-McGraw-Hill International Book Co., Auckland.
2	Elementary Fluid Mechanics – H. Rouse – Toppan C. Ltd. Tokyo.
3	Fundamentals of Fluid Mechanics, Munson, Young, Okiishi, Huebesch, Wiley Publication
4	Fluid Mechanics – Shames - McGraw-Hill International Book Co., Auckland

23UGPCC-CE305 L-BUILDING CONSTRUCTION AND DRAWING LAB

Practicals: 2 hrs / week
Credits: 1

Examination Scheme:
ISA: 50Marks

Course Objectives: The objective of the course is to
1. To understand concept of Civil engineering drawing. 2. To describe requirements and draw components of building. 3. To develop basics for planning and design of building.

Course Outcomes:		
COs	**At the end of successful completion of the course the student will beable to**	**Blooms Taxonomy**
CO1	Define and illustrate types and components of Civil Engineering drawing.	Remember Understand
CO2	Illustrate the procedure and prepare perspective drawing of various objects.	Apply
CO3	Define basic requirements of building and Demonstrate different types of masonry.	Understand
CO4	State and produce drawings of lintel and arches.	Remember Apply
CO5	State and prepare drawings of doors and windows.	Remember Apply
CO6	Describe and sketch different types of staircase.	Understand Apply

Practicals:

Sr. No.	**Practical/ Experiment/Tutorial Topic**	**Hrs.**	**Bloom's Taxonomy**
	A. Sketch Book:		
1	Assignment based on unit no.1 (Sketches and related Theory)	2	Remember Apply
2	Assignment based on unit no.2 (Sketches and related Theory)	2	
3	Assignment based on unit no.3 (Sketches and related Theory)	2	
4	Assignment based on unit no.4 (Sketches and related Theory)	2	
5	Assignment based on unit no.5 (Sketches and related Theory)	2	
6	Assignment based on unit no.6 (Sketches and related Theory)	2	
	B. Full Imperial Drawing Sheet		
1	Exercise on parallel and angular perspective of simple objects	4	

2	Typical type of Door and Window with appropriate scale	2	
3	Stairs: Dog legged, quarter turn and Open well.	2	

Mapping of POs & COs:

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	If applicable		
													PSO1	PSO2	PSO3
CO1	2	-	-	-	-	2	-	1	1	2	-	2	1	1	-
CO2	2	-	-	-	-	2	-	-	-	2	-	1	-	-	-
CO3	2	-	-	-	-	3	1	1	1	2	-	2	1	1	-
CO4	2	-	-	-	-	3	1	1	1	2	-	2	1	1	-
CO5	2	1	1	-	-	3	1	1	1	2	-	2	1	1	-
CO6	2	1	1	-	-	3	1	1	1	2	-	2	1	1	-

References:

Text Books	
1	"A Text Book of Building Construction" - S.P. Arora, S.P. Bindra, Dhanpat Rai Publications.
2	"Building Construction" - B.C.Punmia, Er.A.K.Jain, Dr. A.K.Jain, Laxmi Publications.
3	"Building Construction" – Rangwala, Charotar Publicatins.
4	"Civil Engineering Drawing" - M. Chakraborty.
5	"A Course in Civil Engineering Drawing" - V.B.Sikka, S.K.Kataria and Sons.
Reference Books	
1	"A to Z of Practical Building Construction and Its Management"- Sandeep Mantri Satya Prakashan, New Delhi.
2	"Handbook of Building Construction" – M. M. Goyal (Amrindra Consultancy).
3	"Practical Handbook – Buiding baandhkam Va dekhrekh Part I and II", Pramod Beri, DIT publication, third edition. (Marathi Language).
4	I.S. 962 – 1989 Code for Practice for Architectural and Building Drawings.
Web Links/ Video Lectures	
1	Engineering Drawing: https://nptel.ac.in/courses/112103019
2	Building Materials and construction: https://nptel.ac.in/courses/105102088
3	Building Materials : https://archive.nptel.ac.in/courses/105/106/105106206/#

23UGPCC-CE309 A-ENVIRONMENTAL STUDIES

Course Objectives: The objective of the course is to

1. Understand the fundamental principles of environmental science and its importance.
2. Develop knowledge about various environmental systems and processes.
3. Identify environmental problems and their impact on human health and the ecosystem.
4. Prepare students to contribute to sustainable development and environmental protection.

Course Outcomes:

COs	At the end of successful completion of the course the student will be able to	Blooms Taxonomy
CO1	Relate the interdependency of environmental components.	Understand, Knowledge
CO2	Identify the environmental problems and prevent environmental pollution	Understand
CO3	Interpret impacts of waste on environmental components.	Understand
CO4	Analyze environmental change and its social impacts	Understand

Description:

The syllabus of Environmental Studies provides an integrated, quantitative and interdisciplinary approach to the study of environmental systems. The students of Engineering undergoing this course would develop a better understanding of human relationships, perceptions and policies towards the environment and focus on design and technology for improving environmental quality. Their exposure to subjects like understanding of earth processes, evaluating alternative energy systems, pollution control and mitigation, natural resource management and the effects of global climate change, shall help the students to bring a systems approach to the analysis of environmental problems.

Prerequisites:	1:	Understanding of Environment Education course.
	2:	Foster environmental awareness, values, and ethics.

Section – I		
Unit 1	Ecosystem, Ecological Pyramids, Food chain, food web, Ecological succession, Natural Resources and Associated Problems. Forest resources, Water resources, Mineral resources, Food resources, Energy resources, Land resources Role of individuals in conservation of natural resources.	-
Unit 2	**Air pollution:** Causes, effects, control, Air pollution controlling equipments, Air quality standards, National air quality index, vehicular emission, alternative fuels, indoor air pollution, Thermal inversions, Photochemical Smog and Acid Precipitation **Noise pollution**: Causes, effects, control, noise standards recommended by CPCB environmental Protection Act, Air (Prevention and Control of Pollution) Act Water (Prevention and control of Pollution) Act. Wildlife Protection Act. Forest Conservation Act and International and National efforts for Environmental Protection.	-
Section – II		

Unit 3	Solid waste management, biomedical waste management, E waste, plastic waste management, Hazardous waste management, carbon footprint, Recycling of waste, Role of Central Pollution Control Board (CPCB), State Pollution Control Board, Role of NGO's	-
Unit 4	Global Warming, Ozone layer depletion, CO_2 emission, urban problems related to energy, Alternative energy sources, Evolution of Sustainable development: timeline, Evolution of green movements in India, Disaster management: Flood, Earthquakes, Cyclones, Landslides, Draught, Tsunami etc., Swachh Bharat Mission, Role of Information technology in Environment and human health.	-

Mapping of POs & COs:

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	If applicable		
													PSO1	PSO2	PSO3
CO1	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-
CO2	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-
CO3	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-
CO4	1	1	-	-	-	-	-	-	-	-	-	-	-	-	-

References:

Text Books	
1	Agarwal K.C.,2001 "Environmental Biology", Nidi publication ltd., Bikaner
2	D.K.Asthana, Meera Asthana, A Textbook of Environmental Studies, S. Chand Publication Revise edition, 2006.
3	S. Deswal & A. Deswal, Basic course in environmental Studies, Dhanpat Rai Co ltd., Delhi, Second revised edition, 2009.
4	"Environmental Science" by William C. Brown, Edward J. Ziegler, and Terry L. Schulenburger
5	"Principles of Environmental Science" by William P. Cunningham and Mary Ann Cunningham
6	"Environmental Studies: A Global Perspective" by Rajiv Kumar and Anand Kumar
7	"Environmental Science: An Ecological Approach" by Richard T. Wright and Bernard J. Nebel
8	"Environmental Science for a Changing World" by Tyler Miller and Scott Spoolman

23UGPCC-CE401-MECHANICS OF STRUCTURES

Lectures	**:** 3 Hrs/Week	**Evaluation Scheme**	
Credit	**:** 2	**ISE**	**:** 40 Marks
Tutorials	**:** ---	**ESE**	**:** 60 Marks

Course Objectives: The objective of the course is to

1. Introduction to structural systems, and to methods of analyzing these systems under various loading conditions.
2. To understand behavior of structure under combined loading.
3. To analyze the structures subjected to moving loads.

Course Outcomes:

COs	At the end of successful completion of the course, the student will be able to	Blooms Taxonomy
CO1	Evaluate the state of stress at a point due to combined effect essential of different forces acting on a structural member hence to calculate the maximum and minimum direct and shear stresses.	Knowledge Understand
CO2	Analyze how to superimpose the actions like normal force, shear force bending moment and hence to know the combined effect of these actions on the members.	Understand
CO3	Understand the location a section experiencing the maximum effect due to moving loads on it.	Understand
CO4	Interpret the change in behavior of column due to changes in end conditions and dimensions of the column.	Understand
CO5	Apply the basic methods used to trace the deformed shape of the flexural member.	Apply Evaluate
CO6	Interpret the stress distribution within the cross section when subjected to various actions and study of strain energy for different action	Apply

Description:

Life of the Civil Components is greatly influenced by the Load and material properties So analysis of load and mechanical properties identification is very important task to select the appropriate material, One should know about required properties for specified task. This course deals with different engineering material and their properties. And several analysis methods

Prerequisites:	1:	Basics of Engineering Mechanics
	2:	moment Calculation and Basic concept of stress
	3:	Moment of Inertia and Method of section

Section – I

Unit 1	**Principal planes & stresses:**	
	Normal and shear stresses on any oblique plane. Concept of principal planes and stresses by analytical method & introduction to graphical methods (Mohr'scircle of stress 2-D). Theories of failure: Maximum normal stress, maximum shear stress and maximumstrain energy theory.	**6 Hrs**
Unit 2	**Combined direct and bending stresses:**	
	Concept of Combined direct and bending stresses eccentric load, core /kernel of section. Stability analysis of gravity dam, Analysis of retaining wall, Analysis	**6 Hrs**

	of chimney under wind pressure.	
Unit 3	**Influence line diagrams:**	
	Introduction to Influence line diagram, Muller's Breslau's principle & its applications to statically determinate simple and compound beam.	**6 Hrs**
Section – II		
Unit 4	**Buckling of long columns:**	
	Fundamentals of Critical load and buckling, Effective length for various end conditions. Slenderness ratio, Safe load on column. Euler's theory and its limitation, Rankine's theory.	**6 Hrs**
Unit 5	**Slope and deflection of determinate beams:**	
	Basic concept of slope and deflection, Slope and deflection of determinate beam with Double integration method, Macaulay's method, Moment-Area method & Conjugate beam method.	**6 Hrs**
Unit 6	**Strain Energy and thin walled cylinder:**	
	Strain energy due to different types of actions, suddenly applied load, gradually appliedload & impact load, strain energy method for deflection of determinate beams. Concept of thin walled cylinder**, Hoop and circumferential stresses, Analysis of thin walled cylinder.**	**6 Hrs**

Mapping of POs & COs:

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	If applicable		
													PSO1	PSO2	PSO3
CO1	1	2			1	--	--	---	--	--	--	--	--	--	--
CO2	1	2	1	2		--	--	--	--	--	--	--	--	--	--
CO3	1	2				--	--	--	--	--	--	--	--	--	--
CO4			2	2	2	--	--	--	--	--	--	--	--	--	--
CO5	1	2	1			--	--	--	--	--	--	--	--	--	--
CO6	1	2			1	--	--	--	--	--	--	--	--	--	--

References:

Text Books	
1	"Strength of Materials" - R.K.Bansal., Laxmi Publications.
2	"Strength of Materials" - S Ramamrutham, DhanapatRai Publications.
3	"Structural Analysis" - Bhavikatti S.S, Vikas Publications house New Dehli.
4	"Strength of Materials" - R.K.Rajput., S.Chand Publications.
Reference Books	
1	"Mechanics of Materials" - Gere and Timoshenko, CBS publishers.
2	"Strength of Material" - F. L. Singer and Pytel, Harper and Row publication.
3	"Mechanics of Material" - Beer and Johnston, M.

24UGPCC-CE402-ADVANCED SURVEYING

Lectures	**:**	3 Hrs/Week	**Evaluation Scheme**	
Credit	**:**	1	**ISE**	**:** 40 Marks
Tutorials	**:**	---	**ESE**	**:** 60 Marks

Course Objectives: The objective of the course is to

1. To equip students with knowledge of various advanced surveying methodologies used in large-scale survey projects.
2. To emphasize how modern instruments and technologies have transformed survey approaches, while maintaining the core principles of surveying.

Course Outcomes:

COs	At the end of successful completion of the course, the student will be able to	Blooms Taxonomy
CO1	Adopt the principles of advanced surveying instruments	Understand Apply
CO2	Formulate triangulation stations, flight planning and ground control points	Understand Apply
CO3	Show effectiveness of modern surveying instruments to improve accuracy and to save time and for surveying operations.	Apply Analyze
CO4	Evaluate the setting out of various curves	Evaluate
CO5	Appreciate the use of modern techniques for surveying and mapping.	Understand Evaluate

Description:

Advanced surveying encompasses a range of specialized techniques and tools like Tacheometry, Remote sensing, GIS, GPS used for precise measurements and data collection to support various engineering, construction, and scientific projects.

Prerequisites:	1:	Levelling, Theodolite traversing
	2:	Distance measurement
	3:	Proficiency in using modern instruments

Section – I		
Unit 1	**Tacheometry**	
	Tacheometry – Principles, Suitability, Methods, Stadia diaphragm, Stadia formulae, Tacheometric contouring.	**7 Hrs**
Unit 2	**Geodetic Surveying**	
	Triangulation Principle and Classification, system, Selection of station, Base line, Measurement, Correction and use of sub tense bar, Signals, satellite station, Reduction to center, Trilateration.	**7 Hrs**
Unit 3	**Modern Surveying Equipment's and Project Surveys**	
	Principle of EDM, Use and applications of Total Station. Reconnaissance, Preliminary and Detailed survey for road project.	**4 Hrs**
Section – II		
	Photogrammetry:	

Unit 4	Introduction, principle, uses Aerial camera, aerial photographs Definitions, scale of vertical and tilted photograph Ground coordinates, ground control, examples on scale, number of photographs, Displacements and errors, Procedure of aerial survey, Examples on flight planning, Photomaps and mosaics., Stereoscopes, Parallax bar, Drone Survey	**5 Hrs**
Unit 5	**Curves:**	
	Significance of curves and curve setting, Type of horizontal curve, elements of Simple, Compound curve, Transition curve introduction only, setting out of simple curve by linear and angular methods. Vertical curves – types, lengths of vertical curves.	**7 Hrs**
Unit 6	**Modern methods of surveying:**	
	Remote sensing – Definition, relevance, types, electromagnetic radiation and energy sources and its characteristics, applications to civil engineering. GPS – basic principles, GPS segments, receivers, applications in survey, DGPS GIS – Terminology, advantages, basic components of GIS, data types, GIS analysis, applications of GIS software LIDAR, GNSS- Introduction	**6 Hrs**

Mapping of POs & COs:

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	If applicable		
													PSO1	PSO2	PSO3
CO1	1	2	--	--	1	--	--	---	--	--	--	--	2	--	--
CO2	1	2	1	2		--	--	--	--	--	--	--	1	--	--
CO3	1	2	--	--	--	--	--	--	--	--	--	--	1	--	--
CO4	1	1	2	2	2	--	--	--	--	--	--	--	1	--	--
CO5	1	2	3	2	1	--	--	--	--	--	--	--	--	--	--
CO6	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--

References:

Text Books	
1	Surveying and Levelling Vol. I and Vol. II by T. P. Kanetkar and S.V.Kulkarni, Pune Vidyarthi Griha Prakashan.
2	Surveying and Levelling - R. Agor, Khanna Publishers, New Delhi
3	Surveying and Levelling by N. N. Basak, Tata McGraw Hill.
4	Surveying, Vol. I & II by S. K. Duggal, TataMc-Graw Hill.
Reference Books	
1	Surveying and Levelling by Subramanian, Oxford University Press.
2	Surveying, Vol. I & II by Dr. B. C. Punmia, Ashok K. Jain, Arun K. Jain, Laxmi Publications.
3	Principles of Surveying. Vol. I by J. G. Olliver, J. Clendinning - Van Nostrand Reinhold.
4	Elements of Photogrammetry - Paul R. Wolf, McGraw Hill Publication
5	Remote sensing and Geographical Information System- A. M. Chandra and S. K. Ghosh, Narosa Publishing House

6	Advanced Surveying -Total Station, GIS and Remote Sensing – Satheesh Gopi, R. Sathikumar and N. Madhu, Pearson publication
Web Links/ Video Lectures	
1	https://nptel.ac.in/courses/105103176
2	https://archive.nptel.ac.in/courses/105/104/105104100/
3	https://archive.nptel.ac.in/courses/105/107/105107218/
4	https://archive.nptel.ac.in/courses/105/107/105107121/

23UGPCC-CE403-CONCRETE TECHNOLOGY

Lectures	**:**	2 Hrs/Week	**Evaluation Scheme**		
Credit	**:**	2	**ISE**	**:**	40 Marks
Tutorials	**:**	---	**ESE**	**:**	60 Marks

Course Objectives: The objective of the course is to

1. To study materials used in concrete production.
2. To understand process of concrete manufacturing and to study properties of fresh concrete.
3. To study relationship between compressive strength and tensile strength.
4. To study mix design of concrete by using IS code method and ACI method
5. To study different Chemical Admixtures
6. To study different types of special concrete and their manufacturing.

Course Outcomes:

COs	At the end of successful completion of the course, the student will be able to	Blooms Taxonomy
CO1	Impart knowledge of physical properties of ingredients of concrete and their effect on strength and durability.	Knowledge Understand
CO2	Explain the fundamentals of process of making good quality concrete and its elastic properties.	Understand Apply Evaluate
CO3	Understand the factors affecting properties of concrete.	Understand Evaluate
CO4	Design the concrete mix proportion as per Indian standard code of practice.	Evaluate
CO5	Demonstrate Non Destructive Testing (NDT) and evaluate quality of existing concrete.	Apply Evaluate
CO6	Understand different types of concrete and their applications.	Knowledge Apply

Description:

Life of the Civil Components is greatly influenced by the Load and material properties So analysis of load and mechanical properties identification is very important task to select the appropriate material, One should know about required properties for specified task. This course deals with different engineering material and their properties. And several analysis methods

Prerequisites:	1:	Basics civil engineering
	2:	Building Construction & Drawing

Section – I

Ingredients of concrete:

Unit 1	**Cement**: Manufacturing process of cement, chemical composition, grades of cement, hydration, types of cement, Tests for cement: fineness, Standard consistency, setting time, soundness and compressive strength. **Aggregates**: classification, requirements, Tests for coarse aggregates: specific gravity, grading of aggregate, Flakiness index, Elongation Index, Impact value, abrasion value, crushing value. Tests for fine aggregates: specific gravity, sieve analysis, fineness modulus. Alkali aggregate reaction, bulking of sand, Artificial and Recycled aggregate. **Water**: general requirements, quality of water	**7 Hrs**
Unit 2	**Workability**:	
	Factors affecting, different tests for measurement of workability. Segregation, bleeding. Manufacturing process of concrete: batching, mixing, transportation, compaction, curing of concrete, curing methods.	**6 Hrs**
Unit 3	**Hardened concrete** :	
	Strength of concrete: w/c ratio, gel/space ratio, gain of strength with age, maturity concept of concrete, effect of maximum size of aggregate on strength. Test on hardened concrete: compressive strength, Split tensile strength test, comparison of compressive strength between cube test and cylinder test, flexural strength. Relation between compressive and tensile strength. Definition and factors affecting creep and shrinkage. Nondestructive testing: Schmidt's rebound hammer, Ultrasonic pulse velocity method.	**8 Hrs**
Section – II		
Unit 4	**Admixtures in concrete:**	
	Chemical Admixtures: Plasticizers, Super plasticizers, Retarders, Air entraining agents, IS 9103Specifications **Mineral Admixtures**: Fly ash, Silica Fume, GGBS, Rice husk ash, metakaolin	**5 Hrs**
Unit 5	**Concrete Mix Design** :	
	Objectives of mix design, different methods of mix design, factors affecting mix proportions, quality control of concrete, statistical methods, acceptance criteria, Numerical on mix design by ACI 211.1-1991, IS 10262- 2009 and IS 456 -2000. Mix design of fly ash concrete by IS 10262 – 2009.	**8Hrs**
Unit 6	**Special Concretes and Durability of concrete:**	
	Special Concretes: Light weight concrete, Polymer modified concrete, concept of fibre reinforced concrete, High performance concrete, Pumpable concrete, Roller compacted concrete, Self compacting concrete, Decorative concrete, Green Concrete. **Durability of concrete**: Significance, Permeability and Durability, Chemical Attack, Sulphate attack, Attack by Seawater, Acid attack, Chloride attack, Carbonation of concrete and its determination.	**6Hrs**

Mapping of POs & COs:

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	If applicable		
													PSO1	PSO2	PSO3
CO1	3	1	1	--	--	2	--	--	--	--	1	1	2	1	--
CO2	2	2	--	--	--	2	1	--	--	--	--	1	1	1	--
CO3	3	--	--	--	2	2	--	1	--	--	--	1	1	--	--

CO4	1	2	1	3	1	2	--	1	--	--	--	1	3	--	--
CO5	1	2	1	--	2	1	--	--	--	--	--	--	1	2	--
CO6	2	1	--	--	--	1	1	--	--	1	--	1	--	1	--

References:

Text Books	
1	Shetty, M.S., Concrete Technology, S. Chand Publication.
2	Gambhir, M.L., Concrete Technology, Tata McGraw Hill.
Reference Books	
1	A. M. Neville, J. J. Brooks, "Concrete Technology" Pearson Education India
2	A. M. Neville, "Properties of Concrete", Pearson Education India.
3	R.S. Varshney, "Concrete Technology", Oxford and IBH.
4	P. Kumar Mehta, "Microstructure and properties of concrete", Prentice Hall.SP-26.
IS codes	
1	IS: 10262 - 2009, Recommended guidelines for Concrete Mix Design.
2	IS: 456- 2000, Indian Standard Plain and Reinforced Concrete.

23UGPCC-CE404-HYDRAULICS

Lectures	**:** 2 Hrs/Week	**Evaluation Scheme**	
Credit	**:** 1	**ISE**	**:** 40 Marks
Tutorials	**:** ---	**ESE**	**:** 60 Marks

Course Objectives: The objective of the course is to

1. To study uniform and non-uniform flow in open channel.
2. To study velocity and discharge measurement devices.
3. To study impact of jet, Pumps and turbines.

Course Outcomes:

COs	At the end of successful completion of the course, the student will be able to	Blooms Taxonomy
CO1	Provide students with basic knowledge of fluid properties and utilizing principles developed in fluid mechanics	Knowledge Understand
CO2	Develop the principle and equation for pressure flow and momentum analysis.	Understand
CO3	Provide the students with the analytical knowledge of pressure and velocity distribution in an open channel in order to solve practical problems	Understand
CO4	Illustrate and develop the equations and design principles for open channel flows, including sanitary and storm sewer design and flood control hydraulics.	Apply Evaluate

Description:

The material in this course will provide the student with a fundamental background in the statics and dynamics of fluids, laws of fluid mechanics and energy relationships. The basic conservation laws of mass, momentum and energy are analyzed in control volume and differential form. The student will learn how to choose the right formulation for fluid flow problems. The student will also learn how to analyze practical fluid flow phenomenon and apply basic principles / concepts in fluid mechanics to solve real life situations.

Prerequisites:	1:	Applied Mechanics
	2:	Engineering Mathematics
	3:	Engineering Physics
	4:	Basic Civil Engineering

Section – I

Unit 1	**Uniform Flow in Open Channel:**	
	A. Introduction, Types of Open Channels, Types of Flows in Open Channel, Geometric Elements, Velocity Distribution, Measurement of Velocity- (Pitot tube, Current Meter) B. Steady and Uniform Flow: Characteristics of uniform flow, Chezy's and Manning's Formula, Uniform Flow Computations, Hydraulically Efficient Section (Rectangular, Triangular, Trapezoidal.	**6Hrs**
Unit 2	**Notches and Weirs**:	
	Introduction of notches and weir, Classification of notches and weir, Derivation of Discharge Equation of Rectanguler, Trianguler and Trapizoidal weir or notch, Velocity of Approach, Calibration of Weirs and Notches. Effect on discharge due to errors in head measurement over weir. Time of Emptying Tank with Weir.	**6Hrs**

Unit 3	**Gradually Varied Flow (GVF):**	
	Depth Energy Relationship in Open Channel Flow: Specific Energy Curve Specific Force (Definition and Diagram) Gradually Varied Flow (GVF): Definition, Classification of Channel Slopes, Dynamic Equation of GVF (Assumption and Derivation), Classification of GVF Profiles, Practical Examples.	**6 Hrs**
Section – II		
Unit 4	**Pumps:**	
	Introduction, Types of Pumps Centrifugal Pump: Classification, Performance Characteristics, Common Pump Troubles and Remedies, Net Positive Suction Head (NPSH). Introduction to Different types of pump used in construction Industry. Valve: Types of Valve and its applications.	**6Hrs**
Unit 5	**Rapidly Varied Flow (RVF):**	
	Rapidly Varied Flow (RVF): Definition, Hydraulic Jump- Phenomenon, Conjugate Depth Relationship, Characteristics, Hydraulic Jump (uses, types, location and application) , Hydraulic Jump as an Energy Dissipater.	**6Hrs**
Unit 6	**Hydraulic Turbines:**	
	Hydraulic Turbines: Classification of Turbines- Pelton, Francis and Kaplan Turbine Selection of Type of Turbine, Concept of Draft Tube. Hydropower plant: Introduction, Schematic layout of Hydropower plant. Power generation and its distribution.	**6Hrs**

Mapping of POs & COs:

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	If applicable		
													PSO1	PSO2	PSO3
CO1	1	2				2	--	---	--	--	--	1	--	--	--
CO2		1	2		1	2	--	--	--	--	--	--	--	--	--
CO3	2	1		1		--	--	--	--	--	--	1	--	--	--
CO4		2		2	1	1	--	--	--	--	--	--	--	--	--

References:

Text Books	
1	Fluid Mechanics – A.K. Jain – Khanna Pub., Delhi.
2	Open Channel flow – Rangaraju – Tata McGraw-Hill Pub. Co., Delhi.
3	Fluid Mechanics – K. Subramanyam – Tata McGraw-Hill Pub. Co., Delhi.
4	Fluid Mechanics – Hydraulic and Hydraulic Mechanics -Modi / Seth – Standard Book House, New Delhi.
5	Fluid Mechanics and hydraulic machine-R.K.Bansal, Laxmi Pubication.

Reference Books	
1	Fluid Mechanics – Streeter-McGraw-Hill International Book Co., Auckland.
2	Flow in open channel – V. T. Chaw - McGraw-Hill International Book Co., Auckland.
3	Fluid Mechanics – K. L. Kumar – Eurasia Publication House, Delhi.

23UGMDM2-CE405T-DISASTER MANAGEMENT

Lectures	**:** 1 Hrs/Week	**Evaluation Scheme**	
Credit	**:** 2	**ISA**	**:** 50 Marks
Tutorials	**:** 1		

Course Objectives: The objective of the course is to
1) To provide basic conceptual understanding of disasters. 2) To understand approaches of Disaster Management. 3) To build skills to respond to disaster

Course Outcomes:

COs	**At the end of successful completion of the course, the student will be able to**	**Blooms Taxonomy**
CO1	Classify and Quantify the disaster.	Knowledge Understand
CO2	Communicate and Response to the various organizations.	Apply Knowledge
CO3	Plan and Execute rescue operation in the disaster situation.	Apply

Description:

The course is intended to provide a general concept in the dimensions of disasters caused by nature beyond the human control as well as the disasters and environmental hazards induced by human activities with emphasis on disaster preparedness, response and recovery.

Prerequisites:		
	1:	Basics of Disaster management.
	2:	Role of various organizations.

Unit 1	Introduction on Disaster	
	Different Types of Disaster : A) Natural Disaster: such as Flood, Cyclone, Earthquakes, Landslides etc. B) Man-made Disaster: such as Fire, Industrial Pollution, Nuclear Disaster, Biological Disasters, Accidents (Air, Sea, Rail & Road), Structural failures (Building and Bridge),War & Terrorism etc. Causes, effects and practical examples for all disasters.	**5Hrs**
Unit 2	Disaster Preparedness.	
	Preparedness- 1. Disaster Preparedness: Concept and Nature. 2. Disaster Preparedness Plan. 3. Prediction, Early Warnings and Safety Measures of Disaster.	**5 Hrs**
Unit 3	Role and Responsibilities of various bodies in Disaster Preparedness	
	1. Information, Education, Communication and training. 2. Government, International and NGO Bodies. 3. Information Technology. 4. Engineers.	**5Hrs**

Tutorials	**1**	Assignments on each unit above.	**3**
	2	Training and drills for disaster preparedness, Awareness generation program.	**4**
	3	Basic principles of disasters management, Disaster Management cycle, Disaster management policy,National and State Bodies for Disaster Management.	**4**
	4	Case Study of one Important disaster.	**4**

Mapping of POs & COs:

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	If applicable		
													PSO 1	PSO 2	PSO 3
CO1	1	-	-	-	1	2	--	1	--	--	--	--	--	--	--
CO2	1	-	-	-	-	2	--	--	--	2	--	--	--	--	--
CO3	1	-	-	-	-	2	7	--	2	--	--	--	--	--	--

References:

Text Books	
1	Disaster Management Guidelines, GOI-UND Disaster Risk Program (2009-2012)
2	Damon, P. Copola, (2006) Introduction to International Disaster Management, Butterworth Heineman.
3	Gupta A.K., Niar S.S and Chatterjee S. (2013) Disaster management and Risk Reduction, Role of Environmental Knowledge, Narosa Publishing House, Delhi.
4	Murthy D.B.N. (2012) Disaster Management, Deep and Deep Publication PVT. Ltd. New Delhi.
5	Modh S. (2010) Managing Natural Disasters, Mac Millan publishers India Ltd.

23UGOE1-CE406-ENERGY AND ENVIRONMENT

Lectures	**:**	2 Hrs/Week	**Evaluation Scheme**		
Credit	**:**	2	**ISE**	**:**	40 Marks
Tutorials	**:**	---	**ESE**	**:**	60 Marks

Course Objectives: The objective of the course is to
1) To understand various sources of energy with respect to quantity and use 2) To describe and design the various Building and industrial energy efficient units. 3) To learn the special energy requirements and its methods of applications 4) To learn various sources of Air pollution, Noise Pollution and Solid waste its treatment and safe disposal. 5) Measurement of pollution of Air, Noise, and Solid waste.

Course Outcomes (CO):

COs	**At the end of successful completion of the course, the student will be able to**	**Blooms Taxonomy**
CO1	Describe the various sources of energy with respect to quantity.	Knowledge Understand
CO2	Describe and design the various energy efficient units.	Understand
CO3	Illustrate the special energy requirement and its use in residential and industrial buildings	Understand
CO4	Know the various sources of Air pollution, Noise Pollution and Solid waste its treatment and safe disposal.	Understand
CO5	Measurement of strength of Air pollutants, sound pollution and solid waste	Apply Evaluate

Description:

Energy and Environment is focused on analysing and understanding the quality and quantity of Energy required for various types of buildings and its audits. Moreover, the awareness of Air pollution, Noise Pollution and Solid waste generates its pollution intensity, limits laws, and various methods of testing and reduction of pollution. This course will enhance the knowledge about green energy and its applications. The future of globe to reduce use of non-renewable energy and application of green energy is achieved through this course. The environmental pollution impact can be controlled through various techniques and their implementation.

Prerequisites	1	Energy requirements for human activities
	2	Effects of Air pollution and noise pollution on Human and his environment
	3	Solid wastes and its nuisance
	4	MPCB, CPCB and its standards

Section – I

Unit 1	**Air Pollution**	
	Definition, Sources and classification of pollutants, Effects. Measurement of Air Pollutants, Control of industrial air pollution- Settling Chamber, Bag filter, Cyclone separator, Scrubbers, Electrostatic precipitators. Air quality standards	**7 Hrs**

Unit 2	**Noise Pollution**	
	Noise characteristics and measurements, Levels of noise and standards, control.	**4 Hrs**
Unit 3	**Solid Waste Management**	
	Solid wastes Definition, Types, Sources, Characteristics, Functional outlines-storage, Collection, Processing techniques, Methods of treatment of solid waste-Composting, Incineration, Pyrolysis and Sanitary land filling.	**7Hrs**
Section – II		
Unit 4	**Green Energy and Environment:**	
	Introduction to Green Buildings, Aspects of green energy and the environment, such as bio-fuel and bio-energy, energy storage and networks, Catalysis of sustainable development	**6 Hrs**
Unit 5	**Clean Energy and its uses**	
	Reduced air pollution and greenhouse gas emissions, Lower consumer energy bills, Enhanced state and local economic development and job creation, Improved energy system reliability and security. Energy audits and green building rating	**5 Hrs**
Unit 6	**Environmental Problems and Energy:**	
	Different types of Energy – Conventional and non-conventional, The environmental problems directly related to energy production and consumption include air pollution, climate change, water pollution, thermal pollution, and solid waste disposal. The emission of air pollutants from fossil fuel combustion is the major cause of urban air pollution.	**7 Hrs**

Mapping of POs & COs:

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	If applicable		
													PSO 1	PSO 2	PSO 3
CO 1	1	2	-	-	1	--	--	---	--	--	--	--	--	--	--
CO 2	1	2	1	2	-	--	--	--	--	--	--	--	--	--	--
CO 3	1	2	-	-	-	--	--	--	--	--	--	--	--	--	--
CO 4	-	-	2	2	2	--	--	--	--	--	--	--	--	--	--
CO 5	1	2	2	-	-	--	--	--	--	--	--	--	--	--	--
CO 6	1	2	-	-	1	--	--	--	--	--	--	--	--	--	--

References:

	Text Books
1	Sewage Disposal and Air Pollution Engineering - Garg S.K., [Khanna Publishers]
2	Solid Waste Management in Developing countries - Bhide A.D. and SundersenB.B.[Indian National Scientific Documentation Centre, New Delhi]
3	Air Pollution- Rao M.N. and Rao H.V.N. [Tata McgrawHill]

4	Environmental Noise Pollution: Noise Mapping, Public Health, and PolicyPaperback – Import by Enda Murphy (Author), Eoin A King (Author)
Reference Books	
1	Manual on sewerage & sewage Treatment published by Ministry of Urban Development Govt. of India Msy-2000. 35 PDOP-4-59-85-97, Ministry of Urban development
2	Manual on Municipal Solid Waste Management- Ministry of Urban Development Govt. of India

23UGVSEC-CE407 L-COMPUTER AIDED DESIGN AND DRAWING

Lectures	**:** 1 Hrs/Week	**Evaluation Scheme**	
Credit	**:** 2	**ISA**	**:** 25 Marks
Practical	**:** 2 Hrs/Week		

Course Objectives: The objective of the course is to

1. To use of Computer Aided Drawing (CAD) for civil engineering.
2. To learn 2D commands of CAD.
3. To develop drawing using CAD.

Course Outcomes:

COs	At the end of successful completion of the course, the student will be able to	Blooms Taxonomy
CO1	Describe use & commands of CAD for civil engineering.	Remember, Understand
CO2	Explain edit commands of CAD.	Understand
CO3	Explain view commands of CAD.	Understand
CO4	Explain modify commands of CAD.	Understand
CO5	Illustrate use of layers of CAD.	Understand
CO6	Develop drawing for building by using CAD software.	Apply

Description:

Drawing is important part of any engineering work. For accuracy, repetitive or speedy work, addition or alteration work, we can use computers with different software installed in it. Various companies like Autodesk, ZW etc. are provided CAD software which is very useful in civil engineering. Student must have knowledge about required commands & drafting techniques in CAD.

Prerequisites:	1:	Basic rules for engineering drawing.
	2:	Common usage of computer.
	3:	Components of building along with rules & regulations.

Unit 1	**Introduction to Computer Aided Drawing (CAD)**:	
	Introduction to CAD, history, use, Basic commands to draw 2D objects like, point, line, circle, ellipse, polygon etc.	**2 Hrs**
Unit 2	**Editing commands:**	
	Erase, extension, break, trim, fillet, scale etc.	**2 Hrs**
Unit 3	**Viewing commands:**	
	Zoom, pan, mirror, rotate, move, block, offsetting etc.	**2 Hrs**
Unit 4	**Modify:**	
	Draw & Modify toolbars for CAD Software.	**2 Hrs**
Unit 5	**Layers:**	

	Use of layers in 2D drawing, Annotation and Layers toolbars any advance CAD Software.	**2 Hrs**
Unit 6	**Develop plan for Building:**	
	Develop different plans for any type of building by using CAD software.	**2 Hrs**

NOTE: For practical, individual student must practice & submit unit wise work given by subject teacher in lab on separate computer.

Mapping of Pos & Cos:

	PO1	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**	**PO11**	**PO12**	**If applicable**		
													PSO 1	**PSO 2**	**PSO 3**
CO1	2	1	1	1	3	2	1	1	2	3	2	2	3	1	2
CO2	1				2					2	2	2	2		1
CO3	1				2					2	2	2	2		1
CO4	1				2					2	2	2	2		1
CO5	1				2					2	2	2	2		1
CO6	2	1	1	1	3	2	1	1	2	3	2	2	3	1	2

References:

Reference Books	
1	"AutoCAD" – David Frey, BPB Sybex Publications.
2	"AutoCAD"– George Omura.
Web Links/ Video Lectures	
1	https://nptel.ac.in/courses/112104031
2	https://www.youtube.com/results?search_query=basics+of+autoCAD
3	https://classroom.google.com/c/MzY4OTQwMjcwNzI1

23UGEEC2-CE409-HUMAN RESOURCE MANAGEMENT

Lectures	**:** 2 Hrs/Week	**Evaluation Scheme:**	
Credit	**:** 2	**ISA**	**:** 25 Marks

Course Objectives: The objective of the course is to

1. Understand meaning scope and objectives human resource management & its planning.
2. Develop skills in recruitment, selection, training & compensation process.
3. Understand job evaluation and learn about employee welfare & IHRM.

Course Outcomes:

COs	At the end of successful completion of the course, the student will be able to	Blooms Taxonomy
CO1	Define scope, objectives, need of human resource management.	Remember
CO2	Review and explain Methods of human resource planning.	Understand
CO3	Describe the methods of recruitment and selection process.	Remember
CO4	Explain methods of training and compensation management.	Understand
CO5	Observe job evaluation method and process.	Understand
CO6	Identify different labour laws and understand concept of IHRM.	Remember Understand

Description:

Human Resource management (HRM) plays important role in each organization. Students should have basic knowledge about HRM before the completion of his/her graduation. This subject deals with Introduction to HRM, Planning, Recruitment, and Training of human personnel. Also it focuses on selection and compensation management of employees. It adds insight in to job evaluation, employee welfare & concept of International Human Resource management. (IHRM)

Prerequisites:	1:	Basic knowledge of business concepts, knowledge of organizational behavior.
	2:	Understanding of human behavior psychology and sociology in HRM.
	3:	Strong written and verbal communication skills.
	4:	Knowledge of relevant laws, ethics and social responsibility.

Section – I		
Unit 1	**Introduction To Human Resource Management.**	
	Introduction and meaning of HRM, Scope and Objectives of HRM, Need of HRM in the context of Globalization.	**4Hrs**
Unit 2	**Human Resource Planning.**	
	Introduction and Definition of HRP, Need and objectives of HRP, Methods of HRP: forecasting demand for human resources, manpower inventory, and formulating HR plans.	**4Hrs**
Unit 3	**Recruitment and Selection.**	
	Definition, internal and external sources of recruitment, Methods of Recruitment: Direct, Indirect and Third party methods. Selection: Definition and Process of selection.	**4Hrs**
Section – II		

Unit 4	**Training and Compensation.**	
	Definition, Need of training, Methods of training: On job and Off job training, Concept of Compensation, Compensation management process.	**4Hrs**
Unit 5	**Job Evaluation.**	
	Meaning of job evaluation, Objectives. Process of job evaluation, Methods of Job evaluation: Ranking, Classification, Factor comparison method.	**4Hrs**
Unit 6	**Employee Welfare & IHRM.**	
	Labour laws: Main features of Payment of wages act, Workmen's compensation act, Factory act, Trade Union Act, Concept of International Human Resource management (IHRM).	**4Hrs**

- **Note:** Prepare at least one Assignment on each unit separately for in-semester Assessment (ISA) work.

Mapping of POs & COs:

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	If applicable		
													PSO1	PSO2	PSO3
CO1	1	-	-	-	-	2	-	1	-	-	-	-	1	-	-
CO2	1	-	-	-	-		1	-	-	-	-	-	-	-	-
CO3	1	-	-	-	-	1	-	-	1	-	-	-	1	2	-
CO4	1	-	-	-	-	1	-	-	-	-	-	-	-	-	-
CO5	1	-	-	-	-	1	-	1	-	-	-	-	2	1	-
CO6	1	-	-	-	-	1	-	-	-	1	-	1	-	1	-

References:

Text Books	
1	Personnel/human Resource Management Terry L. Leap, Michael D. Crino, Macmillan Publishing Company, 1993.
2	K. Aswathappa, _Human Resource Management', Tata Mc Graw Hill , New Delhi.
3	Loosemore M., Dainty A., Lingard H., "Human Resource Management in Construction Projects", Spon Press, 2003
4	Venkataratnam & Srivastava, _ Personnel Management and Human Resources', Tata Mc Graw Hill, New Delhi.
Reference Books	
1	Personnel Management: Managing Human Resources, Paul S. Greenlaw, John P. Kohl Harper & Row, 1986
2	NICMAR Publication on - HRD in the Construction Industry - papers and proceedings of the 5th National HRD round table in the Construction Industry, Pune - March - 2000.
Web Links/ Video Lectures	
1	http://nptel.ac.in/
2	http://www.shrm.org/
3	http://www.hrm.org/

23UGVEC2-CE410-ETHICS AND MORAL PHOLOSOPHY

Lectures	**:** 2 Hrs/Week	**Evaluation Scheme**	
Credit	**:** 2	**ISA**	**:** 25 Marks

Course Objectives: The objective of the course is	
1	To familiarize the students with the philosophy subject, its branches, problems, methods and also it provides a wider canvas about tackling day-to-day problems in a larger perspective.
2	To introduce the basics of the science of logic and reasoning, this is the most effective means of developing logical abstract and critical thinking in students.
3	To introduce the ethical philosophies propounded in the different philosophical systems.
4	To give an insight into the nature of ethics, moral notions, and basic moral theories as propounded by ethical philosophers and also deal with the problems of applied ethics.
5	To understand the importance of ethics in the professional practice of engineering.
6	To foster a sense of responsibility towards society and the environment.

Course Outcomes:		
COs	**At the end of successful completion of the course, the student will be able to**	**Blooms Taxonomy**
CO1	Understanding of different ethical philosophies and their influence on life. Understanding right, wrong, good and bad and understanding moral principles and their application in everyday life.	Knowledge, Understand
CO2	Apply philosophical methods in the abstraction of ideas, their explanation, and interpretation.	Understand
CO3	Knowledge of contemporary methods of philosophical inquiry and their applications.	Knowledge, Apply
CO4	Identify an argument in a passage of ordinary text, including identifying the premises and conclusions and distinguishing them from extraneous information.	Understand
CO5	Ability to understand reality from different perspectives and understand the various ancient and contemporary issues of moral philosophy.	Apply Evaluate
CO6	Apply basic ethical concepts and approaches to solving practical problems in everyday life.	Understand , Apply

Description:

This course is designed to equip you with the skills to critically and creatively analyze the ethical dimensions of your own actions and the broader world. You will engage with moral dilemmas through the lens of various philosophical frameworks, including analytical philosophy, philosophical thought, pragmatism, and phenomenology. The curriculum will explore the extensive historical and cultural traditions that address complex moral issues, utilizing epics, parables, religious doctrines, and other methodologies. Furthermore, you will learn to apply these ethical theories to contemporary global challenges.

Prerequisites:	No prerequisites are required for the course

Course Outline:

Section – I		
Unit 1	**Introduction to Philosophy and Ethics**	
	Introduction to philosophy, Philosophical reasoning, Induction and abduction. Definition and scope of ethics, Difference between ethics, morals, and laws, Ethical theories, Value ethics, Importance of ethics in engineering.	**6 Hrs**
Unit 2	**Comprehending the meaning and purpose of the surrounding and events**	
	Nature of reality, skepticism, empiricism, The problem of 'evil' in the practical world, Essentialism, Existentialism, Nihilism, Absurdism.	**6 Hrs**
Unit 3	**Moral dilemmas and their resolutions**	
	Concept of Justice and Rights, Determinism and free will, Compatibilism, Utilitarianism, Theory of natural law.	**6 Hrs**
Unit 4	**Awareness in the era of AI**	
	Personal identity and The ship of Theseus, Artificial Intelligence and personhood , Science and pseudoscience, Ethical implications of emerging technologies, Privacy, security, and ethical concerns in IT and AI.	**6 Hrs**
Unit 5	**Philanthropic pursuits**	
	Poverty and Response, Philanthrophy, Corporate social responsibility, Good life, Eudaimonia, Sustainability and environmental ethics.	**6 Hrs**

Mapping of POs & COs:

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	If applicable		
													PSO1	PSO2	PSO3
CO1	--	--	--	--	--	--	--	1	--	--	--	1	--	--	--
CO2	--	--	--	--	--	--	--	--	--	2	--	--	--	--	--
CO3	--	--	--	--	--	--	--	--	--	--	--	1	--	--	--
CO4	--	--	--	--	--	--	--	--	--	2	2	--	--	--	--
CO5	--	--	--	--	--	--	2	--	--	2	--	--	--	--	--
CO6	--	--	--	--	--	--	2	1	--	--	--	--	--	--	--

Mapping of Course Objectives & Course Outcomes:

	CO1	CO2	CO3	CO4	CO5	CO6
1	✓	✓	--	--	--	--
2	--	✓	✓	✓	--	--
3	--	--	✓	--	✓	--
4	✓	✓	--	✓	✓	✓
5	✓	--	--	--	--	✓
6	✓	--	--	--	--	✓

References:

Text Books	
1	Ethics: The Fundamentals, by Julia Driver
2	Rachels, J., 2007. The Elements of Moral Philosophy. 5th ed. Boston; London: McGraw Hill. Benn, P., 2002. Ethics. London: Routledge.
3	Ethics: History, Theory, and Contemporary Issues, by Steven Cahn & Peter Markie
4	Singer, P., ed., 1993. A Companion to Ethics. Oxford: Blackwell.
Reference Books	
1	The Nicomachean Ethics, by Aristotle
2	Groundwork of the Metaphysics of Morals, by Immanuel Kant
Web Links/ Video Lectures	
1	John Gordon¿s website: http://www.glaucon.pwp.blueyonder.co.uk
2	Crash Course Philosophy https://www.youtube.com/watch?v=BNYJQaZUDrI&list=PL8dPuuaLjXtNgK6MZucdYldNkMybYIHKR
3	NPTEL: Moral Thinking: An Introduction to Value and Ethics https://www.youtube.com/watch?v=XiN8iqJGb48&list=PLFW6lRTa1g83uYgRiZEy_F4pzedPNWpew
4	NPTEL: Ethics https://www.youtube.com/watch?v=1xFZ7ZVVJeA&list=PLXcPnJsWbdxujUIptbSdeJXC0Jd-InxFG

23UGPCC-CE402 LP-ADVANCED SURVEYING

Practicals: 2 hrs / week
Credits: 1

Examination Scheme:
ISA: 25 Marks
POE: 25 Marks

Course Objectives: The objective of the course is to
1) To Equip students with knowledge of various advanced surveying methodologies used in large-scale survey projects. 2) To emphasize how modern instruments and technologies have transformed survey approaches, while maintaining the core principles of surveying.

Course Outcomes:

COs	**At the end of successful completion of the course the student will be able to**	**Blooms Taxonomy**
CO1	Adopt the principles of advanced surveying instruments	Understand Apply
CO2	Formulate triangulation stations, flight planning and ground control points	Understand Apply
CO3	Show effectiveness of modern surveying instruments to improve accuracy and to save time and for surveying operations.	Apply Analyze
CO4	Evaluate the setting out of various curves	Evaluate
CO5	Appreciate the use of modern techniques for surveying and mapping.	Understand Evaluate

Practicals:

Sr. No.	**Practical/ Experiment/Tutorial Topic**	**Hrs.**	**Bloom's Taxonomy**
1	Determination of tacheometric constants	2	Apply Evaluate
2	Determination of grade of a given line.	2	Apply Evaluate
3	Determination of area of polygon.	2	Apply Evaluate
4	Experiments using total station – any two	2	Knowledge, Analyze
5	Setting out of simple curve- one linear and one angular method	2	Knowledge, Analyze
6	Use of stereoscope	2	Knowledge Analyze
7	Use of GPS	2	Knowledge Analyze
7	Project drawings.	4	Knowledge Apply
	Survey Project		

1	Road project – at least 1000m.	4	Apply Evaluate
2	Radial contouring.	4	Apply Evaluate

Mapping of POs & COs:

	PO1	PO2	PO3	PO4		PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	If applicable		
														PSO1	PSO2	PSO3
CO1	1	2	--	--		1	--	--	---	--	--	--	--	2	--	--
CO2	1	2	1	2			--	--	--	--	--	--	--	1	--	--
CO3	1	2	--	--		--	--	--	--	--	--	--	--	1	--	--
CO4	1	1	2	2		2	--	--	--	--	--	--	--	1	--	--
CO5	1	2	3	2		1	--	--	--	--	--	--	--	--	--	--
CO6	--	--	--	--		--	--	--	--	--	--	--	--	--	--	--

References:

Text Books	
1	Surveying and Levelling Vol. I and Vol. II by T. P. Kanetkar and S.V.Kulkarni, Pune Vidyarthi Griha Prakashan.
2	Surveying and Levelling - R. Agor, Khanna Publishers, New Delhi
3	Surveying and Levelling by N. N. Basak, Tata McGraw Hill.
4	Surveying, Vol. I & II by S. K. Duggal, TataMc-Graw Hill.
Reference Books	
1	Surveying and Levelling by Subramanian, Oxford University Press.
2	Surveying, Vol. I & II by Dr. B. C. Punmia, Ashok K. Jain, Arun K. Jain, Laxmi Publications.
3	Principles of Surveying. Vol. I by J. G. Olliver, J. Clendinning - Van Nostrand Reinhold.
4	Elements of Photogrammetry - Paul R. Wolf, McGraw Hill Publication
5	Remote sensing and Geographical Information System- A. M. Chandra and S. K. Ghosh, Narosa Publishing House
6	Advanced Surveying -Total Station, GIS and Remote Sensing – Satheesh Gopi, R. Sathikumar and N. Madhu, Pearson publication
Web Links/ Video Lectures	
1	https://nptel.ac.in/courses/105103176/
2	https://archive.nptel.ac.in/courses/105/104/105104100/
3	https://archive.nptel.ac.in/courses/105/107/105107218/
4	https://archive.nptel.ac.in/courses/105/107/105107121/

23UGPCC-CE403 LP-CONCRETE TECHNOLOGY LAB WORK

Practicals: 2 hrs / week
Credits: 1

Examination Scheme:
ISA: 25 Marks
OE: 25 Marks

Course Objectives: The objective of the course is to
1. Impart knowledge of physical properties of ingredients of concrete and their effect on strength and durability. 2. Understand the factors affecting properties of concrete.

Course Outcomes:		
COs	**At the end of successful completion of the course the student will be able to**	**Blooms Taxonomy**
CO1	Impart knowledge of physical properties of ingredients of concrete and their effect on strength and durability.	Knowledge Understand
CO2	Explain the fundamentals of process of making good quality concrete and its elastic properties.	Understand Apply Evaluate
CO3	Design the concrete mix proportion as per Indian standard code of practice.	Evaluate
CO4	Demonstrate Non Destructive Testing (NDT) and evaluate quality of existing concrete.	Apply Evaluate

Practicals:

Sr. No.	**Practical/ Experiment/Tutorial Topic**	**Hrs.**	**Bloom's Taxonomy**
1	To determine fineness of cement by Sieve analysis and/or Blaine's air permeability method.	2	Knowledge
2	To determine the standard consistency of cement using Vicat's apparatus.	2	Knowledge Apply
3	To determine initial and final setting time of cement.	2	Knowledge Apply
4	Determination of soundness of cement by Le-Chatelier's apparatus and/or Auto Clave test.	2	Analyze
5	To determine compressive strength of cement.	2	Analyze
6	Determination of particle size distribution of fine, coarse and all in aggregate by sieve analysis (grading of aggregate).	2	Analyze
7	Determination of specific gravity of fine aggregates.	2	Analyze
8	Determination of specific gravity and water absorption of coarse aggregates.	2	Analyze
9	To determine flakiness and elongation index of coarse aggregates.	2	Analyze
10	To determine workability of fresh concrete by using slump cone.	2	Analyze Apply

11	To determine compaction factor for workability of fresh concrete.	2	Analyze Apply
12	To determine workability of fresh concrete by using Vee Bee Consitometer.	2	Analyze Apply
13	Split tensile strength test on concrete cylinder	2	Analyze Apply
14	Nondestructive test on concrete by: Rebound Hammer Test, Ultrasonic Pulse Velocity Test.	2	Analyze Apply
15	Tests for compressive strength of concrete cubes for M20 or M30 (ACI 211.1-91, IS 10262- 2009 and IS 456 2000).	2	Analyze Apply

Mapping of POs & COs:

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	If applicable		
													PSO1	PSO2	PSO3
CO1	3	1	1	--	--	2	--	--	--	--	1	1	2	1	--
CO2	2	2	--	--	--	2	1	--	--	--	--	1	1	1	--
CO3	1	2	1	3	1	2	--	1	--	--	--	1	3	--	--
CO4	1	2	1	--	2	1	--	--	--	--	--	--	1	2	--

References:

Text Books	
1	Shetty, M.S., Concrete Technology, S. Chand Publication.
2	Gambhir, M.L., Concrete Technology, Tata McGraw Hill.
Reference Books	
1	A. M. Neville, J. J. Brooks, “Concrete Technology” Pearson Education India
2	A. M. Neville, “Properties of Concrete”, Pearson Education India.
3	R.S. Varshney, “Concrete Technology”, Oxford and IBH.
4	P. Kumar Mehta, “Microstructure and properties of concrete”, Prentice Hall.SP-26.
IS codes	
1	IS: 10262 - 2009, Recommended guidelines for Concrete Mix Design.
2	IS: 456- 2000, Indian Standard Plain and Reinforced Concrete.

23UGPCC-CE404 LP-HYDRAULICS LAB

Practicals: 2 hrs / week
Credits: 1

Examination Scheme:
ISA: 25 Marks
P**OE: 25**

Course Objectives: The objective of the course is to
1. To study uniform and non-uniform flow in open channel. 2. To study velocity and discharge measurement devices. 3. To study impact of jet, Pumps and turbines.

Course Outcomes:		
COs	**At the end of successful completion of the course, the student will be able to**	**Blooms Taxonomy**
CO1	Provide students with basic knowledge of fluid properties and utilizing principles developed in fluid mechanics	Knowledge Understand
CO2	Develop the principle and equation for pressure flow and momentum analysis.	Understand
CO3	Provide the students with the analytical knowledge of pressure and velocity distribution in an open channel in order to solve practical problems	Understand
CO4	Illustrate and develop the equations and design principles for open channel flows, including sanitary and storm sewer design and flood control hydraulics.	Apply Evaluate

Practicals:

Sr. No.	**Practical/ Experiment/Tutorial Topic**	**Hrs.**	**Bloom's Taxonomy**
A.	**Perform at least three experiments from the Following:**		
1	Study of Specific Energy Curve for Different Discharges.	2	Knowledge, Apply
2	Calibration of Rectangular Notch.	2	Apply
3	Calibration of Rectangular sharp creasted Weir.	2	Apply
4	Calibration of Rectangular broad creasted Weir.	2	Knowledge, Analyze
5	Calibration of Ogee Weir.	2	Analyze
B.	**Study of Turbines (Demonstration).**	2	Analyze
C.	**Study of Centrifugal Pump.**	2	Analyze
D.	**Case Study of hydropower plant.**	2	Knowledge, Analyze

Mapping of POs & COs:

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	If applicable		
													PSO1	PSO2	PSO3
CO1	1	2				2	--	---	--	--	--	1	--	1	2
CO2		1	2		1	2	--	--	--	--	--	--	--		1
CO3	2	1		1		--	--	--	--	--	--	1	--	2	1
CO4		2		2	1	1	--	--	--	--	--	--	--		2

References:

Text Books	
1	Fluid Mechanics – A.K. Jain – Khanna Pub., Delhi.
2	Open Channel flow – Rangaraju – Tata McGraw-Hill Pub. Co., Delhi.
3	Fluid Mechanics – K. Subramanyam – Tata McGraw-Hill Pub. Co., Delhi.
4	Fluid Mechanics – Hydraulic and Hydraulic Mechanics -Modi / Seth – Standard Book House, New Delhi.
5	Fluid Mechanics and hydraulic machine-R.K.Bansal, Laxmi Pubication.
Reference Books	
1	Fluid Mechanics – Streeter-McGraw-Hill International Book Co., Auckland.
2	Flow in open channel – V. T. Chaw - McGraw-Hill International Book Co., Auckland.
3	Fluid Mechanics – K. L. Kumar – Eurasia Publication House, Delhi.

23UGPCC-CE411 A-GENERAL PROFICIENCY

Lectures	**:** --	**Evaluation Scheme**
Credit	**:** --	--
Tutorials	**:** --	

Course Objectives: The objective of the course is to

1. Develop basic skills to deal with a variety of business situations
2. Improve knowledge of key business concepts .
3. Develop skills that improve business reports, letters, e-mail writing

Course Outcomes:

COs	At the end of successful completion of the course, the student will be able to	Blooms Taxonomy
CO1	Learn to communicate with others in day to day corporate life	Knowledge Understand
CO2	Learn to express in English with greater fluency, accuracy and confidence	Understand
CO3	Learn to handle a variety of business contexts to making presentations, to socializing.	Apply and Evaluate
CO4	Enhance the skills of interviews and public speaking .	Apply

Description:

This subject provides a key way to become proficient in various aspects of work life. Further it focuses on important aspects like leadership and interpersonal relations to be inculcate in order to become a good employee and human being .

Prerequisites:	1:	Good Reading and Understanding skills
	2:	Ability to speak English moderately

Section – I

Unit 1	Reading Techniques and Comprehension skills, Present, Future and Past Tenses, Phrases.	
Unit 2	Effective oral Communication: Telephonic, Meeting Handling, Written Communication: Letter Writing, E-mail writing.	
Unit 3	Preparing presentation and conduction, Group Discussion, Business Etiquettes Body language.	

Unit 4	Interview Techniques and Do's and Don'ts of interviews, Overcoming stage fear.	

Mapping of POs & COs:

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	If applicable		
													PSO1	PSO2	PSO3
CO1	1	1	-	-	-	--	--	---	--	--	--	--	--	--	--
CO2	-	1	1	-	-	---	--	--	--	--	--	--	--	--	--
CO3	-	-	1	1	-	--	--	--	--	--	--	--	--	--	--
CO4	-	-	-	1	-	--	--	--	--	--	--	--	--	--	--
CO5	-	-	1	1	-	--	--	--	--	--	--	--	--	--	--
CO6	-	-	-	-	-	1	--	--	--	--	--	--	--	--	--

References:

Reference Books.	
1	K. R. Laxminarayan ,*English for Technical Communication,* SCITECH 2nd Edition 2014.
2	Dr. M. Hemamalini, *Technical English,* Wiley, 2014.
3	M. V Rodriques, *Effective Business Communication,* Concept Publishing Company Pvt. Ltd. 2013.
4	T. Thomson, *Business English,* Heinle & Heinle 2004.
Web Links/ Video Lectures	
1	NPTEL Lecture Series.