Nagar Yuwak Shikshan Sanstha's

Yeshwantrao Chavan College of Engineering

(An Autonomous Institution affiliated to Rashtrasant Tukadoji Maharaj Nagpur University)

(Accredited 'A++' Grade by NAAC with a score of 3.25)

Hingna Road, Wanadongri, Nagpur - 441 110

Bachelor of Technology

SoE & Syllabus 2022

1st to 8th Semester

(Department of Civil Engineering)

B. Tech in Civil Engineering

Nagar Yuwak Shikshan Sanstha's

Yeshwantrao Chavan College of Engineering

(An Autonomous Institution affiliated to Rashtrasant Tukadoji Maharaj Nagpur University)

B.TECH SCHEME OF EXAMINATION 2022

(Scheme of Examination w.e.f. 2022-23 onward)

(Department of Civil Engineering)

B. Tech in Civil Engineering

SoE No. 22CV-101

SN	Sem	Type	BoS/ Deptt	Sub. Code	Subject	T/P	Contact Hours				Credits	% Weightage			ESE Duration Hours
							L	T	P	Hrs		MSEs*	TA**	ESE	
FIRST SEMESTER															
1	1	BS	GE/MTH	22CV101	Calculus and Vector	T	3	1	0	4	**4**	30	20	50	3 Hrs
2	1	BS	GE/CHE	22CV102	Engineering Chemistry	T	3	0	0	3	**3**	30	20	50	3 Hrs
3	1	BS	GE/CHE	22CV103	Lab: Engineering Chemistry	P	0	0	2	2	**1**		60	40	
4	1	HS	GE/HUM	22CV104	Professional Communication	T	3	0	0	3	**3**	30	20	50	3 Hrs
5	1	BES	CV/CV	22CV105	Engineering Mechanics	T	3	0	0	3	**3**	30	20	50	3 Hrs
6	1	BES	CV/CV	22CV106	Lab: Engineering Mechanics	P	0	0	2	2	**1**		60	40	
7	1	BES	EE/EE	22CV107	Basic Electrical and Electronics Engineering	T	3	0	0	3	**3**	30	20	50	3 Hrs
8	1	BES	IT/IT	22CV108	Programming for Problem Solving	T	3	0	0	3	**3**	30	20	50	3 Hrs
9	1	BES	IT/IT	22CV109	**Lab:** Programming for Problem Solving	P	0	0	2	2	**1**		60	40	
						TOTAL	**18**	**1**	**6**	**25**	**22**				
List of Mandatory Learning Course (MLC)															
1	1	HS	GE/HUM	GE2131	Universal Human Value	**A**	2	0	0	2	**0**				
2	1	HS	GE/T&P	MLC2121	YCAP1-Get Set Go	**A**	2	0	0	2	**0**				
SECOND SEMESTER															
1	2	BS	GE/MTH	22CV201	Differential Equation, matrices and Statistics	T	3	1	0	4	**4**	30	20	50	3 Hrs
2	2	BS	GE/PHY	22CV202	Engineering Physics	T	3	0	0	3	**3**	30	20	50	3 Hrs
3	2	BS	GE/PHY	22CV203	Lab: Engineering Physics	P	0	0	2	2	**1**		60	40	
4	2	HS	GE/HUM	22CV204	Social Science	T	3	0	0	3	**3**	30	20	50	3 Hrs
5	2	BES	ME/ME	22CV205	Engineering Graphics	T	1	0	0	1	**1**	30	20	50	3 Hrs
6	2	BES	ME/ME	22CV206	Lab: Engineering Graphics	P	0	0	4	4	**2**		60	40	
7	2	BES	CT/CT	22CV207	Elements of AIML	T	3	0	0	3	**3**	30	20	50	3 Hrs
8	2	BES	ME/ME	22CV208	FAB Shop	P	0	0	2	2	**1**		60	40	
9	2	BES	CV/CV	22CV209	Strength of Materials	T	3	0	0	3	**3**	30	20	50	3 Hrs
10	2	BES	CV/CV	22CV210	Lab: Strength of Materials	P	0	0	2	2	**1**		60	40	
						TOTAL	**16**	**1**	**10**	**27**	**22**				
List of Mandatory Learning Course (MLC)															
1	2	HS	GE/T&P	MLC2122	YCAP2 -Functional English	**A**	2	0	0	2	**0**				
2	2	BES	GE/CHE	GE2132	Environmental Science	**A**	2	0	0	2	**0**				

MSEs* = Two MSEs of 15 Marks each will conducted and marks of these 2 MSEs will be considered for Continuous Assessment

TA ** = for Theory : TA1-5 marks on Proctored Online Exam, TA2-12 marks on activitied decided by course teacher, TA3 - 3 marks on class attendance

TA = for Practical : MSPA will be 15 marks each**

		June 2022	1.00
Chairperson	Dean (Acad. Matters)	Date of Release	Version

Applicable for AY 2022-23 Onwards

Nagar Yuwak Shikshan Sanstha's

Yeshwantrao Chavan College of Engineering

(An Autonomous Institution affiliated to Rashtrasant Tukadoji Maharaj Nagpur University)

SoE No. 22CV-101

B.TECH SCHEME OF EXAMINATION 2022

(Scheme of Examination w.e.f. 2022-23 onward)

(Department of Civil Engineering)

B. Tech in Civil Engineering

SN	Sem	Type	BoS/ Deptt	Sub. Code	Subject	T/P	Contact Hours				Credits	% Weightage			ESE Duration Hours
							L	T	P	Hrs		MSEs*	TA**	ESE	
THIRD SEMESTER															
1	3	BS	GE	22CV301	Integral Transforms and Partial Differential Equations	**T**	3	0	0	3	**3**	30	20	50	3 Hrs
2	3	HS	GE/HUM	22CV302	Fundamentals of Management and Economics	**T**	3	0	0	3	**3**	30	20	50	3 Hrs
3	3	PC	CV	22CV303	Geotechnical Engineering	**T**	3	0	0	3	**3**	30	20	50	3 Hrs
4	3	PC	CV	22CV304	**Lab:-** Geotechnical Engineering	**P**	0	0	2	2	**1**		60	40	
5	3	PC	CV	22CV305	Fluid Mechanics	**T**	3	1	0	3	**3**	30	20	50	3 Hrs
6	3	PC	CV	22CV306	**Lab:-** Fluid Mechanics	**P**	0	0	2	2	**1**		60	40	
7	3	PC	CV	22CV307	Water Supply Engineering	**T**	3	0	0	3	**3**	30	20	50	3 Hrs
8	3	PC	CV	22CV308	**Lab:-** Water Supply Engineering	**P**	0	0	2	2	**1**		60	40	
9	3	PC	CV	22CV309	Building Construction and Building Materials	**T**	3	0	0	3	**3**	30	20	50	3 Hrs
10	3	PC	CV	22CV310	**Lab:-** Computer Aided Drawing	**P**	0	0	2	2	**1**		60	40	
11	3	PC	CV	22CV311	Environmental Sustainability, Pollution and Management	**T**	3	0	0	3	**3**	30	20	50	3 Hrs
					TOTAL THIRD SEM		**18**	**1**	**8**	**26**	**25**				
List of Mandatory Learning Course (MLC)															
1	3	HS	T&P	MLC123	**YCAP3 :**	**A**	3	0	0	3	**0**				
2	3	BES	CV	MLC101	Application of Python Programming in Civil Engineering	**A**	2	0	0	2	**0**				
FOURTH SEMSTER															
1	4	PC	CV	22CV401	Wastewater Engineering	**T**	3	0	0	3	**3**	30	20	50	3 Hrs
2	4	PC	CV	22CV402	Reinforced Concrete Structures	**T**	3	1	0	3	**3**	30	20	50	3 Hrs
3	4	PC	CV	22CV403	Concrete Technology	**T**	3	0	0	3	**3**	30	20	50	3 Hrs
4	4	PC	CV	22CV404	**Lab:-** Concrete Technology	**P**	0	0	2	2	**1**		60	40	
5	4	PC	CV	22CV405	Surveying	**T**	3	0	0	3	**3**	30	20	50	3 Hrs
6	4	PC	CV	22CV406	**Lab:-** Surveying	**P**	0	0	2	2	**1**		60	40	
7	4	PC	CV	22CV407	Structural Analysis	**T**	3	0	0	3	**3**	30	20	50	3 Hrs
8	4	PC	CV	22CV408	**Lab:-** Structural Analysis	**P**	0	0	2	2	**1**		60	40	
9	4	PC	CV	22CV409	Transportation Engineering	**T**	3	0	0	3	**3**	30	20	50	3 Hrs
10	4	PC	CV	22CV410	**Lab:-** Transportation Engineering	**P**	0	0	2	2	**1**		60	40	
					TOTAL FOURTH SEM		**18**	**1**	**8**	**26**	**22**				
List of Mandatory Learning Course (MLC)															
1	4	HS	T&P	MLC2124	**YCAP4 :**	**A**	3	0	0	3	**0**				
2	4	BES	CV	MLC102	Quantity ,Estimation and Management	**A**	2	0	0	2	**0**				

		June 2022	**1.00**	**Applicable for AY 2022-23 Onwards**
Chairperson	**Dean (Acad. Matters)**	**Date of Release**	**Version**	

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SoE No. 22CV-101

B.TECH SCHEME OF EXAMINATION 2022

(Scheme of Examination w.e.f. 2022-23 onward)

(Department of Civil Engineering)

B. Tech in Civil Engineering

SN	Sem	Type	BoS/ Deptt	Sub. Code	Subject	T/P	Contact Hours				Credits	% Weightage			ESE Duration Hours
							L	T	P	Hrs		MSEs*	TA**	ESE	
FIFTH SEMESTER															
1	5	PC	CV	22CV501	Engineering Hydrology	**T**	3	0	0	3	**3**	30	20	50	3 Hrs
2	5	PC	CV	22CV502	Advanced Structural Analysis	**T**	3	0	0	3	**3**	30	20	50	3 Hrs
3	5	PC	CV	22CV503	**Lab:-** Analysis and Design Studio	**P**	0	0	2	2	**1**		60	40	
4	5	PC	CV	22CV504	Steel Structures	**T**	3	0	0	3	**3**	30	20	50	3 Hrs
5	5	PC	CV	22CV505	**Lab:-** Building Design Drawing	**P**	0	0	2	2	**1**		60	40	
6	5	PE	CV		**Professional Elective-I**	**T**	3	0	0	3	**3**	30	20	50	3 Hrs
7	5	OE-I	CV		**Open Elective-I**	**T**	3	0	0	3	**3**	30	20	50	3 Hrs
8	5	OE-II	CV		**Open Elective-II**	**T**	3	0	0	3	**3**	30	20	50	3 Hrs
9	5	STR	CV	22CV506	**Industrial training, Seminar & Report**	**P**	0	0	1	1	**1**		100		
					TOTAL FIFTH SEM		**18**	**0**	**5**	**23**	**21**				
Audit Courses															
1	5	HS	T&P	MLC2125	**YCAP5 :**	**A**	3	0	0	3	**0**				
2	5	HS	R&D	MLC125	Design thinking	**A**	2	0	0	2	**0**				

Professional Elective - I

1	5	PE-I	CV	22CV511	PE-I : Advanced Surveying
2	5	PE-I	CV	22CV512	PE-I : Computer Applications in Civil Engineering
3	5	PE-I	CV	22CV513	PE-I : Advanced Concrete Technology
4	5	PE-I	CV	22CV514	PE-I : Water Treatment
5	5	PE-I	CV	22CV515	PE-I : Environmental Management
6	5	PE-I	CV	22CV516	PE-I : Soil Characterization and Identification
7	5	PE-I	CV	22CV517	PE-I : Geographical Information Systems

Open Electives -I

1	5	OE-I	CV	22CV531	OE-I : Building Services Engineering
2	5	OE-I	CV	22CV532	OE-I : Construction Techniques
3	5	OE-I	CV	22CV533	OE-I : Introduction to Environmental Management
4	5	OE-I	CV	22CV534	OE-I : Basics of Transportation Engineering
5	5	OE-I	CV	22CV535	OE-I : Basics of Water Resource Engineering
6	5	OE-I	CV	22CV536	OE-I : Elements of Water Power Engineering

Open Electives -II

1	5	OE-II	CV	22CV551	OE II : Elements of Earthquake Engineering
2	5	OE-II	CV	22CV552	OE II : Introduction to Finite Element Method
3	5	OE-II	CV	22CV553	OE II : Air Pollution and Solid Waste Management
4	5	OE-II	CV	22CV554	OE-II : Environmental and Social Impact Assessment
5	5	OE-II	CV	22CV555	OE II : Disaster Management

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							L	T	P	Hrs		MSEs*	TA**	ESE	
SIXTH SEMESTER															
1	6	PC	CV	22CV601	Foundation Engineering	**T**	3	0	0	3	**3**	30	20	50	3 Hrs
2	6	PC	CV	22CV602	**Lab:-** Building Information Modeling	**P**	0	0	2	2	**1**		60	40	
3	6	PC	CV	22CV603	Hydraulic Engineering	**T**	3	0	0	3	**3**	30	20	50	3 Hrs
4	6	PC	CV	22CV604	**Lab:-** Hydraulic Engineering	**P**	0	0	2	2	**1**		60	40	
5	6	PE	CV		**Professional Elective-II**	**T**	3	0	0	3	**3**	30	20	50	3 Hrs
6	6	PE	CV		**Professional Elective-III**	**T**	3	0	0	3	**3**	30	20	50	3 Hrs
7	6	OE	CV		**Open Elective-III**	**T**	3	0	0	3	**3**	30	20	50	3 Hrs
8	6	OE	CV		**Open Elective-IV**	**T**	3	0	0	3	**3**	30	20	50	3 Hrs
9	6	PR	CV	22CV605	Project Phase-I	**P**	0	0	4	4	**2**		60	40	
					TOTAL SIXTH SEM		**18**	**0**	**8**	**26**	**22**				
Audit Courses															
1	6	HS		MLC126	**YCAP6 :**	**A**	3	0	0	3	**0**				

Professional Elective - II

1	6	PE-II	CV	22CV611	PE-II : Earthquake Engineering
2	6	PE-II	CV	22CV612	PE-II : Water Transmission and Distribution Systems
3	6	PE-II	CV	22CV613	PE-II : Matrix Analysis of Structures
4	6	PE-II	CV	22CV614	PE-II : Environmental Geotechniques
5	6	PE-II	CV	22CV615	PE-II : Traffic Engineering
6	6	PE-II	CV	22CV616	PE-II : Construction Management And Machinery
7	6	PE-II	CV	22CV617	PE-II : Wastewater Treatment

Professional Elective - III

1	6	PE-III	CV	22CV631	PE-III : Prestressed Concrete
2	6	PE-III	CV	22CV632	PE-III : Advanced RCC
3	6	PE-III	CV	22CV633	PE-III : Numerical Methods and Computational Techniques
4	6	PE-III	CV	22CV634	PE-III : Environmental Impact Assessment
5	6	PE-III	CV	22CV635	PE-III : Energy Conversion and Management
6	6	PE-III	CV	22CV636	PE-III : Geotechnical Investigation and Geotextiles
7	6	PE-III	CV	22CV637	PE-III : Earth Pressure & Earth Retaining Structures
8	6	PE-III	CV	22CV638	PE-III : Urban Transportation Planning

Open Electives - III

1	6	OE-III	CV	22CV651	OE-III : Building Services Engineering
2	6	OE-III	CV	22CV652	OE-III : Construction Techniques
3	6	OE-III	CV	22CV653	OE-III : Introduction to Environmental Management
4	6	OE-III	CV	22CV654	OE-III : Basics of Transportation Engineering
5	6	OE-III	CV	22CV655	OE-III : Basics of Water Resource Engineering
6	6	OE-III	CV	22CV656	OE-III : Elements of Water Power Engineering

Open Electives - IV

1	6	OE-IV	CV	22CV671	OE-IV : Elements of Earthquake Engineering
2	6	OE-IV	CV	22CV672	OE-IV : Introduction to Finite Element Method
3	6	OE-IV	CV	22CV673	OE-IV : Air Pollution and Solid Waste Management
4	6	OE-IV	CV	22CV674	OE-IV : Environmental and Social Impact Assessment
5	6	OE-IV	CV	22CV675	OE-IV : Disaster Management

		June 2022	1.00	Applicable for AY 2022-23 Onwards
Chairperson	Dean (Acad. Matters)	Date of Release	Version	

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Yeshwantrao Chavan College of Engineering

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SoE No. 22CV-101

B.TECH SCHEME OF EXAMINATION 2022

(Scheme of Examination w.e.f. 2022-23 onward)

(Department of Civil Engineering)

B. Tech in Civil Engineering

SN	Sem	Type	BoS/ Deptt	Sub. Code	Subject	T/P	Contact Hours				Credits	% Weightage			ESE Duration Hours
							L	T	P	Hrs		MSEs*	TA**	ESE	
SEVENTH SEMESTER															
1	7	PC	CV	22CV701	Estimating & Costing	**T**	3	0	0	3	**3**	30	20	50	3 Hrs
2	7	PC	CV	22CV702	Lab:- Estimating andCosting	**P**	0	0	2	2	**1**		60	40	
3	7	PC	CV	22CV703	Project Planning and Quality Assurance	**T**	3	0	0	3	**3**	30	20	50	3 Hrs
4	7	PC	CV	22CV704	Irrigation Engineering	**T**	3	0	0	3	**3**	30	20	50	3 Hrs
5	7	PE	CV		**Professional Elective-IV**	**T**	3	0	0	3	**3**	30	20	50	3 Hrs
6	7	PE	CV		**Professional Elective-V**	**T**	3	0	0	3	**3**	30	20	50	3 Hrs
7	7	PE	CV		**Professional Elective-VI**	**T**	3	0	0	3	**3**	30	20	50	3 Hrs
8	7	PR	CV	22CV705	Project Phase-II	**P**	0	0	10	10	**5**		60	40	
9	7	STR	CV	22CV706	Campus Recruitment Training (CRT)	**P**	0	0	0	0	**2**		100		
					TOTAL SEVENTH SEM		**18**	**0**	**12**	**30**	**26**				

Professional Elective - IV

1	7	PE-IV	CV	22CV711	PE-IV : Natural Resources Management
2	7	PE-IV	CV	22CV712	PE-IV : Finite Element Method
3	7	PE-IV	CV	22CV713	PE-IV : Introduction to Structural Dynamics
4	7	PE-IV	CV	22CV714	PE-IV : Optimization Techniques
5	7	PE-IV	CV	22CV715	PE-IV : Environmental Legislation and Management System
6	7	PE-IV	CV	22CV716	PE-IV : Advanced Foundation Engineering
7	7	PE-IV	CV	22CV717	PE-IV :Advanced Transportation Engineering

Professional Elective - V

1	7	PE-V	CV	22CV731	PE-V : Maintenance and Rehabilitation Engineering
2	7	PE-V	CV	22CV732	PE-V : Modern Surveying Technique
3	7	PE-V	CV	22CV733	PE-V : Advanced Steel Design
4	7	PE-V	CV	22CV734	PE-V : Design of Bridge Structures
5	7	PE-V	CV	22CV735	PE-V : Industrial Waste Water Treatment and Reuse
6	7	PE-V	CV	22CV736	PE-V : Finite Element methods in Geotechnical Engineering
7	7	PE-V	CV	22CV737	PE-V : Structural Engineering Practices
8	7	PE-V	CV	22CV738	PE-V : Advanced Fluid Mechanics and Hydraulic Machines

Professional Elective - VI

1	7	PE-VI	CV	22CV751	PE-VI : Modern and Innovative Construction Materials
2	7	PE-VI	CV	22CV752	PE-VI : Building Services
3	7	PE-VI	CV	22CV753	PE-VI : Introduction to Remote Sensing
4	7	PE-VI	CV	22CV754	PE-VI : Advanced Hydraulics
5	7	PE-VI	CV	22CV755	PE-VI : Watershed Management
6	7	PE-VI	CV	22CV756	PE-VI : Pavement Design
7	7	PE-VI	CV	22CV757	PE-VI: Water Power Engineering

SN	Sem	Type	BoS/ Deptt	Sub. Code	Subject	T/P	L	T	P	Hrs	Credits	MSEs*	TA**	ESE	ESE Duration Hours
EIGHTH SEMESTER															
1	8	STR	CV	22CV801	Internship - training / Seminar & Report	**P**	0	0	0	0	**3**		60	40	
2	8	ER	CV	22CV802	Extracurricular Activity Evaluation	**P**	0	0	0	0	**2**		100		
					TOTAL EIGHTH SEM		**0**	**0**	**0**	**0**	**5**				
					GRAND TOTAL		**124**	**4**	**57**	**183**	**165**				

Chairperson	Dean (Acad. Matters)	June 2022	1.00
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(Accredited 'A++' Grade by NAAC with a score of 3.25)

Hingna Road, Wanadongri, Nagpur - 441 110

Bachelor of Technology

SoE & Syllabus 2022

1st Semester

(Department of Civil Engineering)

B. Tech in Civil Engineering

28 June 2019

Nagar Yuwak Shikshan Sanstha's

Yeshwantrao Chavan College of Engineering

(An Autonomous Institution affiliated to Rashtrasant Tukadoji Maharaj Nagpur University)

B.TECH SCHEME OF EXAMINATION 2022

(Scheme of Examination w.e.f. 2022-23 onward)

(Department of Civil Engineering)

B. Tech in Civil Engineering

SoE No. 22CV-101

SN	Sem	Type	BoS/ Deptt	Sub. Code	Subject	T/P	Contact Hours				Credits	% Weightage			ESE Duration Hours
							L	T	P	Hrs		MSEs*	TA**	ESE	
FIRST SEMESTER															
1	1	BS	GE/MTH	22CV101	Calculus and Vector	T	3	1	0	4	4	30	20	50	3 Hrs
2	1	BS	GE/CHE	22CV102	Engineering Chemistry	T	3	0	0	3	3	30	20	50	3 Hrs
3	1	BS	GE/CHE	22CV103	Lab: Engineering Chemistry	P	0	0	2	2	1		60	40	
4	1	HS	GE/HUM	22CV104	Professional Communication	T	3	0	0	3	3	30	20	50	3 Hrs
5	1	BES	CV/CV	22CV105	Engineering Mechanics	T	3	0	0	3	3	30	20	50	3 Hrs
6	1	BES	CV/CV	22CV106	Lab: Engineering Mechanics	P	0	0	2	2	1		60	40	
7	1	BES	EE/EE	22CV107	Basic Electrical and Electronics Engineering	T	3	0	0	3	3	30	20	50	3 Hrs
8	1	BES	IT/IT	22CV108	Programming for Problem Solving	T	3	0	0	3	3	30	20	50	3 Hrs
9	1	BES	IT/IT	22CV109	**Lab:** Programming for Problem Solving	P	0	0	2	2	1		60	40	
						TOTAL	**18**	**1**	**6**	**25**	**22**				
List of Mandetory Learning Course (MLC)															
1	1	HS	GE/HUM	GE2131	Universal Human Value	**A**	2	0	0	2	0				
2	1	HS	GE/T&P	MLC2121	YCAP1-Get Set Go	**A**	2	0	0	2	0				
SECOND SEMESTER															
1	2	BS	GE/MTH	22CV201	Differential Equation, matrices and Statistics	T	3	1	0	4	4	30	20	50	3 Hrs
2	2	BS	GE/PHY	22CV202	Engineering Physics	T	3	0	0	3	3	30	20	50	3 Hrs
3	2	BS	GE/PHY	22CV203	Lab: Engineering Physics	P	0	0	2	2	1		60	40	
4	2	HS	GE/HUM	22CV204	Social Science	T	3	0	0	3	3	30	20	50	3 Hrs
5	2	BES	ME/ME	22CV205	Engineering Graphics	T	1	0	0	1	1	30	20	50	3 Hrs
6	2	BES	ME/ME	22CV206	Lab: Engineering Graphics	P	0	0	4	4	2		60	40	
7	2	BES	CT/CT	22CV207	Elements of AIML	T	3	0	0	3	3	30	20	50	3 Hrs
8	2	BES	ME/ME	22CV208	FAB Shop	P	0	0	2	2	1		60	40	
9	2	BES	CV/CV	22CV209	Strength of Materials	T	3	0	0	3	3	30	20	50	3 Hrs
10	2	BES	CV/CV	22CV210	Lab: Strength of Materials	P	0	0	2	2	1		60	40	
						TOTAL	**16**	**1**	**10**	**27**	**22**				
List of Mandetory Learning Course (MLC)															
1	2	HS	GE/T&P	MLC2122	YCAP2 -Functional English	**A**	2	0	0	2	0				
2	2	BES	GE/CHE	GE2132	Environmental Science	**A**	2	0	0	2	0				

MSEs* = Two MSEs of 15 Marks each will conducted and marks of these 2 MSEs will be considered for Continuous Assessment

TA ** = for Theory : TA1-5 marks on Proctored Online Exam, TA2-12 marks on activitied decided by course teacher, TA3 - 3 marks on class attendance

TA = for Practical : MSPA will be 15 marks each**

		June 2022	**1.00**
Chairperson	**Dean (Acad. Matters)**	**Date of Release**	**Version**

Applicable for AY 2022-23 Onwards

I SEMESTER

22CV101: Calculus & Vector

Course Outcomes :

Upon successful completion of the course the students will be able to

1. Apply the knowledge of differentiation to solve the Engineering problems.
2. Determine the derivatives of functions of several variables and develop the relations among the derivatives of variables.
3. Apply the knowledge of Beta and Gamma functions to find area, volume and mass.
4. Discuss Calculus of Scalar and vector point function and use appropriate theorems to evaluate integrals of functions of single and multiple variables.

Unit I: Differential Calculus I	**(6 Hrs.)**
Successive differentiation, n^{th} derivative of rational function, Trigonometrical transformations, n^{th} derivative of the product of two functions (Leibnitz's theorem), Taylor's theorem, Use of Maclaurin's theorem for one variable, standard expansions, Examples on Taylor's Theorem. **(Contemporary Issues related to Topic)**	
Unit II: Differential Calculus II	**(6 Hrs.)**
Definitions of Curvature, Radius of curvature for cartesian curves, Centre of curvature, Circle of curvature, Procedure for tracing the cartesian curve, Important points (singular points, Multiple points, Double points, Node, Cusp), Problems on tracing of curve. **(Contemporary Issues related to Topic)**	
Unit III: Partial Differentiation	**(7 Hrs.)**
Functions of several variables, First and higher order derivatives, Homogeneous functions, Euler's theorem on homogeneous function, Chain rule and total differential coefficient of composite functions. **(Contemporary Issues related to Topic)**	
Unit IV: Integral Calculus	**(6 Hrs.)**
Gamma function, Reduction formula, Beta function, Properties of Beta function (without proof), Relation between Beta and Gamma functions, Double and triple integrals and its applications. **(Contemporary Issues related to Topic)**	
Unit V: Vector Calculus	**(7 Hrs.)**
Vector differentiation, Gradient, Divergence and Curl, Directional derivatives with physical interpretation, Solenoidal and irrotational motions, vector fields. **(Contemporary Issues related to Topic)**	
Unit VI: Vector Integration & Applications	**(7 Hrs.)**
Vector integration: Line, surface and volume integrals, Statement of Stoke's theorem, Gauss divergence theorem and Green's theorem (without proof), Simple applications of these theorems. **(Contemporary Issues related to Topic)**	
Total Lecture	**39 Hours**

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Textbooks:	
1.	Erwin Kreyzig, Advance Engineering Mathematics, 6th Edition, John Wiley and Sons, INC.
2.	H.K. Dass, Engineering Mathematics, 11th revised edition, S. Chand, Delhi.
3.	H.K. Dass, Advanced Engineering Mathematics, 8th revised edition, S. Chand, Delhi.
4.	Dr. B.S. Grewal, Higher Engineering Mathematics, 42th edition, Khanna Publishers.
5.	P.N.Wartikar and J.N.Wartikar, Applied Mathematics, 4th Edition, Vidyarthi GrihaPrakashan.

Reference Books:	
1.	G B Thomas and R L Finney, Calculus and Analytical Geometry, 9th edition, Addison-Wesley, 1999.
2.	Michael Spivak and Tom Apostol, Calculus, VolI & Vol II 2nd edition, Wiley.
3.	N.P. Bali and Manish Goyal, A text book of Engineering Mathematics, 10th edition, Laxmi Prakashan.

YCCE e- library book links [ACCESSIBLE FROM COLLEGE CAMPUS]	
1	http://103.152.199.179/YCCE/Suported%20file/Supprted%20file/e-copies%20of%20books/Applied%20Sciences%20&%20Humanities/Mathematics%20and%20Humanities/

MOOCs Links and additional reading, learning, video material	
1.	https://nptel.ac.in/courses/111/106/111106146/
2.	https://nitkkr.ac.in/docs/5-Multiple%20Integrals%20and%20their%20Applications.pdf

I SEMESTER

22CV102: Engineering Chemistry

Course Outcomes :

Upon successful completion of the course the students will be able to

1. Illustrate qualitative and quantitative aspects of water for industrial and domestic applications. (L2)
2. Identify corrosion and discuss its prevention. (L2)
3. Establish insight into engineering materials. (L3)

Unit I : Water Conditioning	**(7 Hrs.)**
Introduction, Hardness, Types of hardness, softening of water by lime-soda process, Zeolite process, Ion Exchange Process (principle, advantages, and limitations). Numerical based on lime-soda and Zeolite process. Boiler trouble (Scale and sludge), sequestration (carbonate, phosphate) Sterilization of drinking water by chlorination. Langelier Index. **(Contemporary Issues related to Topic)**	
Unit II: Cement	**(6 Hrs.)**
Introduction, Portland cement: Manufacture, role of microscopic constituents. Properties-setting and hardening, heat of hydration and soundness. Types of cement-Rapid hardening cement, low heat cement, High alumina cement; cement additives, Ready-mix concrete, Grading of cement. **(Contemporary Issues related to Topic)**	
Unit III: Corrosion	**(7 Hrs.)**
Introduction to corrosion, electrochemical and galvanic series, Types of corrosion: Chemical and electrochemical corrosion. Mechanisms of electrochemical corrosion, Factors influencing corrosion. Differential aeration theory of corrosion, Forms of corrosion: Pitting corrosion, Intergranular corrosion, Stress corrosion, Waterline. Corrosion prevention: Design and material selection, Cathodic and anodic protection. **(Contemporary Issues related to Topic)**	
Unit IV: Lubricants	**(6 Hrs.)**
Lubricants: Introduction, Classification of lubricants, Mechanism of lubrication. Liquid lubricants: Properties & significance of liquid lubricants–Viscosity and viscosity index. Flash and fire point, Cloud and pour point, Aniline point, acid value, saponification number. Solid lubricant-Graphite. Greases as Semisolid lubricants - Definition and Significance of Consistency test and drop point test Synthetic lubricants- silicones. Criteria for selection of lubricants: IC engines, gears, transformer. **(Contemporary Issues related to Topic)**	
Unit V: Fuels	**(7 Hrs.)**
Introduction, Calorific value, HCV, LCV, Determination of calorific value of fuels by Bomb and Boy's calorimeter. Significance of Proximate and Ultimate analysis Knocking in Internal combustion petrol and diesel engines, Octane and Cetane number, Knocking and its relationship with structure of fuels. Simple numerical on combustion calculations. **(Contemporary Issues related to Topic)**	
Unit VI: Advanced Materials	**(6 Hrs.)**
Nanomaterials: Definition of nanomaterials, nano scale. Carbon Nanotubes and types. Application of Nanomaterials: Applications of nanomaterials in medicine, environment, and electronics. Liquid Crystal Polymers: Phases of LCP's, general properties and applications. Biodegradable Polymers – Synthesis, properties and applications of polylactic acid and Polycaprolactone **(Contemporary Issues related to Topic)**	
Total Lecture	**39 Hours**

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Textbooks:	
1.	S S. Dara , A Text book of Engineering Chemistry , S.Chand & Co New Delhi. Eleventh Edition.
2.	P.C. Jain and Monica Jain , Engineering Chemistry , Dhanpat Rai & sons New Delhi , Sixteenth Edition.
3.	P. W. Atkins, Physical Chemistry ,Oxford Publications,Eighth edition .

Reference Books:	
1.	Eskel Nordell , Water treatment for industrial and other use ,Rein hold Publishing Corporation, New York.
2.	Lloyd A.Munro ,Chemistry in Engineering ,Prentice-hall, Inc Nj,2nd Edition.
3.	Robert B Leighou Mc Graw ,Chemistry of Engineering Materials ,Hill Book Company, Inc New York.
4.	B.K.Sharma Krishna , Engineering Chemistry ,Prakashan media private LTD. 1st Edition, 2014.
5.	R.V.Gadag, A.Nityananda Shetty ,Engineering Chemistry ,I K International Publishing House New Delhi , First Edition.
6	Fred. Billmeyer Jr. ,A textbook of polymer science, Wiley India ,Third Edition.

YCCE e- library book links [ACCESSIBLE FROM COLLEGE CAMPUS]	
1	http://103.152.199.179/YCCE/Suported%20file/Supprted%20file/SERIES%20WISE%20BOOKS/CHEMISTRY/

MOOCs Links and additional reading, learning, video material	
1.	**https://www.youtube.com/watch?v=dCimAH5IRSA**
2.	https://www.youtube.com/watch?v=5OxdXq91TV0
3.	https://www.youtube.com/watch?v=aoWBUhlN3-0
4.	https://www.youtube.com/watch?v=4J3NhT5WRzY
5.	https://www.youtube.com/watch?v=cx5gPKp9QEc

I SEMESTER

22CV103: Lab: Engineering Chemistry

Course Outcomes
Upon successful completion of the course the students will be able to
1. Illustrate qualitative and quantitative aspects of water for industrial and domestic applications. (L2)
2. Identify corrosion and discuss its prevention. (L2)
3. Establish insight into engineering materials. (L3)

Total 10 experiments are to be performed
(4 each from Phase I and Phase II and two demonstration experiments)

SN	Experiments based on
	List of Experiments-Phase I
1	Determination of total hardness of water sample.
2	Determination of alkalinity present in the water sample.
3	Estimation of Fe2+ ions by redox titration
4	Determination of copper by iodometric titration
5	Estimation of Nickel.
6	To determine the strength of a given potassium dichromate solution with N/20 sodium thiosulphate solution
7	Determination of COD of water sample.
8	Synthesis of polyaniline.
9	Determination of rate of the reaction of hydrolysis of ethyl acetate at room temperature and analysis of experimental data using Computational Software.
	List of Experiments-Phase II
1	Determination of viscosity of lubricating oil by Redwood Viscometer I or II
2	Determination of Cation exchange capacity of an ion exchange resin
3	Determination of molecular weight of a polymer.
4	Oil Testing for Flash Point / Cloud Point/Pour Point/Aniline Point
5	Proximate analysis of coal
6	Determination of surface tension of liquids using stalagmometer.
7	Determination of electrochemical equivalence of Copper using Faradays Law
8	To determine the heat of solution of potassium nitrate calorimetrically.
9	Determination of conductivity of water sample by conductivity meter.
10.	To verify Beer-Lambert law for KMnO4 and determine the concentration of the given solution of KMnO4

	List of Demonstration Experiments
1	Determination of pH of water sample by pH meter
2	Synthesis of urea formaldehyde resin.
3	Determination of consistency of grease sample by using penetrometer.
4	Determination of Drop Point of grease sample.

I SEMESTER

22CV104: Professional Communication

Course Outcomes :
Upon successful completion of the course the students will be able to 1. Apply different modes for effective communication. 2. Use competently phonology of English language. 3. Apply nuances of LSRW skills. 4. Communicate through different channels.

Unit I: Basics of Communication	**(7 Hrs.)**
Language as a tool of communication & characteristics of language Process of Communication, Levels of Communication, Flow of Communication, Networks of Communication, Classification of Barriers (Intrapersonal, Interpersonal, Organizational). **(Contemporary Issues related to Topic)**	
Unit II: English Phonetics	**(6 Hrs.)**
Speech Mechanism, Organs of speech, Consonant and Vowels sounds, Word stress rules. **(Contemporary Issues related to Topic)**	
Unit III: Presentation & Visual Communication	**(7 Hrs.)**
Presentation and audience analysis, Organizing content, Nuances of presentation, Visual Communication – Introduction & importance, Role & Psychology of color in visual communication. **(Contemporary Issues related to Topic)**	
Unit IV: Verbal Skills	**(7 Hrs.)**
Listening Skills -definition types and traits. Group Communication- (Purpose, Different types of Group Communication, Organizational GD, GD as a part of selection process), Meeting (purposes, preparation, procedure and minutes of meeting). **(Contemporary Issues related to Topic)**	
Unit V: Interview Skills	**(6 Hrs.)**
Purpose, expectations of employer and preparation for Interview, Types, Types of Questions & Answering Techniques, Telephonic Interviews – preparation and guidelines, Reading Techniques (Exercise based on Complex Unseen passages. **(Contemporary Issues related to Topic)**	
Unit VI: Technical Written Communication	**(6 Hrs.)**
Memo, Email, Report -Types, Characteristics, prewriting aspects of report and preparing writing aspects of report), Types of paragraphs. **(Contemporary Issues related to Topic)**	
Total Lecture	**39 Hours**

Textbooks:	
1.	Raman & Sharma, Technical Communication, Oxford University Press.
2.	T. Balasubramaniam, Textbook of English Phonetics for Indian Students, Macmillan India Ltd.

Reference Books:	
1.	Public Speaking, Dale Carnegie, How to Develop Self – Confidence & Influence People.
2.	Asha Kaul, Communication Skills.
3.	Allen Peas, Body Language.
4.	Gerson's Gerson, Technical Communication.

MOOCs Links and additional reading, learning, video material	
1.	https://dl.uswr.ac.ir/bitstream/Hannan/141245/1/9781138219120.pdf
2.	https://www.pdfdrive.com/word-power-made-easy-the-complete-handbook-for-building-a-superior-vocabulary-e157841139.html
3	https://www.pdfdrive.com/improve-your-communication-skills-present-with-confidence-write-with-style-learn-skills-of-persuasion-e156963640.html
4	https://www.pdfdrive.com/21-days-of-effective-communication-everyday-habits-and-exercises-to-improve-your-communication-skills-and-social-intelligence-e158273760.html

I SEMESTER
22CV105: Engineering Mechanics

Course Outcomes :
Upon successful completion of the course the students will be able to 1. Describe the fundamental concepts of statics and dynamics. 2. Apply the basic concepts of applied mechanics for solution of problems on planar force system. 3. Determine the properties of surface like centroid, moment of inertia, etc. for planar surfaces and mass moment of inertia for rigid body. 4. Analyze pin jointed truss frame structure and beam structure analytically and graphically. 5. Evaluate the dynamic variables of kinetics of particles and simple lifting machine

Unit I: Resultant of planar force System	**(7 Hrs.)**
Fundamental concepts, system of forces, laws of mechanics, principle of transmissibility of force, Moment of force, Principle of moment, Couple, Resultant of a planar force system, Equivalent force couple system. **(Contemporary Issues related to Topic)**	
Unit II: Equilibrium of planar force System	**(6 Hrs.)**
Free body diagrams, Conditions of equilibrium, types of supports, types of beams, types of loads on beam, Equilibrium of a planar force system **(Contemporary Issues related to Topic)**	
Unit III: Friction and Trusses	**(7 Hrs.)**
Friction: Coulomb's laws of dry friction, plane friction, belt friction. Trusses: Types of trusses, assumptions in analysis of truss, Analysis of truss by method of joint. **(Contemporary Issues related to Topic)**	
Unit IV: Properties of Surfaces	**(6 Hrs.)**
Centroid: Introduction, First Moment of Area, Centroid of composite areas. Moment of Inertia: Introduction, Second Moment of Area, Polar moment of Inertia, Radius of Gyration, Transfer formula for moment of Inertia, Product of Inertia, Moment of Inertia, and product of inertia for composite areas, Principal Moments of Inertia. **(Contemporary Issues related to Topic)**	
Unit V: Virtual Work Method and Kinetics of Particle	**(7 Hrs.)**
Virtual Work Method: Introduction, Principle of virtual work, Application to beam and frame. Kinetics of Particle: Introduction, Newton's law of motion for a Particle, D' Alembert's principle, Translation of particle and connected system.	
Unit VI: Work Energy and Impulse Momentum Method	**(6 Hrs.)**
Work Energy Method: Introduction, Work energy equation for translation, Work energy applied to particle motion and connected system. Impulse Momentum Method: Introduction, Linear Impulse momentum, Conservation of linear momentum, coefficient of restitution, elastic impact, Impulse momentum in plane motion. **(Contemporary Issues related to Topic)**	
	Total Lecture **39 Hours**

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Textbooks:	
1.	Nelson A., Engineering Mechanics (Statics and Dynamics), ed 2009, Tata Mc. Grew Hill Education Pvt. Ltd., New Delhi, 2009.
2.	Dubey N.H., Engineering Mechanics (Statics and Dynamics) first edition 2013, Tata Mc. Graw Hill Education Pvt. Ltd., New Delhi, 2013.
3.	Singer F.L, Engineering Mechanics (Statics and Dynamics), Harper and Rowe publication, New Delhi, 1994.
Reference Books:	
1.	Timoshenko S, Young D.H and Rao J.V, Engineering Mechanics, Mc. Graw Hill Publication, New Delhi, 2007.
2.	Bhattacharyya B., Engineering Mechanics, Oxford University Press, New Delhi, 2008.
3.	Hibbeler R.C, Engineering Mechanics (Statics and Dynamics), Pearson Publication, Singapore, 2000.
4.	Shames I.H. and Rao J.V., Engineering Mechanics (Statics and Dynamics), First Edition, Pearson Publication, New Delhi, 2003.
5.	Beer F.P. and Johnston E.R; Vector Mechanics for Engineers, 9th edition Tata Mc. Graw Hill Publication, New Delhi. 2007.
YCCE e- library book links [ACCESSIBLE FROM COLLEGE CAMPUS]	
1	chrome-extension://efaidnbmnnnibpcajpcglclefindmkaj/http://103.152.199.179/YCCE/Suported%20file/Supprted%20file/e-copies%20of%20books/Civil%20Engineering/78.%20Engineering-Mechanics-Statics-and-Dinamics-E-W-Nelson-C-L-Best-W-G-McLean-1st-Ed-1997-Schaum-Outline-McGraw-Hill%20(1).pdf
2	chrome-extension://efaidnbmnnnibpcajpcglclefindmkaj/http://103.152.199.179/YCCE/Suported%20file/Supprted%20file/e-copies%20of%20books/Civil%20Engineering/79.%20Engineering%20Mechanics.%20Statics-%20MERIAM%20%20AND%20KRAIGE.pdf
3	chrome-extension://efaidnbmnnnibpcajpcglclefindmkaj/http://103.152.199.179/YCCE/Suported%20file/Supprted%20file/e-copies%20of%20books/Civil%20Engineering/81.%20Engineering%20Mechanics%201.pdf
MOOCs Links and additional reading, learning, video material	
1.	https://www.youtube.com/watch?v=nGfVTNfNwnk
2.	https://www.youtube.com/watch?v=6nguX-cEsvw
3.	https://nptel.ac.in/courses/112103108

I SEMESTER
22CV106: Lab. : Engineering Mechanics

Course Outcomes
Upon successful completion of the course the students will be able to 1. Describe the fundamental concepts of statics and dynamics. 2. Apply the basic concepts of applied mechanics for solution of problems on planar force system. 3. Determine the properties of surface like centroid, moment of inertia, etc. for planar surfaces and mass moment of inertia for rigid body. 4. Analyze pin jointed truss frame structure and beam structure analytically and graphically. 5. Evaluate the dynamic variables of kinetics of particles and simple lifting machine

Minimum Eight Practical's to be performed from the list as below

SN	Experiments based on
1	To find determine the support reactions of a Simply Supported Beam experimentally and analytically.
2	To determine the forces in the members of a Jib Crane Apparatus experimentally and graphically.
3	To determine the coefficient of friction between two surfaces of different material on Plane Friction Apparatus.
4	To determine the coefficient of friction of Coil Friction Apparatus.
5	To determine the forces in members of a Shear Leg Apparatus experimentally and manually.
6	To determine the mass moment of inertia of a fly wheel using Fly Wheel Apparatus
7	To determine efficiency and law of machine of Differential Axel & Wheel machine.
8	To determine efficiency and Law of machine of Single Purchase Crab machine.
9	To determine efficiency and Law of machine of Double Purchase Crab machine.
10	To verify law of polygonal of forces using Law of Polygon Apparatus.
11	To find support reactions of a simply supported beam using graphical method and hand calculation.
12.	To find the forces in the member of truss using graphical method and hand calculation.
13.	To find (1) Principle moment of inertia and (2) Moment of inertia and product of inertia about any inclined axis for a composite figure using Mohr's circle and hand calculation,

I SEMESTER

22CV107: Basic Electrical and Electronics Engineering

Course Outcomes :
Upon successful completion of the course the students will be able to 1. Understand the fundamental concepts of Analog Electronic and Electrical Circuits 2. Apply the concepts of Electrical and Electronic Circuits to obtain the desired parameter 3. Analyse analog Electrical Circuits for given application. 4.Analyze analog Electronic Circuits for given application.

Unit I: CIRCUIT ELEMENTS AND ENERGY SOURCES	**(7 Hrs.)**
Circuit Elements, Series and Parallel Combination of Resistances, Inductance and Capacitances, Energy Sources, Source Transformation, Sources with Periodic Waveforms, A.C. in Inductance and Capacitance, Star-Delta Connection **(Contemporary Issues related to Topic)**	
Unit II: ANALYSIS OF NETWORK	**(7 Hrs.)**
Kirchhof's Laws, Current Division, Voltage Division, Nodal and Mesh Analysis of Electric Circuits, Superposition Theorem, Thevenin's Theorem. **(Contemporary Issues related to Topic)**	
Unit III: TRANSFORMER AND MOTORS	**(7 Hrs.)**
Introduction to Transformer, Construction, Working principle, Types of transformers, Introduction to DC Motor, Working Principle of DC Motor, Types of Motors. **(Contemporary Issues related to Topic)**	
Unit IV: DIODE AND TRANSISTOR	**(7 Hrs.)**
Introduction to Semiconductor, P-N junction diodes, Biasing & Characteristics of diodes. Diode Circuits - Half wave rectifier, full wave rectifier, bridge rectifier. Introduction to BJT- NPN and PNP, Modes of operation, Configuration and its Characteristics. **(Contemporary Issues related to Topic)**	
Unit V: OPERATIONAL AMPLIFIER AND ITS APPLICATION	**(7 Hrs.)**
Introduction to Op-Amp, Inverting and Non-Inverting Amplifier, Linear Applications of OP-AMP like adder, Subtractor, integrator, differentiator and non-linear application using Comparator. **(Contemporary Issues related to Topic)**	
Unit VI: Electronics Measurement	**(7 Hrs.)**
Introduction to Measurement System, Generalized block diagram of Measurement System, Static & dynamic characteristics of measurement system, Types of errors & their sources, Statistical analysis. **(Contemporary Issues related to Topic)**	
Total Lecture	**42 Hours**

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Textbooks:	
1.	Basic Electrical Engineering, T. K. Nagsarkar and M. S. Sukhija, Oxford Higher Education, First Edition 2005
2.	Electronics Devices and circuits, Millman Jacob, McGraw Hill Education, Fourth Edition (2015)
3.	Circuit Theory (Analysis and Synthesis) , by A. Chakrabarti, Dhanpat Rai & Co., Reprint Edition 2014

Reference Books:	
1.	OP-AMP and Linear Integrated Circuit, by Ramakant A. Gayakwad, Prentice Hall India Learnin Private Limited, Published in 2002
2.	Electrical & Electronic measurement & Instrument, A. K. Sawhney, Dhanpat Rai & Co.,18th edition 2008

YCCE e- library book links [ACCESSIBLE FROM COLLEGE CAMPUS]	
1	http://link.springer.com/openurl?genre=book&isbn=978-1-4613-6193-0
2	https://onlinelibrary.wiley.com/doi/book/10.1002/9780470168042

MOOCs Links and additional reading, learning, video material	
1.	https://onlinecourses.nptel.ac.in/noc22_ee113/preview

I SEMESTER

22CV108: Programming for Problem Solving

Course Outcomes :
On completion of this course, the student will be able to
1) Describe the basics of computer system components and operation, basics of algorithms and flowcharts (L2) 2) Develop programs using conditional statements and loops user defined functions, and pointers.(L3) 3) Analyze single and multi-dimensional arrays as a data structure and its use in problem solving.(L4) 4) Describe the basics of Strings, Structures, Unions, and File handling and its use for problem solving.(L2)

Unit I: Computer System Basics:	**(6 Hrs.)**
Introduction to components of a computer system (disks, memory, processor), how program is executed, understanding of concepts such as operating system, compilers, source and object programs, etc. Introduction to algorithms and flowcharts. **Basic building blocks of C:** Character set, variables, identifiers & keywords, Data types, Operators: arithmetic, logical and relational operators, precedence of operators **(Contemporary Issues related to Topic)**	
Unit II:	**(6 Hrs.)**
Expressions, sizeof() operator, constants, typedef statement, basic input/output statements and functions (scanf, printf, getch, putch, gets, puts), Introduction to library functions, writing straight line programs. Decision control statements: if, if - else and nested if-else statements, else-if ladder statement, switch-case control statement. **(Contemporary Issues related to Topic)**	
Unit III: Loop Structures:	**(6 Hrs.)**
While, do while and for loops, break and continue statement, "goto" statement, real life programming examples based on these loop structures, bitwise operators, real life programming examples. **(Contemporary Issues related to Topic)**	
Unit IV: Modular programming:	**(7 Hrs.)**
Concept of functions, user defined functions, function prototypes, formal parameters, actual parameters, return types, call by value , C programs using functions, Recursive functions, comparing recursion against iteration, C programs using recursive functions, Concepts of a pointer, call by reference, types of programming errors, real life programming examples **(Contemporary Issues related to Topic)**	
Unit V: Arrays:	**(7 Hrs.)**
One dimensional array, array manipulation, insertion, deletion of an element, searching techniques- Linear and binary search, sorting techniques – Bubble sort , and selection sort. Two-dimensional arrays: matrix representation, programs for basic matrix operations such as addition, multiplication and transpose, Array as function arguments. Strings: string representation and string handling functions, real life programming examples **(Contemporary Issues related to Topic)**	
Unit VI: Structure and Union, Concepts of files:	**(7 Hrs.)**
Types of files, file opening in various modes, file opening and closing, fseek(), reading and writing text files, concept of pre-processor directives and macros, command line arguments, real life programming examples **(Contemporary Issues related to Topic)**	

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Textbooks:	
1.	Mastering C, K.R.Venugopal & S.R. Prasad, TMH,2007.
2.	Programming in ANSI C, E. Balaguruswamy, Mc Graw Hill Education
3.	The C Programming Language., J.B.W.Kernighan & D.M.Ritchie, Prentice Hall

Reference Books:	
1.	Problem Solving And Program Design In C, Jeri. R. Hanly, Elliot B. Koffman, Pearson Education
2.	Programming with C, Byron Gottfried, Schaum;s Outline Series
3.	How to solve it by computers, R. G. Dromey, Prentice Hall India

YCCE e- library book links [ACCESSIBLE FROM COLLEGE CAMPUS]	
1	http://103.152.199.179/YCCE/e-copies%20of%20books/7.Information%20Technology/27.c.pdf
2	http://103.152.199.179/YCCE/DTEL%20Material/7.Information%20Technology/DTEL%20PPTs/11.ITCP_E_SSG.pdf

MOOCs Links and additional reading, learning, video material	
1.	https://archive.nptel.ac.in/courses/106/104/106104128/

I SEMESTER

22CV109: Lab. : Programming for Problem Solving

Course Outcomes
Upon successful completion of the course the students will be able to
1) Describe the basics of computer system components and operation, basics of algorithms and flowcharts (L2)
2) Develop programs using conditional statements and loops user defined functions, and pointers.(L3)
3) Analyze single and multi-dimensional arrays as a data structure and its use in problem solving.(L4)
4) Describe the basics of Strings, Structures, Unions, and File handling and its use for problem solving.(L2)

SN	Experiments based on
1(A)	Introduction to Linux Operating system & it's different commands.
1(B)	Introduction to Vi editor, Compilation and Execution of a program in Linux.
2	Practical based on Arithmetic and Conditional operators.
3(A)	Practical based on Decision Control statements
3(B)	Practical based on Case Control statements (switch)
4	Practical based on Looping Statements. (for/while/do-while)
5	Practical based on Functions and Recursion.
6(A)	Practical based on 1-D Array. (Searching)
6(B)	Practical based on 1-D Array. (Sorting)
7	Practical based on 2-D Array.
8	Practical based on Strings
9	Practical based on Structures.
10	Practical based on Files.

I SEMESTER
Audit Course
GE2131: Universal Human Value

Course Outcomes
Upon successful completion of the course the students will be able to 1.Experiential validation through the way to verify right or wrong. 2. Practice living in harmony with natural acceptance. 3. Realize the importance of relationships**.** 4. Recognize the importance of sustainable co-existence in existence.

Unit I: Course Introduction Need, Basic Guidelines, Content and Process for Value Education	**(4 Hrs.)**
Understanding the need, basic guidelines, content and process for Value Education Self Exploration–what is it? - its content and process; 'Natural Acceptance' and Experiential Validation- as the mechanism for self-exploration Continuous Happiness and Prosperity- A look at basic Human Aspirations	
Unit II: Understanding Harmony in the Human Being - Harmony in Myself!	**(4 Hrs.)**
Understanding human being as a co-existence of the sentient 'I' and the material 'Body' Understanding the needs of Self ('I') and 'Body' Understanding the Body as an instrument of 'I' (I being the doer, seer and enjoyer) Understanding the characteristics and activities of 'I' and harmony in 'I'	
Unit III: Understanding Harmony in the Family	**(4 Hrs.)**
Understanding Harmony in the family – the basic unit of human interaction Understanding values in human-human relationship; meaning of Nyaya and program for its fulfillment to ensure Ubhay-tripti; Trust (Vishwas) and Respect (Samman) as the foundational values of relationship Understanding the meaning of Vishwas; Difference between intention and competence Understanding the meaning of Samman, Difference between respect and differentiation; the other salient values in relationship	
Unit IV: Understanding Harmony in the Society-	**(4 Hrs.)**
Difference between intention and competence, Understanding the meaning of Samman, Difference between respect and ,differentiation; the other salient values in relationship ,Understanding the harmony in the society (society being an extension of family): Samadhan, Samridhi, Abhay, Sahasttva as comprehensive Human Goals,Visualizing a universal harmonious order in society- Undivided Society (Akhand Samaj), Universal Order (Sarvabhauma Vyavastha)- from family to world family! ,Practice Exercises and Case Studies will be taken up in Practice Sessions	

Unit V: Understanding Harmony in the Nature -	**(4Hrs)**
Whole existence as Co-existence, Understanding the harmony in the Nature Interconnectedness and mut Practice Exercises and Case Studies will be taken up in the Practice Sessions.ual fulfillment among the four orders of nature- recyclability and self-regulation in nature, Practice Exercises and Case Studies will be taken up in the Practice Sessions.	
Unit VI :Understanding Harmony in the Existence -	**(4Hrs)**
Understanding Existence as Coexistence (Sah-astitva) of mutually interacting units in all-pervasive space, Holistic perception of harmony at all levels of existence ,Practice Exercises and Case Studies will be taken up in the Practice Sessions.	
Total Lecture	**24 Hours**

Textbooks:	
1.	**The primary resource material for teaching this course consists of text book** A foundation course in Human Values and professional Ethics, Excel books, 1st Edition 2011, R.R Gaur, R Sangal, G P Bagaria

Reference Books:	
1.	**The teacher's manual** A foundation course in Human Values and professional Ethics, Excel books,1st Edition 2011, R.R Gaur, R Sangal, G P Bagaria

I SEMESTER
Audit Course
MLC2121: YCAP1-Get Set Go

Objective	Outcomes
Get Set Go program is designed to introduce students to the real world. It gives them the skills they need to reach their goals and live up to their full potential at college, home and work. The program was developed with feedback from students; it consists of interactive sessions that include real-life scenarios and role-playing. It can help young adults become more confident and better able to cope with the pressure and stress they face.	The students gain more confidence and skills required to deal with the challenges they will face in college and at home. Their interpersonal and intrapersonal skills are enhanced pushing them to think towards their future and aim for their goals.

Syllabus Subject: Communication Skills – 1st Year, No. of hours - 18

Unit No.	Topic	Duration
1	Topic: Build a foundation for success - Explain the Importance of Process of improvement, stating your Name with Impact, Recall and Use Names, Name Remembering Formula o LIRA o PACE – Individual Activity o BRAMMS o Chaining Method, Introduce "My Vision	2.5 Hours
2	Topic: Communication Fundamentals for Building Trust- Be a good listener, use conversation links, show genuine interest Hi-Five of Success ♣ Build on Memory Skills and Enhance Relationships ♣ PEG words ♣ Explain Permanent PEG Memory System, energize our Communications – Explain 3Vs of communication – Visual-Vocal-Verbal	3.5 Hours
	Practice Conversations, Activity – Pause-Part-Punch, Group Activity	

Unit No.	Topic	Duration
3	Topic: Increase Self Confidence -• Use our experiences to communicate more confidently • Communicate with clarity and conciseness • Discover how past experiences influence behavior	2.5 Hours
4	Topic: Motivate Others and Enhance Relationships-• Learning Objectives • Explain Gain Willing Cooperation Principles • Group Presentation • Explain Demonstration of Leadership Principles • Explain "Evidence" critical in establishing credibility	4 Hours
	Individual Activity – Sharing of defining moment, Skit to demonstrate Leadership Principles, Stranded on Island	

Unit No.	Topic	Duration
5	Topic: Fundamentals of Communication (Earn the right – Excite -Eagerness) ♣ Elevator Pitch ♣ Develop more Flexibility, ♣ Recap and Summarize	3.5 Hours
6	Activities - – Individual Presentation, Flexibility Drills, Individual Presentations – My Vision Assignment	2 Hours

Reference Books:

1. How to win friends & influence people – Dale Carnegie

Nagar Yuwak Shikshan Sanstha's

Yeshwantrao Chavan College of Engineering

(An Autonomous Institution affiliated to Rashtrasant Tukadoji Maharaj Nagpur University)

(Accredited 'A++' Grade by NAAC with a score of 3.25)

Hingna Road, Wanadongri, Nagpur - 441 110

Bachelor of Technology

SoE & Syllabus 2022

2nd Semester

(Department of Civil Engineering)

B. Tech in Civil Engineering

28 June 2019

Nagar Yuwak Shikshan Sanstha's

Yeshwantrao Chavan College of Engineering

(An Autonomous Institution affiliated to Rashtrasant Tukadoji Maharaj Nagpur University)

B.TECH SCHEME OF EXAMINATION 2022

(Scheme of Examination w.e.f. 2022-23 onward)

(Department of Civil Engineering)

B. Tech in Civil Engineering

SoE No. 22CV-101

SN	Sem	Type	BoS/ Deptt	Sub. Code	Subject	T/P	Contact Hours				Credits	% Weightage			ESE Duration Hours
							L	T	P	Hrs		MSEs*	TA**	ESE	
FIRST SEMESTER															
1	1	BS	GE/MTH	22CV101	Calculus and Vector	T	3	1	0	4	4	30	20	50	3 Hrs
2	1	BS	GE/CHE	22CV102	Engineering Chemistry	T	3	0	0	3	3	30	20	50	3 Hrs
3	1	BS	GE/CHE	22CV103	Lab: Engineering Chemistry	P	0	0	2	2	1		60	40	
4	1	HS	GE/HUM	22CV104	Professional Communication	T	3	0	0	3	3	30	20	50	3 Hrs
5	1	BES	CV/CV	22CV105	Engineering Mechanics	T	3	0	0	3	3	30	20	50	3 Hrs
6	1	BES	CV/CV	22CV106	Lab: Engineering Mechanics	P	0	0	2	2	1		60	40	
7	1	BES	EE/EE	22CV107	Basic Electrical and Electronics Engineering	T	3	0	0	3	3	30	20	50	3 Hrs
8	1	BES	IT/IT	22CV108	Programming for Problem Solving	T	3	0	0	3	3	30	20	50	3 Hrs
9	1	BES	IT/IT	22CV109	**Lab:** Programming for Problem Solving	P	0	0	2	2	1		60	40	
						TOTAL	**18**	**1**	**6**	**25**	**22**				
List of Mandetory Learning Course (MLC)															
1	1	HS	GE/HUM	GE2131	Universal Human Value	**A**	2	0	0	2	0				
2	1	HS	GE/T&P	MLC2121	YCAP1-Get Set Go	**A**	2	0	0	2	0				
SECOND SEMESTER															
1	2	BS	GE/MTH	22CV201	Differential Equation, matrices and Statistics	T	3	1	0	4	4	30	20	50	3 Hrs
2	2	BS	GE/PHY	22CV202	Engineering Physics	T	3	0	0	3	3	30	20	50	3 Hrs
3	2	BS	GE/PHY	22CV203	Lab: Engineering Physics	P	0	0	2	2	1		60	40	
4	2	HS	GE/HUM	22CV204	Social Science	T	3	0	0	3	3	30	20	50	3 Hrs
5	2	BES	ME/ME	22CV205	Engineering Graphics	T	1	0	0	1	1	30	20	50	3 Hrs
6	2	BES	ME/ME	22CV206	Lab: Engineering Graphics	P	0	0	4	4	2		60	40	
7	2	BES	CT/CT	22CV207	Elements of AIML	T	3	0	0	3	3	30	20	50	3 Hrs
8	2	BES	ME/ME	22CV208	FAB Shop	P	0	0	2	2	1		60	40	
9	2	BES	CV/CV	22CV209	Strength of Materials	T	3	0	0	3	3	30	20	50	3 Hrs
10	2	BES	CV/CV	22CV210	Lab: Strength of Materials	P	0	0	2	2	1		60	40	
						TOTAL	**16**	**1**	**10**	**27**	**22**				
List of Mandetory Learning Course (MLC)															
1	2	HS	GE/T&P	MLC2122	YCAP2 -Functional English	**A**	2	0	0	2	0				
2	2	BES	GE/CHE	GE2132	Environmental Science	**A**	2	0	0	2	0				

MSEs* = Two MSEs of 15 Marks each will conducted and marks of these 2 MSEs will be considered for Continuous Assessment

TA ** = for Theory : TA1-5 marks on Proctored Online Exam, TA2-12 marks on activitied decided by course teacher, TA3 - 3 marks on class attendance

TA = for Practical : MSPA will be 15 marks each**

		June 2022	**1.00**
Chairperson	**Dean (Acad. Matters)**	**Date of Release**	**Version**

Applicable for AY 2022-23 Onwards

II SEMESTER
22CV201 : Differential Equation, matrices & Statistics

Course Outcomes
Upon successful completion of the course the students will be able to 1. Use appropriate Methods to solve first order and higher order differential equations and apply it to find solutions of engineering problems. 2. Use Matrix method to solve linear system of equations, evaluate eigen values - eigen vectors and its applications. 3. Make use of probability distributions to solve real life problems. 4. Inspect scientific data, use proper curve fitting and find correlation, regression of variables.

Unit I: Differential Equations I	**(7 Hrs.)**
Linear differential equations of first order and first degree, Differential equation reducible to linear form, Exact differential equations (excluding the case of integrating factor) and their applications to various fields. **(Contemporary Issues related to Topic)**	
Unit II: Differential Equations II	**(7 Hrs.)**
Higher order linear differential equations with constant coefficients, Complementary functions and Particular Integral for different cases, Method of variation of parameters, Examples on application to various fields. **(Contemporary Issues related to Topic)**	
Unit III: Differential Equations III	**(6 Hrs.)**
Cauchy's homogeneous linear differential equations, Legendre's linear differential equation, Applications of differential equations to various field (only up to second order). **(Contemporary Issues related to Topic)**	
Unit IV: Matrices	**(6 Hrs.)**
Rank of a matrix, Consistency of system of equations using rank, Characteristics equations, Eigen values and Eigen vectors, Cayley Hamilton Theorem (without proof) statement and verification, Sylvester's theorem-statement and its application. **(Contemporary Issues related to Topic)**	
Unit V: Probability Distributions	**(7 Hrs.)**
Conditional probability, Baye's theorem, Binomial, Poisson, Normal distributions. **(Contemporary Issues related to Topic)**	
Unit VI: Statistics	**(6 Hrs.)**
Fitting of straight line, $y = a + bx$, a parabola $y = a + bx + cx^2$, exponential curves and power curves by method of least squares; Lines of regression and correlation; Rank correlation. **(Contemporary Issues related to Topic)**	
Total Lecture	**39 Hours**

Textbooks:	
1.	Erwin Kreyzig, Advance Engineering Mathematics, 6th Edition, John Wiley and Sons, INC.
2.	H.K. Dass, Engineering Mathematics, 11th revised edition, S. Chand, Delhi.
3.	H.K. Dass, Advanced Engineering Mathematics, 8th revised edition, S. Chand, Delhi.
4.	Dr. B.S. Grewal, Higher Engineering Mathematics, 42th edition, Khanna Publishers.
5.	P.N.Wartikar and J.N.Wartikar, Applied Mathematics, 4th Edition, Vidyarthi GrihaPrakashan.

Reference Books:	
1.	G B Thomas and R L Finney, Calculus and Analytical Geometry, 9th edition, Addison-Wesley, 1999.
2.	N.P. Bali and Manish Goyal, A text book of Engineering Mathematics, 10th edition, Laxmi Prakashan.

YCCE e- library book links [ACCESSIBLE FROM COLLEGE CAMPUS]	
1	http://103.152.199.179/YCCE/Suported%20file/Supprted%20file/e-copies%20of%20books/Applied%20Sciences%20&%20Humanities/Mathematics%20and%20Humanities/

MOOCs Links and additional reading, learning, video material	
1.	https://nptel.ac.in/courses/111103070
2.	https://onlinecourses.nptel.ac.in/noc19_ma28/preview
3.	https://nptel.ac.in/courses/111/106/111106100/

II SEMESTER
22CV202 : Engineering Physics

Course Outcomes :

Upon successful completion of the course the students will be able to

1. Correlate fundamental of quantum mechanics to solve problems dealing with quantum particle.
2. Justify the characteristics of semiconductor materials in terms of crystal structure, charge carriers and energy bands.
3. Assess the fundamentals of interference and their significance in optical measurements.
4. Illustrate working principle of lasers and optical fibers for their use in the field of industry.
5. Identify and analyze the fundamentals of ultrasonic and acoustic waves and their applications in technology.

Unit:1 Quantum Mechanics	**(7 Hrs.)**
Wave particle duality, de-Broglie's hypothesis, Wave packet, Phase and Group velocity, Heisenberg's uncertainty principle and its applications, Wave function (ψ), Max Born's interpretation, Schrödinger's wave equations and it's applications. **(Contemporary Issues related to Topic)**	
Unit II: Basics of Semiconductors	**(7 Hrs.)**
Formation of energy bands in solids, valence and conduction band, Classification, Pure and doped semiconductors, Law of mass action, Conduction mechanism, Hall effect. Photovoltaic cell (Solar Cell). **(Contemporary Issues related to Topic)**	
Unit III: Wave Optics	**(7 Hrs.)**
Interference: Thin film interference, Wedge shaped film, Newton's rings, Applications of thin film interference, Antireflection coatings. **(Contemporary Issues related to Topic)**	
Unit IV: Laser	**(6 Hrs.)**
Coherence, Interaction of radiation with matter, Population Inversion and Optical resonance cavity , Three and four level laser, Ruby laser, He-Ne laser, Properties and engineering applications of laser. **(Contemporary Issues related to Topic)**	
Unit V: Fibre Optics	**(6 Hrs.)**
Principle, structure and classification, Acceptance angle, Numerical aperture, Losses in optical fibres, Applications as sensor. **(Contemporary Issues related to Topic)**	
Unit VI: Ultrasonic and Acoustics	**(7 Hrs.)**
Ultrasonic waves: Production and detection, Properties of ultrasonic waves, Determination of velocity of ultrasonic waves, Applications. **Acoustics :** Characteristics of sound, Weber Fechner Law, Sound Intensity (Decibel) and Pressure Level, Sound reflection, Sound absorption, Sabine's Formula (Qualitative), Factors affecting the architectural acoustics and their remedies, Acoustic quieting. **(Contemporary Issues related to Topic)**	
Total Lecture	**40 Hours**

			July 2022	1.00	Applicable for AY 2022-23 Onwards
Chairperson	Dean (Acad. Matters)	Dean OBE	Date of Release	Version	

Textbooks:	
1.	M. N. Avadhanulu, P. G. Kshirsagar, A Textbook of Engineering Physics, Revised 14th Edition, S. Chand & Company, 2014.
2.	Hitendra K Malik , A K Singh , Engineering Physics, 2nd Edition, Tata McGraw Hill Education Private Limited, 2015.

Reference Books:	
1.	Sanjay D Jain, Girish G Sahasrabudhe, Engineering Physics, 2nd Edition, Universities Press, 2015.
2.	P K Palanisamy, Engineering Physics, Revised Edition, SCITECH, 2015.
3.	David Halliday, Robert Resnick and Jerle Walker, Fundamentals of Physics, 10th edition, John-Wiley India, 2013.
4.	Arthur Beiser, Concept of Modern Physics, 6th edition , Tata McGraw - Hill Education, 2002.
5.	Subramanyam, Brijlal, M N Avadhanulu, Text Book of Optics, S. Chand & Company, 2006.
6.	S. O. Pillai, Solid State Physics, 9th edition, New Edge International Publishers, 2021

YCCE e- library book links [ACCESSIBLE FROM COLLEGE CAMPUS]	
1	chrome-http://103.152.199.179/YCCE/Suported%20file/Supprted%20file/e-copies%20of%20books/Applied%20Sciences%20&%20Humanities/Physics/Eisberg%20&%20Resnick%20-%20Quantum%20Physics.pdf
2	chrome-http://103.152.199.179/YCCE/Suported%20file/Supprted%20file/e-copies%20of%20books/Applied%20Sciences%20&%20Humanities/Physics/2016_Book_ThePhysicsOfSemiconductors.pdf
3	chrome-http://103.152.199.179/YCCE/Suported%20file/Supprted%20file/e-copies%20of%20books/Applied%20Sciences%20&%20Humanities/Physics/Dekker%20-%20Solid%20State%20Physics.pdf

MOOCs Links and additional reading, learning, video material	
1.	https://archive.nptel.ac.in/courses/122/107/122107035/
2.	https://nptel.ac.in/courses/122104016
3.	https://freevideolectures.com/course/3531/engineering-physics-i

II SEMESTER
22CV203 : Lab: Engineering Physics

Course Outcomes

Upon successful completion of the course the students will be able to

1. Correlate fundamental of quantum mechanics to solve problems dealing with quantum particle.
2. Justify the characteristics of semiconductor materials in terms of crystal structure, charge carriers and energy bands.
3. Assess the fundamentals of interference and their significance in optical measurements.
4. Illustrate working principle of lasers and optical fibers for their use in the field of industry.
5. Identify and analyze the fundamentals of ultrasonic and acoustic waves and their applications in technology.

Minimum Eight Practical's to be performed from the list as below

SN	**Experiments based on**
1	Determination of Planck's constant.
2	To study V-I characteristics of a Tunnel Diode.
3	Determination of Hall coefficient and density of charge carriers using Hall effect.
4	Dependence of Hall coefficient on temperature.
5	To study of V-I characteristics of a semiconductor diode (Germanium and Silicon) in forward and reverse bias mode.
6	To determine the forbidden energy gap of a semiconductor by studying the temperature variation of its resistivity using four probe method.
7	Determination of Band gap in a semiconductor using reverse biased p-n diode.
8	To study V-I characteristics of a LED.
9	To determine the radius of curvature of Plano-convex lens by using Newton's Rings apparatus.
10	To determine the thickness of thin paper using Air Wedge arrangement.
11	Determination of wavelength of laser using diffraction grating.
12.	Determination of divergence of laser beam.
13.	Determination of acceptance angle and numerical aperture of a given optical fibre.
14.	Determination of the velocity of Ultrasonic waves in a non –electrolytic liquid by ultrasonic interferometer.

II SEMESTER
22CV204 : Social Science

Course Outcomes
Upon successful completion of the course the students will be able to 1. Explain the basic concepts of social sciences. 2. Describe the development of various Civilizations and their culture. 3. Explain the basic idea of Constitution of India and aware about their rights & Duties. 4. Analyze the Impact of Industrialization on Society and discuss the Fundamental Concepts of Society.

Unit I: Social Sciences & Its Utility	**(6 Hrs.)**
Meaning & Scope of Social Science, General Utility of Social Sciences to Engineers, Applied Humanities, Social Engineering, Society its types & Characteristics.	
Unit II: Human Civilization	**(7 Hrs.)**
Development of human civilization with specific reference to monumental studies of engineering skill, Ancient Indian Civilization:- a) Indus Valley Civilization b) Vedic Civilization, c) Indian Art & Architecture.	
Unit III: Fundamental Concept in Social Science	**(7 Hrs.)**
Social Structure and Social System, Socialization, Social Control and Social Change, Culture: Characteristics and Features.	
Unit IV: Introduction to Constitution of India	**(7 Hrs.)**
Significance of Preamble, Fundamental Rights and Duties, Directive principles of state policy. Federal System Concept of industrial Democracy.	
Unit V: Industrial Organization & Society	**(6 Hrs.)**
Industrialization and its impact on society, Selection, Training & Motivation of workers, Industrial Psychology, Industrial sociology, Work Organization, Power, Authority and Status system.	
Unit VI: Industrial Management	**(6 Hrs.)**
Labour Union Organization, Discipline in Industry, Labour Turnover, Industrial Fatigue of workers, Health and Safety of Workers.	
Total Lecture	**39 Hours**

Textbooks:	
1.	S. Shabbir & Sheikh, A New Look Into Social Sciences, S.Chand , New Delhi,1993.
2.	C N Shankar Rao, Sociology Principles of Sociology With An Introduction To Social Thought, S. Chand, New Delhi, 2010.
3.	O P Khanna, Industrial Engineering And Management, Dhanpat Rai Publication, New Delhi, 2010.
4.	Dr. G. N. Nimbarte, Social Science, Sankalp Publications, Nagpur.

Reference Books:	
1.	C. N. Shankar Rao, Sociology: Principal of Sociology with an introduction to social thought, Publication: S. Chand, New Delhi.
2.	O. P. Khanna, Industrial Engineering and Management, Dhanpat Rai Publication, New Delhi.
3.	Reader's Digest Vanished Civilizations, The Reader's Digest Association Limited, New York.
4.	Constitution of India: Dr B. R. Ambedkar: Government of India, Government of India.
5.	B. L. Kayastha, Recent trends in Humanities and Social Sciences, 1st Ed., Akinik Publications, New Delhi.

MOOCs Links and additional reading, learning, video material	
1.	https://mobidrive.com/sharelink/r/4I2bDsxN9YrVI03vMZaInJ5VBpojBmR9EqKv7nin9pkN
2.	https://mobidrive.com/sharelink/r/4I2bDsxN9YrVI03vMZaInJ2sUn37wK4V3CpGhemYRKnz

II SEMESTER
22CV205 : Engineering Graphics

Course Outcomes :
Upon successful completion of the course the students will be able to 6. Construct orthographic drawing and isometric drawing of a given object 7. Evaluate Projections of various One Dimensional, Two dimensional, Three dimensional objects 8. Develop the lateral surfaces of various solids, their section and intersection. 9. Practice the use of software tools used for Two dimensional drawings.

Unit I: Theory of Orthographic Projections:	**(3 Hrs.)**
Introduction, Quadrant system, Theory of orthographic projection, Projection method and principal planes, First and Third angle projections, **(Contemporary Issues related to Topic)**	
Unit II: Theory of Isometric Projections:	**(2 Hrs.)**
Theory of isometric projection, Method for drawing isometric views, Different problems on isometric projections. **(Contemporary Issues related to Topic)**	
Unit III: Lines:	**(2 Hrs.)**
Projection of points, Projection of lines, True lengths and inclinations, apparent lengths and inclinations, various positions of lines in different quadrants, Traces of lines, projection of line on auxiliary plane. **(Contemporary Issues related to Topic)**	
Unit IV: Planes and Solids:	**(4 Hrs.)**
Projection planes: (Polygonal Lamina, Circular Lamina), Projection of Perpendicular planes and oblique planes. Auxiliary views (Auxiliary planes) Projection of Solids :(Inclined to One Plane Only) - Polyhedra (Regular and Irregular Polyhedra), Solids of Revolution **(Contemporary Issues related to Topic)**	
Unit V: Section of Solids and Development of Surfaces:	**(2 Hrs.)**
Types of Section planes, Sectional top view, True shape. Development of different solids using Radial line and parallel line methods. **(Contemporary Issues related to Topic)**	
Unit VI: Intersection of Surfaces of solids:	**(2 Hrs.)**
Intersection between similar solids, Intersection between dissimilar solids, Lines and Curves of Intersection. **(Contemporary Issues related to Topic)**	
Total Lecture	**15 Hours**

Textbooks:	
1.	D.M. Kulkarni, A. P. Rastogi and A. K. Sarkar , Engineering Graphics with AutoCAD PHI learning Pvt. Ltd., Revised Edition(2014),
2.	N. D. Bhatt ,Engineering Drawing Charotar Publishing House Pvt. Ltd, 53 rd Edition 2017

Reference Books:	
1.	D. A. Jolhe Engineering Drawing , Tata McGraw Hill Publications , 2008,
2.	K. L. Narayana & P. Kannaiah , Engineering Drawing SciTech Publication , 2010
3.	R. K. Dhawan Engineering Drawing S. Chand Publication Multicolor revised edition 2015

YCCE e- library book links [ACCESSIBLE FROM COLLEGE CAMPUS]	
1	Intranet on address 172.16.1.10. data/CCC/software / AutoCAD Software Setup.

MOOCs Links and additional reading, learning, video material	
1.	https://youtube.com/playlist?list=PLLy_2iUCG87Bw9XPfEF3r3EW5UlAOv8iz
2.	Eng https://nptel.ac.in/courses/112105294

II SEMESTER
22CV206 : Lab. : Engineering Graphics

Course Outcomes
Upon successful completion of the course the students will be able to
1. Construct orthographic drawing and isometric drawing of a given object
2. Evaluate Projections of various One Dimensional, Two dimensional, Three dimensional objects
3. Develop the lateral surfaces of various solids, their section and intersection.
4. Practice the use of software tools used for Two dimensional drawings.

Practical's to be performed from the list as below

SN	Experiments based on	No.of Practical's
1	Introduction of AutoCAD Basic Commands	02
2	Orthographic Projection	03
3	Isometric Projection	03
4	Projection of Straight Line	03
5	Projection of Planar Surface	03
6	Projection of Solid	03
7	Section and Development of Solid	04
8	Intersection of Surfaces	03
9	Drawing Sheet 1: Convention for various lines, Dimensioning and Orthographic Projection	02
10	Drawing Sheet 2: Projection of line, planar surface or solid. (Any one)	02
	Total Practical's	**28 Hours**

II SEMESTER
22CV207 : Elements of AIML

Course Outcomes :
Upon successful completion of the course the students will be able to 10. Develop an understanding what is involved in AIML. 11. Understand learning algorithms of AIML. 12. Understand the deep learning. 13. Apply the knowledge for the selection of tool and languages for problem solving 14. Understand the use of AIML for real world problems.

Unit I: Introduction to Artificial Intelligence	**(7 Hrs.)**
What Is Artificial Intelligence? History, AI and Society, Agents and Knowledge based systems, Components of AI **(Contemporary Issues related to Topic)**	
Unit II: Propositional Logic	**(7 Hrs.)**
Propositional Logic, First order logic, limitations of logic, Search, Games and Problem Solving, Reasoning with Uncertainty **(Contemporary Issues related to Topic)**	
Unit III: Machine Learning	**(7 Hrs.)**
Supervised learning, Unsupervised learning, Reinforcement learning: Model based learning, Regression, Decision trees, Linear Discrimination, Kernel Machines and Graphical Models **(Contemporary Issues related to Topic)**	
Unit IV: Artificial Neural Networks and Deep Learning	**(7 Hrs.)**
Biological neural network, Artificial neural network, Hopfield network, Neural Associative memory, Linear networks, Backpropogation algorithm, Support Vector Machines, Basics of deep learning. **(Contemporary Issues related to Topic)**	
Unit V: Introduction to Platforms, Tools, Frameworks and languages for AIML	**(6 Hrs.)**
Top AIML Softwares: Salesforce Einstein, IBM Watson, Deep Vision, Cloud Machine Learning Engine, Azure Machine Learning Studio, Nvidia Deep Learning AI, Playment; Machine learning tools: TensorFlow, Amazon Machine Learning, Accord.NET, Apache Mahout, Shogun; Programming languages: Python, R, Java, Julia, C/C++, Others: Scikit Learn, Theano, Caffe, MxNet, Keras, PyTorch, CNTK, Auto ML, OpenNN, H20: Open Source AI Platform, Google ML Kit **(Contemporary Issues related to Topic)**	
Unit VI: Applications of AI and ML	**(6 Hrs.)**
Working with software based AI Applications, Working with AI in hardware Applications, Health, Banking and Finance, Automobile, Surveillance, Social Media, Education, Space, etc. **(Contemporary Issues related to Topic)**	
Total Lecture	**40 Hours**

			July 2022	1.00	Applicable for AY 2022-23 Onwards
Chairperson	Dean (Acad. Matters)	Dean OBE	Date of Release	Version	

Textbooks:	
1.	Wolfgang Ertel, "Introduction to Artificial Intelligence" 2nd Edition, UTiCS, Springer
2.	Ethem Alpaydın ,"Introduction to Machine Learning" 3rd Edition,The MIT Press, Cambridge, Massachusetts London, England.

Reference Books:	
1.	John Paul Mueller, Luca Massaron John Wiley & Sons ,"Artificial Intelligence for Dummies" First, 2018
2.	Steven W. Knox,Wiley" Machine Learning A Concise Introduction" First, 2018

MOOCs Links and additional reading, learning, video material	
1.	https://www.youtube.com/watch?v=kwSTs0QVRfU
2.	https://www.youtube.com/watch?v=GHpchgLoDvI&list=PLp6ek2hDcoNB_YJCruBFjhF79f5ZHyBuz
3.	https://nptel.ac.in/courses/106105077

II SEMESTER
22CV208 : FAB Shop

Course Outcomes:

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

1. Interpret the general safety/precautions on shop floor; identify and use the different materials, machines and measuring and cutting tools.
2. Practice on manufacturing of components using workshop trades including fitting, plumbing, carpentry and welding, etc.
3. Demonstrate practical knowledge of the dimensional accuracies and tolerances applicable for different manufacturing/testing processes.
4. Produce simple/small devices of their interest for project/product development or research purpose.

Sr.No	Experiments based on	CO	Level
1	Study and demonstration of safety norms, unfair practices, meaning of different signs/symbols and use of fire extinguishers	I	L-II
2	Study and demonstration of different materials, devices/machines, cutting and measuring devices used in fitting, plumbing, carpentry and welding shop, etc.	I	L-II
3	Create simple job/part/pattern in fitting, carpentry, plumbing and welding shop.	II	L-III
4	Elaborate the created job/part/pattern with proper justification of its dimensional accuracies and tolerances.	III	L-III
5	Case study: To prepare simple/small models (Group Activity)	IV	L-III
6	**To carry out test on bricks :** i) Dimension Test ii) Soundness Test iii) Water Absorption Test iv) Compression Test	III	L-III

Text books

1	Workshop Technology - Part I,Chapman W.A.JFifth edition CBS Publishers
2	Elements of Workshop Technology, (Vol-I), S.K.Hajra Choudhary,A.K.Hajra Choudhary,Nirjhar Roy, Media Promoters & Publishers Pvt Ltd
3	Workshop Technology (Volume-II) Hajra Choudhary 2nd Edition (2012) The McGraw-Hill Companies
4	Manufacturing Technology (Metal Cutting & Machine Tools) P N Rao 2nd Edition (2009) The McGraw-Hill Companies
5	A Course in Workshop Technology , Vol-I, B S Raghwanshi, Dhanpat Rai & Company
6	A Text Book on Workshop Technology by R S Khurmi & J K Gupta, S K Chand & Co
7	Workshop Manual by P Kannaiah & K L Narayana, SCITECH Publications
8	"Building Construction" author by B.C. Punmia, Arun Kumar Jain, Ashook Kumar Jain, 11th Edition Laxmi Publications, 2005
9	Building construction" author by Varghese P.C., 2nd edition, Prentice Hall of India Pvt. Ltd, New Delhi Publication, 2007

Reference Books	
1	Manufacturing Engineering & Technology S Kalpakjian & SR Schmid 1st Edition (2009) Pearson Education Canada
2	Technology of machine Tools Krar & Oswald 1st Edition (1984) Gregg Division, McGraw-Hill
3	Manufacturing Processes M Begman 1st Edition (1974) Ballinger Pub. Co
4	Manufacturing Science Ghosh & Malik 2nd Edition (2010) East West
5	IS: 1077- Dimension Test on Bricks
6	IS 3495 (Part 1 to 4)-1992 METHODS OF TESTS OF BURNT CLAY BUILDING BRICKS

YCCE e- library book links [ACCESSIBLE FROM COLLEGE CAMPUS]	
1	http://link.springer.com/openurl?genre=book&isbn=978-1-4613-6193-0
2	https://onlinelibrary.wiley.com/doi/book/10.1002/9780470168042

MOOCs Links and additional reading, learning, and video material	
1	https://nptel.ac.in/courses/112/103/112103280/
2	https://nptel.ac.in/courses/106/106/106106179/
3	https://nptel.ac.in/courses/127/105/127105007/

II SEMESTER
22CV209 : Strength of Materials

Course Outcomes :
Upon successful completion of the course the students will be able to
1. Explain the basic concept and mechanical properties of materials.
2. Construct graphically the variation of shear force, bending moment and stresses
3. Analyze the behavior of various structural components under different types of loading.

Unit:1	Mechanical properties and uniaxial problems	6 Hours
Types of force distribution, concept of stress, strain and their relationship, stress strain behavior of ductile and brittle material in uniaxial state of stress, elastic constants, relation between elastic constants Uniaxial loading and deformation of simple cases of statically indeterminate problems under axial loading. Stress due to variation of temperature. **(Contemporary Issues related to Topic)**		
Unit:2	**Shear force and bending moment diagram**	**7 Hours**
Axial force, shear force and bending moment diagram. Determination of axial force, shear force and bending moment at a section. Point of contraflexure, Axial force, shear force and bending moment diagram in beams, relation between bending moment, shear force and loading Contemporary issue: Propped cantilever **(Contemporary Issues related to Topic)**		
Unit:3	**Stresses in beam**	**7 Hours**
Theory of simple bending, Bending stresses in simple beam. Shear stresses in simple beams and shear stress distribution. Direct and bending stresses. **(Contemporary Issues related to Topic)**		
Unit:4	**Torsion of Shaft**	**6 Hours**
Torsion of circular sections, assumptions and derivation of relation between torsional moment, shear stress and angle of twist. Torsional stress in solid and hollow circular sections. **(Contemporary Issues related to Topic)**		
Unit:5	**Deflection of Beams**	**7 Hours**
Derivation of differential equation of elastic curve, Differential Equation relating deflection moment, shear and load. Deflection of simple beams by double integration method. **(Contemporary Issues related to Topic)**		
Unit :6	**Compound stresses**	**6 Hours**
State of stress in two dimensions, principal stresses, combined effect of Bending and Shear. Thin walled cylindrical and spherical pressure vessel subjected to internal pressure. **(Contemporary Issues related to Topic)**		
	Total Lecture	**39 Hours**

			July 2022	1.00	Applicable for AY 2022-23 Onwards
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Text Books	
1	Bhavikatti S. S., Strength of Materials, 3rd Edition, Vikas Publication House Pvt. Ltd., Noida, UP, 2008.
2	Popov E.P., Engineering Mechanics of Solids, 4th Edition, Printice Hall, 2002.
3	R.K.Rajput, Strength of Materials, S.Chand Publication
4	S.Ramamurtham, Strength of Materials, Dhanpat Rai publisjing company

Reference Books	
1	Chakraborti, M., Strength of Materials, S. K. Kataria& Sons.
2	Pytel A., Kivsalaas J. Mechenics of Material, CENGAGE LEARNING, (INDIAN EDITION), 2010.
3	Shah V.L., Ogale R.A., Strength of Materials and Machine Element, 2nd Edition, Jain Book Agency, New Delhi.

YCCE e- library book links [ACCESSIBLE FROM COLLEGE CAMPUS]	
1	https://link.springer.com/book/10.1007/978-3-030-59667-5
2	https://onlinelibrary.wiley.com/doi/10.1002/0471752037.ch2

MOOCs Links and additional reading, learning, video material	
1	https://nptel.ac.in/courses/105105108
2	https://www.youtube.com/watch?v=ufd-CJj8Jxs
3	https://www.youtube.com/watch?v=TgK6VdpVF3o

II SEMESTER
22CV210 : Lab. : Strength of Materials

Course Outcomes:
Upon successful completion of the course the students will be able to
1. Explain the basic concept and mechanical properties of materials.
2. Calculate the Shear stress, stiffness, and impact test.
3. Analyze the behavior of various structural components under different types of loading.
4. Evaluate the properties of materials by conducting experiment.

Minimum Ten Practical's to be performed from the list as below

SN	Experiments based on
1	To study the universal testing machine and extensometer.
2	To perform tension test on metal.
3	To determine flexural strength of timber beam.
4	To determine modulus of rigidity of M.S. bar by torsion test.
5	To determine impact value of metal by Charpy Impact Test and Izod Impact Test.
6	To determine Rockwell / Brinnel hardness number for M.S. and Aluminium bar.
7	To determine the flexural strength of roofing and flooring tile.
8	To determine the stiffness of spring and modulus of rigidity.
9	To perform shear test on metals.
10	To determine the compressive strength of steel and aluminium specimens.
11	To perform the compressive strength test on timber wood, (parallel and perpendicular to the grain)
12	To determine the principal stresses for given problem by using Mohr's Circle.

IS CODES :	
1	IS: 1708 (Parts 1 To 18) .. 1986METHODS OF TESTING OF SMALL CLEAR SPECIMENS OF TIMBER
2	IS : 2408 – 1963 Methods Of Static Tests Of Timbers In Structural Sizes
3	IS 1237 : 2012 Cement Concrete Flooring Tiles — Specification
4	IS 13630 (Part 2) : 2006 Ceramic Tiles — Methods Of Test, Sampling And Basis For Acceptance
5	IS 1608 : 2005 Metallic Materials - Tensile Testing At Ambient Temperature

II SEMESTER
Audit Course
MLC2122: YCAP2 -Functional English

MLC2122 YCAP-II	**No of Evaluations**	**Result of successful completion of YCAP II shall be calculated based on the basis of evaluations.** **To pass the exam a students must score 50% marks**
Evaluation Scheme	EVAL-I	
	100 marks	

Objective	Objective
The aim of this course is to get the students to a common level in spoken English. The majority of the target group is expected to know English as a foreign/official language. Thus the objective of the course is to make the students comfortable in using it as a spoken language when the situation demands	Students will heighten their awareness of correct usage of English grammar in writing and speaking.

Syllabus Subject: Functional English – 2nd Sem , No. of hours - 20

Unit No.	Topic	Duration
1	Introduction to Functional English - What is FE? And Areas of application. Basic Interactive sentences - Greetings & Replies, Asking for information, Telling people what you do, Asking somebody's opinion, Giving your opinion, Saying someone is correct, Saying that someone is wrong, Apologizing, Praising someone's work, Saying goodbye	2 hours
2	Introduction & Basics of Common Expressions – Offer, Request, Gratitude, Apology Modal Verbs - Words used often : Can- could, Will – would, Shall – should, Ought to-Must, May-might	2 hours
	Practice exercises, Practice Conversations, Script Activity	1.5 Hours
	Quiz on the above Topics, Exercises for Evaluation	0.5 Hours

Unit No.	Topic	Duration
3	Topic: Internet & Social Media Communication Introduction & Basics to Social Networking, Texting & Instant messaging, Blogs & Discussion Board- discussion with examples, Ethics of Social media & communication	3 Hours
	Topic: Introduction to Creative Ads Why Ads, Whats in it for me?, Characteristics of ads, Assignment	
4	Topic: Tenses -1 Introduction & Basics, Simple Tense (Past, Present, Future), Continuous Tense (Past, Present, Future) – discussion with examples	4 Hours
	Assignment Presentation on Mad Ads, Quiz on Tenses and Social Media-Internet Communication	

Unit No.	Topic	Duration
5	Topic: Tenses -2 Introduction & Basics, Perfect Tense (Past, Present, Future), Perfect Continuous Tense (Past, Present, Future) – discussion with examples	3.5 Hours
	Topic: Introduction to Movie Magic Learn English with films, Film Vocabulary, Describing a film, Types of Films,	
6	Topic: Written Communciation Introduction & Basics of Writing, Five methods of communication, Mind your grammar, Commonly confusing words Letters – Format, Parts of a business letter, When does communication fail?, Things to remember, Positive language not negative language, Active voice not passive voice Effective emailing -How to make an effective e-mail, Few common e-mail habits that cause problems, Parts of an e-mail, Some other important aspects	3.5 Hours
	Assessment – Letter and Email Writing, Tenses - Quiz	

Reference Books:	
1.	Soft Skills and Professional Communication, Francis Peters SJ, Mcgraw Hill Education
2.	Bringing out the best in People, Aubrey Daniels, Mcgraw Hill

MOOCs Links and additional reading, learning, video material	
1.	https://www.youtube.com/channel/UCLsI5-B3rIr27hmKqE8hi4w
2.	https://www.youtube.com/channel/UC1Y1I4shF84scQ4HBThahcg

			July 2022	1.00	Applicable for AY 2022-23 Onwards
Chairperson	Dean (Acad. Matters)	Dean OBE	Date of Release	Version	

II SEMESTER
Audit Course
GE2132: Environmental Science

Course Outcome :

Upon successful completion of the course the students will be able

1. To understand the basic concepts and problems and follow sustainable development practices
2. To enhance knowledge skills and attitude towards environment
3. To understand natural environment and its relationship with human activities.
4. To evaluate local, regional and global environmental topics related to resource use and management.

Unit I: : Introduction	**(2Hrs.)**
Definition, scope and importance; Need for public awareness – institutions in environment, people in environment.	

Unit II: : Natural Resources	**(2 Hrs.)**
Renewable and non-renewable and associated problems; Role of an individual in conservation of natural resources; Equitable use of resources for sustainable lifestyles.	

Unit III: Ecosystems	**(4 Hrs.)**
Concept of an ecosystem – understanding ecosystems, ecosystem degradation, resource utilization. Structure and functions of an ecosystem – producers, consumers and decomposers. Energy flow in the ecosystem – water, carbon, oxygen, nitrogen and energy cycles, integration of cycles in nature. Ecological succession; Food chains, food webs and ecological pyramids; Ecosystem types – characteristic features, structure and functions of forest, grassland, desert and aquatic ecosystems.	

Unit IV: Bio-diversity	**(4 Hrs.)**
Introduction – biodiversity at genetic, species and ecosystem levels Bio-geographic classification of India. Value of biodiversity – Consumptive use value, productive use value, social, ethical, moral, aesthetic and optional vlue of biodiversity. India as a mega-diversity nation; hotspots of biodiversity.Threats to bio-diversity – habitat loss, poaching of wildlife, man-wild life conflicts. Common endangered and endemic plant and animal species of India. Insitu and Exsitu conservation of biodiversity. Role of individual and institutions in prevention of pollution.Disaster management – Floods, earthquake, cyclone, landslides.	

Unit V: Pollution	**(4 Hrs.)**
Definition; Causes, effects and control measures of air, water, soil, marine, noise and thermal pollutions and nuclear hazards. Solid waste management – Causes, effects and control measures of urban and industrial waste.	

Unit VI: Social Issues and the Environment	**(4 Hrs.)**
Unsustainable to sustainable development; Urban problems related to energy; Water conservation, rainwater harvesting, watershed management; Problems and concerns of resettlement and rehabilitation of affected people. Environmental ethics – issues and possible solutions – Resource consumption patterns and need for equitable utilization; Equity disparity in Western and Eastern countries; Urban and rural equity issues; need for gender equity. Preserving resources for future generations. Te rights of animals; Ethical basis of environment education and awareness; Conservation ethics and traditional value systems of India. Climate change, global warming, acid rain, Ozone layer depletion, nuclear accidents and holocasts. Wasteland Reclamation; Consumerism and Waste products. Environment legislations – The Environment (Protection) Act; The water (Prevention and Control of Pollution) Act; The Wildlife Protection Act; Forest Conservation Act; Issues involved in enforcement of environmental legislations – environment impact assessment (EIA), Citizens actions and action groups. Public awareness – Using an environmental calendar of activities, self-initiation.	
Unit VII : Human Population and the Environment	**(4Hrs.)**
Global population growth, variation among nations. Population explosion; Family Welfare Programmes – methods of sterilization; Urbanization. Environment and human health – Climate and health, infectious diseases, water-related diseases, risk due to chemicals in food, Cancer and environment. Human rights – equity, Nutrition and health rights, Intellectual property rights (IPRS), Community Biodiverstity registers (CBRs). Value education – environmental values, valuing nature, valuing cultures, social justice, human heritage, equitable use of resources, common property resources, ecological degradation. HIV / AIDS; Women and Child Welfare; Information technology in environment and human health.	
Total Lecture	**24 Hours**

Textbooks:	
1.	Perspectives in environmental studies by A. Kaushik and C. P. Kaushik.
2.	Textbook for Environmental studies by Erach Bharucha for UGC
3.	Textbook of Environmental studies by Shanta Satyanarayan, Dr. Suresh Zade, Dr. Shashikant Sitre & Dr. Pravin Meshram.
4.	Fundamental concepts in Environmental studies by Dr. D.D. Mishra. S. Chand publications

Reference Books:	
1.	Essentials of Ecology and Environmental Science by Dr. S .V .S. Rana,PHI Learning Pvt. Ltd, Delhi
2.	Environmental Chemistry by Anil Kumar De, Wiley Eastern Limited
3.	Environmental Science by T.G. Miller, Wadsworth Publishing Co, 13th edition.
4.	Ecology and Environment by P. D. Sharma, Rastogi publications

Nagar Yuwak Shikshan Sanstha's

Yeshwantrao Chavan College of Engineering

(An Autonomous Institution affiliated to Rashtrasant Tukadoji Maharaj Nagpur University)

(Accredited 'A++' Grade by NAAC with a score of 3.25)

Hingna Road, Wanadongri, Nagpur - 441 110

Bachelor of Technology

SoE & Syllabus 2022

3rd Semester

(Department of Civil Engineering)

B. Tech in Civil Engineering

Nagar Yuwak Shikshan Sanstha's

Yeshwantrao Chavan College of Engineering

(An Autonomous Institution affiliated to Rashtrasant Tukadoji Maharaj Nagpur University)

SoE No. 22CV-101

B.TECH SCHEME OF EXAMINATION 2022

(Scheme of Examination w.e.f. 2022-23 onward)

(Department of Civil Engineering)

B. Tech in Civil Engineering

SN	Sem	Type	BoS/ Deptt	Sub. Code	Subject	T/P	Contact Hours				Credits	% Weightage			ESE Duration Hours
							L	T	P	Hrs		MSEs*	TA**	ESE	
THIRD SEMESTER															
1	3	BS	GE	22CV301	Integral Transforms and Partial Differential Equations	**T**	3	0	0	3	3	30	20	50	3 Hrs
2	3	HS	GE/HUM	22CV302	Fundamentals of Management and Economics	**T**	3	0	0	3	3	30	20	50	3 Hrs
3	3	PC	CV	22CV303	Geotechnical Engineering	**T**	3	0	0	3	3	30	20	50	3 Hrs
4	3	PC	CV	22CV304	**Lab:-** Geotechnical Engineering	**P**	0	0	2	2	1		60	40	
5	3	PC	CV	22CV305	Fluid Mechanics	**T**	3	1	0	3	3	30	20	50	3 Hrs
6	3	PC	CV	22CV306	**Lab:-** Fluid Mechanics	**P**	0	0	2	2	1		60	40	
7	3	PC	CV	22CV307	Water Supply Engineering	**T**	3	0	0	3	3	30	20	50	3 Hrs
8	3	PC	CV	22CV308	**Lab:-** Water Supply Engineering	**P**	0	0	2	2	1		60	40	
9	3	PC	CV	22CV309	Building Construction and Building Materials	**T**	3	0	0	3	3	30	20	50	3 Hrs
10	3	PC	CV	22CV310	**Lab:-** Computer Aided Drawing	**P**	0	0	2	2	1		60	40	
11	3	PC	CV	22CV311	Environmental Sustainability, Pollution and Management	**T**	3	0	0	3	3	30	20	50	3 Hrs
					TOTAL THIRD SEM		**18**	**1**	**8**	**26**	**25**				
List of Mandatory Learning Course (MLC)															
1	3	HS	T&P	MLC123	**YCAP3 :**	**A**	3	0	0	3	0				
2	3	BES	CV	MLC101	Application of Python Programming in Civil Engineering	**A**	2	0	0	2	0				
FOURTH SEMSTER															
1	4	PC	CV	22CV401	Wastewater Engineering	**T**	3	0	0	3	3	30	20	50	3 Hrs
2	4	PC	CV	22CV402	Reinforced Concrete Structures	**T**	3	1	0	3	3	30	20	50	3 Hrs
3	4	PC	CV	22CV403	Concrete Technology	**T**	3	0	0	3	3	30	20	50	3 Hrs
4	4	PC	CV	22CV404	**Lab:-** Concrete Technology	**P**	0	0	2	2	1		60	40	
5	4	PC	CV	22CV405	Surveying	**T**	3	0	0	3	3	30	20	50	3 Hrs
6	4	PC	CV	22CV406	**Lab:-** Surveying	**P**	0	0	2	2	1		60	40	
7	4	PC	CV	22CV407	Structural Analysis	**T**	3	0	0	3	3	30	20	50	3 Hrs
8	4	PC	CV	22CV408	**Lab:-** Structural Analysis	**P**	0	0	2	2	1		60	40	
9	4	PC	CV	22CV409	Transportation Engineering	**T**	3	0	0	3	3	30	20	50	3 Hrs
10	4	PC	CV	22CV410	**Lab:-** Transportation Engineering	**P**	0	0	2	2	1		60	40	
					TOTAL FOURTH SEM		**18**	**1**	**8**	**26**	**22**				
List of Mandatory Learning Course (MLC)															
1	4	HS	T&P	MLC2124	**YCAP4 :**	**A**	3	0	0	3	0				
2	4	BES	CV	MLC102	Quantity ,Estimation and Management	**A**	2	0	0	2	0				

		June 2022	**1.00**	**Applicable for AY 2022-23 Onwards**
Chairperson	**Dean (Acad. Matters)**	**Date of Release**	**Version**	

III SEMESTER
22CV301 : Integral Transforms and Partial Differential Equations

Course Outcomes:
Upon successful completion of the course the students will be able to 1 Apply the knowledge of Laplace and Fourier transforms to solve the continuous problems. 2. Apply the knowledge of Z transforms to solve the discrete mathematical equations. 3. Determine Fourier series expansion of periodic functions, Fourier Transform. 4. Use appropriate methods to solve partial differential equations.

Unit:1	**Laplace Transforms**	**6 Hours**
Definition and examples of Laplace transforms, properties of Laplace transforms, Examples by using properties of Laplace transforms, Unit step function, periodic function. **Contemporary Issues related to Topic**		

Unit:2	**Inverse of Laplace Transform**	**7 Hours**
Definition and examples of Inverse Laplace transforms, Inverse Laplace transform by using properties, Partial fraction method to find Inverse Laplace transforms, convolution theorem, Applications of Laplace transform to solve ordinary differential equations. **Contemporary Issues related to Topic**		

Unit:3	**Z-Transform**	**6 Hours**
Some elementary concepts, Definition of Z-Transform, Examples of Z-Transform, Properties (without proof), Inversion by partial fraction decomposition and residue theorem, Applications of Z-transform to solve difference equations with constant co-efficient. **Contemporary Issues related to Topic**		

Unit:4	**Fourier Series**	**7 Hours**
Periodic Functions, standard results, Fourier series expansion, Convergence of Fourier Series, Fourier Series for even and odd function, Change of interval, half range Fourier Series, Examples on half range sine and cosine series. **Contemporary Issues related to Topic**		

Unit:5	**Partial Differential Equation**	**7 Hours**
Partial Differential Equations of first order and first degree i.e., Lagrange's form, Linear homogeneous equations of higher order with constant coefficient. Application of variable separable method to solve first and second order partial differential equations. . **Contemporary Issues related to Topic**		

Unit :6	**Fourier Transform**	**6 Hours**
Definition of Fourier Integral Theorem, Fourier Transforms, Fourier sine and cosine integrals, Finite Fourier sine and cosine Transforms, Convolution Theorem**,** Parseval's Identity. **Contemporary Issues related to Topic**		
	Total Lecture Hours	**39 Hours**

Text books	
1	Erwin Kreyzig, Advance Engineering Mathematics, 9th Edition, John Wiley and Sons, INC.
2	Dr. B. S. Grewal, Higher Engineering Mathematics, 40th edition, Khanna Publisher.
3	H.K. Dass, Advanced Engineering Mathematics, 8th revised edition, S. Chand, Delhi.

Reference Books	
1	Chandrika Prasad, Mathematics for Engineers, 19th Edition, John Wiley and Sons, INC.
2	L. A. Pipes and Harville, Applied Mathematics for Engineers, 3rd Edition, McGraw Hill.
3	P.N. and J. N. Wartikar, A text book of Applied MAthematics, 3rd edition, Pune Vidyarthi Griha Prakashan
4	N.P. Bali and Manish Goyal, A text book of Engineering Mathematics, 10th edition, Laxmi Prakashan.

YCCE e- library book links [ACCESSIBLE FROM COLLEGE CAMPUS]	
1	http://103.152.199.179/YCCE/Suported%20file/Supprted%20file/e-copies%20of%20books/Applied%20Sciences%20&%20Humanities/Mathematics%20and%20Humanities/

MOOCs Links and additional reading, learning, video material	
1	https://nptel.ac.in/courses/111106111
2	https://onlinecourses.nptel.ac.in/noc22_ma41/preview
3	https://archive.nptel.ac.in/courses/111/101/111101153/

III SEMESTER

22CV302 : Fundamentals of Management and Economics

Course Outcomes:

Upon successful completion of the course the students will be able to

1. Explain the Functions of Management and identify tools and techniques of Marketing of goods and services
2. Analyze the role of Financial Accountancy and Management in the Organization
3. Develop perspective about economy based on logical reasoning and estimate the economic outcomes.
4. Interprets comparative advantage of resources.

Unit:1	Principles of Management	6 Hours

Evolution of Management Thought: Scientific and Administrative Theory of Management, Definition and Concept of Management, Functions of Management: Planning, Organizing, Directing, Coordinating and Controlling, Motivational Theories, Concept of Leadership

Contemporary Issues related to Topic

Unit:2	Marketing Management	6 Hours

Marketing Management - Definition & scope, Selling & Modern Concepts of Marketing, Market Research, Customer Behaviors, Product Launching, Sales Promotion, Pricing, Channels of Distribution, Advertising, Market Segmentation, Marketing Mix, Positioning, Targeting

Contemporary Issues related to Topic

Unit:3	Financial Accountancy and Management	7 Hours

Definition & Functions of Finance department, Sources of finance, Types of capital, Types of Taxes, Introduction of Accountancy and its rules, Preparation of Books of Account- Jounal, Posting of transaction into ledger and preparation of trial balance, Introduction of trading account, profit and loss account and balance sheet

Contemporary Issues related to Topic

Unit:4	Introduction to Economics and engineering Economy:	6 Hours

Economics and engineering economy, Utility analysis- Cardinal, ordinal, Law of diminishing marginal utility, Laws of demand and supply, elasticity of demand, its measurement and application.

Contemporary Issues related to Topic

Unit:5	Engineering Production and Costs	7 Hours

Factors of Production: Land, Labour, Capital, Enterprise and their peculiarities, Concepts and types of costs, Law of Variable proportions (Law of diminishing marginal returns) and Return to Scale (Increasing, constant and decreasing), Economies and diseconomies of scale. Inflation: Meaning, types, causes and consequences, measures to control inflation, Concepts of deflation and Stagflation.

Contemporary Issues related to Topic

Unit :6	Market structures - equilibrium output and price	7 Hours
Forms of market structures: Perfect competition, monopolistic competition, oligopoly, duopoly and monopoly, Demand and revenue curves for firm and industry in various forms of market structure, Total, average and marginal revenue curves, equilibrium of firms and industries under various forms of market structures, Price discrimination. **Contemporary Issues related to Topic**		
Total Lecture Hours		**39 Hours**

Textbooks	
1.	Principle of Management, 9th edition , Harold Koontz Ramchandra, Tata McGrow hills
2.	Marketing Management: Planning, Implementation and Control, 3rd Edition, Ramaswamy V.S. and Namakumari S, Macmillian
3.	Financial Services, 19th Edition, Khan M Y, Tata McGraw Hill, 19
4.	Modern Economics, 13th Edition, H. L. Ahuja, S. Chand Publisher, 2009
5.	Modern Economic Theory, 3rd edition, K. K. Devett, S. Chand Publisher,2007
6.	Principle of Economics, 7th edition, Mankiw N. Gregory, Thomson, 2013

Reference Books	
1.	Foundations of Financial Markets and Institutions, 3rd Edition, Fabozzi, Pretice Hall
2.	Fundamentals of Financial Instruments , 2nd Edition, Parameshwaran, Wiley India
3.	Marketing Management , 3rd Edition , RajanSaxena, Tata McGraw Hill
4.	Advance Economic Theory, 17th Edition, H. L. Ahuja, S. Chand Publisher, 2009
5.	International Trade, 12th edition, M. L. Zingan, Vindra Publication, 2007
6.	Macro Economics, 11th edition, M. L. Zingan, Vindra Publication, 2007
7.	Monitory Economics:, 1st Edition, M. L. Sheth, Himayalaya Publisher, 1995
8.	Economics of Development and Planning, 12th edition, S. K. Misra and V. K. Puri, Himalaya Publishing House, 2006.

YCCE e- library book links [ACCESSIBLE FROM COLLEGE CAMPUS]	
1	http://link.springer.com/openurl?genre=book&isbn=978-1-4613-6193-0
2	https://onlinelibrary.wiley.com/doi/book/10.1002/9780470168042

MOOCs Links and additional reading, learning, video material	
1	https://onlinecourses.nptel.ac.in/noc22_mg104/preview
2	https://nptel.ac.in/
3	https://onlinecourses.nptel.ac.in/noc20_mg31/preview
4	https://onlinecourses.nptel.ac.in/noc21_hs52/preview
5	https://onlinecourses.nptel.ac.in/noc22_hs67/preview

III SEMESTER

22CV303 : Geotechnical Engineering

Course Outcomes:
Upon successful completion of the course the students will be able to 1. Determine index properties of soil and its classification 2. Compute Engineering properties of soil. 3. Predict Compaction of soil 4. Calculate Vertical stresses and shear strength of soil

Unit:1	**Phases of Soil**	**7 Hours**
Formation of soil, residual & transported soil, Role of Geotechnical engineer in construction industry, Soil as three-phase system. Various soil weight & volume inter–relationship. **Contemporary Issues related to Topic: Unsaturated soil condition**		
Unit:2	**Index Properties & classification of soil**	**6 Hours**
Water content, specific gravity, sieve analysis, particle size distribution curve, Density, Consistency of soil, Unified & I.S. classification system. **Contemporary Issues related to Topic**		
Unit:3	**Permeability and Seepage**	**7 Hours**
Darcy's law & its validity, Discharge & seepage velocity, factors affecting Permeability, permeability tests, permeability of stratified soil, Seepage pressure, quicksand condition, flow nets, **Contemporary Issues related to Topic**		
Unit:4	**Stress Distribution**	**6 Hours**
Boussinesq's point load theory, uniformly loaded circular areas, Equivalent point load method, Newmark's charts. **Contemporary Issues related to Topic**		
Unit:5	**Compaction and Consolidation**	**7 Hours**
Mechanics of compaction, factors affecting compaction, Standard & Modified Proctor Tests, Proctor needle method, field compaction methods, Terzaghi's 1–D consolidation theory, various terms associated with consolidation, Consolidation Test. **Contemporary Issues related to Topic**		
Unit :6	**Shear Strength**	**6 Hours**
Introduction, Mohr-Coulomb's failure theory, Direct shear test, Triaxial test, Unconfined compression test, Vane shear test, different drainage conditions. **Contemporary Issues related to Topic**		
	Total Lecture	**39 Hours**

Text Books	
1	Soil Mechanics & Foundations, Punmia B. C., Jain A.K., Jain A.K., 16th edition, Laxmi Publications, New Delhi, 2005.

Reference Books	
1	Soil Mechanics & Foundation Engineering, 2009, Arora K.R., Standard Publisher Distributors
2	Principles and Practices of Soil Mechanics and Foundation Engineering, Murthy V.N.S., CRC Press, 2003.
3	Physical and Geotechnical Properties of Soils, Joseph E. Bowles, 2nd Revised edition (March 1984), McGraw-Hill College
4	Basic and Applied Soil Mechanics, Gopal Ranjan and A.S.R. Rao, New Age International Publisher, Revised Second Edtion, 2005

YCCE e- library book links [ACCESSIBLE FROM COLLEGE CAMPUS]	
1	http://103.152.199.179/YCCE/Suported%20file/Supprted%20file/e-copies%20of%20books/Civil%20Engineering/
2	https://drive.google.com/uc?id=152rovJSnSMcqsxwc5TbrPOShWrryn-4r&export=download

MOOCs Links and additional reading, learning, video material	
1	https://www.youtube.com/watch?v=Lng0hVDvsu0&list=PLOzRYVm0a65dtbpo_DP7acjsLYdmWT99r
2	https://www.youtube.com/watch?v=HFJXxSJb9sI&list=PLOzRYVm0a65dtbpo_DP7acjsLYdmWT99r&index=2
3	https://www.youtube.com/watch?v=m1a-7HsF1A0&list=PLOzRYVm0a65dtbpo_DP7acjsLYdmWT99r&index=3

III SEMESTER
22CV304: Lab. Geotechnical Engineering

Course Outcomes
Upon successful completion of the course the students will be able to
1. Determine index properties of soil and its classification
2. Compute Engineering properties of soil.
3. Predict Compaction of soil.
4. Calculate Vertical stresses and shear strength of soil

Minimum Ten Practical's to be performed from the list as below

SN	Experiments based on
1	To determine Moisture content of given soil sample
2	To determine Specific gravity of soil.
3	To perform Grain Size Analysis – (Dry Sieve Analysis)
4	To determine Atterberg's Limits.
5	To determine coefficient of Permeability by (i) Constant head, and (ii) Falling head.
6	To perform Standard Proctor Compaction Test and to determine OMC.
7	Field Density determination by sand replacement method.
8	Field Density determination by core cutter method.
9	To perform Unconfined compression test.
10	To perform Direct shear Test.
11	To perform Triaxial Compression test (Demonstration)
12	To find F.S.W. and D.F.S. of soil. Identification of swelling Soil.
13	To study the Consolidation characteristics of soil

III SEMESTER
22CV305 : Fluid Mechanics

Course Outcomes:

Upon successful completion of the course the students will be able to

1. Calculate various fluid properties, Fluid pressure, forces on various surface
2. Determine various flow patterns of fluid visualization without reference of force.
3. Examine the fundamental principles of fluid mechanics and related applications to fluid flow.
4. Compute the flow in pipe, channel and tank by using various devices.

Unit:1	**Fluids and Their Properties**	**7 Hours**

Definition of fluid, Differences between solids, liquids and gases , fluid properties, mass density, specific weight and specific gravity, viscosity, Newton's equation, coefficients of dynamic and kinematic viscosity, Rheological Diagram, Ideal and real fluids. Compressibility and bulk modulus. Surface tension, capillarity, pressure inside a bubble and cylindrical jet, vapor pressure and cavitation. Effect of pressure and temperature on fluid properties.

Contemporary Issues related to Topic

Unit:2	**Fluids Pressure and its Measurement**	**6 Hours**

Fluid pressure, law of fluid pressure, variation of fluid pressure with depth, pressure and head, Atmospheric pressure and vacuum. Gauge and absolute pressures. Pressure measurement by manometers.

Contemporary Issues related to Topic

Unit:3	**Hydrostatics**	**6 Hours**

Total pressure & centre of pressure, Forces on a Horizontal submerged surfaces, Vertical submerged surfaces, Inclined submerged surfaces, Curved submerged surfaces.

Contemporary Issues related to Topic

Unit:4	**Kinematics of Flow**	**7 Hours**

Lagrangian and Eularian approaches in fluid flow description. Steady, unsteady, uniform, Non–uniform flow. One, two and three dimensional flow, Rotational & Irrotational flow. Streamline, path line, streak line Velocity and its variation with space and time. Acceleration of fluid particles, Normal and tangential acceleration. Equation of continuity in Cartesian co-ordinates, stream functions, velocity potential. Relationship between stream function and velocity potential, flow net.

Contemporary Issues related to Topic

Unit:5	**Kinetics of Flow**	**6 Hours**

Forces influencing motion, Euler's equations of motion for one dimensional flow, Bernoulli's equation for ideal fluids, Assumptions, derivation, limitation and application, Kinetic energy correction factor. Momentum equation, forces on pipe bends and closed conduits, Momentum correction factor. Discharge measurement by Venturi meter, Orifice meter.

Contemporary Issues related to Topic

Unit :6	**Flow through Orifices and mouthpieces:**	**7 Hours**

Definition, types, hydraulic coefficients, factors affecting them and their experimental determination, time for emptying tank by Orifices. Discharge through large and submerged Orifices, external and internal mouth pieces, running free and running full, pressure at vena contracta, Discharge through a convergent-divergent mouthpiece.

Contemporary Issues related to Topic

	Total Lecture	**39 Hours**

			July 2022	1.00	Applicable for AY 2022-23 Onwards
Chairperson	Dean (Acad. Matters)	Dean OBE	Date of Release	Version	

Text Books	
1	P.N. Modi, Seth, Hydraulics and Fluid Mechanics Including Hydraulics Machines, S.M., 14th edition, Standard Book House Publishers, New Delhi, 2009
2	R. K. Rajput, A Textbook of Fluid Mechanics and Hydraulic Machines, S. Chand & Company Ltd Ram Nagar New Delhi 2009
3	R. K. Bansal, A Textbook of Fluid Mechanics and Hydraulic Machines, Laxmi Publications P Ltd New Delhi.
4	K. Jain, Fluid Mechanics, Khanna Publication, New Delhi.

Reference Books	
1	Gupta V., Gupta S.K., Fluid Mechanics and Its Applications, John Wiley & Sons, 1984.
2	Fox R.W., McDonald A.T, Introduction to Fluid Mechanics, 6th edition, John Wiley & Sons, 2003

YCCE e- library book links [ACCESSIBLE FROM COLLEGE CAMPUS]	
1	http://103.152.199.179/YCCE/Suported%20file/Supprted%20file/e-copies%20of%20books/Civil%20Engineering/50.%20FLUID%20MECHANICS%20AND%20HYDRAULIC%20MACHINES-R.%20K.%20RAJPUT.pdf
2	http://103.152.199.179/YCCE/Suported%20file/Supprted%20file/e-copies%20of%20books/Civil%20Engineering/55.%20FLUID%20MECHANICS-%20FRANK%20%20WHITE.pdf

MOOCs Links and additional reading, learning, video material	
1	http://103.152.199.179/YCCE/Suported%20file/Supprted%20file/e-copies%20of%20books/Civil%20Engineering/49.%20FLUID%20MECHANICS.pdf
2	http://103.152.199.179/YCCE/Suported%20file/Supprted%20file/e-copies%20of%20books/Civil%20Engineering/51.%20%20FLUID%20MECHANICS%20AND%20HYDRAULIC%20MACHINES-S.%20K.%20SOM.pdf
3	https://onlinecourses.nptel.ac.in/noc21_ce56/announcements?force=true

III SEMESTER
22CV306 : Lab. Fluid Mechanics

Course Outcomes:
Upon successful completion of the course the students will be able to
1. Calculate various fluid properties, Fluid pressure, forces on various surface
2. Determine various flow patterns of fluid produced without reference of force.
3. Examine the fundamental principles of fluid mechanics and related applications to fluid flow.
4. Compute the flow in pipe, channel and tank by using various devices.

Minimum Ten Practical's to be performed from the list as below.

SN	Experiments based on
1	Determination of Cd of a rectangular notch:
2	Determination of Cd of a triangular notch.
3	Determination of metacentric height of a given ship models.
4	Discharge measurement by Venturi meter- determination of coefficient discharge.
5	Discharge measurement by pipe orifice, determination of Cd
6	Verification of Bernoulli's theorem
7	Determination of Cd of an external cylindrical mouth piece
8	Determination of hydraulic coefficient of a sharp-edged circular orifice.
9	Determination of types of flow in pipe using Reynold's apparatus
10	Velocity measurement by Pitot tube.
11	Study of micrometre contraction gauge

III SEMESTER
22CV307: Water Supply Engineering

Course Outcomes :

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

1. Predict population forecasting including design of water conveyance system and raising main.
2. Explain different characteristics of water and water treatment methods.
3. Classify different methods and patterns of distribution of water.
4. Illustrate various methods of solid waste management.

Unit:1	Water Supply Scheme	7 Hours

Introduction, Importance and necessity of water supply scheme, Water demand: Types of demand, factors affecting per Capita demand, variation in demand, design period and methods of population forecasting.

Contemporary Issues related to Topic

Unit:2	Conveyance of Water	6 Hours

Conveyance of water: Types of pipes, joints in pipes, valves and fittings, Intake structures: Location types – river, lake, canal reservoir, Hydraulic design of rising mains. Pump: Classification, working, merits, demerits & selection of pumps.

Contemporary Issues related to Topic

Unit:3	Water Quality and Aeration	7 Hours

Water quality: General idea of water borne diseases, Physical, Chemical, and bacteriological characteristics and analysis of water, Standards of drinking water. Water treatment: Objective of treatment, unit operations and processes, Flow sheet of conventional water treatment plant. Aeration: Purpose, types of aerators.

Contemporary Issues related to Topic

Unit:4	Sedimentation and Filtration	6 Hours

Sedimentation: Principles, types of settling basins, inlet and outlet arrangements, clariflocculators, Coagulation and Flocculation: Definition, Principles, types of coagulants and reactions, coagulant doses, types of mixing and flocculation devices. Filtration: Mechanism of filtration, types of filters, working, operational problems in filters.

Contemporary Issues related to Topic

Unit:5	Disinfection and Distribution of Water	7 Hours

Disinfection: Purpose, Mechanism, criteria for good disinfectant, types of disinfectants, chlorination. Distribution systems: Requirements for a good distribution system, methods of distribution, systems and their layouts, Leakage and leak-detector. Storage reservoirs for treated water: Types, capacity of reservoir, mass curve.

Contemporary Issues related to Topic

Unit :6	Solid Waste Management	6 Hours

Introduction to Municipal solid waste management: Generation sources, composition, Quality, Methods of Collection, transportation, treatment and disposal, 3 R's of solid waste management.

Contemporary Issues related to Topic: Waste to energy

	Total Lecture	39 Hours

			July 2022	1.00	Applicable for AY 2022-23 Onwards
Chairperson	Dean (Acad. Matters)	Dean OBE	Date of Release	Version	

Text books	
1	Water Supply Engineering (Vol.–I & II), Modi P.N., 2nd Edition, Standard Book House / Rajsons Publication, New Delhi.
2	Water Engineering, Punmia B. C., 2nd Edition, Laxmi Publication, New Delhi.
3	Water Supply and Sanitary Engineering, Birdie G.S., Birdie J.S., 4th Edition, Dhanpat Rai Publication, New Delhi.
4	Water Supply Engineering, S. K. Garg, Khanna Publications.
5	Solid Waste Management for Developing country, A.D. Bhide & Sunderson, Indian National Scientific Documentation Centre, New Delhi.

Reference Books	
1	Water supply and Sewerage, E.W. Steel, T. J. McGhee, 6th Edition (31 January 1991), McGraw-Hill Education.
2	Water and wastewater Engineering, Fair, Geyer and Okun, John Wiley & Sons Ltd.

YCCE e- library book links [ACCESSIBLE FROM COLLEGE CAMPUS]	
1	http://103.152.199.179/YCCE/Suported%20file/Supprted%20file/e-copies%20of%20books/Civil%20Engineering/
2	http://link.springer.com/openurl?genre=book&isbn=978-1-4613-6193-0
3	https://onlinelibrary.wiley.com/doi/book/10.1002/9780470168042

MOOCs Links and additional reading, learning, video material	
1	https://onlinecourses.nptel.ac.in/noc20_ce23/course
2	https://www.youtube.com/watch?v=yDnrv-oGSBc

III SEMESTER
22CV308 : Lab. Water Supply Engineering

Course Outcomes :
Upon successful completion of the course, the students will be able to 1. Examine water quality standards. 2. Experiment on various characteristics of water 3. Compute different characteristics of water. 4. Relate water quality with permissible standards.

Minimum Ten Practical's to be performed from the list as below

SN	Experiments based on
1	Determination of pH.
2	Determination of turbidity.
3	To perform Jar test.
4	Determination of available chlorine.
5	Determination of residual chlorine.
6	Determination of dissolved oxygen.
7	Determination of Hardness.
8	Determination of acidity
9	Determination of alkalinity
10	M.P.N. Test.
11	Plate count test.
12	B.O.D. test
13	C.O.D. test

Text books	
1	Water Supply Engineering (Vol.–I & II), Modi P.N., 2nd Edition, Standard Book House / Rajsons Publication, New Delhi.
2	Water Engineering, Punmia B.C., 2nd Edition, Laxmi Publication, New Delhi.
Reference Books	
1	Water Supply and Sanitary Engineering, Birdie G.S., Birdie J.S., 4th Edition, Dhanpat Rai Publication, New Delhi.
2	Water Supply Engineering, S. K. Garg, Khanna Publications.
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1	http://103.152.199.179/YCCE/Suported%20file/Supprted%20file/e-copies%20of%20books/Civil%20Engineering/
MOOCs Links and additional reading, learning, video material	
1	https://www.vlab.co.in/
2	https://ee1-nitk.vlabs.ac.in/
3	https://ee2-nitk.vlabs.ac.in/

III SEMESTER
22CV309 : Building Construction and Material

Course Outcomes :
Upon successful completion of the course the students will be able to 1. Classify the appropriate material for building construction. 2. Describe the brickwork, stonework, lintel arches, dam proofing concept 3. Explain formwork, floor, roofs, and as well as knowledge about painting and plastering 4. Determine the soil condition, deciding the suitable foundation for different structures

Unit:1	**Properties of Building Material**	**7 Hours**
Aggregate: Classification, Physical and mechanical properties, soundness, alkali-aggregate reaction, thermal properties of aggregate Bricks and Stones:: classification, properties **Cement**: types, Portland cement: chemical composition of raw material, bogue compounds, hydration of cement, role of water in hydration fly ash: properties **Concrete:** Production, mix proportions and grades of concrete, fresh, mechanical and durability properties of concrete, factors affecting properties of concrete, admixtures,Metals: **Steel:** Important properties and uses of Iron Cast iron, wroght iron and steel Glass: types and uses, **Contemporary Issues related to Topic**		

Unit:2	Brick and Stone Masonery, Finishing	**7 Hours**
Brick Masonry: types of bonds, relative merits and demerits of English, Single Flemish and Double Flemish bond. **Stone Masonry**: General principles, classification of stone masonry and their relative merits and demerits, **Finishing-** Plastering and Pointing: Necessity, types and methods, distempering and painting: Purpose, methods, defects and their solutions.		

Unit:3	**Chajja, lintel, arches and trussess**	**7 Hours**
Arches and Lintels : Terminology in construction, Types of Arches, Types chajjas and canopies, Types of lintels, **Truss**: Terminology, different types of trusses.		

Unit:4	**Flooring, Roofing and Damp Proofing**	**6 Hours**
Floors and Roofs : Floors : General principals, types and method of construction, floors finished quality, testing floor tiles, synthetic & Ceramic Tiles. **Roofs** : Flat and pitches roofs, roof coverings, types and their constructional features. Thermal Insulation **Damp Proofing** : Causes and effect of dampness. Various methods of damp proofing Damp proofing in plinth protection, New Techniques of Damp Proofing Damp Proofing in Plinth Protection, New Techniques of Damp proofing. Epoxy etc.		

Unit:5	**Stairs ,Doors, Window**	**7 Hours**
Stairs: Terminology**,** requirements of good staircase, classification, Types of stairs, functional design of stairs. **Doors and Windows:** Terminology, Purpose, materials and types.		

Unit :6	Foundation and Formwork	7 Hours
Foundation : Necessity and types of foundations, details of shallow foundations, bearing capacity of soils and its assessment. Presumptive bearing capacity values from codes. Loads on foundation, Causes of failures of foundation and remedial measures, Foundation on black cotton soils, setting out layout for foundation trenches, excavation and timbering of foundation trenches. Load bearing and framed structures. **Formwork:** Centering shuttering, shoring, underpinning, scaffolding		
	Total Lecture	**39 Hours**

Text Books	
1.	"Building construction" author by Varghese P.C., 2nd edition, Prentice Hall of India Pvt. Ltd, New Delhi Publication, 2007.
2.	"Building Construction" author by B.C. Punmia, Arun Kumar Jain, Ashook Kumar Jain, 11th Edition Laxmi Publications, 2005
3.	"Building Construction" author by Rangwala, 33th Edition, Charotar Publishing House Pvt. Ltd.2017.

Reference Books	
1	"Building Materials & Construction" author by Soni,S. 1st edition REPRINT, S. K. Kataria And Sons publication.
2	"Building Materials" author by Bhavikatti S.S, Vikas Publication
3	"Building Construction," author by Sushil Kumar, 19th Edition, Standard Publisher Distributors New Delhi, 2001.

YCCE e- library book links [ACCESSIBLE FROM COLLEGE CAMPUS]	
1	http://103.152.199.179/YCCE/Suported%20file/Supprted%20file/e-copies%20of%20books/Civil%20Engineering/20.%20Matrix%20methods%20of%20structural%20analysis%20(%20PDFDrive%20)-ebook.pdf

MOOCs Links and additional reading, learning, video material	
1	https://nptel.ac.in/courses/105/102/105102088/

III SEMESTER
22CV310 : Lab. Computer Aided Drawing

Course Outcomes :
Upon successful completion of the course the students will be able to
1.Understand and recognize freehand sketches/ drawings for different components of buildings.
2.Prepare freehand sketches/ drawings for different components of buildings.
3.Understand and implement building byelaws in planning of building.

Minimum Ten Practical's to be performed from the list as below

SN	Experiments based on
1	To study different types of lines and scales used in Building Drawing {01 Assignment using Auto CAD}
2	To study different types of Footings/ Foundations {Dimensionless sketches for at least 02 types using Auto CAD}
3	To study different types of walls with various bonds {Dimensionless sketches for at least 02 types using Auto CAD}
4	To study different types of doors {Dimensionless sketches for at least 02 types using Auto CAD}
5	To study different types of windows {Dimensionless sketches for at least 02 types using Auto CAD}
6	To study different types of roofs {Dimensionless sketches for at least 02 types using Auto CAD}
7	To study different types of stairs {Dimensionless sketches for at least 02 types using Auto CAD}
8	To study elements of RCC Framed structure building {At least dimensionless sketches for each element at least 02 for each element using Auto CAD}
9	Study of the IS code provisions for the building drawing and building byelaws for government authorities {Nagpur Region}
10	To study various types of drawing templates applicable in Building Design and Drawing

III SEMESTER
22CV311 : Environmental Sustainability, Pollution and Management

Course Outcomes:
Upon successful completion of the course, the students will be able to The student will be able to 1. Gain insights into the efforts to safeguard the Earth's environment and resources. 2. Develop a critical understanding of the contemporary environmental issues of concern 3. Have an overview of pollution, climate change and national and global efforts to address adaptation and mitigation to changing environment through environmental management. 4. Learn about the major international treaties and our country's stand on and responses to the major international agreements.

Unit:1	Environment, Natural Resources and Sustainable Development	6 Hours
The man-environment interaction; Environmental Ethics and emergence of environmentalism; Overview of natural resources: Definition of resource; Classification of natural resources- biotic and abiotic, water, soil and mineral resources, renewable, and non-renewable energy resources; Introduction to sustainable development: Sustainable Development Goals (SDGs)- targets and indicators, challenges and strategies for SDGs		
Unit:2	**Environmental Issues, Conservation of Biodiversity and Ecosystems**	**6 Hours**
Environmental issues and scales: Land use and Land cover change, Global change; Biodiversity and its distribution, Ecosystems and ecosystem services, Threats to biodiversity and ecosystems, National and international policies for conservation.		
Unit:3	**Environmental Pollution and Health**	**7 Hours**
Understanding pollution: Production processes and generation of wastes, Air pollution, Water pollution, Soil pollution and solid waste, Noise pollution, Thermal and Radioactive pollution. Impact on human health		
Unit:4	**Climate Change: Impacts, Adaptation and Mitigation**	**7 Hours**
Understanding climate change, Impacts, vulnerability and adaptation to climate change, Mitigation of climate change		
Unit:5	**Environmental Management**	**7 Hours**
Environmental management system: ISO 14001, Concept of Circular Economy, Life cycle analysis; Cost-benefit analysis, Environmental audit and impact assessment; Waste Management and sustainability; Ecolabeling /Eco mark scheme		
Unit :6	**Environmental Treaties and Legislation**	**6 Hours**
Introduction to environmental laws and regulation, An overview of instruments of international cooperation, Major International Environmental Agreements, Major Indian Environmental Legislations, Major International organizations, and initiatives		
	Total Lecture	**39 Hours**

Text books	
1	Chiras, D. D and Reganold, J. P. (2010). Natural Resource Conservation: Management for a Sustainable Future.10th edition, Upper Saddle River, N. J. Benjamin/Cummins/Pearson
2	Rajagopalan, R. (2011). Environmental Studies: From Crisis to Cure. India: Oxford University Press
3	Krishnamurthy, K.V. (2003) Textbook of Biodiversity, Science Publishers, Plymouth, UK
4	Jackson, A. R., & Jackson, J. M. (2000). Environmental Science: The Natural Environment and Human Impact. Pearson Education
5	Pittock, Barrie (2009) Climate Change: The Science, Impacts and Solutions. 2nd Edition. Routledge.
6	Theodore, M. K. and Theodore, Louis (2021) Introduction to Environmental Management, 2nd Edition. CRC Press
7	Kanchi Kohli and Manju Menon (2021) Development of Environment Laws in India, Cambridge University Press
Reference Books	
1	Headrick, Daniel R. (2020) Humans versus Nature- A Global Environmental History, Oxford University Press
2	Gilbert M. Masters and W. P. (2008). An Introduction to Environmental Engineering and Science, Ela Publisher (Pearson)
3	William P. Cunningham and Mary A. (2015). Cunningham Environmental Science: A global concern, Publisher (Mc-Graw Hill, USA)
4	Varghese, Anita, Oommen, Meera Anna, Paul, Mridula Mary, Nath, Snehlata (Editors) (2022) Conservation through Sustainable Use: Lessons from India. Routledge.
5	Central Pollution Control Board Web page for various pollution standards. https://cpcb.nic.in/ standards
6	Barnett, J. & S. O'Neill (2010). Maladaptation. Global Environmental Change—Human and Policy Dimensions 20: 211–213
7	Richard A. Marcantonio, Marc Lame (2022). Environmental Management: Concepts and Practical Skills. Cambridge University Press
8	Ministry of Environment, Forest and Climate Change (2019) A Handbook on International Environment Conventions & Programmes. https://moef.gov.in/wp- content/uploads/2020/02/ convention-V-16-CURVE-web.pdf

III Semester

MLC2123 - YCCE Communication Aptitude Preparation (YCAP3)

III SEMESTER
MLC101 : Application of Python programming in Civil Engineering

Course Outcomes:
Upon successful completion of the course the students will be able to 1. Explain the basic concepts of Python Programming language. 2. Apply the knowledge of Python program to write simple programs. 3. Develop computer programs for the solution of civil engineering problems

Unit:1	Introduction	4 Hours
Introduction: Python Fundamentals, character set data type constant and variables, Declaration of constants & variables, Expression, Statements, Symbolic constants. Operator and Expression, Arithmetic operator, Relation and Logical operator, Assignment operators, the conditional operator. Data input & output.		
Unit:2	**Control Statement**	**4 Hours**
Control statement and its application, loops and nested loops, if –else, multi way if statement, Loop logic.		
Unit:3	**Advance Topics**	**4 Hours**
User defined Functions, Library functions, Storage class, Arrays, Pointers, structures and Unions, Data files, File Handling.		
Unit:4	**Basic Programs**	**4 Hours**
Development of basic programs using functions, Arrays, control statement etc.		
Unit:5	**Application programs**	**4 Hours**
Computer program based on Transportation Engineering, Geotechnical Engineering, Hydraulic Engineering, Irrigation Engineering, Surveying.		
Unit :6	**Application programs**	**4 Hours**
Computer program based on Structural analysis, Structural Design, Environmental Engineering, Matrix algebra, Use of excel in structural design, estimating & costing **Contemporary Issues related to graphics design in Civil Engineering programs**		
	Total Lecture	**24 Hours**

Text Books	
1	Fundamentals of Python First Programs, Kenneth A. Lambert, Cengage Publishing

Reference Books	
1	Python: The Complete Reference, Martin C. Brown McGraw Hill Education; Forth edition (20 March 2018)
2	Python Programming: Using Problem Solving Approach , Reema Thareja, Oxford University Press; First edition (10 June 2017)
3	Exploring Python, Timothy A.Budd, McGraw Hill Education (India) Private Limited.

			July 2022	1.00	Applicable for AY 2022-23 Onwards
Chairperson	Dean (Acad. Matters)	Dean OBE	Date of Release	Version	

YCCE e- library book links [ACCESSIBLE FROM COLLEGE CAMPUS]	
1	https://riptutorial.com/ebook/python
2	https://www.programmer-books.com/wp-content/uploads/2018/07/Python_language_Projects.pdf
3	http://www.davekuhlman.org/python_book_01.pdf
4	https://programmer-books.com/wp-content/uploads/2018/05/Beginning%20Programming%20with%20Python.pdf

MOOCs Links and additional reading, learning, video material	
1	https://youtu.be/9MmC_uGjBsM?list=PL3pGy4HtqwD02GVgM96-V0sq4_DSinqvf
2	https://youtu.be/Bc__4fV94lE?list=PL3pGy4HtqwD02GVgM96-V0sq4_DSinqvf
3	https://youtu.be/Bc__4fV94lE?list=PL3pGy4HtqwD02GVgM96-V0sq4_DSinqvf
5	https://youtu.be/TURlDFwVeEs?list=PL3pGy4HtqwD02GVgM96-V0sq4_DSinqvf
6	https://youtu.be/9MmC_uGjBsM?list=PL3pGy4HtqwD02GVgM96-V0sq4_DSinqvf

Nagar Yuwak Shikshan Sanstha's

Yeshwantrao Chavan College of Engineering

(An Autonomous Institution affiliated to Rashtrasant Tukadoji Maharaj Nagpur University)

(Accredited 'A++' Grade by NAAC with a score of 3.25)

Hingna Road, Wanadongri, Nagpur - 441 110

Bachelor of Technology

SoE & Syllabus 2022

4th Semester

(Department of Civil Engineering)

B. Tech in Civil Engineering

Nagar Yuwak Shikshan Sanstha's

Yeshwantrao Chavan College of Engineering

(An Autonomous Institution affiliated to Rashtrasant Tukadoji Maharaj Nagpur University)

SoE No. 22CV-101

B.TECH SCHEME OF EXAMINATION 2022

(Scheme of Examination w.e.f. 2022-23 onward)

(Department of Civil Engineering)

B. Tech in Civil Engineering

SN	Sem	Type	BoS/ Deptt	Sub. Code	Subject	T/P	Contact Hours				Credits	% Weightage			ESE Duration Hours
							L	T	P	Hrs		MSEs*	TA**	ESE	
THIRD SEMESTER															
1	3	BS	GE	22CV301	Integral Transforms and Partial Differential Equations	**T**	3	0	0	3	3	30	20	50	3 Hrs
2	3	HS	GE/HUM	22CV302	Fundamentals of Management and Economics	**T**	3	0	0	3	3	30	20	50	3 Hrs
3	3	PC	CV	22CV303	Geotechnical Engineering	**T**	3	0	0	3	3	30	20	50	3 Hrs
4	3	PC	CV	22CV304	**Lab:-** Geotechnical Engineering	**P**	0	0	2	2	1		60	40	
5	3	PC	CV	22CV305	Fluid Mechanics	**T**	3	1	0	3	3	30	20	50	3 Hrs
6	3	PC	CV	22CV306	**Lab:-** Fluid Mechanics	**P**	0	0	2	2	1		60	40	
7	3	PC	CV	22CV307	Water Supply Engineering	**T**	3	0	0	3	3	30	20	50	3 Hrs
8	3	PC	CV	22CV308	**Lab:-** Water Supply Engineering	**P**	0	0	2	2	1		60	40	
9	3	PC	CV	22CV309	Building Construction and Building Materials	**T**	3	0	0	3	3	30	20	50	3 Hrs
10	3	PC	CV	22CV310	**Lab:-** Computer Aided Drawing	**P**	0	0	2	2	1		60	40	
11	3	PC	CV	22CV311	Environmental Sustainability, Pollution and Management	**T**	3	0	0	3	3	30	20	50	3 Hrs
					TOTAL THIRD SEM		**18**	**1**	**8**	**26**	**25**				
List of Mandatory Learning Course (MLC)															
1	3	HS	T&P	MLC123	**YCAP3 :**	**A**	3	0	0	3	0				
2	3	BES	CV	MLC101	Application of Python Programming in Civil Engineering	**A**	2	0	0	2	0				
FOURTH SEMSTER															
1	4	PC	CV	22CV401	Wastewater Engineering	**T**	3	0	0	3	3	30	20	50	3 Hrs
2	4	PC	CV	22CV402	Reinforced Concrete Structures	**T**	3	1	0	3	3	30	20	50	3 Hrs
3	4	PC	CV	22CV403	Concrete Technology	**T**	3	0	0	3	3	30	20	50	3 Hrs
4	4	PC	CV	22CV404	**Lab:-** Concrete Technology	**P**	0	0	2	2	1		60	40	
5	4	PC	CV	22CV405	Surveying	**T**	3	0	0	3	3	30	20	50	3 Hrs
6	4	PC	CV	22CV406	**Lab:-** Surveying	**P**	0	0	2	2	1		60	40	
7	4	PC	CV	22CV407	Structural Analysis	**T**	3	0	0	3	3	30	20	50	3 Hrs
8	4	PC	CV	22CV408	**Lab:-** Structural Analysis	**P**	0	0	2	2	1		60	40	
9	4	PC	CV	22CV409	Transportation Engineering	**T**	3	0	0	3	3	30	20	50	3 Hrs
10	4	PC	CV	22CV410	**Lab:-** Transportation Engineering	**P**	0	0	2	2	1		60	40	
					TOTAL FOURTH SEM		**18**	**1**	**8**	**26**	**22**				
List of Mandatory Learning Course (MLC)															
1	4	HS	T&P	MLC2124	**YCAP4 :**	**A**	3	0	0	3	0				
2	4	BES	CV	MLC102	Quantity ,Estimation and Management	**A**	2	0	0	2	0				

		June 2022	**1.00**	**Applicable for AY 2022-23 Onwards**
Chairperson	**Dean (Acad. Matters)**	**Date of Release**	**Version**	

IV SEMESTER
22CV401 : Wastewater Engineering

Course Outcomes :
Upon successful completion of the course the students will be able to 1. Explain the collection and conveyance of sewage. 2. Construct sewerage system including house drainage system. 3. Analyze the wastewater characteristics, treatment units and design of primary treatment units. 4. Examine the air pollution effects and methods of control.

Unit:1		**6 Hours**
Systems of sanitation: Conservancy and water carriage system. Patterns of sewage collection systems, Quantity of storm water and sanitary wastewater. Hydraulic Design of sewers - capacity, size, grade. Egg shape sewers. **Drains & Sewers**		
Unit:2		**7 Hours**
Sewer Appurtenances – manholes, street inlets, storm water overflows, inverted siphons. Construction and Maintenance of sewers, equipment for maintenance, safety equipment. Sewage pumping. House drainage systems, sanitary fitting and appliances, traps – function, types, anti-syphon age, inspection chambers		
Unit:3	**Secondary treatment processes-I**	**7 Hours**
Characteristics of wastewater, Flow sheet of conventional sewage treatment plant. Preliminary and Primary treatment: Screens, Grit chambers, Primary settling tank. Design of bar screens, grit chambers and primary settling tanks		
Unit:4	**Secondary treatment processes-II**	**6 Hours**
Secondary Treatment: Activated sludge process, Trickling filter – Types, Working. Anaerobic Sludge digestion, Sludge drying beds. Methods of disposal.		
Unit:5	**Advanced wastewater Treatment**	**7 Hours**
Rural sanitation: Introduction, collection and disposal, Pit Privy, Aqua Privy, Bio-gas Plant, Eco-Sanitation, Septic tank including soak pit, and Imhoff tanks. Industrial wastewater treatment processes		
Unit :6	**Treatment alternatives for Industrial waste**	**6 Hours**
Air Pollution: Sources, Types, causes and effects of air pollution Monitoring and Control. Meteorological Parameters and Plume behavior, Techniques of air pollution control.		
	Total Lecture	**39 Hours**

Text Books	
1	Punmia B. C., Wastewater Engineering, 2nd Edition, Laxmi Publication, New Delhi.
2	Birdie G.S., Birdie J.S., Water Supply and Sanitary Engineering, 4th Edition, Dhanpat Rai Publication, New Delhi
3	S.K. Garg, Environmental Engineering-Vol-II, Sewage Disposal and Air Pollution Engg., Khanna Publications
4	M.N. Rao, H.V.N. Rao, Air Pollution, Tata MacGraw Hill Publication.
5	P.N. Modi, Sewage Treatment & Disposal & Wastewater Engineering Vol. II, Standard Book House, 2019

			July 2022	1.00	Applicable for AY 2022-23 Onwards
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Reference Books	
1	Metcalf and Eddy, Wastewater Treatment Disposal and Reuse, Tata McGraw Hill publishing company Ltd., 2006.
2	CPHEEO Manual on Sewerage and Sewage Treatment Systems,2013.

YCCE e- library book links [ACCESSIBLE FROM COLLEGE CAMPUS]	
1	http://103.152.199.179/YCCE/Suported%20file/Supprted%20file/e-copies%20of%20books/Civil%20Engineering/7.%20Water_and_Waste_Water_Engineering.pdf

MOOCs Links and additional reading, learning, video material	
1	https://nptel.ac.in/courses/105105178

IV SEMESTER
22CV402 : Reinforced Concrete Structures

Course Outcomes :
Upon successful completion of the course the students will be able to 1. Explain the structural properties of steel and concrete and their applications in structural planning. 2. Apply the knowledge of various methods of structural design. 3. Analysis, design and carry out the detailing of RC structural elements. 4. Illustrate the concept and application of prestressed concrete

Unit:1	Introduction	6 Hours
Properties of different grades of concrete and steel, Permissible stresses, load factors, Structural planning & understanding the behavior of R.C.C. members. Load distribution of frame structure for beam, Slabs, Column, and footing. Introduction to IS 456-2000, SP: 34, SP: 16 and specification for beam, slab, column. **Contemporary Issues related to Topic**		
Unit:2	**Design Methodology**	**7 Hours**
Working stress method: Behavior of beam under flexure, Stress distribution diagram, Basic concept in design for flexure, assumptions, design constant, analysis of rectangular singly reinforced sections. Limit state method: Characteristic values, partial safety factor, stress strain relationship, stress block parameters, failure criteria. Limit state of collapse in flexure, basic assumptions.		
Unit:3	**Beam**	**6 Hours**
Limit state Method: Analysis and design of singly and doubly reinforced rectangular section, analysis and design of T beam for flexure.		
Unit:4	**Slab**	**7 Hours**
Limit state of serviceability, deflection control of beam and slab. Design for Shear and Bond. Design of one way, two way slab, Staircase slab. Introduction to cantilever slabs.		
Unit:5	**Column and Footing**	**7 Hours**
Limit state of collapse in compression; basic assumptions. Analysis and design of columns subjected to axial load, uni-axial and biaxial moments. Design of isolated footing for column subjected to axial loads. Types of piles and combined footing.		
Unit :6	**Introduction to prestressed concrete**	**6 Hours**
Types of prestressing, Advantages and limitations of Prestressing, systems and devices, materials, Introduction to losses in Prestress, IS1343 –2012 codal provisions.		
	Total Lecture	**39 Hours**

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Text Books	
1	P.C. Vergese, Limit State Design of Reinforced Concrete, Prentice Hall Publishers, 2nd edition, 2008
2	Shah and Karve, Reinforced Concrete Structures, Structures Publishers, Pune, 5th edition, 2015.
3	Sinha S.N, Reinforced Concrete Design, Tata McGraw Hill Publishing Company Limited, New Delhi, 2007

Reference Books	
1	P.C. Varghese, Advanced Design of Structures, Prentice Hall Publishers,2009
2	Punmia B.C., Jain A.K., Jain A.K, Reinforced Concrete Structures (Vol-I), Laxmi Publications Pvt Ltd, New Delhi, 2007
3	N. Krishana Raju, Prestressed Concrete, Tata McGraw Hill Publishing Company Limited, New Delhi, 5th edition 2012
4	Ashok K. Jain, Reinforced Concrete – Limit State Design, Nem chand and Brothers, 7th edition,2012
5	IS 456-2000: Plain and Reinforced Concrete – Code of Practice
6	IS 13920-2016 :Ductile detailing of Reinforced concrete Structures

YCCE e- library book links [ACCESSIBLE FROM COLLEGE CAMPUS]	
1	http://link.springer.com/openurl?genre=book&isbn=978-3-211-82919-6
2	http://103.152.199.179/YCCE/Suported%20file/Supprted%20file/e-copies%20of%20books/Civil%20Engineering/12.%20REINFORCED%20CONCRETE%20DESIGN%20-%20N.KRISHNA%20RAJU.pdf
3	http://103.152.199.179/YCCE/Suported%20file/Supprted%20file/e-copies%20of%20books/Civil%20Engineering/11.%20Design%20of%20Concrete%20Structures,%2013th%20Edition%20-%20(Malestrom).pdf

MOOCs Links and additional reading, learning, video material	
1	https://nptel.ac.in/courses/105105105

IV SEMESTER
22CV403 : Concrete Technology

Course Outcomes :

Upon successful completion of the course the students will be able to

1. Explain the properties of the constituent materials of concrete.
2. Examine the properties of fresh and hardened concrete and tests to determine these properties.
3. Analyse the concrete mixes design and apply statistical quality control techniques
4. Explain admixtures, their role in concrete properties and various durability aspects in concrete.

Unit:1	Cement And Aggregate	7 Hours

Constituents of cements, Hydration of cement. Water requirement, Physical properties and testing of cement. Effect of fineness, Initial, final and false setting of cement, Soundness test. Hardening and compressive strength, Grades and different types of cement,

Aggregates: Coarse and fine aggregate, normal, light and heavy weight aggregates. Aggregate characteristics and their significance in properties of concrete. Sampling, Particle shape and texture, Bond of aggregate, size & grading of aggregate, strength of aggregate. Mechanical properties and tests, bulking of sand. Crushed sand. Alkali aggregate reaction.

Unit:2	Fresh Concrete	6 Hours

Batching, Mechanical mixers, automatic batching and mixing plants. Efficiency of mixing, Workability and its Measurement, Factor affecting workability, setting time, Significance of w/c ratio, cohesiveness of concrete, Segregation, bleeding, voids, permeability. Hot weather concreting, Conveyance of concrete, placing of concrete, compaction, vibrators, curing of concrete, significance and methods, temperature effects on curing and strength gain, Maturity of concrete, Formwork for concrete. Introduction to Ready mix, pumped and self-compacting concrete.

Unit:3	Strength of Concrete	7 Hours

Strength gain, factors affecting compressive strength, Tensile and flexural strengths, relation between compressive and tensile strength. Failure modes in concrete, cracking in compression. Impact strength, fatigue strength, shear, elasticity, Poisson's ratio.

Testing of Hardened Concrete: Compression test, cube strength and cylinder strength and their relation, effect of aspect ratio on strength. Flexural strength of concrete, determination of tensile strength, indirect tension test, splitting test, abrasion resistance, accelerated curing test.

Non Destructive Test: Significance, rebound hammer, ultra-sonic pulse velocity test, and Advanced concrete testing equipment.

Unit:4	Mix Design	6 Hours

Process, statistical relation between main and characteristic strength, variance, standard deviation, factors affecting mix properties, grading of aggregates, water/cement ratio etc. Degree of quality control, design of mix by IS method, introduction to road Note No. 4 (BS) and ACI method.

Unit:5	Additives and Admixtures	7 Hours
Types of admixtures, natural products, diatomaceous earth, calcined clays of shales, volcanic glasses, by-products–pozzolana, fly ash, silica fume, rice husk ash, metakaolin, G.G. blast furnace slag, admixtures- air entraining, water reducing, accelerators, retarders, plasticizers and superplasticizers, permeability reducing, grouting agents, surface hardeners. Shrinkage: Early volume changes, drying shrinkage, mechanism and factors affecting shrinkage, influence of curing conditions, differential shrinkage, carbonation, creep- factors influencing, relation between creep and time, nature of creep, effect of creep.		
Unit :6	**Durability of Concrete**	**6 Hours**
Significance, water as an agent of deterioration, permeability of concrete, sulphate attack and its control, sea water attack, acid attack, efflorescence, resistance to corrosion, abrasion and cavitation, process of rusting of steel.		
	Total Lecture	**39 Hours**

Text Books	
1	Gambhir M.L: Concrete Technology Tata McGraw Hill (Second Edition) 1995.
2	M.S. Shetty, Concrete Technology S. Chand & Company New Delhi 2005.

Reference Books	
1	P.Kumar Mehata, Paulo & J.M. Monteiro, Concrete microstructure, properties & materials, Prentice Hall INC & Mcgraw Hill USA.
2	Short & Kenniburg, Light Weight Concrete, Asia Publishing House, Bombay 1963.
3	Chen Orchard D.F.; Concrete Technology-Vol I. & II Applied Science Publishers (Fourth Edition) 1979.
4	Neville A.M., J.J. Brook Properties of Concrete Addison Wesley 1999.

YCCE e- library book links [ACCESSIBLE FROM COLLEGE CAMPUS]	
1	https://link.springer.com/book/10.1007/978-3-030-10510-5
2	https://easyengineering.net/concrete-technology-books-collection-new/

MOOCs Links and additional reading, learning, video material	
1	https://youtu.be/cx5gPKp9QEc
2	https://archive.nptel.ac.in/courses/105/102/105102012/
3	https://archive.nptel.ac.in/courses/105/106/105106176/

IV SEMESTER
22CV404 : Lab. Concrete Technology

Course Outcomes :

Upon successful completion of the course the students will be able to

1. Explain the properties of the constituent materials of concrete.
2. Examine the properties of fresh and hardened concrete and tests to determine these properties.
3. Analyse the concrete mixes design and apply statistical quality control techniques
4. Explain admixtures, their role in concrete properties and various durability aspects in concrete.

Minimum Ten Practical's to be performed from the list as below

SN	Experiments based on
1	To determine the normal consistency and initial setting time and final setting time by Vicat's apparatus.
2	To determine the fineness of cement.
3	To perform soundness test of cement.
4	To determine fineness modulus for coarse and fine aggregates.
5	To determine the bulking of sand & plotting bulking curve.
6	To determine the compressive strength of cement.
7	To design the concrete mix of required characteristic strength according to I.S .method.
8	To determine the workability of concrete by slump cone, Vee bee apparatus, compaction factor and flow test.
9	To prepare and test the concrete cubes for compressive strength by Indian standard method.
10	Study and performance of various Non-Destructive testing methods (NDT) in concrete technology
11	To determine workability of cement mortar.
12	To determine the permeable voids of concrete.
13	To determine the permeability of mortar.

IS Code

1	IS-10262-2009 " CONCRETE MIX DESIGN PROPORTIONING"
2	IS-456-2000 "PLAIN AND REINFORCED CONCRETE

IV SEMESTER
22CV405 : Surveying

Course Outcomes :
Upon successful completion of the course the students will be able to
1. Discuss the basic concepts of surveying and use of conventional surveying equipment.
2. Calculate the horizontal, vertical angle and distances by using dumpy level and theodolite.
3. Explain the methods of plane table surveying and compute the volume of earthwork.
4. Compute the distance and elevation by using tachometric survey.

Unit:1	Introduction, Chain and Compass Traversing	7 Hours
Introduction: - Classification, division of survey, Principle of survey, Chain Surveying : Basics, direct ranging and cross staff survey. Compass Surveying : Prismatic Compass, true and magnetic bearing, local attraction, Compass traversing.		
Unit:2	**Direct Levelling**	**6 Hours**
Levelling: Definitions, Study of Dumpy Level, temporary adjustments, principles of levelling, reduction of levels, classification of levelling, Curvature & Refraction corrections ,Reciprocal levelling.		
Unit:3	**Contouring and Trignometrical Levelling**	**6 Hours**
Contouring: Definitions, Characteristics, uses, and methods of locating contours, interpolation of contours Trignometrical Levelling: Indirect levelling, elevation of a point with base of an object accessible and inaccessible (with instrument station in/not in the same vertical plane as the elevated object)		
Unit:4	**Theodolite Surveying**	**7 Hours**
Theodolite: Introduction, Type of theodolite, temporary adjustment, Principle Axes and relationship, measurement of horizontal and vertical angles, Traverse Computation : Consecutive and independent co-ordinates, adjustment of closed traverse, Area calculation by co-ordinate.		
Unit:5	**Plane Table Surveying & Computation of Area & Volume**	**6 Hours**
Plane Table Survey: Equipment's, advantages and disadvantages, orientation, methods of plane tabling, two point and three point problems in plane tabling. Computation of Area and Volume: Trapezoidal and Simpsons Rule,		
Unit :6	**Tachometric Survey and Advanced Survey**	**7 Hours**
Tachometric Surveying :Classification, Principle of stadia method, Distance and elevation Calculation by Stadia method Introduction to Total Station, Remote sensing, GIS and GPS. **Contemporary Issues related to Topic**		
	Total Lecture	**39 Hours**

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Text books	
1	Surveying and Leveling, Basak N. N., 1st Edition, Tata McGraw–Hill Publishing company Ltd. New Delhi

Reference Books	
1	Surveying and Leveling (Vol-I&II), Kanitkar T.P., Kulkarni S.V., Pune Vidyarthi Griha Prakashan, Pune
2	Surveying and Leveling (Vol–I & II), Punmia B.C., Jain A.K., Jain A.K., 15thEdition, Laxmi Publication (P) Ltd. New Delhi, 2005

YCCE e- library book links [ACCESSIBLE FROM COLLEGE CAMPUS]	
1	http://link.springer.com/openurl?genre=book&isbn=978-94-010-6763-8
2	http://link.springer.com/openurl?genre=book&isbn=978-1-4613-5858-9

MOOCs Links and additional reading, learning, video material	
1	https://nptel.ac.in/courses/105107122
2	https://onlinecourses.nptel.ac.in/noc22_ce05/preview

IV SEMESTER
22CV406 : Lab. Surveying

Course Outcomes :

Upon successful completion of the course the students will be able to

1. Discuss the basic concepts of surveying and use of conventional surveying equipment.
2. Calculate the horizontal, vertical angle and distances by using dumpy level and theodolite.
3. Explain the methods of plane table surveying and compute the volume of earthwork.
4. Compute the distance and elevation by using tachometric survey.

Minimum Ten Practical's to be performed from the list as below

SN	Experiments based on
1	Measurement of bearing of sides of traverse with prismatic compass and computation of correct included angles.
2	Locating given building by chain and compass traversing (1 full size drawing sheet)
3	Determination of elevation of various points with dumpy level by collimation plane method and rise and fall method.
4	Fixing the bench mark with respect to temporary bench mark with dumpy level by fly leveling and check leveling.
5	Measurement of horizontal angle with theodolite by method of repetition.
6	Measurement of vertical angle with theodolite.
7	Determination of horizontal distance between two inaccessible point with theodolite.
8	Locating given building by theodolite traversing. (One full size drawing sheet)
9	Determination of elevation of point by trigonometric leveling.
10	Determination of constants of Tacheometer.
11	Determination of elevation of points by Tacheometric surveying.
12	Determination of elevation of points and horizontal distance between them by Tacheometrical survey.
13	Determination of gradient of given length of road by Tacheometric survey
14	Demonstration of Total Station

IV SEMESTER
22CV407 : Structural Analysis

Course Outcomes :
Upon successful completion of the course the students will be able to
1. Explain basic concepts of structural analysis, strain gauges and strain measurements.
2. Apply various theoretical concepts of different methods of structural analysis.
3. Analyze different types of structures like beam, column, parabolic arches, and trusses theoretically and experimentally.

Unit:1	**Slope Deflection Method**	**7 Hours**
Slope deflection method as applied to indeterminate beams & continuous beams, portal frames.		
Unit:2	**Three Moment Theorem**	**6 Hours**
Analysis of fixed and continuous beams by theorem of three moments including effect of sinking of support.		
Unit:3	**Moment Distribution Method**	**6 Hours**
Analysis of continuous beams and simple portals (Non sway) by using Moment Distribution method, effect of sinking of support for beam.		
Unit:4	**Strain Energy Methods**	**7 Hours**
Strain energy method as applied to the analysis of simple and redundant frames, redundant trusses up to two degrees. Determination of deflection of trusses, Castigliano's theorems, Maxwell's reciprocal theorem, Betti's theorem, Muller Breslauw Principle		
Unit:5	**Columns and Arches**	**6 Hours**
Buckling of Columns, Euler's and Rankine's formula. Analysis of Two and Three Hinged parabolic arches, shear force and normal thrust.		
Unit :6	**Influence Line Diagrams**	**7 Hours**
Influence lines for reactions, bending moments and shear forces in simply supported beams, cantilevers, beams with overhangs subjected to different types of loadings.		
	Total Lecture	**39 Hours**

Text Books	
1	Structural Analysis, Pandit G.S and Gupta S.P., Tata McGraw-Hill Publishing company LTD, New Delhi, 1997
2	Theory of Structure, Timoshenko S.P. and D.H. Young, Tata McGraw Hill Publication, Delhi

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Reference Books	
1	Theory of structures, Ramamruthum S.S. and Narayan R., DhanpatRai and Sons New Delhi 2010
2	Analysis of structures, Vazirani V.N and Ratwani M.M, Khanna Publishers New Delhi 1994
3	Structural Analysis (volume II) , Bhavikatti S.S, Vikas publishing House LTD Delhi 2011
4	Intermediate structural analysis, Kinney J.S, Oxford and IBH Publishing o.PVT.LTD, New Delhi.

YCCE e- library book links [ACCESSIBLE FROM COLLEGE CAMPUS]	
1	http://103.152.199.179/YCCE/Suported%20file/Supprted%20file/e-copies%20of%20books/Civil%20Engineering/19.%20Basic%20Structural%20Analysis%20by%20C.S.Reddy%20(%20PDFDrive%20).pdf
2	http://103.152.199.179/YCCE/Suported%20file/Supprted%20file/e-copies%20of%20books/Civil%20Engineering/21.%20STRUCTURAL%20ANALYSIS.pdf

MOOCs Links and additional reading, learning, video material	
1	https://www.youtube.com/watch?v=oa5ojjGEUSw&list=PLUogGZJOiMtNOus85Tq1zNvg9EU3aJ8VO

IV SEMESTER
22CV408 : Lab. Structural Analysis

Course Outcomes :
Upon successful completion of the course the students will be able to 1. Explain basic concepts of structural analysis, strain gauges and strain measurements. 2. Apply various theoretical concepts of different methods of structural analysis. 3. Analyze different types of structures like beam, column, parabolic arches and trusses theoretically and experimentally.

Minimum Ten Practical's to be performed from the list as below

SN.	Experiments based on
1	To study various types of electrical resistance strain gauges.
2	To measure the strain in the cantilever beam subjected to point load at tip and to check this value with theoretical value.
3	To determine slope and deflection at center of each span for a two span continuous beam subjected to point load W at center of each span and to check these values with theoretical values.
4	To verify Maxwell's Reciprocal Theorem for simply supported beam.
5	To determine the value of flexural rigidity of given beam and to compare it with theoretical value.
6	To determine the elastic displacements of the curved members experimentally and to check these values with theoretical values.
7	To study the behavior of different types of struts and to calculate the Euler's buckling load for each case.
8	To determine the horizontal thrust and to draw the influence line diagram for horizontal thrust of two hinged parabolic arch.
9	To determine the horizontal thrust and to draw the influence line diagram for horizontal thrust of three hinged parabolic arch.
10	To determine deflection of cantilever end of cantilever truss by Willot Mohr's diagram and to check this value with theoretical value.
11	To study the behavior of a portal frame under different end conditions.
12	To find the deflection of a pin-connected truss experimentally and to verify the result theoretically.
13	To obtain the influence line for bending moment of prismatic fixed beam for cases (a) one end hinged (b) both ends fixed.
14	To determine experimentally and analytically the reactions in the three suspension rods supporting an elastic beam with a concentrated load hung midway between two of the suspension rods when the suspension rods are attached at their upper end to rigid support.
15	To verify Castigliano's Theorem for simply supported beam

IV SEMESTER
22CV409 : Transportation Engineering

Course Outcomes :
Upon successful completion of the course the students will be able to 1. Explain the concepts of highway and railway engineering. 2. Compute geometric elements and explain construction and maintenance procedures for road pavements. 3. Describe and compute properties of highway materials. 4. Investigate flood discharge and forces acting on bridges.

Unit:1	Introduction to Transportation Engineering	6 Hours
Introduction and importance of transportation, Road transport characteristics, Classification of roads, network patterns, Principles of alignment. Traffic Engineering: 3E's of traffic engineering, Various Traffic Surveys, Intersection-types, parking		
Unit:2	**Geometric Design of Highway**	**7 Hours**
Road user & road vehicle characteristics, Factors affecting design standards. Cross Section elements, Stopping & overtaking sight distance overtaking zones. Horizontal alignment, Curves, design of super elevation, extra widening, transition curves, vertical alignments, I.R.C. Standards for geometric Design.		
Unit:3	**Highway Materials**	**7 Hours**
Aggregates: Physical & Mechanical properties, tests on aggregates, Bituminous materials; classification, sources, properties and tests. Cutback bitumen& Emulsions, IRC/IS standards.		
Unit:4	**Construction and Maintenance of Highway**	**6 Hours**
IRC, MOST specifications for quality & quantity of materials, techniques, tools and plant for the Earthwork, subbase, base and wearing/ surface course of flexible pavements with gravel, WBM, stabilized Bitumen & Concrete as Construction materials, Drainage, shoulders, maintenance & repairs		
Unit:5	**Introduction to Bridge Engineering**	**6 Hours**
Introduction, Components, classification and identification, Data Collection, site selection, Economic Span, Estimation of flood discharge, waterway, scours depth, depth of foundation, Afflux, clearance and free board, Loads, Forces and Stresses for Bridges.		
Unit :6	**Introduction to Railway Engineering**	**7 Hours**
Railways: Classification, lines and their track standards, gauges, track section, railway terminology, permanent way. Sleepers: Function, types, merits and demerits, sleeper density, ballast cushion, ballast section.		
	Total Lecture	**39 Hours**

Text Books	
1	S.K.Khanna & C.E.G.Justo, Highway engineering, 9th Edition, Nem Chand & Bros, 2011
2	S.P. Bindra, Principles and Practice of Bridge Engineering, 9th Edition, Dhanpat Rai Publications (P) Ltd, 2007
3	S. C. Saxena and S. P. Arora, A Text Book of Railway Engineering, 8th Edition, Dhanpat Rai Publications (P) Ltd, 2015

Reference Books	
1	K. L. Bhanot Highway Engineering,3rd edition, S. Chand & Company (P) Ltd. New Delhi,1996
2	T. D.Ahuja, Highway Engineering, Standard Book House Delhi,2011
3	J. Garber and L. A. Hoel, Traffic and Highway Engineering,5th edition, Thomson Learning, Inc,2002

YCCE e- library book links [ACCESSIBLE FROM COLLEGE CAMPUS]	
1	http://103.152.199.179/YCCE/Suported%20file/Supprted%20file/e-copies%20of%20books/Civil%20Engineering/

MOOCs Links and additional reading, learning, video material	
1	https://nptel.ac.in/courses/105105107
2	https://nptel.ac.in/courses/105105216
3	https://nptel.ac.in/courses/105107123

IV SEMESTER
22CV410 : Lab. Transportation Engineering

Course Outcomes :
Upon successful completion of the course the students will be able to
1. Describe and compute basic properties of aggregates and soil.
2. Describe and compute basic properties of bitumen and bitumen mix.

Minimum Ten Practical's to be performed from the list as below

SN	Experiments based on
1	To determine specific gravity of aggregates.
2	To determine impact value of given aggregate sample.
3	To determine crushing value of given aggregate sample.
4	To determine flakiness index of given aggregate sample.
5	To determine abrasion value by Los Angeles test.
6	To perform water absorption test on given aggregate sample.
7	To find softening point of given bitumen sample.
8	To perform penetration test for given bitumen sample.
9	To perform flash and fire point for given bitumen sample.
10	To perform ductility test on given bitumen sample.
11	To perform viscosity test on bitumen.
12	To perform CBR test on given soil sample.
13	To perform Marshall Stability Test on bituminous concrete.
14	Bridge site visit.

IV Semester

MLC2124 - YCCE Communication Aptitude Preparation (YCAP4)

IV SEMESTER
MLC102 : Quantity Estimation & Management

Course Outcomes:
Upon successful completion of the course the students will be able to
1. Estimate the quantity and costing of various structures
2. Illustrate the specifications and quantities of materials in different items
3. Evaluate the rate analysis and valuation
4. Planning of various construction projects such as Building, Roads, etc.
5. Explain Manpower & Machinery requirement planning during project
6. Analysis technique of project management.

UNIT:1	**Estimate**	**04 Hrs**
Purposes of Estimating, Types of Estimates, Methods of Estimates, Units of Measurement of Various Items. Detailed Estimation of civil Engineering Works, Specifications: Definition, Objectives, Use, Types, Classification, Design of Specifications, Principles of Specification Writing, Sources of Information and Typical Specifications. Contemporary issues – Introduction of different software's in Estimating like STACK, COSTX etc.		
UNIT:2	**Contracts**	**04 Hrs**
Definition, Essential Requirements, Trade usages, Forms of contract, Termination of Contracts, Labour Contract Negotiated Contracts, Schedule of Prices Contracts, Package Deal Contracts, Demolition Contracts		
UNIT:3	**Rate Analysis**	**04 Hrs**
Purposes of Rate Analysis, Factors affecting, importance, Schedule of Rates, Rate analysis of typical Items. Valuation: Purposes, Cost, Price and Value, Methods of Carrying out Works, Measurement Book		
UNIT:4	**Construction Management**	**04 Hrs**
Significance of Construction Management, Objectives, Functions, Resources, and Stages in construction, construction team, Organization Structure Contemporary issues – Introduction of BIM for construction management.		
UNIT:5	**Project planning**	**04 Hrs**
Work Break down structure, Bar charts, Detailed Bar chart for a Construction Project, CPM and PERT analysis, Line of balance method. Resources levelling		
UNIT:6	**QA & QC**	**04 Hrs**
Quality Control & Quality Inspection, Construction safety, Acts for Construction Labour, Materials management, Equipment Management		
	Total Lecture	**24 Hours**

Text Books	
1	Rangawala S.C., Estimating ,Costing and Contracts, Chortor Publications, 2004.
2	Dutta B.N. Estimating and Costing in Civil Engineering, UBS Publication, 2004.
3	Kumar Neeraj Jha, Construction Project Management, Pearson Publication.
4	K.K. Chitkara, Construction Project Management, 2nd Edition, McGraw Hill Publication

Reference Books	
1	Estimating & Costing, Chandola S.P. &Vazirani V.N, Khanna Publishers 2-B, Nath market, Naisarak, Delhi, 2010
2	Estimating, Costing, Specification & valuation in Civil Engineering, Chakraborti M. UBS Publication, Calcutta, 2010
3	Srinath L, CPM and PERT, East-West Press Pvt. Ltd New Delhi.
4	N.D. Vora, Quantitative Techniques in Management, Tata McGraw Hill, New Delhi, 3rd Edition.
5	Estimating & Costing, Chandola S.P. &Vazirani V.N, Khanna Publishers 2-B, Nath market, Naisarak, Delhi, 2010

YCCE e- library book links [ACCESSIBLE FROM COLLEGE CAMPUS]	
1	https://link.springer.com/book/10.1007/978-1-4612-2936-0
2	https://link.springer.com/chapter/10.1007/1-84628-335-3_3
3	https://link.springer.com/book/10.1007/978-3-030-03174-9
4	https://link.springer.com/book/10.1007/978-3-319-05443-8

MOOCs Links and additional reading, learning, video material	
1	https://onlinecourses.nptel.ac.in/noc22_ce59/preview
2	https://www.edx.org/course/introduction-to-project-management?index=product&queryID=2579bf0809fad7ea1e57295364fafe85&position=2

Nagar Yuwak Shikshan Sanstha's

Yeshwantrao Chavan College of Engineering

(An Autonomous Institution affiliated to Rashtrasant Tukadoji Maharaj Nagpur University)

(Accredited 'A++' Grade by NAAC with a score of 3.25)

Hingna Road, Wanadongri, Nagpur - 441 110

Bachelor of Technology

SoE & Syllabus 2022

5th Semester

(Department of Civil Engineering)

B. Tech in Civil Engineering

Nagar Yuwak Shikshan Sanstha's

Yeshwantrao Chavan College of Engineering

(An Autonomous Institution affiliated to Rashtrasant Tukadoji Maharaj Nagpur University)

SoE No. 22CV-101

B.TECH SCHEME OF EXAMINATION 2022

(Scheme of Examination w.e.f. 2022-23 onward)

(Department of Civil Engineering)

B. Tech in Civil Engineering

SN	Sem	Type	BoS/ Deptt	Sub. Code	Subject	T/P	Contact Hours				Credits	% Weightage			ESE Duration Hours
							L	T	P	Hrs		MSEs*	TA**	ESE	
FIFTH SEMESTER															
1	5	PC	CV	22CV501	Engineering Hydrology	**T**	3	0	0	3	**3**	30	20	50	3 Hrs
2	5	PC	CV	22CV502	Advanced Structural Analysis	**T**	3	0	0	3	**3**	30	20	50	3 Hrs
3	5	PC	CV	22CV503	**Lab:-** Analysis and Design Studio	**P**	0	0	2	2	**1**		60	40	
4	5	PC	CV	22CV504	Steel Structures	**T**	3	0	0	3	**3**	30	20	50	3 Hrs
5	5	PC	CV	22CV505	**Lab:-** Building Design Drawing	**P**	0	0	2	2	**1**		60	40	
6	5	PE	CV		**Professional Elective-I**	**T**	3	0	0	3	**3**	30	20	50	3 Hrs
7	5	OE-I	CV		**Open Elective-I**	**T**	3	0	0	3	**3**	30	20	50	3 Hrs
8	5	OE-II	CV		**Open Elective-II**	**T**	3	0	0	3	**3**	30	20	50	3 Hrs
9	5	STR	CV	22CV506	**Industrial training, Seminar & Report**	**P**	0	0	1	1	**1**		100		
					TOTAL FIFTH SEM		**18**	**0**	**5**	**23**	**21**				
Audit Courses															
1	5	HS	T&P	MLC2125	**YCAP5 :**	**A**	3	0	0	3	**0**				
2	5	HS	R&D	MLC125	Design thinking	**A**	2	0	0	2	**0**				

Professional Elective - I

1	5	PE-I	CV	22CV511	PE-I : Advanced Surveying
2	5	PE-I	CV	22CV512	PE-I : Computer Applications in Civil Engineering
3	5	PE-I	CV	22CV513	PE-I : Advanced Concrete Technology
4	5	PE-I	CV	22CV514	PE-I : Water Treatment
5	5	PE-I	CV	22CV515	PE-I : Environmental Management
6	5	PE-I	CV	22CV516	PE-I : Soil Characterization and Identification
7	5	PE-I	CV	22CV517	PE-I : Geographical Information Systems

Open Electives -I

1	5	OE-I	CV	22CV531	OE-I : Building Services Engineering
2	5	OE-I	CV	22CV532	OE-I : Construction Techniques
3	5	OE-I	CV	22CV533	OE-I : Introduction to Environmental Management
4	5	OE-I	CV	22CV534	OE-I : Basics of Transportation Engineering
5	5	OE-I	CV	22CV535	OE-I : Basics of Water Resource Engineering
6	5	OE-I	CV	22CV536	OE-I : Elements of Water Power Engineering

Open Electives -II

1	5	OE-II	CV	22CV551	OE II : Elements of Earthquake Engineering
2	5	OE-II	CV	22CV552	OE II : Introduction to Finite Element Method
3	5	OE-II	CV	22CV553	OE II : Air Pollution and Solid Waste Management
4	5	OE-II	CV	22CV554	OE-II : Environmental and Social Impact Assessment
5	5	OE-II	CV	22CV555	OE II : Disaster Management

		June 2022	**1.00**	**Applicable for AY 2022-23 Onwards**
Chairperson	**Dean (Acad. Matters)**	**Date of Release**	**Version**	

V SEMESTER
22CV501__Engineering Hydrology

Course Outcomes:		
Upon successful completion of the course the students will be able to		
1. Explain the basic concept of hydrology and various processes.		
2. Compute various components of the hydrological processes.		
3. Calculate geo-hydrological parameters.		
4. Illustrate various methods of groundwater recharge.		
Unit:1	**Introduction to Hydrology and Precipitation**	**7 Hours**
Engineering Hydrology, Hydrological Cycle, Hydrological Equation, Importance of Temperature, Wind and Humidity in Hydrological Studies, Latent Heat, Vapour Pressure, Bulb Pressure, circulation cell, Residence time. Precipitation: Definition, Types and Forms of Precipitation, Factors Affecting Precipitation, Measurement of Precipitation by using Rain-gauges, Optimum Number of Rain-gauge Stations and consistency of rainfall data. **Contemporary Issues related to Topic**		
Unit:2	**Infiltration and Evaporation**	**6 Hours**
Infiltration, factors affecting infiltration, Horton's equation, Infiltration Indices and Numerical. Evaporation, factors affecting evaporation, Estimation of Evaporation and Evaporation Control. Transpiration and Evapo-transpiration and water balance equation with respect to lake hydrology, catchment characteristics. **Contemporary Issues related to Topic**		
Unit:3	**Runoff**	**6 Hours**
Runoff, Sources of Runoff, Components of Runoff, Classification of Streams, inphalmal and emphalmal stresses, Factors affecting runoff, Rainfall Runoff Relationships, Numerical on runoff estimation. Introduction to Interception Storage and Depression Storage. **Contemporary Issues related to Topic**		
Unit:4	**Hydrograph**	**6 Hours**
Hydrograph**,** Components of hydrograph, types of basin, factors affecting hydrograph, S-curve hydrograph, Synthetic hydrograph, mass curve, Derived Rainfall Hydrograph, Unit Hydrograph, Mass curve, Numericals on		
Unit:5	**Introduction to Geo-hydrology**	**7 Hours**
Geo-hydrology, Introduction, Occurrence and Distribution of Groundwater, Aquiclude, Aquitard, Aquifers, Types and Properties of Aquifer, Specific Yield, Specific Retention, Porosity, Permeability, Water Table, Darcy's law and Introduction to Hydraulics of Wells. **Contemporary Issues related to Topic**		

Unit :6	Ground Water Recharge	7 Hours
Introduction, Selection of Recharge Sites, Recharging Methods, Spreading Method, Induced Recharge Method, Recharge Well Method, Sub-surface Dams, Waste water Recharge and Recharge through Rain Water Harvesting. **Contemporary Issues related to Topic**		
	Total Lecture	**39 Hours**

Text Books	
1	Ojha, C.S.P., Berndtsson, R., and Bhunya, P., Engineering Hydrology, Oxford University Press, 2008
2	Raghunath H.M., Hydrology, New Age International Publishers, 1985.
3	Reddy R., Hydrology, Tata McGraw-Hill New Delhi, 2012.
4	VenTe Chow, David, Larry, Applied Hydrology, Mac Graw Hill Publications,1988.
5	Dr. Jaya Rami Reddy, Hydrology, Laxmi Publications. 2008.
6	K. C. Patra, Hydrology and Water Resources Engineering, 2nd edition, 2008
Reference Books	
1	Todd, D.K., Ground Water Hydrology, John Wiley & Sons, 2005.
2	Subramnaya, K., Engineering Hydrology,Tata McGraw-Hill Publishing Company Limited, 2017.
3	Sharma R.K., Sharma T.K., Hydrology & Water Resources Engineering, DhanpatRai Publications, 2002.
4	Linsley, R.K., Kohler, M.A. and Paulhus,Hydrology for Engineers, Tata McGraw-Hill Publishing Company Limited,1975.
YCCE e- library book links [ACCESSIBLE FROM COLLEGE CAMPUS]	
1	http://link.springer.com/openurl?genre=book&isbn=978-3-540-89464-3
2	http://link.springer.com/openurl?genre=book&isbn=978-3-662-22016-0
3	http://link.springer.com/openurl?genre=book&isbn=978-1-62703-594-1
4	http://link.springer.com/openurl?genre=book&isbn=978-1-4612-9177-0
5	http://link.springer.com/openurl?genre=book&isbn=978-3-540-70804-9
6	http://103.152.199.179/YCCE/Suported%20file/Supprted%20file/e-copies%20of% 20books / Civil % 20 Engineering /
MOOCs Links and additional reading, learning, video material	
1	NPTEL : Civil Engineering - Water Resources Engineering
2	NPTEL : Civil Engineering - Water Resources Systems Planning and Management
3	NPTEL : Civil Engineering - NOC:Rural Water Resources Management
4	NPTEL : Civil Engineering - Water Resources Systems : Modeling Techniques and Analysis

V SEMESTER
22CV502__Advanced Structural Analysis

Course Outcomes:
Upon successful completion of the course the students will be able to
1. Explain the matrix methods of structural analysis and its applications.
2. Apply the column analogy method and its application to beam structure.
3. Analyze the frame structure by moment distribution method.
4. Apply the approximate method for analysis of multistoried frame structures

Unit I: Flexibility Matrix Method (Beam)	**7 Hours**
Introduction to Flexibility matrix Method, force method, Degree of static indeterminacy, Basic Concept of flexibility matrix method of analysis, Analysis of continuous beam without sinking and with sinking of support. **Contemporary Issues related to Topic**	
Unit II: Stiffness Matrix Method (Pin jointed frame)	**6 Hours**
Introduction to Stiffness Method, Degree of kinematic Indeterminacy, Freedom codes, Global and Local Coordinate system, development of stiffness matrix for bar element along local and global coordinate system, Analysis of pin jointed frame structure. **Contemporary Issues related to Topic**	
Unit III: Stiffness Matrix Method (Beam)	**7 Hours**
Development of stiffness matrix for a beam member, analysis of continuous beam. **Contemporary Issues related to Topic**	
Unit IV: Column Analogy Method	**6 Hours**
Introduction to Column Analogy; Stiffness factors and carryover factors for non-prismatic member; Application of the analogy for fixed beam. **Contemporary Issues related to Topic**	
Unit V: Moment Distribution Method (Sway Rigid Frame)	**7 Hours**
Analysis of one bay one story frame with sway, Analysis of one leg inclined frame with sway. **Contemporary Issues related to Topic**	
Unit VI: Approximate method of analysis	**6 Hours**
Introduction to approximate method of analysis, substitute frame method, portal frame method; cantilever method, Analysis of Multistorey frame for vertical and horizontal forces, (maximum upto THREE bay THREE story). **Contemporary Issues related to Topic**	
Total Lecture	**39 Hours**

			July 2022	1.00	Applicable for AY 2022-23 Onwards
Chairperson	Dean (Acad. Matters)	Dean OBE	Date of Release	Version	

Text Books	
1.	Pandit G.S and Gupta S.P, "Structural Analysis (Matrix Approach)", Tata McGraw Hill Publishing company LTD, New Delhi, 2006.
2.	Gere and Weaver, "Matrix Method of Structural Analysis", CBS Publication, 2004.
3.	C. S Reddy, "Basic structural Analysis", Tata McGraw Hill Publication, New Delhi, 8th Edition.
Reference Books	
1.	Timoshenko S.P. and D.H. Young, "Theory of Structure", Tata Mc Graw Hill Publication, Delhi.2nd Edition.
2.	Bhavikatti S.S, "Structural Analysis - Volume II", Vikas publishing House LTD, Delhi, 2nd Edition (2011).
3.	Meghre A.S. & Deshmukh S.K., "Matrix Method of Structural Analysis", Charotar publishing house, Anand, 1st Edition (2003).
YCCE e- library book links [ACCESSIBLE FROM COLLEGE CAMPUS]	
1.	http://link.springer.com/openurl?genre=book&isbn=978-1-4419-1046-2
2.	http://link.springer.com/openurl?genre=book&isbn=978-1-4757-2008-2
3.	https://www.google.co.in/books/edition/Structural_Analysis/hmBsyb4R4oEC?hl=en&gbpv=1 &dq=structural+analysis&printsec=frontcover
4.	https://www.google.co.in/books/edition/Structural_Analysis_I_4th_Edition/wDpDDAAAQBAJ?hl=en&gbp1 &dq=structural+analysis&printsec=frontcover
MOOCs Links and additional reading, learning, video material	
1.	https://www.youtube.com/playlist?list=PLAE2D920B08D74108
2.	https://www.youtube.com/playlist?list=PLbRMhDVUMngeZatm4MIOKG4sHxXuB_yri
3.	https://www.youtube.com/watch?v=s4CN6aVKhPo

V SEMESTER
22CV503__Lab : Analysis & Design Studio

Course Outcomes :

Upon successful completion of the course the students will be able to

1. Develop the model (Beams / Plane truss / Frames / slab), apply the member properties, create the boundary condition, and add the loads in the software package.
2. Analyze the model (Beams / Plane truss / Frames) in the software package without any error.
3. Analyze and design the RCC structural elements in the software package without any error.
4. Compare and contrast the results of the hand calculation with those of the software package.

S.N.	Experiments based on
1	Using a software package, analyze a continuous beam without support sinking (maximum two degrees of static indeterminacy). Compare the results of the software analysis with the results of the manual analysis. Use the Flexibility Matrix Method for manual analysis. Conclude it from both the result.
2	Using a software tool, analyze a continuous beam with support sinking (maximum two degrees of static indeterminacy). Compare the results of the software analysis with the results of the manual analysis. Use the Flexibility Matrix Method for manual analysis. Conclude it from both the result.
3	Using a software application, analyze a plane truss (maximum of TWO degrees of Kinematic Indeterminacy). Compare the results of the software analysis with the results of the manual analysis. Use the Stiffness Matrix approach for manual analysis. Conclude it from both the result.
4	Using a software application, analyze a plane truss (maximum of THREE degrees of Kinematic Indeterminacy). Compare the results of the software analysis with the results of the manual analysis. Use the Stiffness Matrix approach for manual analysis. Conclude it from both the result.
5	Using a software application, analyze a non-prismatic fixed beam (beam breaks into TWO sections). Compare the results of the software analysis with the results of the manual analysis. Use the Column Analogy Method for manual analysis. Conclude it from both the result.
6	Using a software application, analyze a non-prismatic fixed beam (beam breaks into THREE sections). Compare the results of the software analysis with the results of the manual analysis. Use the Column Analogy Method for manual analysis. Conclude it from both the result.
7	Using a software application, analyze a rigid sway frame (one bay and one floor). Compare the results of the software analysis with the results of the manual analysis. Use the Moment Distribution Method for manual analysis. Conclude it from both the result.

8	Using a software application, analyze a rigid sway frame (one bay and one floor with one leg inclined). Compare the results of the software analysis with the results of the manual analysis. Use the Moment Distribution Method for manual analysis. Conclude it from both the result.
9	Using a software application, analyse and design a simple supported beam. Compare the software and manual design results.
10	Using a software application, analyse and design of frame (one bay and one floor). Compare the software and manual design results.
11.	Using a software application, design the Isolated footing of the frame (one bay and one floor). Compare the software and manual design results.
12.	Using a software application, design a slab. Compare the software and manual design results.

Links on online STAAD Tutorial	
1.	https://youtu.be/GB4jEiGwXnw
2.	https://youtu.be/U1L_9VmbWjQ
3.	https://youtu.be/UWQ0pE9o4Ak

V SEMESTER
22CV504__Steel Structures

Course Outcomes :

Upon successful completion of the course the students will be able to

1. Explain the properties of Structural Steel and their application in design.
2. Apply the knowledge of IS Codes and various design methodology for the design of steel structural components.
3. Analyze the different types of connection and roof truss.
4. Design the simple steel sections and Column Bases.

Unit:1	**Steel as a Structural Material:**	**6 Hours**
Physical and Mechanical properties of Structural Steel, Merits and Demerits of Structural Steel, Grades of Structural Steel, Structural Steel Sections, Introduction to Hollow Section, IS 800:2007, Introduction to Limit State Method. **Contemporary Issues related to Topic**		
Unit:2	**Connection:**	**7 Hours**
Riveted Connection, Bolted Connection, Welded Connection, Failure of Connections, Strength and Efficiency of Joint. **Contemporary Issues related to Topic**		
Unit:3	**Tension and Compression Member:**	**6 Hours**
Tension Member: Types of Tension Member, Types of Failure, Design of Tension Member Compression Member: Effective length, Slenderness ratio, Types of Buckling, Design of Compression Member. **Contemporary Issues related to Topic**		
Unit:4	**Column and Roof Trusses**	**7 Hours**
Column: Design of Axially loaded columns. Roof Trusses: Types of Trusses, Loads on Roof Truss, Analysis of Roof Truss **Contemporary Issues related to Topic**		
Unit:5	**Beam:**	**6 Hours**
Types of Beams, Lateral Stability of beams, Classification of Cross-Section, Design of Laterally Supported Beam, Design of Laterally Unsupported Beam. **Contemporary Issues related to Topic**		
Unit :6	**Column Bases and PEB Structures**	**7 Hours**
Column Bases: Types of Column Bases (Slab Base and Gusset Base), Design of Slab Base and Gusseted Base. Introduction to Pre-Engineered Building (PEB). **Contemporary Issues related to Topic**		
	Total Lecture	**39 Hours**

			July 2022	1.00	Applicable for AY 2022-23 Onwards
Chairperson	Dean (Acad. Matters)	Dean OBE	Date of Release	Version	

Text Books	
1	S.K. Duggal, Limit State Design of Steel Structures, McGraw-Hill, Third edition, 2019
2	M.L. Gambhir, Fundamentals of Structural Steel Design, McGraw Hill Education, First edition, 2017
3	N. Subramanian, Design of Steel Structures Limit State Method, Oxford University Press, 2018
Reference Books	
1	S. S. Bhavikatti, Design of Steel Structures: By Limit State Method as Per IS: 800-2007, I K International Publishing House, Fifth edition, 2017
2	Jack C. McCormac, Structural Steel Design, Pearson, 5th edition, 2011
3	IS 800 (2007): General Construction In Steel - Code of Practice
YCCE e- library book links [ACCESSIBLE FROM COLLEGE CAMPUS]	
1	http://link.springer.com/openurl?genre=book&isbn=978-1-4613-5864-0
MOOCs Links and additional reading, learning, video material	
1	https://archive.nptel.ac.in/courses/105/105/105105162/

V SEMESTER
22CV505__Lab : Building Design Drawing

Course Outcomes :
Upon successful completion of the course the students will be able to
1. Draw various orthographic views of a building using drawing instruments and by free hand sketches.
2. Apply principles of planning and building bye-laws to draw working and submission drawings of a building.
3. Draw perspective view of a building and its elements.
4. Use software used for building drawing to draw submission and working drawings

Sr. No.	Following Practical's will be conducted:
1	Development of Line plan for a residential building. **(01 Assignments)**
2	Submission drawing of a residential building. **(01 Assignments)**
3	Line Plan of public building on A1 size graph sheet. **(01 Assignment)**
4	Two Point Perspective of a building or its element **(01 Assignment)**
5	Submission drawing of a residential building using AutoCAD. **(01 Assignment)**
6	Free Hand Sketches (minimum 30) of various elements of building in **A3 size sketchbook**.

V SEMESTER
22CV511__ PE-I : Advance Surveying

Course Outcomes :		
Upon successful completion of the course the students will be able to 1. Distinguish the horizontal and vertical curve. 2. Classify the triangulation system 3. Illustrate the basic concepts of electronic surveying 4. Explain the basic concepts of photographic surveying		
Unit:1	**Simple and Compound Curves**	**6 Hours**
Simple Curves: Elements of simple curves, Types of Horizontal curve Methods of Curve ranging. **Compound Curves**: Elements of compound Curves, setting out the curve.		
Unit:2	**Transition and vertical curve**	**7 Hours**
Transition Curves: Elements of transition curves, Super elevation, Length of transition curve, setting out the transition curve. Vertical Curves: Elements of vertical curves, Types, Tangent Correction, Location of highest or lowest point.		
Unit:3	**Geodetic Surveying and Triangulation Adjustment**	**7 Hours**
Geodetic Surveying: Classification of triangulation survey, Station marks, Signal and tower, Inter visibility of stations Triangulation Adjustment: Definitions, Laws of weights, Station adjustment.		
Unit:4	**Electronic Surveying**	**6 Hours**
Introduction, electromagnetic wave theory – electromagnetic application, Modulation, types of EDM instrument, distance measuring system-Principle of working and EDM instrument, distomat, errors in EDM.		
Unit:5	**Total Station Surveying**	**6 Hours**
Introduction, basic principle, types of total station, characteristics, feature of total station, component of total station, working of total station, sources of error, care and maintenance of total station instrument, advantages of total station over conventional instrument.		
Unit :6	**Advanced surveying techniques**	**7 Hours**
Photographic Surveying: Basic definitions, Terrestrial and aerial photography, Scale of vertical photograph, ground coordinate flight planning, study of photo theodolite and stereoscope, Displacement due to ground relief. **Contemporary Issues related to Topic**		
	Total Lecture	**39 Hours**

Text Books	
1	Surveying and Leveling, Basak N. N., 1st Edition, Tata McGraw–Hill Publishing company Ltd. New Delhi
Reference Books	
1	Surveying and Leveling (Vol-I&II), Kanitkar T.P., Kulkarni S.V., Pune Vidyarthi Griha Prakashan, Pune.
2	Surveying and Leveling (Vol–I & II), Punmia B.C., Jain A.K., Jain A.K., 15thEdition, Laxmi Publication (P) Ltd. New Delhi, 2005.
3	Reddy M. A., Remote sensing & GIS, B. S. Publication, Hyderabad.
4	Dr. A.M. Chandra, Higher Surveying, New age international publishers, New Delhi.
5	Thomas M. L., Ralph W. K., Jonathan W., Remote Sensing and Image Interpretation, Chipman Wiley & Sons, 5th Edition (2010).
YCCE e- library book links [ACCESSIBLE FROM COLLEGE CAMPUS]	
1	http://link.springer.com/openurl?genre=book&isbn=978-94-010-6763-8
2	http://link.springer.com/openurl?genre=book&isbn=978-1-4613-5858-9
MOOCs Links and additional reading, learning, video material	
1	https://nptel.ac.in/courses/105107122
2	https://www.youtube.com/watch?v=Edl-EiIsf_8

V SEMESTER
22CV512__PE-I : Computer Application In Civil Engineering

Course Outcomes :

Upon successful completion of the course the students will be able to

1. Explain the basic concepts of C Programming language
2. Apply the knowledge of C program to write simple programs.
3. Develop computer programs for the solution of numerical methods and civil engineering problems

Unit:1	**Introduction**	**6 Hours**

C-Fundamentals, character set data type constant and variables, Declaration of constants & variables, Expression, Statements, Symbolic constants. Operator and Expression, Arithmetic operator, Unary operator, Relation and Logical operator, Assignment operators, the conditional operator. Data input & output.

Contemporary Issues related to Topic

Unit:2	**Control Statement**	**7 Hours**

Control statement and its application, the WHILE statements, do-while, for nested loop, if –else, switch break, continue, go to statement.

Contemporary Issues related to Topic

Unit:3	**Advance Topics**	**6 Hours**

User defined Functions, Library functions, Storage class, Arrays, Pointers, structures and Unions, Data files, File Handling.

Contemporary Issues related to Topic

Unit:4	**Basic Programs**	**7 Hours**

Fundamental of Numerical Methods, Interpolation & extrapolation. Numerical Integration (Simpson's method, Trapezoidal method, Newton's Gauss Quadrature method), Interactive Computer Program Development.

Contemporary Issues related to Topic

Unit:5	**Application programing**	**6 Hours**

Computer program based on Transportation Engineering, Geotechnical Engineering, Hydraulic Engineering, Irrigation Engineering, Surveying, Estimating & costing.

Contemporary Issues related to Topic

Unit :6	**Application programming**	**7 Hours**

Computer program based on Structural analysis, Structural Design, Environmental Engineering, Matrix algebra, Use of excel in structural design.

Contemporary Issues related to graphics design in Civil Engineering programs

Total Lecture	**39 Hours**

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Text Books	
1	Let Us C, Yashavant Kanetkar, BPB Publications .
Reference Books	
1	C programming language, 2th Edition 1996, Dennis Ritchie, Pearson
2	C: The Complete Reference, 4thEdititon 2017, Herbert Schildt, McGraw Hill
YCCE e- library book links [ACCESSIBLE FROM COLLEGE CAMPUS]	
1	http://103.152.199.179/YCCE/Suported%20file/Supprted%20file/e-copies%20of%20books/Computer%20Science%20and%20Engineering/C-in-depth-2nd-ed.pdf
2	http://103.152.199.179/YCCE/Suported%20file/Supprted%20file/e-copies%20of%20books/Computer%20Science%20and%20Engineering/The%20C%20Programming%20Language%20-%202nd%20Edition%20-%20Ritchie%20Kernighan.pdf
MOOCs Links and additional reading, learning, video material	
1	https://www.youtube.com/watch?v=XTiIiI-LOY8&list=PLEAYkSg4uSQ2k6GwNhpgSHodGT8wfvgwu
2	https://www.youtube.com/watch?v=qSacuVNWdtI&list=PLEAYkSg4uSQ2k6GwNhpgSHodGT8wfvgwu&index=2
3	https://www.youtube.com/watch?v=kb0MG6oUCTw&list=PLEAYkSg4uSQ2k6GwNhpgSHodGT8wfvgwu&index=3
5	https://www.youtube.com/watch?v=kb0MG6oUCTw&list=PLEAYkSg4uSQ2k6GwNhpgSHodGT8wfvgwu&index=3
6	https://www.youtube.com/watch?v=p5MRUoEv5bw&list=PLEAYkSg4uSQ2k6GwNhpgSHodGT8wfvgwu&index=5

V SEMESTER
22CV513__PE-I : Advanced Concrete Technology

Course Outcomes :

Upon successful completion of the course the students will be able to

1. Explain the properties of the constituent materials of concrete.
2. Examine the properties of fresh and hardened concrete and tests to determine these properties.
3. Analyse the concrete mixes design and apply statistical quality control techniques
4. Explain admixtures, their role in concrete properties and various durability aspects in concrete.

Unit:1	Properties of Cement & Aggregate	7 Hours

Review of properties of cement, their physical and chemical properties, special purpose cements, Classification and properties of aggregates, soundness of aggregates, alkali aggregate reaction, thermal properties of aggregates, Importance of shape and Surface area and grading, gap graded and aggregates.

Contemporary Issues related to Topic

Unit:2	Properties of Concrete	6 Hours

Rheological behaviour of concrete, requirements of workability of concrete, Effect of environmental conditions, Strength properties of hardened concrete, Impact, Dynamic and fatigue behaviour of concrete, shrinkage and creep of concrete, behaviour of concrete under fire.

Contemporary Issues related to Topic

Unit:3	Production of concrete	6 Hours

Permeability and Durability of concrete, Parameters of durability of concrete, chemical attack on concrete, Production of concrete, batching mixing, transportation, placing, compaction of concrete. Special methods of concreting and curing of concrete, Hot weather and cold weather concreting, Guniting (Shotcreting).

Contemporary Issues related to Topic

Unit:4	Mix Design for Higher Grade	7 Hours

Concrete mix design, Basic considerations and choice a mix proportions, various methods of mix designs including IS Code method. Quality control and quality assurance of concrete, Acceptance criteria. Use of Fly Ash, Silica Fumes, Metakaolin & GGBS in concrete. Admixtures & construction chemicals.

Contemporary Issues related to Topic

Unit:5	Quality Management in Concrete	7 Hours

Quality management in concrete construction, Inspection and testing of concrete. Non-destructive testing of concrete, core test and load test. Significance, rebound hammer, ultra-sonic pulse velocity test, Advanced concrete testing equipment.

Contemporary Issues related to Topic		
Unit :6	**Special concrete**	**6 Hours**
Special concrete such as high strength, Lightweight, heavy weight, vacuum processed concrete. Mass concrete, high performance concrete, Pumpable concrete, Self-Compacting concrete, Air entrained concrete, Ferro cement, fiber reinforced concrete, Polymer impregnated concrete. Jet concrete. Deterioration and repair technology of concrete, Distress and type of repairs, crack sealing techniques. **Contemporary Issues related to Topic**		
	Total Lecture	**39 Hours**

Text Books	
1	Gambhir M.L: Concrete Technology Tata McGraw Hill (Second Edition) 1995.
2	M.S. Shetty, Concrete Technology S. Chand & Company New Delhi 2005.
Reference Books	
1	P.Kumar Mehata, Paulo & J.M. Monteiro, Concrete microstructure, properties & materials, Prentice Hall INC & Mcgraw Hill USA.
2	Short & Kenniburg, Light Weight Concrete, Asia Publishing House, Bombay 1963.
3	Chen Orchard D.F.; Concrete Technology-Vol I. & II Applied Science Publishers (Fourth Edition) 1979.
4	Neville A.M., J.J. Brook Properties of Concrete Addison Wesley 1999.
YCCE e- library book links [ACCESSIBLE FROM COLLEGE CAMPUS]	
1	https://link.springer.com/book/10.1007/978-3-030-10510-5
2	https://easyengineering.net/concrete-technology-books-collection-new/
MOOCs Links and additional reading, learning, video material	
1	https://youtu.be/cx5gPKp9QEc
2	https://archive.nptel.ac.in/courses/105/102/105102012/
3	https://archive.nptel.ac.in/courses/105/106/105106176/

V SEMESTER
22CV514__PE-I : Water Treatment

Course Outcomes :		
Upon successful completion of the course, the students will be able to 1. Understand working of water treatment units and their significance in water treatment. 2. Understand fundamentals of unit processes and analyse data related to the processes. 3. Design different water treatment units.		
Unit:1	**Objectives of Water Treatment**	**7 Hours**
Water treatment objectives, Water quality standards and regulations, **Aeration:** Objectives, Principles, Various methods, Design of aerator. **Contemporary Issues related to Topic**		
Unit:2	**Coagulation And Flocculation**	**7 Hours**
Need for coagulation, the chemistry of coagulation, various coagulants used in the process, Factors affecting efficiency of the coagulation process. Design of flash mixer, Theory of flocculation, slow mixing devices **Contemporary Issues related to Topic**		
Unit:3	**Sedimentation**	**7 Hours**
Stoke's law, working of ideal sedimentation tank, Types of sedimentation tanks, design of rectangular sedimentation tank, Working and Design of clariflocculator, Operational problems in the sedimentation tanks **Contemporary Issues related to Topic**		
Unit:4	**Filtration**	**6 Hours**
Theory of filtration, Types of filters, Slow and rapid sand filters, Operation of rapid sand filters, Operational difficulties, Design of rapid sand filter **Contemporary Issues related to Topic**		
Unit:5	**Disinfection**	**7 Hours**
Various methods of disinfection, Chlorination, Chemistry of chlorination, Methods of chlorination. **Contemporary Issues related to Topic**		
Unit :6	**Other Processess**	**7 Hours**
Adsorption, Theory, Granular and powder activated carbon, Performance and reactivation. Application in water treatment Deflouridation, Effects of fluorides on human health, Different methods of removal, Ion Exchange, Materials and reactions. **Contemporary Issues related to Topic**		
	Total Lecture	**39 Hours**

Text Books	
1	P.N. Modi, Water Supply and treatment, Standard Book House, 2015 Edition
Reference Books	
1	CPHEEO Manual on Water Supply and Treatment
2	Fair, Geyer and Okun, Water and wastewater engineering Vol. 2, John Wiley and Sons, New York , 2015
3	B.C. Punmia, Waste Water Engineering, Firewall Media.
YCCE e- library book links [ACCESSIBLE FROM COLLEGE CAMPUS]	
1	http://link.springer.com/openurl?genre=book&isbn=978-1-4613-6193-0
2	https://onlinelibrary.wiley.com/doi/book/10.1002/9780470168042
MOOCs Links and additional reading, learning, video material	
1	https://nptel.ac.in/courses/105107207
2	https://nptel.ac.in/courses/103107212

V SEMESTER
22CV515__PE-I : Environmental Management

Course Outcomes :

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

1. Explain the importance of environmental management tools.
2. Illustrate the procedures of impact assessment studies in environmental management
3. Explain environmental legislations and policies for environmental resources.
4. Explain the need for resource management and its challenges for sustainable development

Unit:1	Sustainable Development	7 Hours

Introduction to Environmental Management Development and Environment, environmental attributes, nature of impact – primary, secondary, tertiary, shot –term long-term, local and regional, reversible & Irreversible impacts. **Overview of impacts** –directly & indirectly measurable impacts with respect to air, noise, land, biological & socio-economic environment

Contemporary Issues related to Topic

Unit:2	Environmental Impact Assessment	7 Hours

Introduction to Environmental Impact Assessment: need for EIA, concept of EIA, elements of EIA Role and Status of EIA in India EIA Procedures, Environmental Impact Statement, Methodologies of EIA

Contemporary Issues related to Topic

Unit:3	Environmental Clearance and Management Plan	7 Hours

MoEF questionnaire for environmental clearance, critical environmental issues and formulation of strategies of EMP, environmental management plan, development of action plans for critical environmental education programmers. ISO 14001

Contemporary Issues related to Topic

Unit:4	Environmental Legislation	6 Hours

Environmental legislation – basic concepts, critical issues, civil liability, various enactment and their provisions – Water Act (1974, 1988), forest Conservation Act (1980), Air Act (1981, 1988), Water (Cess) Act 1977, Environmental Protection Act 1986, Role of State & Central boards of pollution control, local government social action groups, and national environmental policies

Contemporary Issues related to Topic

Unit:5	Environmental Audit	7 Hours

Environmental Audit- Concept of EA, procedural aspects of conducting environmental audit, EMS. Introduction to life cycle assessment

Contemporary Issues related to Topic

Unit :6	Resources Management	7 Hours
Depletion of resources – causes & effects, resource utilization, optimal use of resources. **Contemporary Issues related to Topic**		
	Total Lecture	**39 Hours**

Text books	
1	Anand Bal, An Introduction to Environmental Management, Himalaya Publishing House., 2009
Reference Books	
1	John Rau & Wooten, Environmental Impact Assessment, Mc Graw Hill. 4th Edition, McGraw Hill Education, 2012
2	Harry W. Gehm, Jacob I. Bregman, a handbook on pollution Control Acts, Central Pollution Control Board, New Delhi, 2015
3	R.K. Sapra, S. Bhardwaj, the New Environmental Age, Ashish Pub. House, New Delhi. 2011.
YCCE e- library book links [ACCESSIBLE FROM COLLEGE CAMPUS]	
1	http://link.springer.com/openurl?genre=book&isbn=978-1-4613-6193-0
2	https://onlinelibrary.wiley.com/doi/book/10.1002/9780470168042
MOOCs Links and additional reading, learning, video material	
1	https://nptel.ac.in/courses/114106017
2	https://onlinecourses.nptel.ac.in/noc21_hs83/preview

V SEMESTER
22CV516__PE-I : Soil Characterization & Identification

Course Outcomes:		
Upon successful completion of the course the students will be able to 1. Examine properties of the expansive and soft soil 2. Explain characteristics of Liquefiable and filled up Soils 3. Identify Geotechnical properties of organic, peaty Soils, collapsible soils 4. Apply various techniques for stabilization of different soil.		
Unit:1	**Expansive Soils**	**7 Hours**
Geology, engineering properties, swelling, swelling pressure, strength and compressibility, permeability stabilization methods, foundation types. **Contemporary Issues related to Topic**		
Unit:2	**Soft Clays**	**6 Hours**
Geology of soft marine clays, mineralogy, physical properties, shear strength and compressibility, foundation types. **Contemporary Issues related to Topic**		
Unit:3	**Liquefiable Soils**	**7 Hours**
Identification, Factors affecting Liquefaction, Methods for improving resistance of soils to Liquefaction. **Contemporary Issues related to Topic**		
Unit:4	**Filled up Soils**	**6 Hours**
Characterization, Methods for Strengthening Filled up material for supporting structures, Foundation practices in Filled up areas **Contemporary Issues related to Topic**		
Unit:5	**Collapsible soils**	**7 Hours**
Organic and Peaty Soils, Collapsible soils Geotechnical properties, foundation types. **Contemporary Issues related to Topic**		
Unit :6	**Methods of stabilization**	**6 Hours**
Advanced methods of stabilization admixtures, fly ash, waste materials and Geosynthetics **Contemporary Issues related to Topic**		
	Total Lecture	**39 Hours**

Text Books	
1	Soil 1. Ground Improvement Techniques by P. Purushothama Raj, Lakshmi Publications Soil Mechanics & Foundation Engineering, 2009, Arora K.R., Standard Publisher Distributors.
Reference Books	
1	Tropical soils in engineering practice by S. A. Ola, Balkema publications, Holland Principles of Foundation Engineering: Das B.M., PWS publishing co., (1999)
2	Soil stabilization principles and practice by Ingles, O. G. and Metcalf, J. B., Butterworth,1972.
3	Soil Mechanics & Foundations, 2009, Punmia B. C., Laxmi publication.
YCCE e- library book links [ACCESSIBLE FROM COLLEGE CAMPUS]	
1	http://103.152.199.179/YCCE/Suported%20file/Supprted%20file/e-copies%20of%20books/Civil%20Engineering/
2	https://drive.google.com/uc?id=152rovJSnSMcqsxwc5TbrPOShWrryn-4r&export=download
MOOCs Links and additional reading, learning, video material	
1	https://www.youtube.com/watch?v=afirGWlleSM&list=PL3MO67NH2XxJytJh5pAKKSIm5k4MWGicO
2	https://www.youtube.com/watch?v=mORZLCH-YA0
3	https://www.youtube.com/watch?v=m1a-7HsF1A0&t=1037s

V SEMESTER
22CV517__PE-I : Geographical Information Systems

Course Outcomes :

Upon successful completion of the course the students will be able to

1. Explain basic concepts, components and terminologies related to GIS.
2. Differentiate various types of data and its measurement techniques.
3. Explain various data models, coordinate systems, map projections, types of surfaces and operations in GIS.
4. Examine the application GIS in civil engineering problems.

Unit:1	Introduction of GIS	7 Hours

A Brief History of GIS - Geographical concepts and terminology - Essential components of GIS -utility of GIS- Hardware, Software, Data, People, Methods – Proprietary and open-source Software Various GIS packages.

Contemporary Issues related to Topic

Unit:2	GIS Data	7 Hours

Spatial Data: Points, Lines, Polygons/Area and Surface - Non-Spatial Data - Scales/Levels of Measurement. Data Base: Data sources, Data Base Structure models.

Contemporary Issues related to Topic

Unit:3	Data Models	7 Hours

Data acquisition: Vector Data Models, Raster data model, Data Compression, arc-node data structure - Raster to vector conversion - Topology and spatial relationships - Data storage verification and editing.

Contemporary Issues related to Topic

Unit:4	Coordinate systems, projections, and transformations	6 Hours

Coordinate systems, Datums- Map projections - Coordinate transformation, Georeferencing, Digitization- Methods of digitization, Common errors in digitization.

Contemporary Issues related to Topic

Unit:5	Digital elevation models	7 Hours

Discrete and continuous surfaces- Digital elevation models, sources of DEM, TIN structure, Extraction of topographic parameters: slope, aspect, delineation of watershed and drainage network - DEM applications.

Contemporary Issues related to Topic

Unit :6	Operations in GIS	7 Hours

Operations in GIS - Overlay, Buffers, Spatial analysis, Network analysis, Application of GIS to various natural resources mapping and monitoring and other civil engineering related problems.

Contemporary Issues related to Topic

	Total Lecture	39 Hours

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Text Books	
1	Lo C.P. and Yeung A.K.W, Concepts and Techniques of Geographic Information Systems, Prentice-Hall, Inc., NJ, 2002.
2	An Introduction to Geographical Information Systems (4th Edition) by Ian Heywood, Sarah Cornelius and Steve Carver, 2012
3	Burrough, P.A. and McDonnell, R.A. (1998) Principles of Geographical Information Systems. Oxford University Press, Oxford.
4	Introduction to Geographic Information Systems by Chang Kang-tsung (Karl), 2006
5	Geographic Information Systems: An Introduction by Tor Bernhardsen, 2005
Reference Books	
1	M. Anji Reddy BS Publications Remote Sensing and Geographical Information Systems Third Edition
2	Geographic Information System and Environment Modeling Keith C. Clerk, Bradely O Parks, Michel P Crane Pritince Hall of India 2002.
YCCE e- library book links [ACCESSIBLE FROM COLLEGE CAMPUS]	
1	http://link.springer.com/openurl?genre=book&isbn=978-1-4613-6193-0
2	https://onlinelibrary.wiley.com/doi/book/10.1002/9780470168042
MOOCs Links and additional reading, learning, video material	
1	https://nptel.ac.in/courses/105102015
2	https://nptel.ac.in/courses/105107206
3	https://nptel.ac.in/courses/105107155

V SEMESTER
22CV531__OE-I : Building Services Engineering

Course Outcomes :		
Upon successful completion of the course the students will be able to 1. Associate relevance of ventilation, acoustics & to understand the methodologies. 2. Explain special installations in buildings such as electrical, air conditioning, heating 3. Relate specifications & usage of mechanical installations like lifts, security systems etc. 4. Articulate causes of fires in buildings & their preventive and protective strategies.		
Unit:1	**Lighting and Ventilation**	**7 Hours**
Day lighting, Fenestration, Daylight Factor, Functions of ventilation, Stack effect, wind effect, Air flow through buildings, cross- ventilation. **Contemporary Issues related to Topic**		
Unit:2	**Acoustics, Sound Insulation and Noise Control**	**6 Hours**
Basic terminology and definitions, Physics of sound. Behaviour of sound in an enclosed space. Requisites for acoustic environment, Noise and its control. **Contemporary Issues related to Topic**		
Unit:3	**Electrical Installations**	**7 Hours**
Different types of wiring need of Earthing, comparison between fuse and MCB, substation, types of lightening fixtures, Building protection against lightening. **Contemporary Issues related to Topic:** arcing and overheating issues due to Loose connections		
Unit:4	**Air Conditioning**	**6 Hours**
Requirement of air conditioning, air conditioning system, Pressure-Enthalpy (heat) diagram of vapour compression cycle, refrigeration effect, Thermodynamics of human body. Psychometric chart. **Contemporary Issues related to Topic**		
Unit:5	**Mechanical Equipment & Installation**	**7 Hours**
Installation of lifts and escalators, Hot Water Provision (Solar and Electrical), Special features required for physically handicapped and elderly, Conveyors, Vibrators, Concrete mixers. **Contemporary Issues related to Topic**		
Unit :6	**Fire protection**	**6 Hours**
Causes of fire in building, Fire classification, Portable extinguishers, fire escapes, Fire detectors and alarm system. **Contemporary Issues related to Topic**		
	Total Lecture	**39 Hours**

Text Books	
1	Building services, B.S. Patil, Orient Longman.
2	Building Services Engineering, Fred Hall, Roger Greeno, Butterworth-Heinemann, 2007.
3	Building Services Engineering, David V. Chadderton, Taylor & Francis Group, 2007.
Reference Books	
1	E.R. Ambrose, "Heat Pumps and Electric Heating", John and Wiley and Sons, Inc., New York, 1968.
2	Handbook for Building Engineers in Metric systems, NBC, New Delhi, 1968.
3	R.G. Hopkinson and J.D. Kay, "The Lighting of buildings", Faber and Faber, London, 1969.
4	William H. Severns and Julian R. Fellows, "Air-conditioning and Refrigeration", John Wiley and Sons, London, 1988.
5	A.F.C. Sherratt, "Air-conditioning and Energy Conservation", the Architectural Press, London, 1980.
YCCE e- library book links [ACCESSIBLE FROM COLLEGE CAMPUS]	
1	https://link.springer.com/book/10.1007/978-3-030-64781-0
2	https://onlinelibrary.wiley.com/doi/10.1002/9781118511022.ch0
MOOCs Links and additional reading, learning, video material	
1	https://nptel.ac.in/courses/105102176
2	https://www.youtube.com/watch?v=MmW2407MSlQ
3	https://www.youtube.com/watch?v=9u5m-EK55tI

V SEMESTER
22CV532__OE-I : Construction Techniques

Course Outcomes :
Upon successful completion of the course the students will be able to
1. Explain various constituents of Cement & Concrete
2. Select, maintain and operate hand, power tools, equipment used at building construction sites.
3. Adapt to work with interdisciplinary groups at sites, Practice safety measures, rules, regulation at site.
4. Apply new techniques & soft computing tools to solve problems in construction operations.

Unit:1	**INTRODUCTION TO CEMENT AND CONCRETE**	**7 Hours**
Introduction to Cement and Concrete: Introduction to various types of cement, mortar, Ferro cement, Ready mix concrete, Eco-friendly construction.		
Unit:2	**CONSTRUCTION EQUIPMENT**	**7 Hours**
Introduction to Various construction Equipment with its Advantages, Disadvantages and its Uses.		
Unit:3	**TYPE OF STRUCTURE**	**7 Hours**
Load bearing, Frame & Composite. Sub Structure Construction: - Foundation: Necessity and types of foundations, Footings and its Types.		
Unit:4	**SUPER STRUCTURE CONSTRUCTION**	**6 Hours**
Introduction to Stone Masonary and Brick Masonary, pointing and plastering, roofs, Partitions, arches, lintels, stairs etc.		
Unit:5	**New Construction Techniques & Building Services**	**6 Hours**
Fibers and its types, Pre - Engineered Building and its Application & Advantages. Understanding building services- MEP services, for mechanical, electrical, and plumbing. Understanding HVAC Systems, Fire fighting Systems, Fire Alarm Systems, and Plumbing Systems.		
Unit :6	**Hazardous, their solutions & Safety in Construction Operations**	**6 Hours**
Safety in Construction Operations: Introduction to various types of Hazards and their solutions using soft computing techniques, Safety, measurement on construction site.		
	Total Lecture	**39 Hours**

Text Books	
1	M.S. Shetty, " Concrete Technology": S Chand & Co., 6th edition, S. Chand & Company, Limited, 2008
2	Rangwala, Building Construction, 32nd Edition, Charotar Publishing House Pvt. Ltd.2014.
3	Peurifoy, R.L., Ledbetter, W.B. and Schexnayder, C., "Construction Planning, Equipment and Methods", 5th Edition, McGraw Hill, Singapore, 1995
4	Arora S.P. and Bindra S.P., "Building Construction, Planning Techniques and Method of Construction", Dhanpat Rai and Sons, 1997
Reference Books	
1	Building Services Engineering by David V Chadderton.
2	Construction Planning, Equipment and methods – Peurifoy-Tata McGraw Hill Publication.
3	Sushil Kumar, Building Construction, 19th Edition, Standard Publisher Distributors 2001, New Delhi, 2001
4	SP 70 (2001): Handbook on Construction Safety Practices
5	Sharma S.C. "Construction Equipment and Management", Khanna Publishers New Delhi, 2002.
6	Deodhar, S.V. "Construction Equipment and Job Planning", Khanna Publishers, New Delhi, 2012.
7	Mahesh Varma, "Construction Equipment and its Planning and Application", Metropolitan Book Company, New Delhi, 1983.
8	Handbook on Functional Requirement of Buildings.
9	Building Services Environmental & Electro – Mechanical Services, by S M Patil, Jain Book Depot
YCCE e- library book links [ACCESSIBLE FROM COLLEGE CAMPUS]	
1	http://link.springer.com/openurl?genre=book&isbn=978-1-4613-6193-0
2	https://onlinelibrary.wiley.com/doi/book/10.1002/9780470168042
MOOCs Links and additional reading, learning, video material	
1	https://archive.nptel.ac.in/courses/105/102/105102206/
2	https://archive.nptel.ac.in/courses/105/103/105103206/

V SEMESTER

22CV533__OE-I : Introduction to Environmental Management

Course Outcomes :		
Upon successful completion of the course, the students will be able to 1. Explain the importance of environmental management tools. 2. Illustrate the procedures of impact assessment studies in environmental management 3. Explain environmental legislations and policies for environmental resources. 4. Explain the need for resource management and its challenges for sustainable development		
Unit:1	**Sustainable Development**	**7 Hours**
Introduction to Environmental Management: Quality of life, Objectives and components of Environmental Management, Environmental Management in Socio-economic context. Development and Environmental for Sustainable Development. **Contemporary Issues related to Topic**		
Unit:2	**Environmental Impact Assessment**	**7 Hours**
Introduction to Environmental Impact Assessment: Role and Status of EIA in India EIA Procedures, Environmental Impact Statement, Methodologies of EIA. **Contemporary Issues related to Topic**		
Unit:3	**Environmental Clearance and Management Plan**	**7 Hours**
MoEF questionnaire for environmental clearance, critical environmental issues and formulation of strategies of EMP, environmental management plan, development of action plans for critical environmental education programmers. ISO 14001 **Contemporary Issues related to Topic**		
Unit:4	**Environmental Legislation**	**6 Hours**
Environmental Laws and legislation –various enactment and their provisions, Role of State & Central boards of pollution control, Cleaner Technology of production **Contemporary Issues related to Topic**		
Unit:5	**Environmental Audit**	**7 Hours**
Environmental Audit- Concept of EA, procedural aspects of conducting environmental audit, EMS. Introduction to life cycle assessment **Contemporary Issues related to Topic**		
Unit :6	**Resources Management**	**7 Hours**
Depletion of resources – causes & effects, resource utilization, optimal use of resources. **Contemporary Issues related to Topic**		
	Total Lecture	**39 Hours**

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Text Books	
1	Anand Bal, An Introduction to Environmental Management, Himalaya Publishing House., 2009
Reference Books	
1	John Rau & Wooten, Environmental Impact Assessment, Mc Graw Hill. 4th Edition, McGraw Hill Education, 2012
2	Harry W. Gehm, Jacob I. Bregman, a handbook on pollution Control Acts, Central Pollution Control Board, New Delhi, 2015
3	R.K. Sapra, S. Bhardwaj, the New Environmental Age, Ashish Pub. House, New Delhi.2011.
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2	https://onlinelibrary.wiley.com/doi/book/10.1002/9780470168042
MOOCs Links and additional reading, learning, video material	
1	https://nptel.ac.in/courses/114106017
2	https://onlinecourses.nptel.ac.in/noc21_hs83/preview

V SEMESTER

22CV534__OE-I : Basics of Transportation Engineering

Course Outcomes:		
Upon successful completion of the course the students will be able to 1. Explain importance of various modes of transportation. 2. Compare various characteristics of individual transportation modes. 3. Distinguish appropriate regulations as per various organizations and government bodies for the transportation sector in India. 4. Discus recent development in the transportation sector.		
Unit:1	**Introduction to Transportation Engineering**	**7 Hours**
Importance of Transportation in Nation Development, Different modes of Transportation, Introduction to Road Transportation. **Contemporary Issues related to Topic**		
Unit:2	**Traffic Engineering**	**7 Hours**
Road users, regulations, signs & signals. **Contemporary Issues related to Topic**		
Unit:3	**Organizations and Government Bodies**	**7 Hours**
Introduction to various organizations and government bodies for transportation sector in India. **Contemporary Issues related to Topic**		
Unit:4	**Railway Transportation**	**6 Hours**
Introduction to Railway transportation and its development. **Contemporary Issues related to Topic**		
Unit:5	**Air Transportation**	**7 Hours**
Introduction to Air transportation and its development. **Contemporary Issues related to Topic**		
Unit :6	**Water Transportation**	**7 Hours**
Introduction to Water transportation and its development. **Contemporary Issues related to Topic**		
	Total Lecture	**39 Hours**

Text Books	
1	Khanna & Justo, Highway engineering, Nem Chand & Bros.
2	K.L. Bhanot, Highway Engineering, S. Chand &Company (P) Ltd. New Delhi
3	Railway Engineering, Saxena, Dhanpat Rai Publication.
4	Airport Planning & Design, Goyal & Praveen Kumar, Galgotia Publication
5	Rangwala, Railway Engineering, Charotar Publishing House, 1995.
6	Rangwala, Airport Engineering, Charotar Publishing House, 1996.
7	Srinivasan R. Harbour, "Dock and Tunnel Engineering", 26th Edition 2013.
Reference Books	
1	Indian Road Congress, IRC handbooks ,International Code Council International Code Council
2	Textbook on Transportation Engineering, S. P. CHANDOLA, 200, S. Chand Publishers, New Delhi
3	Planning and Design of Airports, Robert Horonjeff, Francis Mckelvey, William Sproule, Seth Young, Fifth Edition 2010, McGraw Hill Professionals
YCCE e- library book links [ACCESSIBLE FROM COLLEGE CAMPUS]	
1	http://103.152.199.179/YCCE/Suported%20file/Supprted%20file/e-copies%20of%20books/Civil%20Engineering/
2	http://103.152.199.179/YCCE/Suported%20file/Supprted%20file/e-copies%20of%20books/Civil%20Engineering/17.%20Highway_Engineering_Khanna_and_Justo.pdf
MOOCs Links and additional reading, learning, video material	
1	https://nptel.ac.in/courses/105105107
2	https://nptel.ac.in/courses/105105216
3	https://nptel.ac.in/courses/105107123
4	https://archive.nptel.ac.in/courses/105/107/105107123/
5	https://archive.nptel.ac.in/courses/105/103/105103204/
6	https://archive.nptel.ac.in/courses/105/105/105105215/

V SEMESTER
22CV535_OE-I : Basics of Water Resource Engineering

Course Outcomes:		
Upon successful completion of the course the students will be able to 1. Explain the basic concept of hydrology and various processes. 2. Compute various components of the hydrological processes. 3. Calculate geo-hydrological parameters. 4. Illustrate various methods of groundwater recharge.		
Unit:1	**Introduction to Hydrology and Precipitation**	**7 Hours**
Introduction: Engineering Hydrology, Hydrological Cycle, Hydrological Equation, Importance of Temperature, Wind and Humidity in Hydrological Studies, Latent Heat, Vapour Pressure, Bulb Pressure, circulation cell, Residence time. **Precipitation:** Definition, Types and Forms of Precipitation, Factors Affecting Precipitation, Measurement of Precipitation by using Rain-gauges, Optimum Number of Rain-gauge Stations and consistency of rainfall data. **Contemporary Issues related to Topic**		
Unit:2	**Infiltration and Evaporation**	**6 Hours**
Infiltration: Factors Affecting Infiltration, Horton's equation, Infiltration Indices and Numerical. **Evaporation:** Factors Affecting Evaporation, Estimation of Evaporation and Evaporation Control. Transpiration and Evapo-transpiration and water balance equation with respect to lake hydrology, catchment characteristics. **Contemporary Issues related to Topic**		
Unit:3	**Runoff**	**6 Hours**
Runoff: Runoff, Sources of Runoff, Components of Runoff, Classification of Streams, inphalmal and emphalmal stresses, Factors affecting runoff, Rainfall Runoff Relationships, Numerical on runoff estimation. Introduction to Interception Storage and Depression Storage. **Contemporary Issues related to Topic**		
Unit:4	**Hydrograph**	**6 Hours**
Hydrograph : Components of hydrograph, types of basin, factors affecting hydrograph, S-curve hydrograph, Synthetic hydrograph, mass curve, Derived Rainfall Hydrograph, Unit Hydrograph, Mass curve, Numericals on Hydrograph. **Contemporary Issues related to Topic**		
Unit:5	**Introduction to Geo-hydrology**	**7 Hours**
Introduction, Occurrence and Distribution of Groundwater, Aquiclude, Aquitard, Aquifers, Types and Properties of Aquifer, Specific Yield, Specific Retention, Porosity, Permeability, Water Table, Darcy's law and Introduction to Hydraulics of Wells. **Contemporary Issues related to Topic**		
Unit :6	**Ground Water Recharge**	**7 Hours**
Introduction, Selection of Recharge Sites, Recharging Methods, Spreading Method, Induced Recharge Method, Recharge Well Method, Sub-surface Dams, Waste Water Recharge and Recharge through Rain Water Harvesting. **Contemporary Issues related to Topic**		
	Total Lecture	**39 Hours**

			July 2022	1.00	Applicable for AY 2022-23 Onwards
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Text Books	
1	Ojha, C.S.P., Berndtsson, R., and Bhunya, P., Engineering Hydrology, Oxford University Press, 2008
2	Raghunath H.M., Hydrology, New Age International Publishers, 1985.
3	Reddy R., Hydrology, Tata McGraw-Hill New Delhi, 2012.
4	VenTe Chow, David, Larry, Applied Hydrology, Mac Graw Hill Publications,1988.
5	Dr. Jaya Rami Reddy, Hydrology, Laxmi Publications. 2008.
6	K. C. Patra, Hydrology and Water Resources Engineering, 2nd edition, 2008
Reference Books	
1	Todd, D.K., Ground Water Hydrology**,** John Wiley & Sons**,** 2005.
2	Subramnaya, K., Engineering Hydrology**,**Tata McGraw-Hill Publishing Company Limited, 2017.
3	Sharma R.K., Sharma T.K., Hydrology & Water Resources Engineering, DhanpatRai Publications, 2002.
4	Linsley, R.K., Kohler, M.A. and Paulhus**,**Hydrology for Engineers**,** Tata McGraw-Hill Publishing Company Limited,1975.
YCCE e- library book links [ACCESSIBLE FROM COLLEGE CAMPUS]	
1	http://link.springer.com/openurl?genre=book&isbn=978-3-540-89464-3
2	http://link.springer.com/openurl?genre=book&isbn=978-3-662-22016-0
3	http://link.springer.com/openurl?genre=book&isbn=978-1-62703-594-1
4	http://link.springer.com/openurl?genre=book&isbn=978-1-4612-9177-0
5	http://link.springer.com/openurl?genre=book&isbn=978-3-540-70804-9
6	http://103.152.199.179/YCCE/Suported%20file/Supprted%20file/e-copies%20of%20books/Civil%20Engineering/
MOOCs Links and additional reading, learning, video material	
1	NPTEL : Civil Engineering - Water Resources Engineering
2	NPTEL : Civil Engineering - Water Resources Systems Planning and Management
3	NPTEL : Civil Engineering - NOC:Rural Water Resources Management
4	NPTEL : Civil Engineering - Water Resources Systems : Modeling Techniques and Analysis

V SEMESTER
22CV536__OE-I : Elements of Water Power Engineering

Course Outcomes:

Upon successful completion of the course the students will be able to

1. Examine fundamentals of hydropower and hydropower potential.
2. Explain components of intake structure and surge tank.
3. Determine the flow parameters of turbines.
4. Explain the pump storage plant and its economics.

Unit:1	**Sources of energy**	**7 Hours**

Introduction: Sources of energy, types of power station, choice of type of generation, components of water power project, types and general layouts of various hydropower schemes, General arrangements of a power station, powerhouse, sub-structure and super structure, underground power station–necessity, principal, types, development, need of hydropower.

Contemporary Issues related to Topic

Unit:2	**Power potential**	**6 Hours**

Power potential, storage and structures related to hydro-power, Nature of demand: Load curve, load duration curves, load factor, plant factor, plant use factor, firm power secondary power.

Contemporary Issues related to Topic

Unit:3	**Intake structures**	**6 Hours**

Intake structures: Types, level of intake, hydraulics of intake structures, trash rack, transition, types of gates. Conduits: Types, economic section, power canals, pen-stock types and diameter pipe supports, anchor blocks, tunnels classification, location and tunnel linings.

Contemporary Issues related to Topic

Unit:4	**Surge Tank**	**6 Hours**

Simple surge tank, Functions and behavior of the surge tanks, location, types of surge tanks, fore-bay.

Contemporary Issues related to Topic

Unit:5	**Turbines**	**7 Hours**

Turbines: Classification of turbines, characteristics of different types, choice of type of turbine, turbine setting and cavitation, Tail race: Functions, types, channel and tunnel, draft tubes-function and principal types.

Contemporary Issues related to Topic

Unit :6	**Pumped storage plants**	**7 Hours**

Pumped storage plants, purpose and general layout of pumped storage schemes, main types, typical arrangements of the upper reservoirs, economics of pumped storage plants.

Contemporary Issues related to Topic

	Total Lecture	**39 Hours**

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Chairperson	Dean (Acad. Matters)	Dean OBE	Date of Release	Version	

Text Books	
1	Dandekar M. M. & Sharma K. N, Water Power Engineering, Vikas Publishing House Pvt. Ltd., New Delhi.
2	Sharma R.K. & Sharma T.K., Water Power Engineering, S. Chand Publication.
3	S. K Garg, Irrigation Engineering & Hydraulic Structure (Volume-I & II), Khanna Publications.
4	Arora K. R., Irrigation, Water Power & Water Resources Engineering, Standard Publishers Distributors.
Reference Books	
1	A. K. Raja, A. P. Srivastava, M. Dwivedi, Power Plant Engineering, New age International publishers
YCCE e- library book links [ACCESSIBLE FROM COLLEGE CAMPUS]	
1	Irrigation and Water Power Engineering By Dr. B. C. Punmia Dr. Pande Brij Basi Lal Ashok Kumar Jain Arun Kumar Jain | Meg Nas - Academia.edu
2	https://ia802309.us.archive.org/30/items/hydro-dandekar-pdf/hydro dandekar pdf.pdf
3	103.152.199.179/YCCE/Suported file/Supprted file/e-copies of books/Civil Engineering/9. Irriagtion Engineering and Hydraulic Structures by Santosh Kuma- By EasyEngineering.net.pdf
MOOCs Links and additional reading, learning, video material	
1	Turbine - Wikipedia

V SEMESTER

22CV551__OE-II : Elements of Earthquake Engineering

Course Outcomes :
Upon successful completion of the course the students will be able to
1. Examine the earthquake parameters and ground motion characteristics.
2. Explain the provisions of IS codes used for the design of structures.
3. Prepare the methods for retrofitting earthquake-damaged structures.
4. Illustrate the damages caused due to past earthquakes with their effective management.

Unit:1	Basics of Seismology	7 Hours
Geology of earth, earthquake and their types, causes of an earthquake, plate tectonics, the configuration of tectonic plates in a globe, elastic rebound theory, Faults and types of faults, Basic terminologies, measurement of earthquake – magnitudes & intensity scales. **Contemporary Issues related to Topic**		
Unit:2	**Interpretation of Earthquake Data**	**6 Hours**
Seismic waves, strong ground motion, recording of earthquakes, analysis and interpretation of earthquake data, ground motion parameters, Determination of magnitude, epicentral distance, focal depth, etc. Contemporary Issues related to Topic: Generation of Response Spectra in Microsoft Excel		
Unit:3	**Introduction to Design Strategies as per Indian Standards**	**6 Hours**
Fundamentals of earthquake vibrations of structures, Concept of static and earthquake-resistant design, Introduction to design philosophies and strategies, Introduction to various loading and design codes such as IS 456:2000, IS:1893:2016, etc. **Contemporary Issues related to Topic**		
Unit:4	**Behavior of Structures During Earthquake**	**7 Hours**
Seismic coefficient method, Importance of Architectural Features, irregularities in buildings, consequences of irregularities, failure modes of structural elements, Case study of RC framed buildings. **Contemporary Issues related to Topic**		
Unit:5	**Introduction to Earthquake-Resistant Features and Retrofitting Techniques of Structures**	**7 Hours**
Introduction of load-bearing and framed structures, non-engineered structures, earthquake resistant features of load-bearing and masonry structures, strengthening, rehabilitation, and retrofitting of earthquake-damaged structures.		

Contemporary Issues related to Topic		
Unit :6	**Seismicity of the World and Various Case Studies**	**6 Hours**
Seismicity of world and India, Case studies on the behavior of structures during past earthquakes - causes and sources of earthquake damage, remedial measures Earthquake disaster management, mitigation, and social aspects of earthquakes. **Contemporary Issues related to Topic**		
	Total Lecture	**39 Hours**

Text Books	
1	Agrawal &Shrikhande, Design of Earthquake Resistant Structures, 3 rd 2006, Prentice – Hall of India Pvt. Ltd
2	Paulay, T. & Prestiley M.J.N., Seismic design of R C & Masonry Buildings, 2nd 1999, John Willey & Sons
3	Asadour H. Hadjian, Basic Elements of Earthquake Engineering, 2015, Wiley
Reference Books	
1	C.V.R. Murty, Earthquake Tips, 2005, NICEE, IITK
2	Robin K. McGuire, Seismic Hazard and Risk Analysis, 2004, Earthquake Engineering Research Institute; First edition.
3	Roberto Villaverde, Fundamental Concepts of Earthquake Engineering, 2009, CRC Press
4	Guidelines for Earthquake Resistant Non- Engineered Construction, Anand S.Arya Teddy BOEN ,Yuji ISHIYAMA ,UNESCO, Published in 2014
YCCE e - library book links [ACCESSIBLE FROM COLLEGE CAMPUS]	
1	http://link.springer.com/openurl?genre=book&isbn=978-3-540-93817-0
2	http://103.152.199.179/YCCE/Suported%20file/Supprted%20file/e copies%20of%20books/Civil%20Engineering/75.%20EARTHQUAKE%20RESISTANT%20DESIGN%20_%20Pankaj%20Agrawal.pdf
3	http://103.152.199.179/YCCE/Suported%20file/Supprted%20file/e-copies%20of%20books/Civil%20Engineering/76.%20FUNDAMENTALS%20OF%20EARTHQUAKE%20ENGINEERING_ELANSHAI_&_SARNO.pdf
4	http://103.152.199.179/YCCE/Suported%20file/Supprted%20file/e-copies%20of%20books/Civil%20Engineering/77.%20INTRODUCTION_TO_SEISMOLOGY_PETER_M_SHEARER.pdf
5	http://103.152.199.179/YCCE/Suported%20file/Supprted%20file/e-copies%20of%20books/Civil%20Engineering/80.%20Basics%20of%20structural%20dynamics%20and%20seismic%20design.pdf
MOOCs Links and additional reading, learning, video material	
1	https://www.traditional-is-modern.net/LIBRARY/GUIDELINES/1986IAEE-Non-EngBldgs/1986GuidelinesNon-Eng(ALL).pdf
2	https://www.nicee.org/EQTips.php
3	https://archive.nptel.ac.in/courses/105/104/105104200/
4	https://archive.nptel.ac.in/courses/105/101/105101004/
5	https://archive.nptel.ac.in/courses/105/102/105102016/
6	https://archive.nptel.ac.in/courses/105/101/105101209/

V SEMESTER

22CV552__OE-II : Introduction to Finite Element Method

Course Outcomes :
Upon successful completion of the course the students will be able to 1. Explain the concepts of FEM. 2. Apply concepts of FEM for the derivation of elemental equation. 3. Analyze engineering problems using FEM. 4. Explain Modelling, storage and solution techniques.

Unit:1	**Introduction**	**7 Hours**
Development, Historical background, Applications, Advantages and Disadvantages of FEM, General steps of FEM, direct equilibrium approach, Variational approach, Rayleigh Ritz method, application to simple problems. **Contemporary Issues related to Topic**		
Unit:2	**Shape functions**	**6 Hours**
Introduction, requirement of Ideal displacement functions, Derivation of shape functions using Cartesian Coordinates, Lagrange and Serendipity elements. **Contemporary Issues related to Topic**		
Unit:3	**Application of FEM to 1D Problems**	**6 Hours**
Derivation of element property matrix and influence vector, application, Application to bar, truss, steady state heat conduction, steady state flow through porous medium problems. **Contemporary Issues related to Topic**		
Unit:4	**Application of FEM to 2D problems**	**7 Hours**
Equilibrium equations, Triangular and Rectangular element formulation using Cartesian Coordinates, Application to two-dimensional stress analysis. **Contemporary Issues related to Topic**		
Unit:5	**Isoparametric Elements**	**7 Hours**
Natural coordinates, Isoparametric elements, Application to 1D and 2D Problems. **Contemporary Issues related to Topic**		
Unit:6	**Storage Techniques**	**6 Hours**
Numerical integration, Modeling, storage and solution techniques.		
	Total Lecture	**39 Hours**

Text Books	
1	Chandrapatla T.R., Belegundu A. D. Introduction to Finite Elements in Engineering, Prentice Hall India, 1991
2	Godbole P.N, Introduction to Finite Element Method, I. K. International Publishing House Pvt. Ltd., New Delhi, 2013
3	Desai Y.M., Eldho T.I. and Shah A. H., Finite Element Method s and Application to Engineering, Pearson, 2011

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Reference Books	
1	Krishnamoorthy C S, "Finite Element Analysis – Theory and Programming", Tata McGraw Hill Publishing Co., New Delhi, 1994.
2	Cook R D, Malkus D S, Plesha M E and Witt R J, "Concepts and Applications of Finite Element Analysis", John Weily & sons inc, New York, Fourth Edition, 2003.
3	Rajasekaran S, "Finite Element Analysis in Engineering Design". S Chand & Co., 2003.
YCCE e- library book links [ACCESSIBLE FROM COLLEGE CAMPUS]	
1	http://link.springer.com/openurl?genre=book&isbn=978-3-211-81202-0
2	http://link.springer.com/openurl?genre=book&isbn=978-1-4020-8732-5
3	http://link.springer.com/openurl?genre=book&isbn=978-3-540-25181-1
4	http://103.152.199.179/YCCE/Suported%20file/Supprted%20file/e-copies%20of%20books/Civil%20Engineering/13.%20367869499-Finite-Element-Method-With-Applications-in-Engineering.pdf
MOOCs Links and additional reading, learning, video material	
1	https://nptel.ac.in/courses/105107209

V SEMESTER

22CV553__OE-II : Air Pollution and Solid Waste Management

Course Outcomes :

Upon successful completion of the course the students will be able to

1. Classify the type, sources & effect of air pollutants.
2. Explain the parameters affecting air pollution and various methods of measurement.
3. Illustrate various air pollution control equipment & pollution caused due to automobile exhaust and basics of noise pollution.
4. Interpret the concepts of solid waste management, treatment and disposal methods.

Unit:1	**Introduction to air pollution**	**6 Hours**

Introduction, Air pollution episodes, Atmosphere and its zones, classification and sources of air pollutants, effects of air pollutants on man, plants animal & materials.

Contemporary Issues related to Topic

Unit:2	**Meteorological Aspects**	**7 Hours**

Atmospheric stability, plume behaviour**,** Ambient air sampling and stack sampling, collection of particulates and gaseous pollutants.

Contemporary Issues related to Topic

Unit:3	**Air pollution control methods and equipment**	**6 Hours**

Principle of control methods for particulates and gaseous pollutants, gravity settlers, electrostatic precipitators, bag filters cyclones, wet scrubbers, automobile exhaust: Pollution due to diesel and petrol engines, exhaust treatment and abatement, noise Pollution: Sources, ill effects, control measures.

Contemporary Issues related to Topic

Unit:4	**Introduction to solid waste management**	**7 Hours**

Introduction, Sources, quantification and characterization, classification and components, sampling and analysis Method of collection.

Contemporary Issues related to Topic- Composition of waste.

Unit:5	**Equipment for solid waste**	**6 Hours**

Equipment used for collection and transportation, transfer stations, solid waste processing and management.

Contemporary Issues related to Topic

Unit :6	**Treatment for solid waste**	**7 Hours**

Treatment and disposal methods: composting, sanitary landfills, Incineration – concept, components and applications, leachate management.

Contemporary Issues related to Topic

Total Lecture	**39 Hours**

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Text Books	
1	M.N. Rao & H.V.N. Rao, 1988, Air Pollution, Tata McGraw Hill Publishing Co. Ltd.
2	C.S. RAO, 2007, Environmental Pollution Control Engineering, New Age International, Wiley Estern Ltd. New Delhi.
3	Stern A. C., 1973, Air pollution, Academic Press.
4	A.D. Bhide & Sunderesan B.B., 1983, Solid Waste Management in Developing countries, INSDOC, New Delhi.
5	Tohobanoglous, 1993, Intgrated Solid Waste Management Engineering Principle and Management Issues, McGraw-Hill publication Ltd.
6	K. V. S. G. Murlikrishna, 1995, Air Pollution, Kaushal & Company.
Reference Books	
1	P. Aarne Vesilind, William Worrell & Debra Reinhart, 2002, Solid Waste Engineering, Cengage Learning India pvt. Ltd.
2	Dr. Y Anjaneyulu, 2002, Air Pollution and Control Technologies, Allied Publisher pvt. Ltd. Waste Management: A Reference Handbook. Contributors: Jacqueline Vaughn - Author. Publisher: ABC-Clio.
YCCE e- library book links [ACCESSIBLE FROM COLLEGE CAMPUS]	
1	https://link.springer.com/search?query=air+pollution
2	https://link.springer.com/search?query=solid+waste+mangement
MOOCs Links and additional reading, learning, video material	
1	https://archive.nptel.ac.in/courses/105/102/105102089/
2	https://archive.nptel.ac.in/courses/105/107/105107213/

V SEMESTER

22CV554__OE-II : Environmental & Social Impact Assessment

Course Outcomes :		
Upon successful completion of the course the students will be able to 1. Explain the EIA process, analyse major environmental issues for development projects. 2. Examine model tasks within an EIA cycle. 3. Construct portions of environmental documents through administrative and legal requirements. 4. Illustrate the standards of professional practice about EIA.		
UNIT:1	**Evolution of EIA**	**7 Hours**
Concepts, Nature & Type of impacts, Need of EIA, Participation in EIA, New concepts- Life cycle assessment. **Contemporary Issues related to Topic**		
UNIT:2	**Methods for impact assessment**	**6 Hours**
Screening, Scoping, Base line studies, Check list, Mitigation, Matrices, Interaction of network methodologies. **Contemporary Issues related to Topic**		
UNIT:3	**Assessment of impact for air and noise environment**	**7 Hours**
Basic information of air quality, identification of type and quantity of air pollutant, impact prediction and assessment. **Contemporary Issues related to Topic**		
UNIT:4	**Assessment of impact for water and soil environment**	**6 Hours**
Basic information of water Quality, identification of impact, prediction of impact and assessment, mitigations. **Contemporary Issues related to Topic**		
UNIT:5	**Assessment of impact on cultural and socioeconomic environment**	**7 Hours**
Public participation in EIA, Cumulative environmental effects Monitoring and auditing: after the decision. Contemporary Issues - Cost-benefit Analysis. **Contemporary Issues related to Topic**		
UNIT:6	**EIA notification by Ministry of Environment and Forest (Govt. of India)**	**6 Hours**
Provisions in the EIA notification, Categorization of Industries for seeking environmental clearance from concerned authorities, Environmental management plan post environmental monitoring. Case studies in EIA. **Contemporary Issues related to Topic**		
	Total Lecture	**39 Hours**

Text Books	
01	Anand Bal, An Introduction to Environmental Management, Himalaya Publishing House.
02	Canter L.W. 1977. Environmental Impact Assessment. McGraw Hill, Inc. Printed in the United States of America.
03	Peter Watten (Eds.) – "Environmental Impact Assessment Theory and Practice", Unwin Hyman, London (1988).
Reference Books	
01	John G. Rau and David C Hooten (Ed)., "Environmental Impact Analysis Handbook", McGraw-Hill Book Company, 1990.
02	"Environmental Assessment Source book", Vol. I, II & III. The World Bank, Washington, D.C., 1991.
03	Judith Petts, "Handbook of Environmental Impact Assessment Vol. I & II", Blackwell Science, 1999.
04	Bass, Herson and K. Bogdon, 2001, The NEPA Book: A step-by-step guide on how to comply with the National Environmental Policy Act, Solano Press.
05	Shukla, S.K. and Srivastava, P.R., "Concepts in Environmental Impact Analysis", Common Wealth Publishers, New Delhi, 1992.
YCCE e- library book links [ACCESSIBLE FROM COLLEGE CAMPUS]	
1	https://link.springer.com/book/10.1007/978-94-011-2528-4
2	https://link.springer.com/book/10.1007/978-3-030-80942-3
3	https://link.springer.com/chapter/10.1007/978-94-009-6795-3_21
4	https://link.springer.com/book/10.1007/978-3-030-83152-3
MOOCs Links and additional reading, learning, video material	
1	https://onlinecourses.swayam2.ac.in/nou22_bt06/preview
2	https://onlinecourses.swayam2.ac.in/cec22_hs41/preview
3	https://onlinecourses.swayam2.ac.in/nou22_mg05/preview

V SEMESTER
22CV555__OE-II : Disaster Management

Course Outcomes:

Upon successful completion of the course the students will be able to

1. Distinguish the nature & types of disaster.
2. Report its preparedness, role of different government & social agencies.
3. Predict methods of the extent of risk and cost assessment.
4. Conclude provisions, management of disaster, post disaster condition & its management

Unit:1	**Understanding Natural Disasters**	**8 Hours**

Understanding Natural Disasters: Natural disasters, category of disaster such as hydrological, wind-related, geo-physical, hydro-geological and climatic, causes and impacts, along with illustrations and geographical distribution. Flood, Drought, Cyclone, Earthquakes, Landslides, Avalanches, Volcanic Eruptions, Heat and Cold Waves, Climate Change: Global Warming, Sea Level Rise, Ozone layer Depletion.

Contemporary Issues related to Topic

Unit:2	**Man-Made Disasters**	**5 Hours**

Man-Made Disasters: Nuclear Disasters, Chemical Disasters, Biological Disasters, Building Fire, Coal Fire, Forest Fire, Oil Fire, Air Pollution, Water Pollution, Deforestation, Industrial Pollution, Road Accidents, Rail Accidents, Air Accidents, Sea Accidents, Green House Effect.

Contemporary Issues related to Topic

Unit:3	**Risk & Cost Assessment**	**6 Hours**

Risk & Cost Assessment: Geographical conditions, Population, Living habits, Threats, Extent of damages to the lives, agricultural area, industrial units, Awareness & Safety Program. Relief arrangement & essential components, Shelters, Rescue search tools and equipments, transport facilities. Method of Cost assessment.

Contemporary Issues related to Topic

Unit:4	**Disaster Preparedness**	**7 Hours**

Disaster Preparedness: Information Technology: Role in Disaster Preparedness with Special Reference to Geographical Information System, Use and Application of Emerging Technologies in Disaster Preparedness, Role of Information, Education, Communication.

Contemporary Issues related to Topic

Unit:5	**Disaster Response**	**6 Hours**

Disaster Response: Psychological Response, Trauma and Stress Management. Rumour and Panic Management, Minimum Standards of Relief, Managing Relief, Recovery.

Contemporary Issues related to Topic

Unit :6	Reconstruction and Rehabilitation	7 Hours
Reconstruction and Rehabilitation : Damage Assessment, Management and Development Information Structural, Development of Physical and Economic Infrastructure, Funding Arrangements for Reconstruction, Disaster Resistant House Construction, Role of Housing / Building Authorities, Education and Awareness Role of Information Dissemination, Participative Rehabilitation Process: Some Case Studies Long-term Recovery. **Contemporary Issues related to Topic**		
	Total Lecture	**39 Hours**

Text Books	
1	Satish Modh: Introduction to Disaster Management, Macmillan, 2009
2	Amit Awasthy: Disaster Management: Warning Response and Community Relocation, Global India Publications, 2009
3	Jyoti Purohit :Disaster Management in India: Structure and Challenges, 2013
4	Prakash Singh: Disaster Response in India, www.MilitaryBookshop.Companyuk, 2011
Reference Books	
1	D.B.N. Murthy: Disaster Management: Text and Case Studies, Deep and Deep Publications, 2007
2	National Policy on Disaster Management, NDMA, New Delhi, 2009.
3	A Global Report - Reducing Disaster Risk, A Challenge for Development; UNDP Publication, 2004.
4	Disaster Management Act. (2005), Ministry of Home Affairs, Government of India, New Delhi, 2005.
YCCE e- library book links [ACCESSIBLE FROM COLLEGE CAMPUS]	
1	
MOOCs Links and additional reading, learning, video material	
1	NPTEL
2	(PDF) Disaster Management (researchgate.net)
3	disaster-management-handbook.pdf

V SEMESTER

22CV506__Industrial Training, Seminar & Report

Course Outcomes :
Upon successful completion of the course the students will be able to 1. Make detailed notes and reports. 2. Compute the problems on quants 3. Illustrate the problems on logical, technical and verbal 4. Apply the field knowledge to the practical applications.
Contents :
The students are expected to visit minimum Four different civil engineering structures. The students shall prepare the report based on such visits. The reports should include the technical details on all aspects of the project including plant, material, machinery, HR, Quality Assurance etc. being followed at the site for construction. The evaluation will be based on seminar and the site visit report submitted by the students.

V SEMESTER

Audit Course

MLC2125 : YCAP5

V SEMESTER

Audit Course

MLC125: Design thinking

Nagar Yuwak Shikshan Sanstha's

Yeshwantrao Chavan College of Engineering

(An Autonomous Institution affiliated to Rashtrasant Tukadoji Maharaj Nagpur University)

(Accredited 'A++' Grade by NAAC with a score of 3.25)

Hingna Road, Wanadongri, Nagpur - 441 110

Bachelor of Technology

SoE & Syllabus 2022

6th Semester

(Department of Civil Engineering)

B. Tech in Civil Engineering

Nagar Yuwak Shikshan Sanstha's

Yeshwantrao Chavan College of Engineering

(An Autonomous Institution affiliated to Rashtrasant Tukadoji Maharaj Nagpur University)

SoE No. 22CV-101

B.TECH SCHEME OF EXAMINATION 2022

(Scheme of Examination w.e.f. 2022-23 onward)

(Department of Civil Engineering)

B. Tech in Civil Engineering

SN	Sem	Type	BoS/ Deptt	Sub. Code	Subject	T/P	Contact Hours				Credits	% Weightage			ESE Duration Hours
							L	T	P	Hrs		MSEs*	TA**	ESE	
SIXTH SEMESTER															
1	6	PC	CV	22CV601	Foundation Engineering	**T**	3	0	0	3	**3**	30	20	50	3 Hrs
2	6	PC	CV	22CV602	**Lab:-** Building Information Modeling	**P**	0	0	2	2	**1**		60	40	
3	6	PC	CV	22CV603	Hydraulic Engineering	**T**	3	0	0	3	**3**	30	20	50	3 Hrs
4	6	PC	CV	22CV604	**Lab:-** Hydraulic Engineering	**P**	0	0	2	2	**1**		60	40	
5	6	PE	CV		**Professional Elective-II**	**T**	3	0	0	3	**3**	30	20	50	3 Hrs
6	6	PE	CV		**Professional Elective-III**	**T**	3	0	0	3	**3**	30	20	50	3 Hrs
7	6	OE	CV		**Open Elective-III**	**T**	3	0	0	3	**3**	30	20	50	3 Hrs
8	6	OE	CV		**Open Elective-IV**	**T**	3	0	0	3	**3**	30	20	50	3 Hrs
9	6	PR	CV	22CV605	Project Phase-I	**P**	0	0	4	4	**2**		60	40	
					TOTAL SIXTH SEM		**18**	**0**	**8**	**26**	**22**				
Audit Courses															
1	6	HS		MLC126	**YCAP6 :**	**A**	3	0	0	3	**0**				

Professional Elective - II

1	6	PE-II	CV	22CV611	PE-II : Earthquake Engineering
2	6	PE-II	CV	22CV612	PE-II : Water Transmission and Distribution Systems
3	6	PE-II	CV	22CV613	PE-II : Matrix Analysis of Structures
4	6	PE-II	CV	22CV614	PE-II : Environmental Geotechniques
5	6	PE-II	CV	22CV615	PE-II : Traffic Engineering
6	6	PE-II	CV	22CV616	PE-II : Construction Management And Machinery
7	6	PE-II	CV	22CV617	PE-II : Wastewater Treatment

Professional Elective - III

1	6	PE-III	CV	22CV631	PE-III : Prestressed Concrete
2	6	PE-III	CV	22CV632	PE-III : Advanced RCC
3	6	PE-III	CV	22CV633	PE-III : Numerical Methods and Computational Techniques
4	6	PE-III	CV	22CV634	PE-III : Environmental Impact Assessment
5	6	PE-III	CV	22CV635	PE-III : Energy Conversion and Management
6	6	PE-III	CV	22CV636	PE-III : Geotechnical Investigation and Geotextiles
7	6	PE-III	CV	22CV637	PE-III : Earth Pressure & Earth Retaining Structures
8	6	PE-III	CV	22CV638	PE-III : Urban Transportation Planning

Open Electives - III

1	6	OE-III	CV	22CV651	OE-III : Building Services Engineering
2	6	OE-III	CV	22CV652	OE-III : Construction Techniques
3	6	OE-III	CV	22CV653	OE-III : Introduction to Environmental Management
4	6	OE-III	CV	22CV654	OE-III : Basics of Transportation Engineering
5	6	OE-III	CV	22CV655	OE-III : Basics of Water Resource Engineering
6	6	OE-III	CV	22CV656	OE-III : Elements of Water Power Engineering

Open Electives - IV

1	6	OE-IV	CV	22CV671	OE-IV : Elements of Earthquake Engineering
2	6	OE-IV	CV	22CV672	OE-IV : Introduction to Finite Element Method
3	6	OE-IV	CV	22CV673	OE-IV : Air Pollution and Solid Waste Management
4	6	OE-IV	CV	22CV674	OE-IV : Environmental and Social Impact Assessment
5	6	OE-IV	CV	22CV675	OE-IV : Disaster Management

		June 2022	1.00	Applicable for AY 2022-23 Onwards
Chairperson	Dean (Acad. Matters)	Date of Release	Version	

VI SEMESTER
22CV601__Foundation Engineering

Course Outcomes :

Upon successful completion of the course the students will be able to

1. Explain planning and implementation of a site investigation.
2. Evaluate the bearing capacity for shallow and deep foundation design.
3. Calculate the lateral earth pressure for retaining wall.
4. Describe different techniques for ground improvement and slopes stability analysis

Unit:1	Geotechnical Exploration	7 Hours

Objectives of field exploration, Stages of subsurface exploration, types of boring, Open excavation method, number, Lateral extent, and depth of exploration for different structures, type of soil samples & samplers, bore logs, Geophysical methods.

Contemporary Issues related to Topic

Unit:2	Shallow Foundations	6 Hours

Basic definitions of bearing capacity, types of shear failure, Terzaghi's bearing capacity theory, its validity and limitations, effect of water table on bearing capacity, Standard Penetration Test, Plate load test, Settlement of foundation.

Contemporary Issues related to Topic

Unit:3	Deep Foundation	7 Hours

Classification of piles, Pile capacity by Static formula & Dynamic formula, pile load test, group action of piles, negative skin friction, under reamed piles.

Contemporary Issues related to Topic: Piled raft foundation

Unit:4	Lateral Earth Pressure	6 Hours

Fundamentals of earth pressure at-rest, active & passive pressures, Rankine's theories of earth for cohesionless and cohesive soil, graphical solutions of Rebhan and Culmann for active case.

Contemporary Issues related to Topic

Unit:5	Stability of Slopes	7 Hours

Causes and types of slope failure, stability analysis of infinite slopes and finite slopes including effect of seepage, Swedish slip circle, Friction circle, Taylor's stability numbers & stability charts, methods of improving stability of slopes

Contemporary Issues related to Topic

Unit :6	Ground Improvement	6 Hours

Method of soil stabilization, reinforced earth, geotextile materials-types, function and applications, deep compaction, vibroflotation, sand drain, pre-loading and surcharging.

Contemporary Issues related to Topic

	Total Lecture	39 Hours

			July 2022	1.00	Applicable for AY 2022-23 Onwards
Chairperson	Dean (Acad. Matters)	Dean OBE	Date of Release	Version	

Text Books	
1	Soil Mechanics & Foundation Engineering, 2009, Arora K.R., Standard Publisher Distributors
Reference Books	
1	Soil Mechanics & Foundations, Punmia B. C., Jain A.K., Jain A.K., 16th edition, Laxmi Publications, New Delhi, 2005.
2	Principles and Practices of Soil Mechanics and Foundation Engineering, Murthy V.N.S., CRC Press, 2003.
3	Physical and Geotechnical Properties of Soils, Joseph E. Bowles, 2nd Revised edition (March 1984), McGraw-Hill College
YCCE e- library book links [ACCESSIBLE FROM COLLEGE CAMPUS]	
1	http://103.152.199.179/YCCE/Suported%20file/Supprted%20file/e-copies%20of%20books/Civil%20Engineering/
2	https://drive.google.com/uc?id=152rovJSnSMcqsxwc5TbrPOShWrryn-4r&export=download
MOOCs Links and additional reading, learning, video material	
1	https://www.youtube.com/watch?v=lsYFtwwlHIw&list=PLbRMhDVUMngeiZjKPTPEFl1CByXmYX3Kv
2	https://www.youtube.com/watch?v=H6_J8LuTa-M&list=PLA4019BB0B0CF6518
3	https://www.youtube.com/watch?v=UyWy38Cbvj0&list=PLbRMhDVUMngfknLLHeILh7YbweG-OQC92

VI SEMESTER
22CV602__Lab : Building Information Modelling

Course Outcomes :
Upon successful completion of the course the students will be able to
1. Understand BIM concept and process.
2. Create architectural, structural & MEP models.
3. Extract information from BIM model

S.N.	Experiments based on
1	**Introduction to BIM Process** BIM Processes used by professionals in AEC industry, Different BIM Concepts
2	**Basics of Revit Modelling** Fundamentals of Revit Modelling, Revit Interface, toolbars, navigations, Importing from CAD, Project Templates
3	**Architectural and Structural BIM model creation** Creating 3D modelling tools, creating groups, components, and families for G+1 building model Structural grids and levels, Structural columns. beams, slabs, and bracings for G+1 building model
4	**3D Visualizations** Virtual reality, Real time rendering, Creating Walkthrough,
5	**Introduction to 4D, 5D, 6D, 7D BIM Process** Project WBS planning, Visual validation for construction processes, Real time project monitoring

VI SEMESTER

22CV603__Hydraulic Engineering

Course Outcomes:		
Upon successful completion of the course the students will be able to 1. Calculate various losses, discharges, pressure, in flow through pipe and various flow parameter in open channel 2. Analyze the water distribution network by using Hardy Cross Method and most efficient channel section for conveyance of water 3. Apply Buckingham's Pi theorem to establish relation between various physical quantities. 4. Compute the discharges in channel by using notches and weirs		
Unit:1	**Flow Through Pipes-I**	**7 Hours**
Frictional resistance to flow of fluid, loss of energy in pipe, Darcy-Weis-bach & Hazen William's equation for frictional head loss, Hydro-dynamically smooth and rough surfaces, Hydraulic gradient and energy gradient lines: Pipes in series and parallel, equivalent pipe. **Contemporary Issues related to Topic**		
Unit:2	**Flow Through Pipes-II**	**6 Hours**
Flow Through Pipes: Syphon, Branched pipes, Three reservoir, pipe networks, Hardy – Cross method, Water hammer phenomenon. **Contemporary Issues related to Topic**		
Unit:3	**Dimensional Analysis**	**6 Hours**
Introduction, fundamental quantity, derived quantity, dimensions, dimensional homogeneity, methods of dimensional analysis, repeated variable, Buckingham pi method. **Contemporary Issues related to Topic**		
Unit:4	**Notches and weirs**	**7 Hours**
Definition and types, flow over rectangular notch, triangular notch end contraction, coefficient of discharge and its determination. Error in measurement of head. Velocity of approach and its effects, Cippoletti, Broad crested and submerged weirs. **Contemporary Issues related to Topic**		
Unit:5	**Uniform flow in Open Channel**	**6 Hours**
Types of channel and their geometrical properties, Types of flow in open channel. Chezy's and Manning's equations for computations of normal depth of flow, Hydraulically most efficient rectangular and trapezoidal sections. **Contemporary Issues related to Topic**		
Unit :6	**Critical Flow and Rapidly Varied Flow**	**7 Hours**
Specific energy and specific energy diagram, alternate depths, Computations of critical depth, section factor for critical flow, Conditions of critical flow, Hydraulic jump, Belanger momentum equation. **Contemporary Issues related to Topic**		
	Total Lecture	**39 Hours**

Text Books	
1	Modi P.N., Seth, Hydraulics and Fluid Mechanics Including Hydraulics Machines, S.M., 14th edition, Standard Book House Publishers, New Delhi, 2009
2.	R K Rajput S., A Textbook of Fluid Mechanics and Hydraulic Machines, Chand & Company Ltd Ram Nagar, New Delhi 2009
3.	R K Bansal, A Textbook of Fluid Mechanics and Hydraulic Machines, Laxmi Publications P Ltd New Delhi.
Reference Books	
1	Subramanya K.,Flow in open channels, Tata McGraw Hill Publication, 2009.
2	Asawa, G.L., Fluid Flow in Pipes and Channels, 1st edition, CBS Publishers and Distributers, 2009.
3.	Ranga Raju, Flow through open channels, Tata McGraw Hill Publications, 1998.
4	D S Kumar,S K Katariya & Sons, Fluid Mechanics & Fluid power Engineering, New Delhi
YCCE e- library book links [ACCESSIBLE FROM COLLEGE CAMPUS]	
1	http://103.152.199.179/YCCE/Suported%20file/Supprted%20file/e-copies%20of%20books/Civil%20Engineering/2.%20FLOW_IN_OPEN_CHANNELS_Third_Edition.pdf
2	http://103.152.199.179/YCCE/Suported%20file/Supprted%20file/e-copies%20of%20books/Civil%20Engineering/50.%20FLUID%20MECHANICS%20AND%20HYDRAULIC%20MACHINES-R.%20K.%20RAJPUT.pdf
MOOCs Links and additional reading, learning, video material	
1	http://103.152.199.179/YCCE/Suported%20file/Supprted%20file/e-copies%20of%20books/Civil%20Engineering/52.%20FLUID%20MECHANICS%20%20FUNDAMENTALS%20AND%20APPLICATIONS%20%20YUNUS%20CENGAL.pdf
2	http://103.152.199.179/YCCE/Suported%20file/Supprted%20file/e-copies%20of%20books/Civil%20Engineering/3.%20A%20Textbook%20of%20Fluid%20Mechanics%20%20By%20R%20K%20Rajput%20(%20PDFDrive.com%20).pdf
3	https://onlinecourses.nptel.ac.in/noc20_ce30/course

VI SEMESTER

22CV604__Lab : Hydraulic Engineering

Course Outcomes:
Upon successful completion of the course the students will be able to
1. Calculate various losses, velocity, discharges, pressure, in flow through pipe and various flow parameter in open channel
2. Analyze pipe water distribution network and flow around the submerged body
3. Analyze various flow profiles, in open channel
4. Calculate profile length by using Direct step method

S.N.	Minimum of **Ten** practical from the list given below shall be performed.
1	Determination of Darcy – Weisbach friction factor for given pipes.
2	Determination of minor losses in pipes.
3	Determination of velocity in open channels flow by using current meter.
4	Determination of Manning's or Chezy's constant for uniform flow in an open channel.
5	Development of specific energy diagram for rectangular channel.
6	Study of hydraulic jump in a horizontal rectangular channel.
7	Study of flow over horizontal contraction.
8	Design problems of pipe network analysis.
9	Sketch the various standard profiles in open channels flow
10	Sketch the various profiles in open channels flow by considering break in grade
11	Computation of water surface length in open channel by using direct step method.
12	Study of flow around immersed bodies.

VI SEMESTER

22CV611__PE-II : Earthquake Engineering

Course Outcomes :

Upon successful completion of the course the students will be able to

1. Explain the fundamentals and Importance of Earthquake Engineering.
2. Analyze and design the earthquake resistant structures and construction in accordance with the Provisions of Indian Standard Codes.
3. Explain special aspects in multi-story buildings.
4. Explain behavior of structure during earthquake and understand the principles of repair and rehabilitation of structures

Unit:1	**Basics of Seismology**	**7 Hours**
Origin of earthquakes, engineering geology, seismicity of the world, faults, earthquake waves, quantification of earthquake (magnitude, energy, intensity of earthquake), measurements of earthquake, analysis of earthquake records and its interpretation.		
Unit:2	**Earthquake Measurement technology**	**6 Hours**
Determination of magnitude, epicenter, epicenter distances, focal depth, seismic zoning, ground motion and their characteristics, factors affecting ground motions, causes or sources of earthquake damages, evaluation of seismic hazards.		
Unit:3	**Earthquake Load Analysis on Structures as per Indian Standards**	**6 Hours**
Study of IS: 1893-2016, IS: 13920-2016 for analysis and ductile detailing of RCC structures and other related codes, concept of earthquake resistant design, design philosophy, virtues of earthquake resistant design. Calculation of base shear distribution to various floors.		
Unit:4	**Ductility considerations in earthquake resistant design of RCC buildings**	**7 Hours**
Design and detailing of RCC members, beam, column for ductility as per IS 13920-2016.Introduction to shear wall building and beam-column joints for ductile behaviors.		
Unit:5	**Special aspects in multi-storey buildings**	**7 Hours**
Special aspects in multi-storey buildings, effect of torsion, flexible first storey, P-delta effect, and soil-structure interaction on building response, drift limitation, soil liquefaction during earthquakes. Contemporary Issues related to Topic		
Unit :6	**Introduction to Earthquake-Resistant Features and Retrofitting Techniques of Structures**	**6 Hours**
Introduction of load-bearing and framed structures, non-engineered structures, earthquake resistant features of load-bearing and masonry structures, strengthening, rehabilitation, and retrofitting of earthquake-damaged structures.		
	Total Lecture	**39 Hours**

			July 2022	1.00	Applicable for AY 2022-23 Onwards
Chairperson	Dean (Acad. Matters)	Dean OBE	Date of Release	Version	

Text Books	
1	Agrawal &Shrikhande, Design of Earthquake Resistant Structures, 3 rd 2006, Prentice – Hall of India Pvt. Ltd
2	Paulay, T. & Prestiley M.J.N., Seismic design of R C & Masonry Buildings, 2nd 1999, John Willey & Sons
3	Asadour H. Hadjian, Basic Elements of Earthquake Engineering, 2015, Wiley
4	IS 1893 (Part 1) :2016 Criteria for Earthquake Resistant Design of Structures
5	Ductile Design and Detailing of Reinforced Concrete Structures Subjected to Seismic Forces Code of Practice IS 13920-2016- Ductile Design and Detailing of Reinforced Concrete Structures Subjected to Seismic Forces Code of Practice
Reference Books	
1	C.V.R. Murty, Earthquake Tips, 2005, NICEE, IITK
2	Robin K. McGuire, Seismic Hazard and Risk Analysis, 2004, Earthquake Engineering Research Institute; First edition.
3	Roberto Villaverde, Fundamental Concepts of Earthquake Engineering, 2009, CRC Press
4	Guidelines for Earthquake Resistant Non- Engineered Construction, Anand S.Arya Teddy BOEN ,Yuji ISHIYAMA ,UNESCO, Published in 2014
YCCE e- library book links [ACCESSIBLE FROM COLLEGE CAMPUS]	
1	http://link.springer.com/openurl?genre=book&isbn=978-3-540-93817-0
2	https://drive.google.com/file/d/1WeI4wzsbzGqd-UGra1CWukcROIujg7jQ/view?usp=drive_web&authuser=2
3	https://drive.google.com/file/d/1sI5ppMZJX0OTN1cGHKjPBz8IANkzSAbR/view?usp=drive_web&authuser=2
4	http://103.152.199.179/YCCE/Suported%20file/Supprted%20file/e copies%20of%20books/Civil%20Engineering/75.%20EARTHQUAKE%20RESISTANT%20DESIGN%20_%20Pankaj%20Agrawal.pdf
5	http://103.152.199.179/YCCE/Suported%20file/Supprted%20file/e-copies%20of%20books/Civil%20Engineering/76.%20FUNDAMENTALS%20OF%20EARTHQUAKE%20ENGINEERING_ELANSHAI_&_SARNO.pdf
6	http://103.152.199.179/YCCE/Suported%20file/Supprted%20file/e-copies%20of%20books/Civil%20Engineering/80.%20Basics%20of%20structural%20dynamics%20and%20seismic%20design.pdf
MOOCs Links and additional reading, learning, video material	
1	https://www.traditional-is-modern.net/LIBRARY/GUIDELINES/1986IAEE-Non-EngBldgs/1986GuidelinesNon-Eng(ALL).pdf
2	https://www.nicee.org/EQTips.php
3	https://archive.nptel.ac.in/courses/105/104/105104200/
4	https://archive.nptel.ac.in/courses/105/101/105101004/
5	https://archive.nptel.ac.in/courses/105/102/105102016/
6	https://archive.nptel.ac.in/courses/105/101/105101209/

VI SEMESTER

22CV612__ PE-II : Water Transmission and Distribution System

Course Outcomes :

Upon successful completion of the course the students will be able to

1. Compute discharges in three reservoir, multi reservoir system, capacity of reservoir and design of Rising main.
2. Analyze the water distribution network by using Hardy cross method, Newtonian Raphson method and Node flow analysis
3. Apply Graph Theory, Critical path method and Spanning tree concept for design of water distribution network.
4. Analyze optimized solution of water distribution network by using Cost Head Loss ratio Method

Unit:1	**Reservoirs, pump,Valves**	**6 Hours**

General Hydraulic Principles, major losses,& minor losses, Head loss formulae- Darcy-Weisbach formula, Hazen – Williams formula, continuity equation, Equivalent length of Pipes, three Reservoirs, multi reservoir, Pumps and Valves in Water distribution systems.

Contemporary Issues related to Topic

Unit:2	**Analysis of water distribution networks**	**7 Hours**

Types of networks, Formulation of Equations for looped Water Distribution Networks, Analysis of flow in looped networks using Hardy-Cross method and Newton-Raphson method.

Contemporary Issues related to Topic

Unit:3	**Node flow analysis of water distribution networks**	**7 Hours**

Necessity of node flow analysis, classification of node according to HGL, classification of node according to flow, compatibility, node head-discharge relationship, Application of NFA technique to serial networks.

Contemporary Issues related to Topic

Unit:4	**Reservoir capacity &Rising Mains**	**6 Hours**

Estimation of reservoir capacity, Optimal and Economical diameter of pumping main. Design of pumping main considering rising main diameter as continuous as well as discrete variable and explicit function.

Contemporary Issues related to Topic

Unit:5	**Design of water distribution networks**	**6 Hours**

Design of single source branching network using Critical path method, Determining number of branching configuration for a looped network by graph theory, Use of path concept and minimum spanning tree concept.

Contemporary Issues related to Topic

Unit :6	Optimal Design Water Distribution Networks	7 Hours
Cost head loss Ratio (CHR) method – CHR criterion, Problem formulation CHR methodology (for single source branching networks). **Contemporary Issues related to Topic**		
	Total Lecture	**39 Hours**

Text Books	
1.	Bhave P. R Optimal design of water distribution networks, Narosa publishing house pvt. Ltd 2003
2.	Bhave P.R., & Gupta R. Analysis of Water Distribution Networks, Narosa publishing house pvt. Ltd 2006
Reference Books	
1.	Bhave P.R Analysis of flow in water distribution networks, Technomic publishing co, INC, Lancaster, USA.
2.	Walski T.M. (1984) "Analysis of Water Distribution System" Van Nostrand Reinhold Co. New York, N.Y. USA
YCCE e- library book links [ACCESSIBLE FROM COLLEGE CAMPUS]	
1.	
MOOCs Links and additional reading, learning, video material	
1	https://onlinecourses.nptel.ac.in/noc22_ce07/announcements?force=true
2	https://in.video.search.yahoo.com/video/play;_ylt=AwrPpGf64dJiGsrmWrmHAx.;_ylu=c2VjA3NyBHNsawN2aWQEZ3BvcwMy

VI SEMESTER
22CV613__ PE-II : Matrix Analysis of Structures

Course Outcomes :
Upon successful completion of the course the students will be able to
1. Apply the stiffness method for structural analysis.
2. Analyze continuous beams, plane truss, plane frame neglecting axial deformation, plane frame considering axial deformation.
3. Evaluate continuous beams, plane truss with special effects.
4. Explain various storage techniques used in computer programming for structural analysis.

Unit:1	**Stiffness Matrix Method**	**7 Hours**
Basic terminology, degree of freedom, basic concept of direct stiffness method, derivation of all stiffness coefficients, formulation of compatibility equations, rotation transformation matrix.		
Unit:2	**Beam**	**6 Hours**
Formulation of elemental stiffness matrix for Beam, transformation matrix, assembly of global stiffness matrix, member load matrix due to concentrated load, uniformly distributed load and moment, assembly of global load matrix, solution to problem without sinking of support with maximum three degrees of freedom.		
Unit:3	**Plane Truss**	**6 Hours**
Formulation of elemental stiffness matrix and global stiffness matrix, assembly of global stiffness matrix, member load matrix due to concentrated load, assembly of global load matrix, solution to problem of plane truss with maximum three degrees of freedom. Contemporary Issues related to Topic		
Unit:4	**Plane Frame (Without axial deformation):**	**6 Hours**
Formulation of elemental stiffness matrix and, assembly of global stiffness matrix, member load matrix due to concentrated loads, uniformly distributed loads and moments, assembly of global load matrix, solution to plane frame problems with maximum three degrees of freedom, inclined member problem. Contemporary Issues related to Topic		
Unit:5	**Plane frame (With axial deformation):**	**7 Hours**
Formulation of elemental stiffness matrix and transformation matrix, assembly of global stiffness matrix, member load matrix due to concentrated loads, uniformly distributed loads and moments, assembly of global load matrix, solution to plane frame problems with maximum three degrees of freedom, inclined member problem. Contemporary Issues related to Topic {Analysis of Multistoried Plane Frame Using Commercial Software}		
Unit :6	**Space Truss and Banded Storage Techniques**	**7 Hours**
Formulation of elemental stiffness matrix and global stiffness matrix, assembly of global stiffness matrix, member load matrix due to concentrated load, assembly of global load matrix, solution to problem of space truss with maximum three degrees of freedom. Storing of global stiffness matrix, full storage, banded storage and band minimization. Contemporary Issues related to Topic		
	Total Lecture	**39 Hours**

Text Books	
1	Matrix Method of Structural Analysis, Gere and Weaver, McGraw Hill. 2004
2	Structural Analysis: A Matrix Approach, Pandit Gupta, Tata McGraw-Hill, 2001
Reference Books	
1	Matrix Method of Structural Analysis, Meghre A.S. &Deshmukh S.K., Charotar Publishing House Pvt. Limited, 2003
2	Computer Analysis of Structures, Flemming, McGraw-Hill Education, 1996
3	Intermediate Structural Analysis, Wang C K, McGraw-Hill Education, 2010
4	Computational Structural Mechanics, S. Rajasekaran, G. Sankarasubramanian PHI Learning Private Limited, 2004
YCCE e- library book links [ACCESSIBLE FROM COLLEGE CAMPUS]	
1	http://103.152.199.179/YCCE/Suported%20file/Supprted%20file/e-copies%20of%20books/Civil%20Engineering/20.%20Matrix%20methods%20of%20structural%20analysis%20(%20PDFDrive%20)-ebook.pdf
MOOCs Links and additional reading, learning, video material	
1	https://onlinecourses.nptel.ac.in/noc22_ce71/preview

VI SEMESTER
22CV614__ PE-II : Environmental Geotechniques

Course Outcomes		
Upon successful completion of the course the students will be able to 1. Analyze Geo-environmental problems. 2. Examine soil-water interaction and its implications. 3. Explain Waste Containment System and contaminant site remediation. 4. Illustrate soil characterization.		
Unit:1	**Fundamentals of Geoenviromental Engineering**	**7 Hours**
Scope of Geoenviromental engineering - multiphase behavior of soil – role of soil in Geoenviromental applications – importance of soil physics, soil chemistry, hydrogeology, biological process – sources and type of ground contamination – impact of ground contamination on Geoenviromental - case histories on Geoenviromental problems		
Unit:2	**Soil mineralogy characterization and its significance in determining soil behavior**	**6 Hours**
soil-water interaction and concepts of double layer – forces of interaction between soil particles. Concepts of unsaturated soil – importance of unsaturated soil in Geoenviromental problems - measurement of soil suction - water retention curves - water flow in saturated and unsaturated zone.. **Contemporary Issues related to Topic**		
Unit:3	**Soil-water-contaminant interactions and its implications**	**7 Hours**
Factors effecting retention and transport of contaminants. **Contemporary Issues related to Topic**		
Unit:4	**Waste Containment System**	**6 Hours**
Evolution of waste containment facilities and disposal practices – Site selection based on environmental impact assessment –different role of soil in waste containment – different components of waste containment system and its stability issues – property evaluation for checking soil suitability for waste containment – design of waste containment facilities. **Contemporary Issues related to Topic**		
Unit:5	**Contaminant Site Remediation**	**7 Hours**
Site characterization – risk assessment of contaminated site - remediation methods for soil and groundwater – selection and planning of remediation methods – some examples of in-situ remediation **Contemporary Issues related to Topic**		
Unit :6	**Advanced Soil Characterization**	**6 Hours**
Contaminant analysis - water content and permeability measurements – electrical and thermal property evaluation – use of GPR for site evaluation - introduction to geotechnical centrifuge modelling. **Contemporary Issues related to Topic**		

Total Lecture	**39 Hours**

Text Books	
1	Environmental geotechnics, International Technical Committee No. 5 (ITC5) on Environmental Geotechnics of the International Society of Soil Mechanics and Geotechnical Engineering (ISSMGE), 2006
Reference Books	
1	Introduction to Environmental Geotechnology 2nd Version by Hsai-Yang Fang and Ronald C. Chaney
2	Soil stabilization principles and practice by Ingles, O. G. and Metcalf, J. B., Butterworth,1972.
3	Soil Mechanics & Foundations, 2009, Punmia B. C., Laxmi publication.
YCCE e- library book links [ACCESSIBLE FROM COLLEGE CAMPUS]	
1	http://103.152.199.179/YCCE/Suported%20file/Supprted%20file/e-copies%20of%20books/Civil%20Engineering/
2	https://www.issmge.org/filemanager/technical_committees/26/TC215/Environmental_Geotechnics.pdf
MOOCs Links and additional reading, learning, video material	
1	https://www.youtube.com/watch?v=afirGWlleSM&list=PL3MO67NH2XxJytJh5pAKKSIm5k4MWGicO
2	https://www.youtube.com/watch?v=mORZLCH-YA0
3	https://www.youtube.com/watch?v=m1a-7HsF1A0&t=1037s

VI SEMESTER
22CV615__ PE-II : Traffic Engineering

Course Outcomes :

Upon successful completion of the course the students will be able to

1. Compute the measurement of spot speed journey speed & running speed for different methods
2. Analyze the different Statistical methods used in various traffic studies
3. Illustrate Rotary Intersections, Parking & accidents.
4. Calculate the total time at Signals at various intersections.

Unit:1	**Traffic Surveys:**	**7 Hours**

General: Road, road user &road vehicle characteristics.

Traffic Surveys: speed, journey time and delay studies, methods of measurement of spot speed, measurements of running and journey speeds, highway capacity, level of service.

Contemporary Issues related to Topic

Unit:2	**Traffic Events:**	**7 Hours**

Statistical method for interpretation, regression, application of binomial normal and Poisson's distributions, test of significance–Chi-square & 'T' test.

Contemporary Issues related to Topic

Unit:3	**Road geometry:**	**7 Hours**

Hierarchy of urban roads and their standards, diverging, merging, crossing, weaving, maneuvers and conflict points, types of road junction, traffic calming, traffic rotary design, driveways.

Contemporary Issues related to Topic

Unit:4	**Traffic controlling devices:**	**6 Hours**

Traffic signs, traffic signals, design of signalized intersections & signaling systems, Queuing theory.

Contemporary Issues related to Topic

Unit:5	**Traffic Safety:**	**7 Hours**

Driver's error, collection and interpretation of accident data and recording in standard Format, speed and weather effects on accidents, analysis of accidents, pedestrian, 3E's of traffic management.

Contemporary Issues related to Topic

Unit :6	**Parking:**	**7 Hours**

Parking surveys, on and off-street parking & parking systems, parking demand, design of on & off-street parking lot, underground & multi-storeyed parking.

Contemporary Issues related to Topic

Total Lecture	**39 Hours**

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Text Books	
1	Highway Engineering, Khanna S.K. and Justo C.E.G., 1991, Nem Chand & Bros.
2	Traffic engineering and transportation planning, Kadiyali, Khanna Publications, 1987
3	Transportation Engineering: An Introduction, C. JotinKhisty , B. Kent Lall
4	Transportation Engineering and Planning ,C.S. Papacostas, P.D. Prevedouros
Reference Books	
1	Highway Engineering, Rangawala B.S. Charotar Publishing House, 2011
2	IRC Handbook and MOST Specifications, Indian Road Congress, 2012
YCCE e- library book links [ACCESSIBLE FROM COLLEGE CAMPUS]	
1	http://103.152.199.179/YCCE/Suported%20file/Supprted%20file/e-copies%20of%20books/Civil%20Engineering/57.%20Principles%20of%20Highway%20Engineering%20and%20Traffic%20Analysis%20(%20PDFDrive%20).pdf
2	http://103.152.199.179/YCCE/Suported%20file/Supprted%20file/e-copies%20of%20books/Civil%20Engineering/59.%20Traffic%20engineering%20and%20transport%20planning%20by%20kadiyali%20pdf.pdf
3	https://link.springer.com/book/10.1007/978-1-349-10800-8
4	https://onlinelibrary.wiley.com/doi/10.1002/9781119174738.ch4
MOOCs Links and additional reading, learning, video material	
1	https://archive.nptel.ac.in/courses/105/105/105105215/
2	https://archive.nptel.ac.in/courses/105/101/105101008/
3	https://nptel.ac.in/courses/127/105/127105007/

VI SEMESTER

22CV616__ PE-II : Construction Management and Machinery

Course Outcomes :

Upon successful completion of the course the students will be able to

1. Understand and analyze scope and role of civil engineer in developing economy of Nation and construction industry.
2. Evaluate the development of network techniques for project planning.
3. Develop knowledge about function of money, banking and material management methods.
4. Classify various major construction equipment used in construction and its safety management.

Unit:1	Construction Industry and Management	6 Hours

Introduction to Construction Industry, Nature, Characteristics, Size and structures. Role in economic development of nation. Construction Management, Necessity, Application of management functions viz. Planning, Organizing, Staffing, etc. Construction manager, Role and Responsibilities.

Contemporary Issues related to Topic

Unit:2	Project management and Job planning	7 Hours

Introduction to Project management, Types and various phases of projects. Planning-Components, Objectives, Factors affecting planning. Organizational setup of a few major construction projects.

Methods of planning and programming- Bar charts, Application of Network techniques (CPM & PERT) for planning. Estimation of critical path and project duration.

Contemporary Issues related to Topic

Unit:3	Finance and Material management	7 Hours

Functions of money. Function of Commercial & Central Banks. Material management-Functions, Objectives. Inventory control, EOQ, ABC analysis.

Contemporary Issues related to Topic

Unit:4	Equipment management	7 Hours

Classification of construction equipment, factors affecting selection, Operation & Maintenance cost, Depreciation & Replacement cost, Economic life, Down time cost, Cost of owning equipment. Safety Management: Safety in construction, industry & at work site.

Contemporary Issues related to Topic

Unit:5	Equipment for major projects	6 Hours

Excavating machines such as Power shovels, Drag Line, Bulldozer, Scrapper, Drilling & blasting equipment, material transporting & handling equipment such as cranes, hoists, conveyer belts, dumpers, cableways, rail system (size, performance & limitations).

Contemporary Issues related to Topic

Unit :6	**Concrete equipment**	**6 Hours**
Different types of mixers, vibrators, batch mixing plants, Transportation of concrete, concrete pumps & placers, Shotcreting, Guniting. **Contemporary Issues related to Topic-RMC**		
	Total Lecture	**39 Hours**

Text Books	
1	Shrivastava U.K., Construction Planning and management, Galgotia publication.
2	Khanna O.P, Industrial Engineering & Management, Dhanpat Rai & Sons, New Delhi, 1992.
3	Verma Mahesh, Equipment Management, S.Chand & Sons
4	Punmia B.C. & Khandelwal K.K., Project Planning & Control with PERT&CPM, Laxmi Publications, New Delhi,1990.
5	BL Gupta, Amit Gupta, Construction Management & Machinery, Standard Publishers Distributors, 2010.
Reference Books	
1	Peurifoy, M.H, Construction Management, McGraw Hill, New York.
2	Srinath L, CPM & PERT, Affiliated East-West Press Pvt. Ltd., New Delhi.
3	P.S. Gahlot & B.M.Dhir, Construction Planning and Management, New Age International.
4	Chaudhary Roy, Project Management, Tata McGraw Hill, New Delhi.
YCCE e- library book links [ACCESSIBLE FROM COLLEGE CAMPUS]	
1	https://link.springer.com/search?query=CONSTRUCTION+MANAGEMNET
2	https://web.p.ebscohost.com/ehost
MOOCs Links and additional reading, learning, video material	
1	

VI SEMESTER
22CV617__ PE-II : Wastewater Treatment

Course Outcomes :		
Upon successful completion of the course the students will be able to 1. Apply suitable method for safe disposal of wastewater. 2. Design various treatment units for waste water. 3. Explain advanced processes for treatment of waste water. 4. Select suitable treatment of waste water from various industries.		
Unit:1	**Wastewater management**	**6 Hours**
Need of wastewater management and treatment, effective wastewater management approach, recycling perspective in wastewater management, Global and Indian scenario of wastewater management, issues and challenges in wastewater management, Wastewater Characteristics. **Contemporary Issues related to Topic**		
Unit:2	**Preliminary and Primary Treatment Processes**	**7 Hours**
Screens, Grit Chamber And Primary Settling Tank- Principles, Types & Designs. **Contemporary Issues related to Topic**		
Unit:3	**Secondary treatment processes-I**	**7 Hours**
Introduction to biological treatment, Microbial growth, Activated Sludge Process (ASP), Activated Sludge Process (ASP): Biochemical Reactions. **Contemporary Issues related to Topic**		
Unit:4	**Secondary treatment processes-II**	**6 Hours**
Other biological treatment units: Stabilization Ponds, Up flow Sludge Blanket Reactors, Sludge Digester **Contemporary Issues related to Topic**.		
Unit:5	**Advanced wastewater Treatment**	**7 Hours**
Need of tertiary or advanced treatment of wastewater, Tertiary treatment objectives, options and approaches, Control of nutrients, Nitrification and De- nitrification, Removal of phosphorus.. **Contemporary Issues related to Topic**.		
Unit :6	**Treatment alternatives for Industrial waste**	**6 Hours**
Volume Reduction, Strength Reduction, Equalization Tank, Neutralization Tank, Specific Industrial Wastewater Treatment For Paper And Pulp Industry, Sugar Industry,Dairy Industry. **Contemporary Issues related to Topic**.		
	Total Lecture	**39 Hours**

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Text Books	
1	S.K. Garg, Environmental Engineering (Volume-2), Khanna Publication, 2010
2	P.N. Modi,Sewage Treatment & Disposal and Waste Water Engineering, Standard Book House, 2008,
Reference Books	
1	Metcalf and Eddy, Wastewater Treatment Disposal and Reuse, Tata McGraw Hill publishing company Ltd., 2006.
2	CPHEEO Manual on Sewerage and Sewage Treatment Systems, 2013.
YCCE e- library book links [ACCESSIBLE FROM COLLEGE CAMPUS]	
1	http://103.152.199.179/YCCE/Suported%20file/Supprted%20file/e-copies%20of%20books/Civil%20Engineering/7.%20Water_and_Waste_Water_Engineering.pdf
MOOCs Links and additional reading, learning, video material	
1	https://nptel.ac.in/courses/105105178

VI SEMESTER
22CV631__ PE-III : Prestressed Concrete

Course Outcomes :
Upon successful completion of the course the students will be able to
1. Explain the concepts of Prestressed concrete.
2. Apply the knowledge of IS codes related to Prestressed concrete.
3. Analyze and design the basic structural members in Prestressed concrete.
4. Examine the limit state of serviceability to Prestressed concrete members.

Unit:1	**Introduction to prestressed concrete**	**6 Hours**
Types of prestressing, advantages and limitations of Prestressing, systems and devices, materials, losses in prestress, IS1343 –2012 codal provisions. Contemporary Issues related to Topic		
Unit:2	**Analysis and Design of Member**	**7 Hours**
Analysis of Prestress - Resultant Stresses at Section, Concept of Load Balancing, Cracking Moment, Kern Point, Pressure Line, Design of Members - Design of Sections for Axial Tension, Design of Sections for Flexure.		
Unit:3	**Analysis and Design of Shear**	**6 Hours**
Analysis for Shear - Stress in an Uncracked Beam, Types of Cracks, Components of Shear Resistance, Modes of Failure, Effect of Prestressing Force, Design for Shear - Limit State of Collapse for Shear, Design of Transverse Reinforcement, Detailing Requirements.		
Unit:4	**Deflections of Prestressed concrete Members and Transmission of Prestress**	**7 Hours**
Deflection due to Gravity Loads, Prestressing Force, Total Deflection, Codal provision for Limits of Deflection. Transmission of Prestress in Pre-tensioned and Post-tensioned Members.		
Unit:5	**Prestressed concrete slabs**	**7 Hours**
Analysis and Design of prestressed concrete slabs - one way and two way, Introduction to Flat Slab.		
Unit :6	**Statically Indeterminate Structures**	**6 Hours**
Analysis and design of Continuous Beam, Principle of Linear Transformation, Concordant Tendon Profile.		
	Total Lecture	**39 Hours**

Text Books	
1	N. Krishana Raju, Prestressed Concrete, McGraw Hill Education, New Delhi.6th edition, 2018
2	N. Rajagopalan, Prestressed Concrete, Alpha Science International Ltd, 2nd edition 2005
3	P. Dayaratnam, Prestressed Concrete, Oxford & IBH Publishing Co Pvt.Ltd, 6th edition, 2018

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Reference Books	
1	Praveen Nagarajan, Prestressed Concrete Design, Pearson Education India, 1st edition, 2013
2	K.U. Muthu, Prestressed Concrete, PHI Learning, 2016
3	Lin T.Y., Design of Prestressed Concrete structures, Wiley India Private Limited, 3rd edition, 2010
4	IS 1343: 2012 - Prestressed concrete-code of practice
YCCE e- library book links [ACCESSIBLE FROM COLLEGE CAMPUS]	
1	http://link.springer.com/openurl?genre=book&isbn=978-0-412-37760-0
MOOCs Links and additional reading, learning, video material	
1	https://nptel.ac.in/courses/105106117
2	https://archive.nptel.ac.in/courses/105/106/105106118/

VI SEMESTER

22CV632__ PE-III : Advanced RCC

Course Outcomes :
Upon successful completion of the course the students will be able to
1. Explain the provisions of relevant IS codes required for design of structures.
2. Analyze problems on building frames subjected to vertical load & horizontal load.
3. Analyze advanced concrete structures such as multi-storeyed buildings, retaining wall, water tank, flat slab.
4. Illustrate RCC detailing of structures.

Unit I: Analysis and Design of Beam	**(7 Hrs.)**
Limit state of collapse in torsion with flexure and shear: Introduction, Behavior of beam section in torsion, Interaction of torsion with flexure, Interaction of torsion with shear, Interaction of torsion with shear and flexure, Design of beam section for torsion combined with flexure and shear, Reinforcement detailing for beams due to torsion combined with flexure and shear. **Contemporary Issues related to Topic**.	
Unit II: Analysis and Design of Slab	**(6 Hrs.)**
Two way slab: Design an RCC two-way slab with different end conditions using the IS code coefficient approach. Reinforcement details for slabs with varying end conditions. Flat Slab: Introduction, analysis of flat slab, punching shear in flat slab, Design of flat slab, Reinforcement detailing for flat slabs. **Contemporary Issues related to Topic**.	
Unit III: Analysis and design of building frame	**(7 Hrs.)**
Analysis and design of building frames subjected to vertical load by substitute frame method and lateral forces by portal frame method and cantilever method.	
Unit IV: Analysis and Design of Combined Footing	**(6 Hrs.)**
Design of footing for two columns, i) Rectangular footing ii) Strap beam footing iii)Trapezoidal footing. **Contemporary Issues related to Topic**.	
Unit V: Analysis and Design of Retaining Wall	**(7 Hrs.)**
Introduction, types of retaining walls, stresses on retaining walls, retaining wall stability, Design of RCC Cantilever and Counter-fort Retaining wall. **Contemporary Issues related to Topic**.	
Unit VI: Analysis and Design of Water Tank	**(6 Hrs.)**
Design of water tank (rectangular and circular) with roof slab / dome resting on ground by approximate methods / IS code method. **Contemporary Issues related to Topic**.	
Total Lecture	**39 Hours**

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Text Books	
1.	S.N. Sinha, Reinforced concrete Design, McGraw Hill Education (India) Private Limited, 3rd edition,
2.	S. R. Karve, V. L. Shah, "Limit State Theory and Design of Reinforced Concrete", Structures publication, 8th edition.
3.	Dr. B.C. Punmia, Ashok Kumar Jain & Arun Kumar Jain, "Comprehensive Rcc.Designs", Laxmi Publication (P) Ltd, 8th edition.
Reference Books:	
1.	Bhavikatti S. S., Advanced R. C. C. Design Volume-II, New age international publisher, New Delhi, Ist edition.
2.	Krishna Raju N, Advanced R. C. C. Design, CSB Publisher and Distributor, New Delhi, 2nd edition.
3.	IS 456 : 2000, "Plain and Reinforced Concrete - Code of Practice", Fourth Revision, Bureau of Indian Standards (BIS), New Delhi, India.
4.	IS 3370 : 2009, "Concrete Structures for Storage of Liquids - Code of Practice" Bureau of Indian Standards (BIS), New Delhi, India.
5.	SP 16 (1980): Design Aids for Reinforced Concrete to IS 456, Bureau of Indian Standards (BIS), New Delhi, India.
6.	SP 34 (1987): Handbook on Concrete Reinforcement and. Detailing, Bureau of Indian Standards (BIS), New Delhi, India.
YCCE e- library book links [ACCESSIBLE FROM COLLEGE CAMPUS]	
1.	http://103.152.199.179/YCCE/Suported%20file/Supprted%20file/e-copies%20of%20books/Civil%20Engineering/12.%20REINFORCED%20CONCRETE%20DESIGN%20-%20N.KRISHNA%20RAJU.pdf
2.	http://103.152.199.179/YCCE/Suported%20file/Supprted%20file/e-copies%20of%20books/Civil%20Engineering/15.%20design_of_reinforced_concrete_9th_edition_-_jack_c._mccormac.pdf
3.	http://103.152.199.179/YCCE/Suported%20file/Supprted%20file/e-copies%20of%20books/Civil%20Engineering/16.%20Reinforced%20concrete%20design%20theory%20&%20examples.pdf%20(%20PDFDrive%20).pdf
MOOCs Links and additional reading, learning, video material	
1.	https://archive.nptel.ac.in/courses/105/105/105105105/
2.	https://www.youtube.com/watch?v=pIdaC_I6H_M
3.	https://www.youtube.com/watch?v=xlr5_7vY0NI

VI SEMESTER

22CV633__ PE-III : Numerical Methods and Computational Techniques

Course Outcomes :		
Upon successful completion of the course the students will be able to 1. Discuss the basic elements underlying development and use of numerical methods in engineering applications. 2. Compute numerical solution of various types of problems such as Roots of equations, Systems of linear simultaneous equations, Numerical Differentiation and integration, Eigen value problems etc. 3. Analyse algorithms to solve problems using modern computational tools. 4. Investigate the direct integration method and compare it with basic method.		
Unit:1	**Algebraic and transcendental equation:**	**7 Hours**
Regula Falsi Method, Newton-Raphson method, Development of Computer Program. **Contemporary Issues related to Topic**.		
Unit:2	**Linear algebraic equations:**	**7 Hours**
Gauss elimination, Cholesky method, Given's method, Householder's method. **Contemporary Issues related to Topic**.		
Unit:3	**Eigen values problems**	**7 Hours**
Direct, Jacobi, Rutishauser's LR method, QR method. **Contemporary Issues related to Topic**.		
Unit:4	**Initial & two point boundary value problem:**	**6 Hours**
Euler's, Runge - Kutta, Milne's Methods. **Contemporary Issues related to Topic**.		
Unit:5	**Numerical Integration:**	**7 Hours**
Trapezoidal Method, Simpson's Method, Gauss Quadrature. **Contemporary Issues related to Topic**.		
Unit :6	**Direct Integration Methods:**	**7 Hours**
Central difference method, Houbolt method, Newmark's method, Wilson - θ method. **Contemporary Issues related to Topic**.		
	Total Lecture	**39 Hours**

Text Books	
1	Balachandra Rao S., Santha C.K. Numerical Methods with programs in BASIC, FORTRAN and Pascal, University Press (India) Limited, Hyderabad 1992.

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Reference Books	
1	Bathe K. J., Wilson E. L., Numerical Methods in Finite Element Analysis, Prentice-Hall of India Private Limited, New Delhi, 1987.
2	Kandasamy P. Thilagavathy K, Gunavathi K.; Numerical Methods, S. Chand & Company Ltd, New Delhi, Edition-I, 1997.
3	Chapra S.C. and Canale,R.P., " Numerical Methods for Engineers with Programming and Software Applications"- 3 Ed., Tata McGraw Hill, New Delhi, 2009.
4	Salvadori M., "Numerical Mehtods"- PHI learning Pvt., ltd., New Delhi, 1987.
5	Gupta S. K.; Numerical Methods for Engineers, New Age International Limited Publishers, New Delhi, 1997
YCCE e- library book links [ACCESSIBLE FROM COLLEGE CAMPUS]	
1	https://people.math.ethz.ch/~hiptmair/tmp/NumCSE/NumCSE15.pdf
2	https://www.kopykitab.com/Numerical-Method-Computing-Technique-By-Gopal-Pathak-eBook
3	https://link.springer.com/book/10.1007/978-3-319-15585-2
MOOCs Links and additional reading, learning, video material	
1	https://archive.nptel.ac.in/courses/111/107/111107105/
2	https://www.youtube.com/watch?v=zT83sJ5IrEE
3	https://archive.nptel.ac.in/courses/105/107/105107067/

VI SEMESTER

22CV634__ PE-III : Environmental Impact Assessment

Course Outcomes:		
Upon successful completion of the course, the students will be able to 1. Illustrate the process of EIA. 2. Explain the various methodologies used for EIA. 3. Explain the procedures for EIA projects. 4. Illustrate the various case studies of EIA		
Unit:1	**Evolution of EIA**	**7 Hours**
Concepts, Nature & Type of impacts, Need of EIA, Participation in EIA, New Concepts - Life cycle assessment. **Contemporary Issues related to Topic**		
Unit:2	**Methods for impact assessment**	**7 Hours**
Screening, Scoping, Baseline studies, Checklist, Mitigation, Matrices, Interaction of network methodologies **Contemporary Issues related to Topic**		
Unit:3	**Prediction and assessment of the impact on air and noise environment**	**7 Hours**
Basic information on air quality, Identification of type and quantity of air pollutant, existing air quality and air quality standards, impact prediction and assessment, mitigation **Contemporary Issues related to Topic**		
Unit:4	**Prediction and assessment of the impact on water and soil environment**	**6 Hours**
Basic information on water quality (Surface water and groundwater), water quality standards, identification of impact, prediction of impact and assessment, mitigations. **Contemporary Issues related to Topic**		
Unit:5	**Prediction and assessment of the impact on the cultural and socio-economic environment**	**7 Hours**
Basic information on cultural resources, rules, and regulations for cultural resources, Basic information of the socioeconomic environment, description of the existing socioeconomic environment, prediction and assessment of impact, mitigation, resettlement, and rehabilitation. **Contemporary Issues related to Topic**		
Unit :6	**EIA notification by Ministry of Environment and Forest (Govt. of India)**	**7 Hours**
Provisions in the EIA notification, Categorization of Industries for seeking environmental clearance from concerned authorities, Environmental management plan, post environmental monitoring. Case studies in EIA. **Contemporary Issues related to Topic**		
	Total Lecture	**39 Hours**

			July 2022	1.00	Applicable for AY 2022-23 Onwards
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Text books	
1	Anand Bal, An Introduction to Environmental Management, Himalaya Publishing House., 2009
Reference Books	
1	John Rau & Wooten, Environmental Impact Assessment, Mc Graw Hill., 4th Edition, McGraw Hill Education, 2012
2	Harry W. Gehm, Jacob I. Bregman, a handbook on pollution Control Acts, Central Pollution Control Board, New Delhi, 2015
3	R.K. Sapra, S. Bhardwaj, the New Environmental Age, Ashish Pub. House, New Delhi. 2011.
YCCE e- library book links [ACCESSIBLE FROM COLLEGE CAMPUS]	
1	http://link.springer.com/openurl?genre=book&isbn=978-1-4613-6193-0
2	https://onlinelibrary.wiley.com/doi/book/10.1002/9780470168042
MOOCs Links and additional reading, learning, video material	
1	https://nptel.ac.in/courses/114106017
2	https://onlinecourses.nptel.ac.in/noc21_hs83/preview

VI SEMESTER
22CV635__ PE-III : Energy Conversion and Management

Course Outcomes :

Upon successful completion of the course the students will be able to

1. Explain different sustainable energy sources
2. Analyze energy management and importance of energy conversion.
3. Recommend different energy conversion method.
4. Select modern technologies of Waste to Energy conversion

UNIT:1	**Significance of Energy Conversion and Environment**	**07 Hrs**

Overview of Global and Indian Energy Scenario; Environmental Impacts of Energy Conversion, Principles of Waste Minimization and Energy Recovery.

Contemporary Issues related to Topic

UNIT:2	**Renewable and Non-Renewable Energy Sources**	**06 Hrs**

Energy Conversion Methods: solar, wind, tidal and geothermal with their principles and application, Estimation of Potential of Energy Recovery from various Sources, Energy economics.

Contemporary Issues related to Topic

UNIT:3	**Waste to Energy options**	**07 Hrs**

Physical, thermochemical and bio chemical processes, Combustion, Gasification, pyrolysis; Anaerobic digestion, Biogas Technology, Future Technologies for Waste to Energy Systems.

Contemporary Issues- CNG & Biodiesel.

Contemporary Issues related to Topic

UNIT:4	**Other Energy options**	**06 Hrs**

Introduction to Microbial Fuel cell, Gas generations and collection in landfills, Measurements and Control; Energy and Resources Conservation Strategies and Policies.

Contemporary Issues related to Topic

UNIT:5	**Energy Checks**	**07 Hrs**

Environmental Appraisal, Energy audit, Carbon Foot prints, Sustainable Energy-Efficient systems, Case studies of sustainable Energy Projects.

Contemporary Issues related to Topic

UNIT:6	**Green Building & material**	**06 Hrs**

Intelligent Green Building, Green Rating Systems, Alternative Construction Materials & methods Testing and Verification. Contemporary Issues- Green Audit.

Contemporary Issues related to Topic

Total Lecture	**39 Hours**

			July 2022	1.00	Applicable for AY 2022-23 Onwards
Chairperson	Dean (Acad. Matters)	Dean OBE	Date of Release	Version	

Text Books	
1	D. O. Hall, G. W. Barnard and P. A. Moss, Biomass for Energy in the Developing Countries, Current Roles, Potentials, Problems, Prospects, Pergamon Press Ltd, 1st edition.
2	W. C. Turner, Energy Management Handbook Wiley New york 1st edition.
3	P. Meier, Energy System Analysis for Developing countries, Sringer Verlag 1st edition.
4	Dorthy J De Renzo, Energy from Bioconversion of Waste materials, Noyes data Corporation USA 1st edition.
Reference Books	
1	G.D. Rai, Non-Conventional Energy Source, Standard Publishers Distributors.
2	Fowler J. M. Energy and the Environment McGraw Hill New York 2nd edition.
3	B.H. Khan, Non-Conventional Energy Resources, 2nd Edition, McGraw Hill Companies.
YCCE e- library book links [ACCESSIBLE FROM COLLEGE CAMPUS]	
1	https://www.springer.com/series/15901
2	https://www.springer.com/series/15433
3	https://www.springer.com/series/8059
4	https://link.springer.com/book/10.1007/978-3-030-76221-6
MOOCs Links and additional reading, learning, video material	
1	https://onlinecourses.nptel.ac.in/noc22_me98/preview
2	https://onlinecourses.nptel.ac.in/noc22_me104/preview
3	https://onlinecourses.nptel.ac.in/noc22_hs105/preview
4	https://onlinecourses.swayam2.ac.in/nou22_ge71/preview
5	https://onlinecourses.swayam2.ac.in/nou22_me10/preview
6	https://onlinecourses.nptel.ac.in/noc22_ch38/preview

VI SEMESTER

22CV636__ PE-III : Ground Improvement and stabilization Techniques

Course Outcomes :

Upon successful completion of the course the students will be able to

1. Explain various types and Characterization of Geotextiles
2. Apply various types of Geotextiles ground improvement.
3. Implement geosynthetic materials and Diaphragm wall in construction

Unit:1	Types of Geotextiles	7 Hours

Function and properties of geotextiles-geomembranes, geogrids, geonet, geosynthetic clay liners (GCLs), geo-composite sheet drains, recomposite strip (wick) drains, geocells, erosion control products and HDPE vertical barrier systems.

Contemporary Issues related to Topic

Unit:2	Characterization of Geotextiles	6 Hours

Various properties of Geosynthetics, physical properties, mechanical properties, hydraulic properties, endurance properties

Contemporary Issues related to Topic

Unit:3	Applications Geotextiles	7 Hours

Need for ground improvement, various ground improvement techniques, economic considerations, and suitability. Grouting: Materials and methods of grouting Stone Columns.

Contemporary Issues related to Topic: Use of waste material for ground improvement

Unit:4	Reinforced soil and Geotextiles	6 Hours

Basic theory of reinforced soil, concept of reinforced soil wall and reinforced slope, geo-synthetic types: applications in Civil Engineering.

Contemporary Issues related to Topic

Unit:5	Ground Anchor and Soil Nailing	7 Hours

Concept, Design features, types, construction procedure, Functions, Applications, Advantages. Limitations of soil nailing system and ground anchors.

Contemporary Issues related to Topic

Unit :6	Diaphragm wall	6 Hours

Construction sequence, cement slurry wall, Design features, Functions, applications, Case study on Diaphragm wall. Deep soil mixing. Contemporary Issues related to Topic

	Total Lecture	39 Hours

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Text Books	
1	Soil Mechanics & Foundation Engineering, 2009, Arora K.R., Standard Publisher Distributors.
Reference Books	
1	Design Aids in Soil Mechanics and Foundation Engineering, 1988, Kaniraj R., McGraw Hill New Delhi.
2	Analysis and Design of Foundations and Retaining Structures, 1979, Shamsher Prakash, Gopoal Ranjan and Swami Sharan, Sarita Prakashan..
3	Theory and Practice of Foundation Design, 2004, Som N.N. & Das S.C., Prentice Hall and co New Delhi.
YCCE e- library book links [ACCESSIBLE FROM COLLEGE CAMPUS]	
1	http://103.152.199.179/YCCE/Suported%20file/Supprted%20file/e-copies%20of%20books/Civil%20Engineering/
2	https://drive.google.com/uc?id=152rovJSnSMcqsxwc5TbrPOShWrryn-4r&export=download
MOOCs Links and additional reading, learning, video material	
1	https://www.youtube.com/watch?v=6yhW3CbArQc&list=PL3MO67NH2XxKuZwStwfy3GZkKRou_q9Yp
2	https://www.youtube.com/watch?v=6yhW3CbArQc
3	https://www.youtube.com/watch?v=iC5YWjZjVVM&list=PLbMVogVj5nJRb_yA6oMKfoT89hyUcuHIA

VI SEMESTER

22CV637__PE-III : Earth Pressure & Earth Retaining Structures

Course Outcomes :

Upon successful completion of the course the students will be able to

1. Explain various earth pressure theories
2. Evaluate earth pressure on various retaining structures
3. Analyze and design of earth retaining structures

Unit:1	Earth pressure	7 Hours

Earth pressure, introduction, earth pressure as a stability problem, concept of strain dependence of developed stresses, active, at rest and passive conditions, plastic equilibrium, EP computation for practical cases

Unit:2	Various theories related with Earth Pressure	6 Hours

Various theories related with E.P. Distillation, Rankine, Coulomb and Hansen theoretical derivation and graphical construction with different geometric and boundary conditions**.**

Contemporary Issues related to Topic

Unit:3	Retaining wall	7 Hours

Types, material, method of construction, nature of forces acting. Comparison of different earth pressure theories and application in retaining wall. Stability analysis and design aspects, application of theory of elasticity in analysis of earth pressure distribution.

Contemporary Issues related to Topic

Unit:4	Earth -structure	6 Hours

Earth -structure - Definition, Features of an earth dam, stability analysis of slope, total-vs.- effective stress analysis, limit equilibrium method of slices based on circular failure surfaces, introduction to analysis based on general failure surfaces, introduction to analysis based on general failure surfaces. Stability of earth dams during different stages- during and at end of construction, steady seepage, sudden draw down, estimation of pore water pressure-use of stability charts, Soil arching,

Contemporary Issues related to Topic

Unit:5	Bulkhead	7 Hours

Bulkhead: Classification of Bulkhead, Cantilever sheet pile wall in cohesionless and cohesive soil, Cofferdam, Subsurface and underground structures

Contemporary Issues related to Topic: Predication of Earth pressure in hilly areas

Unit :6	Design of gravity retaining wall	6 Hours

Design of gravity retaining wall: Preliminary design Detailed design.

Contemporary Issues related to Topic

	Total Lecture	39 Hours

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Text Books	
1	Earth Pressure and Earth Retaining Structures, 2013, Chris R.I. ClaytonRick I. Woods Andrew J. Bond Jarbas Milititsky., Third edition, CRC press (Taylors & Francis Group).
Reference Books	
1	Soil Mechanics & Foundation Engineering, 2009, Arora K.R., Standard Publisher Distributors
2	Soil Mechanics & Foundations, 2009, Punmia B. C., Laxmi publication
3	Tropical soils in engineering practice by S. A. Ola, Balkema publications, Holland Principles of Foundation Engineering: Das B.M., PWS publishing co., (1999)
YCCE e- library book links [ACCESSIBLE FROM COLLEGE CAMPUS]	
1	http://103.152.199.179/YCCE/Suported%20file/Supprted%20file/e-copies%20of%20books/Civil%20Engineering/
2	https://drive.google.com/uc?id=152rovJSnSMcqsxwc5TbrPOShWrryn-4r&export=download
MOOCs Links and additional reading, learning, video material	
1	https://www.youtube.com/watch?v=4VB8ejPvka4
2	https://www.youtube.com/watch?v=pH7Ly8KCR3E
3	https://www.youtube.com/watch?v=2e_FGFEDJI0&t=18s

VI SEMESTER
22CV638__PE-III : Urban Transportation Planning

Course Outcomes :

Upon successful completion of the course the students will be able to

1. Explain basics of the transportation planning process.
2. Illustrate various methods of forecasting and discuss environmental impacts caused by traffic.
3. Explain factors governing trip generation and various methods of trip distribution.
4. Explain various traffic regulations, enforcements, and traffic management approaches.

Unit:1	**Transport Planning Process**	**7 Hours**

Importance of urban transport planning, Transport Planning Process: Scope, Independence of the land use and traffic, system approach to transport planning, stages, survey and analysis, forecast analysis and future condition of plan synthesis, evolution, programme adoption and implementation, continuing study, citizen participation, difficulties in transport planning process.

Unit:2	**Traffic Forecasting & Environment**	**7 Hours**

Traffic forecasting: Necessity, Limitations, Types of traffic, Methods of forecasting, Period of forecasting.

Traffic and environment: Introduction, Detrimental effects on environment, Noise, Air pollution, vibration, Visual intrusion and degrading aesthetics, Severance and land consumption.

Unit:3	**Trip Generation & Distribution**	**7 Hours**

Trip Generation: introduction and definition, trip purpose, factors governing trip generation and attraction rates.

Trip Distribution: Introduction, Methods: Uniform factor method, Average factor method. Farther method, Furness Method, Criticism of Growth factor method etc.

Unit:4	**Model Split**	**6 Hours**

General consideration, factors affecting, Model split in transport planning process, recent development. Mode choice analysis. Introduction to Various modes of urban transportation.

Unit:5	**Traffic Regulation**	**7 Hours**

Basic principles of regulation, scope of traffic regulation, traffic laws, regulation of speed, vehicles, driver & traffic, parking & enforcement regulations, motor vehicle act.

Unit :6	**Traffic problems**	**7 Hours**

Growth of town & traffic, present difficulties in urban traffic condition, measures, Application of ITS in urban traffic management, VMS, Signal coordination.

Total Lecture	**39 Hours**

Text Books	
1	Traffic Engineering and Transport Planning, Kadiyali, L.R, Khanna Publishers
2	Principles & Practice of Highway Engineering, Chakroborty P Das, Khanna Publisher, 2000
3	Highway Engineering, Rangawala B.S, Charotar Publishing House, 2011
Reference Books	
1	IRC Handbook and MORTH Specifications, Indian Road Congress publications.
2	Fundamentals of Transportation and traffic Operations. Pergamon, Elsevier science Inc
3	Institute of Transportation Engineers, 'Manual of Transportation Engineering Studies', Prentice Hall
YCCE e- library book links [ACCESSIBLE FROM COLLEGE CAMPUS]	
1	http://103.152.199.179/YCCE/Suported%20file/Supprted%20file/e-copies%20of%20books/Civil%20Engineering/59.%20Traffic%20engineering%20and%20transport%20planning%20by%20kadiyali%20pdf.pdf
2	https://onlinelibrary.wiley.com/doi/10.1002/9781119174738.ch4
3	https://onlinelibrary.wiley.com/doi/10.1002/9781119174738.ch1
4	https://link.springer.com/book/10.1007/978-94-015-8293-3
MOOCs Links and additional reading, learning, video material	
1	https://archive.nptel.ac.in/courses/105/107/105107067/
2	https://archive.nptel.ac.in/courses/105/106/105106058/

VI SEMESTER
22CV651__OE-III : Building Services Engineering

Course Outcomes :		
Upon successful completion of the course the students will be able to		
1. Associate relevance of ventilation, acoustics & to understand the methodologies.		
2. Explain special installations in buildings such as electrical, air conditioning, heating		
3. Relate specifications & usage of mechanical installations like lifts, security systems etc.		
4. Articulate causes of fires in buildings & their preventive and protective strategies.		
Unit:1	**Lighting and Ventilation**	**7 Hours**
Day lighting, Fenestration, Daylight Factor, Functions of ventilation, Stack effect, wind effect, Air flow through buildings, cross- ventilation.		
Unit:2	**Acoustics, Sound Insulation and Noise Control**	**6 Hours**
Basic terminology and definitions, Physics of sound. Behaviour of sound in an enclosed space. Requisites for acoustic environment, Noise and its control.		
Unit:3	**Electrical Installations**	**7 Hours**
Different types of wiring need of Earthing, comparison between fuse and MCB, substation, types of lightening fixtures, Building protection against lightening. **Contemporary Issues related to Topic:** arcing and overheating issues due to Loose connections		
Unit:4	**Air Conditioning**	**6 Hours**
Requirement of air conditioning, air conditioning system, Pressure-Enthalpy (heat) diagram of vapour compression cycle, refrigeration effect, Thermodynamics of human body. Psychometric chart.		
Unit:5	**Mechanical Equipment & Installation**	**7 Hours**
Installation of lifts and escalators, Hot Water Provision (Solar and Electrical), Special features required for physically handicapped and elderly, Conveyors, Vibrators, Concrete mixers.		
Unit :6	**Fire protection**	**6 Hours**
Causes of fire in building, Fire classification, Portable extinguishers, fire escapes, Fire detectors and alarm system.		
	Total Lecture	**39 Hours**

Text books	
1	Building services, B.S. Patil, Orient Longman.
2	Building Services Engineering, Fred Hall, Roger Greeno, Butterworth-Heinemann, 2007.
3	Building Services Engineering, David V. Chadderton, Taylor & Francis Group, 2007.

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Reference Books	
1	E.R. Ambrose, "Heat Pumps and Electric Heating", John and Wiley and Sons, Inc., New York, 1968.
2	Handbook for Building Engineers in Metric systems, NBC, New Delhi, 1968.
3	R.G. Hopkinson and J.D. Kay, "The Lighting of buildings", Faber and Faber, London, 1969.
4	William H. Severns and Julian R. Fellows, "Air-conditioning and Refrigeration", John Wiley and Sons, London, 1988.
5	A.F.C. Sherratt, "Air-conditioning and Energy Conservation", the Architectural Press, London, 1980.
YCCE e- library book links [ACCESSIBLE FROM COLLEGE CAMPUS]	
1	https://link.springer.com/book/10.1007/978-3-030-64781-0
2	https://onlinelibrary.wiley.com/doi/10.1002/9781118511022.ch0
MOOCs Links and additional reading, learning, video material	
1	https://nptel.ac.in/courses/105102176
2	https://www.youtube.com/watch?v=MmW2407MSlQ
3	https://www.youtube.com/watch?v=9u5m-EK55tI

VI SEMESTER
22CV652__OE-III : Construction Techniques

Course Outcomes :
Upon successful completion of the course the students will be able to
1. Explain various constituents of Cement & Concrete
2. Select, maintain and operate hand, power tools, equipment used at building construction sites.
3. Adapt to work with interdisciplinary groups at sites, Practice safety measures, rules, regulation at site.
4. Apply new techniques & soft computing tools to solve problems in construction operations.

Unit:1	**INTRODUCTION TO CEMENT AND CONCRETE**	**7 Hours**
Introduction to Cement and Concrete: Introduction to various types of cement, mortar, Ferro cement, Ready mix concrete, Eco-friendly construction.		
Unit:2	**CONSTRUCTION EQUIPMENT**	**7 Hours**
Introduction to Various construction Equipment with its Advantages, Disadvantages and its Uses.		
Unit:3	**TYPE OF STRUCTURE**	**7 Hours**
Load bearing, Frame & Composite. Sub Structure Construction: - Foundation: Necessity and types of foundations, Footings and its Types.		
Unit:4	**SUPER STRUCTURE CONSTRUCTION**	**6 Hours**
Introduction to Stone Masonary and Brick Masonary, pointing and plastering, roofs, Partitions, arches, lintels, stairs etc.		
Unit:5	**New Construction Techniques & Building Services**	**6 Hours**
Fibers and its types, Pre - Engineered Building and its Application & Advantages. Understanding building services- MEP services, for mechanical, electrical, and plumbing. Understanding HVAC Systems, Fire fighting Systems, Fire Alarm Systems, and Plumbing Systems.		
Unit :6	**Hazardous, their solutions & Safety in Construction Operations**	**6 Hours**
Safety in Construction Operations: Introduction to various types of Hazards and their solutions using soft computing techniques, Safety, measurement on construction site.		
	Total Lecture	**39 Hours**

Text Books	
1	M.S. Shetty, " Concrete Technology": S Chand & Co., 6th edition, S. Chand & Company, Limited, 2008
2	Rangwala, Building Construction, 32nd Edition, Charotar Publishing House Pvt. Ltd.2014.
3	Peurifoy, R.L., Ledbetter, W.B. and Schexnayder, C., "Construction Planning, Equipment and Methods", 5th

	Edition, McGraw Hill, Singapore, 1995
4	Arora S.P. and Bindra S.P., "Building Construction, Planning Techniques and Method of Construction", Dhanpat Rai and Sons, 1997
Reference Books	
1	Building Services Engineering by David V Chadderton.
2	Construction Planning, Equipment and methods – Peurifoy-Tata McGraw Hill Publication.
3	Sushil Kumar, Building Construction, 19th Edition, Standard Publisher Distributors 2001, New Delhi, 2001
4	SP 70 (2001): Handbook on Construction Safety Practices
5	Sharma S.C. "Construction Equipment and Management", Khanna Publishers New Delhi, 2002.
6	Deodhar, S.V. "Construction Equipment and Job Planning", Khanna Publishers, New Delhi, 2012.
7	Mahesh Varma, "Construction Equipment and its Planning and Application", Metropolitan Book Company, New Delhi, 1983.
8	Handbook on Functional Requirement of Buildings.
9	Building Services Environmental & Electro – Mechanical Services, by S M Patil, Jain Book Depot
YCCE e- library book links [ACCESSIBLE FROM COLLEGE CAMPUS]	
1	http://link.springer.com/openurl?genre=book&isbn=978-1-4613-6193-0
2	https://onlinelibrary.wiley.com/doi/book/10.1002/9780470168042
MOOCs Links and additional reading, learning, video material	
1	https://archive.nptel.ac.in/courses/105/102/105102206/
2	https://archive.nptel.ac.in/courses/105/103/105103206/

VI SEMESTER

22CV653__OE-III : Introduction to Environmental Management

Course Outcomes :		
Upon successful completion of the course, the students will be able to 1. Explain the importance of environmental management tools. 2. Illustrate the procedures of impact assessment studies in environmental management 3. Explain environmental legislations and policies for environmental resources. 4. Explain the need for resource management and its challenges for sustainable development		
Unit:1	**Sustainable Development**	**7 Hours**
Introduction to Environmental Management: Quality of life, Objectives and components of Environmental Management, Environmental Management in Socio-economic context. Development and Environmental for Sustainable Development. **Contemporary Issues related to Topic**		
Unit:2	**Environmental Impact Assessment**	**7 Hours**
Introduction to Environmental Impact Assessment: Role and Status of EIA in India EIA Procedures, Environmental Impact Statement, Methodologies of EIA. **Contemporary Issues related to Topic**		
Unit:3	**Environmental Clearance and Management Plan**	**7 Hours**
MoEF questionnaire for environmental clearance, critical environmental issues and formulation of strategies of EMP, environmental management plan, development of action plans for critical environmental education programmers. ISO 14001 **Contemporary Issues related to Topic**		
Unit:4	**Environmental Legislation**	**6 Hours**
Environmental Laws and legislation –various enactment and their provisions, Role of State & Central boards of pollution control, Cleaner Technology of production **Contemporary Issues related to Topic**		
Unit:5	**Environmental Audit**	**7 Hours**
Environmental Audit- Concept of EA, procedural aspects of conducting environmental audit, EMS. Introduction to life cycle assessment **Contemporary Issues related to Topic**		
Unit :6	**Resources Management**	**7 Hours**
Depletion of resources – causes & effects, resource utilization, optimal use of resources. **Contemporary Issues related to Topic**		
	Total Lecture	**39 Hours**

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Text Books	
1	Anand Bal, An Introduction to Environmental Management, Himalaya Publishing House., 2009
Reference Books	
1	John Rau & Wooten, Environmental Impact Assessment, Mc Graw Hill. 4th Edition, McGraw Hill Education, 2012
2	Harry W. Gehm, Jacob I. Bregman, a handbook on pollution Control Acts, Central Pollution Control Board, New Delhi, 2015
3	R.K. Sapra, S. Bhardwaj, the New Environmental Age, Ashish Pub. House, New Delhi.2011.
YCCE e- library book links [ACCESSIBLE FROM COLLEGE CAMPUS]	
1	http://link.springer.com/openurl?genre=book&isbn=978-1-4613-6193-0
2	https://onlinelibrary.wiley.com/doi/book/10.1002/9780470168042
MOOCs Links and additional reading, learning, video material	
1	https://nptel.ac.in/courses/114106017
2	https://onlinecourses.nptel.ac.in/noc21_hs83/preview

VI SEMESTER

22CV654__OE-III : Basics of Transportation Engineering

Course Outcomes:		
Upon successful completion of the course the students will be able to 1. Explain importance of various modes of transportation. 2. Compare various characteristics of individual transportation modes. 3. Distinguish appropriate regulations as per various organizations and government bodies for the transportation sector in India. 4. Discus recent development in the transportation sector.		
Unit:1	**Introduction to Transportation Engineering**	**7 Hours**
Importance of Transportation in Nation Development, Different modes of Transportation, Introduction to Road Transportation.		
Unit:2	**Traffic Engineering**	**7 Hours**
Road users, regulations, signs & signals.		
Unit:3	**Organizations and Government Bodies**	**7 Hours**
Introduction to various organizations and government bodies for transportation sector in India.		
Unit:4	**Railway Transportation**	**6 Hours**
Introduction to Railway transportation and its development.		
Unit:5	**Air Transportation**	**7 Hours**
Introduction to Air transportation and its development.		
Unit :6	**Water Transportation**	**7 Hours**
Introduction to Water transportation and its development.		
	Total Lecture	**39 Hours**

Text Books	
1	Khanna & Justo, Highway engineering, Nem Chand & Bros.
2	K.L. Bhanot, Highway Engineering, S. Chand &Company (P) Ltd. New Delhi
3	Railway Engineering, Saxena, Dhanpat Rai Publication.
4	Airport Planning & Design, Goyal & Praveen Kumar, Galgotia Publication
5	Rangwala, Railway Engineering, Charotar Publishing House, 1995.
6	Rangwala, Airport Engineering, Charotar Publishing House, 1996.
7	Srinivasan R. Harbour, "Dock and Tunnel Engineering", 26th Edition 2013.

Reference Books	
1	Indian Road Congress, IRC handbooks ,International Code Council International Code Council
2	Textbook on Transportation Engineering, S. P. CHANDOLA, 200, S. Chand Publishers, New Delhi
3	Planning and Design of Airports, Robert Horonjeff, Francis Mckelvey, William Sproule, Seth Young, Fifth Edition 2010, McGraw Hill Professionals
YCCE e- library book links [ACCESSIBLE FROM COLLEGE CAMPUS]	
1	http://103.152.199.179/YCCE/Suported%20file/Supprted%20file/e-copies%20of%20books/Civil%20Engineering/
2	http://103.152.199.179/YCCE/Suported%20file/Supprted%20file/e-copies%20of%20books/Civil%20Engineering/17.%20Highway_Engineering_Khanna_and_Justo.pdf
MOOCs Links and additional reading, learning, video material	
1	https://nptel.ac.in/courses/105105107
2	https://nptel.ac.in/courses/105105216
3	https://nptel.ac.in/courses/105107123
4	https://archive.nptel.ac.in/courses/105/107/105107123/
5	https://archive.nptel.ac.in/courses/105/103/105103204/
6	https://archive.nptel.ac.in/courses/105/105/105105215/

VI SEMESTER

22CV655__OE-III : Basics of Water Resource Engineering

Course Outcomes:		
Upon successful completion of the course the students will be able to 1. Explain the basic concept of hydrology and various processes. 2. Compute various components of the hydrological processes. 3. Calculate geo-hydrological parameters. 4. Illustrate various methods of groundwater recharge.		
Unit:1	**Introduction to Hydrology and Precipitation**	**7 Hours**
Introduction: Engineering Hydrology, Hydrological Cycle, Hydrological Equation, Importance of Temperature, Wind and Humidity in Hydrological Studies, Latent Heat, Vapour Pressure, Bulb Pressure, circulation cell, Residence time. **Precipitation:** Definition, Types and Forms of Precipitation, Factors Affecting Precipitation, Measurement of Precipitation by using Rain-gauges, Optimum Number of Rain-gauge Stations and consistency of rainfall data. **Contemporary Issues related to Topic**		
Unit:2	**Infiltration and Evaporation**	**6 Hours**
Infiltration: Factors Affecting Infiltration, Horton's equation, Infiltration Indices and Numerical. **Evaporation:** Factors Affecting Evaporation, Estimation of Evaporation and Evaporation Control. Transpiration and Evapo-transpiration and water balance equation with respect to lake hydrology, catchment characteristics. **Contemporary Issues related to Topic**		
Unit:3	**Runoff**	**6 Hours**
Runoff: Runoff, Sources of Runoff, Components of Runoff, Classification of Streams, inphalmal and emphalmal stresses, Factors affecting runoff, Rainfall Runoff Relationships, Numerical on runoff estimation. Introduction to Interception Storage and Depression Storage. **Contemporary Issues related to Topic**		
Unit:4	**Hydrograph**	**6 Hours**
Hydrograph : Components of hydrograph, types of basin, factors affecting hydrograph, S-curve hydrograph, Synthetic hydrograph, mass curve, Derived Rainfall Hydrograph, Unit Hydrograph, Mass curve, Numericals on Hydrograph. **Contemporary Issues related to Topic**		
Unit:5	**Introduction to Geo-hydrology**	**7 Hours**
Introduction, Occurrence and Distribution of Groundwater, Aquiclude, Aquitard, Aquifers, Types and Properties of Aquifer, Specific Yield, Specific Retention, Porosity, Permeability, Water Table, Darcy's law and Introduction to Hydraulics of Wells. **Contemporary Issues related to Topic**		
Unit :6	**Ground Water Recharge**	**7 Hours**
Introduction, Selection of Recharge Sites, Recharging Methods, Spreading Method, Induced Recharge Method, Recharge Well Method, Sub-surface Dams, Waste Water Recharge and Recharge through Rain Water Harvesting. **Contemporary Issues related to Topic**		
	Total Lecture	**39 Hours**

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Text Books	
1	Ojha, C.S.P., Berndtsson, R., and Bhunya, P., Engineering Hydrology, Oxford University Press, 2008
2	Raghunath H.M., Hydrology, New Age International Publishers, 1985.
3	Reddy R., Hydrology, Tata McGraw-Hill New Delhi, 2012.
4	VenTe Chow, David, Larry, Applied Hydrology, Mac Graw Hill Publications,1988.
5	Dr. Jaya Rami Reddy, Hydrology, Laxmi Publications. 2008.
6	K. C. Patra, Hydrology and Water Resources Engineering, 2nd edition, 2008
Reference Books	
1	Todd, D.K., Ground Water Hydrology**,** John Wiley & Sons**,** 2005.
2	Subramnaya, K., Engineering Hydrology**,**Tata McGraw-Hill Publishing Company Limited, 2017.
3	Sharma R.K., Sharma T.K., Hydrology & Water Resources Engineering, DhanpatRai Publications, 2002.
4	Linsley, R.K., Kohler, M.A. and Paulhus**,**Hydrology for Engineers**,** Tata McGraw-Hill Publishing Company Limited,1975.
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1	http://link.springer.com/openurl?genre=book&isbn=978-3-540-89464-3
2	http://link.springer.com/openurl?genre=book&isbn=978-3-662-22016-0
3	http://link.springer.com/openurl?genre=book&isbn=978-1-62703-594-1
4	http://link.springer.com/openurl?genre=book&isbn=978-1-4612-9177-0
5	http://link.springer.com/openurl?genre=book&isbn=978-3-540-70804-9
6	http://103.152.199.179/YCCE/Suported%20file/Supprted%20file/e-copies%20of%20books/Civil%20Engineering/
MOOCs Links and additional reading, learning, video material	
1	NPTEL : Civil Engineering - Water Resources Engineering
2	NPTEL : Civil Engineering - Water Resources Systems Planning and Management
3	NPTEL : Civil Engineering - NOC:Rural Water Resources Management
4	NPTEL : Civil Engineering - Water Resources Systems : Modeling Techniques and Analysis

VI SEMESTER

22CV656__OE-III : Elements of Water Power Engineering

Course Outcomes:		
Upon successful completion of the course the students will be able to 1. Examine fundamentals of hydropower and hydropower potential. 2. Explain components of intake structure and surge tank. 3. Determine the flow parameters of turbines. 4. Explain the pump storage plant and its economics.		
Unit:1	**Sources of energy**	**7 Hours**
Introduction: Sources of energy, types of power station, choice of type of generation, components of water power project, types and general layouts of various hydropower schemes, General arrangements of a power station, powerhouse, sub-structure and super structure, underground power station–necessity, principal, types, development, need of hydropower. **Contemporary Issues related to Topic**		
Unit:2	**Power potential**	**6 Hours**
Power potential, storage and structures related to hydro-power, Nature of demand: Load curve, load duration curves, load factor, plant factor, plant use factor, firm power secondary power. **Contemporary Issues related to Topic**		
Unit:3	**Intake structures**	**6 Hours**
Intake structures: Types, level of intake, hydraulics of intake structures, trash rack, transition, types of gates. Conduits: Types, economic section, power canals, pen-stock types and diameter pipe supports, anchor blocks, tunnels classification, location and tunnel linings. **Contemporary Issues related to Topic**		
Unit:4	**Surge Tank**	**6 Hours**
Simple surge tank, Functions and behavior of the surge tanks, location, types of surge tanks, fore-bay. **Contemporary Issues related to Topic**		
Unit:5	**Turbines**	**7 Hours**
Turbines: Classification of turbines, characteristics of different types, choice of type of turbine, turbine setting and cavitation, Tail race: Functions, types, channel and tunnel, draft tubes-function and principal types. **Contemporary Issues related to Topic**		
Unit :6	**Pumped storage plants**	**7 Hours**
Pumped storage plants, purpose and general layout of pumped storage schemes, main types, typical arrangements of the upper reservoirs, economics of pumped storage plants. **Contemporary Issues related to Topic**		

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Total Lecture	**39 Hours**

Text Books	
1	Dandekar M. M. & Sharma K. N, Water Power Engineering, Vikas Publishing House Pvt. Ltd., New Delhi.
2	Sharma R.K. & Sharma T.K., Water Power Engineering, S. Chand Publication.
3	S. K Garg, Irrigation Engineering & Hydraulic Structure (Volume-I & II), Khanna Publications.
4	Arora K. R., Irrigation, Water Power & Water Resources Engineering, Standard Publishers Distributors.
Reference Books	
1	A. K. Raja, A. P. Srivastava, M. Dwivedi, Power Plant Engineering, New age International publishers
YCCE e- library book links [ACCESSIBLE FROM COLLEGE CAMPUS]	
1	Irrigation and Water Power Engineering By Dr. B. C. Punmia Dr. Pande Brij Basi Lal Ashok Kumar Jain Arun Kumar Jain | Meg Nas - Academia.edu
2	https://ia802309.us.archive.org/30/items/hydro-dandekar-pdf/hydro dandekar pdf.pdf
3	103.152.199.179/YCCE/Suported file/Supprted file/e-copies of books/Civil Engineering/9. Irriagtion Engineering and Hydraulic Structures by Santosh Kuma- By EasyEngineering.net.pdf
MOOCs Links and additional reading, learning, video material	
1	Turbine - Wikipedia

VI SEMESTER

22CV671__OE-IV : Elements of Earthquake Engineering

Course Outcomes :
Upon successful completion of the course the students will be able to 1. Examine the earthquake parameters and ground motion characteristics. 2. Explain the provisions of IS codes used for the design of structures. 3. Prepare the methods for retrofitting earthquake-damaged structures. 4. Illustrate the damages caused due to past earthquakes with their effective management.

Unit:1	**Basics of Seismology**	**7 Hours**
Geology of earth, earthquake and their types, causes of an earthquake, plate tectonics, the configuration of tectonic plates in a globe, elastic rebound theory, Faults and types of faults, Basic terminologies, measurement of earthquake – magnitudes & intensity scales.		
Unit:2	**Interpretation of Earthquake Data**	**6 Hours**
Seismic waves, strong ground motion, recording of earthquakes, analysis and interpretation of earthquake data, ground motion parameters, Determination of magnitude, epicentral distance, focal depth, etc. Contemporary Issues related to Topic: Generation of Response Spectra in Microsoft Excel		
Unit:3	**Introduction to Design Strategies as per Indian Standards**	**6 Hours**
Fundamentals of earthquake vibrations of structures, Concept of static and earthquake-resistant design, Introduction to design philosophies and strategies, Introduction to various loading and design codes such as IS 456:2000, IS:1893:2016, etc.,		
Unit:4	**Behavior of Structures During Earthquake**	**7 Hours**
Seismic coefficient method, Importance of Architectural Features, irregularities in buildings, consequences of irregularities, failure modes of structural elements, Case study of RC framed buildings.		
Unit:5	**Introduction to Earthquake-Resistant Features and Retrofitting Techniques of Structures**	**7 Hours**
Introduction of load-bearing and framed structures, non-engineered structures, earthquake resistant features of load-bearing and masonry structures, strengthening, rehabilitation, and retrofitting of earthquake-damaged structures.		
Unit :6	**Seismicity of the World and Various Case Studies**	**6 Hours**
Seismicity of world and India, Case studies on the behavior of structures during past earthquakes - causes and sources of earthquake damage, remedial measures Earthquake disaster management, mitigation, and social aspects of earthquakes		
	Total Lecture	**39 Hours**

			July 2022	1.00	Applicable for AY 2022-23 Onwards
Chairperson	Dean (Acad. Matters)	Dean OBE	Date of Release	Version	

Text Books	
1	Agrawal &Shrikhande, Design of Earthquake Resistant Structures, 3 rd 2006, Prentice – Hall of India Pvt. Ltd
2	Paulay, T. & Prestiley M.J.N., Seismic design of R C & Masonry Buildings, 2nd 1999, John Willey & Sons
3	Asadour H. Hadjian, Basic Elements of Earthquake Engineering, 2015, Wiley
Reference Books	
1	C.V.R. Murty, Earthquake Tips, 2005, NICEE, IITK
2	Robin K. McGuire, Seismic Hazard and Risk Analysis, 2004, Earthquake Engineering Research Institute; First edition.
3	Roberto Villaverde, Fundamental Concepts of Earthquake Engineering, 2009, CRC Press
4	Guidelines for Earthquake Resistant Non- Engineered Construction, Anand S.Arya Teddy BOEN ,Yuji ISHIYAMA ,UNESCO, Published in 2014
YCCE e - library book links [ACCESSIBLE FROM COLLEGE CAMPUS]	
1	http://link.springer.com/openurl?genre=book&isbn=978-3-540-93817-0
2	http://103.152.199.179/YCCE/Suported%20file/Supprted%20file/e copies%20of%20books/Civil%20Engineering/75.%20EARTHQUAKE%20RESISTANT%20DESIGN%20_%20Pankaj%20Agrawal.pdf
3	http://103.152.199.179/YCCE/Suported%20file/Supprted%20file/e-copies%20of%20books/Civil%20Engineering/76.%20FUNDAMENTALS%20OF%20EARTHQUAKE%20ENGINEERING_ELANSHAI_&_SARNO.pdf
4	http://103.152.199.179/YCCE/Suported%20file/Supprted%20file/e-copies%20of%20books/Civil%20Engineering/77.%20INTRODUCTION_TO_SEISMOLOGY_PETER_M_SHEARER.pdf
5	http://103.152.199.179/YCCE/Suported%20file/Supprted%20file/e-copies%20of%20books/Civil%20Engineering/80.%20Basics%20of%20structural%20dynamics%20and%20seismic%20design.pdf
MOOCs Links and additional reading, learning, video material	
1	https://www.traditional-is-modern.net/LIBRARY/GUIDELINES/1986IAEE-Non-EngBldgs/1986GuidelinesNon-Eng(ALL).pdf
2	https://www.nicee.org/EQTips.php
3	https://archive.nptel.ac.in/courses/105/104/105104200/
4	https://archive.nptel.ac.in/courses/105/101/105101004/
5	https://archive.nptel.ac.in/courses/105/102/105102016/
6	https://archive.nptel.ac.in/courses/105/101/105101209/

VI SEMESTER

22CV672__OE-IV : Introduction to Finite Element Method

Course Outcomes :
Upon successful completion of the course the students will be able to
1. Explain the concepts of FEM.
2. Apply concepts of FEM for the derivation of elemental equation.
3. Analyze engineering problems using FEM.
4. Explain Modelling, storage and solution techniques.

Unit:1	**Introduction**	**7 Hours**
Development, Historical background, Applications, Advantages and Disadvantages of FEM, General steps of FEM, direct equilibrium approach, Variational approach, Rayleigh Ritz method, application to simple problems.		
Unit:2	**Shape functions**	**6 Hours**
Introduction, requirement of Ideal displacement functions, Derivation of shape functions using Cartesian Coordinates, Lagrange and Serendipity elements. Contemporary Issues related to Topic		
Unit:3	**Application of FEM to 1D Problems**	**6 Hours**
Derivation of element property matrix and influence vector, application, Application to bar, truss, steady state heat conduction, steady state flow through porous medium problems.		
Unit:4	**Application of FEM to 2D problems**	**7 Hours**
Equilibrium equations, Triangular and Rectangular element formulation using Cartesian Coordinates, Application to two-dimensional stress analysis.		
Unit:5	**Isoparametric Elements**	**7 Hours**
Natural coordinates, Isoparametric elements, Application to 1D and 2D Problems.		
Unit:6	**Storage Techniques**	**6 Hours**
Numerical integration, Modeling, storage and solution techniques.		
	Total Lecture	**39 Hours**

Text Books	
1	Chandrapatla T.R., Belegundu A. D. Introduction to Finite Elements in Engineering, Prentice Hall India, 1991
2	Godbole P.N, Introduction to Finite Element Method, I. K. International Publishing House Pvt. Ltd., New Delhi, 2013
3	Desai Y.M., Eldho T.I. and Shah A. H., Finite Element Method s and Application to Engineering, Pearson, 2011

Reference Books	
1	Krishnamoorthy C S, "Finite Element Analysis – Theory and Programming", Tata McGraw Hill Publishing Co., New Delhi, 1994.
2	Cook R D, Malkus D S, Plesha M E and Witt R J, "Concepts and Applications of Finite Element Analysis", John Weily & sons inc, New York, Fourth Edition, 2003.
3	Rajasekaran S, "Finite Element Analysis in Engineering Design". S Chand & Co., 2003.
YCCE e- library book links [ACCESSIBLE FROM COLLEGE CAMPUS]	
1	http://link.springer.com/openurl?genre=book&isbn=978-3-211-81202-0
2	http://link.springer.com/openurl?genre=book&isbn=978-1-4020-8732-5
3	http://link.springer.com/openurl?genre=book&isbn=978-3-540-25181-1
4	http://103.152.199.179/YCCE/Suported%20file/Supprted%20file/e-copies%20of%20books/Civil%20Engineering/13.%20367869499-Finite-Element-Method-With-Applications-in-Engineering.pdf
MOOCs Links and additional reading, learning, video material	
1	https://nptel.ac.in/courses/105107209

VI SEMESTER

22CV673__OE-IV : Air Pollution and Solid Waste Management

Course Outcomes :

Upon successful completion of the course the students will be able to

1. Classify the type, sources & effect of air pollutants.
2. Explain the parameters affecting air pollution and various methods of measurement.
3. Illustrate various air pollution control equipment & pollution caused due to automobile exhaust and basics of noise pollution.
4. Interpret the concepts of solid waste management, treatment and disposal methods.

Unit:1	**Introduction to air pollution**	**6 Hours**

Introduction, Air pollution episodes, Atmosphere and its zones, classification and sources of air pollutants, effects of air pollutants on man, plants animal & materials.

Contemporary Issues related to Topic

Unit:2	**Meteorological Aspects**	**7 Hours**

Atmospheric stability, plume behaviour**,** Ambient air sampling and stack sampling, collection of particulates and gaseous pollutants.

Contemporary Issues related to Topic

Unit:3	**Air pollution control methods and equipment**	**6 Hours**

Principle of control methods for particulates and gaseous pollutants, gravity settlers, electrostatic precipitators, bag filters cyclones, wet scrubbers, automobile exhaust: Pollution due to diesel and petrol engines, exhaust treatment and abatement, noise Pollution: Sources, ill effects, control measures.

Contemporary Issues related to Topic

Unit:4	**Introduction to solid waste management**	**7 Hours**

Introduction, Sources, quantification and characterization, classification and components, sampling and analysis Method of collection.

Contemporary Issues related to Topic- Composition of waste.

Unit:5	**Equipment for solid waste**	**6 Hours**

Equipment used for collection and transportation, transfer stations, solid waste processing and management.

Contemporary Issues related to Topic

Unit :6	**Treatment for solid waste**	**7 Hours**

Treatment and disposal methods: composting, sanitary landfills, Incineration – concept, components and applications, leachate management.

Contemporary Issues related to Topic

Total Lecture	**39 Hours**

			July 2022	1.00	Applicable for AY 2022-23 Onwards
Chairperson	Dean (Acad. Matters)	Dean OBE	Date of Release	Version	

Text Books	
1	M.N. Rao & H.V.N. Rao, 1988, Air Pollution, Tata McGraw Hill Publishing Co. Ltd.
2	C.S. RAO, 2007, Environmental Pollution Control Engineering, New Age International, Wiley Estern Ltd. New Delhi.
3	Stern A. C., 1973, Air pollution, Academic Press.
4	A.D. Bhide & Sunderesan B.B., 1983, Solid Waste Management in Developing countries, INSDOC, New Delhi.
5	Tohobanoglous, 1993, Intgrated Solid Waste Management Engineering Principle and Management Issues, McGraw-Hill publication Ltd.
6	K. V. S. G. Murlikrishna, 1995, Air Pollution, Kaushal & Company.
Reference Books	
1	P. Aarne Vesilind, William Worrell & Debra Reinhart, 2002, Solid Waste Engineering, Cengage Learning India pvt. Ltd.
2	Dr. Y Anjaneyulu, 2002, Air Pollution and Control Technologies, Allied Publisher pvt. Ltd. Waste Management: A Reference Handbook. Contributors: Jacqueline Vaughn - Author. Publisher: ABC-Clio.
YCCE e- library book links [ACCESSIBLE FROM COLLEGE CAMPUS]	
1	https://link.springer.com/search?query=air+pollution
2	https://link.springer.com/search?query=solid+waste+mangement
MOOCs Links and additional reading, learning, video material	
1	https://archive.nptel.ac.in/courses/105/102/105102089/
2	https://archive.nptel.ac.in/courses/105/107/105107213/

VI SEMESTER

22CV674__OE-IV : Environmental & Social Impact Assessment

Course Outcomes:

Upon successful completion of the course the students will be able to

1. Explain the EIA process, analyse major environmental issues for development projects.
2. Examine model tasks within an EIA cycle.
3. Construct portions of environmental documents through administrative and legal requirements.
4. Illustrate the standards of professional practice about EIA.

UNIT:1	**Evolution of EIA**	**07 Hrs**
Concepts, Nature & Type of impacts, Need of EIA, Participation in EIA, New concepts- Life cycle assessment.		
UNIT:2	**Methods for impact assessment**	**06 Hrs**
Screening, Scoping, Base line studies, Check list, Mitigation, Matrices, Interaction of network methodologies.		
UNIT:3	**Assessment of impact for air and noise environment**	**07 Hrs**
Basic information of air quality, identification of type and quantity of air pollutant, impact prediction and assessment.		
UNIT:4	**Assessment of impact for water and soil environment**	**06 Hrs**
Basic information of water Quality, identification of impact, prediction of impact and assessment, mitigations.		
UNIT:5	**Assessment of impact on cultural and socioeconomic environment**	**07 Hrs**
Public participation in EIA, Cumulative environmental effects Monitoring and auditing: after the decision. Contemporary Issues - Cost-benefit Analysis		
UNIT:6	**EIA notification by Ministry of Environment and Forest (Govt. of India)**	**06 Hrs**
Provisions in the EIA notification, Categorization of Industries for seeking environmental clearance from concerned authorities, Environmental management plan post environmental monitoring. Case studies in EIA.		
	Total Lecture	**39 Hours**

Text Books

01	Anand Bal, An Introduction to Environmental Management, Himalaya Publishing House.
02	Canter L.W. 1977. Environmental Impact Assessment. McGraw Hill, Inc. Printed in the United States of America.
03	Peter Watten (Eds.) – "Environmental Impact Assessment Theory and Practice", Unwin Hyman, London (1988).

Reference Books

01	John G. Rau and David C Hooten (Ed)., "Environmental Impact Analysis Handbook", McGraw-Hill Book Company, 1990.
02	"Environmental Assessment Source book", Vol. I, II & III. The World Bank, Washington, D.C., 1991.
03	Judith Petts, "Handbook of Environmental Impact Assessment Vol. I & II", Blackwell Science, 1999.

04	Bass, Herson and K. Bogdon, 2001, The NEPA Book: A step-by-step guide on how to comply with the National Environmental Policy Act, Solano Press.
05	Shukla, S.K. and Srivastava, P.R., "Concepts in Environmental Impact Analysis", Common Wealth Publishers, New Delhi, 1992.
YCCE e- library book links [ACCESSIBLE FROM COLLEGE CAMPUS]	
1	https://link.springer.com/book/10.1007/978-94-011-2528-4
2	https://link.springer.com/book/10.1007/978-3-030-80942-3
3	https://link.springer.com/chapter/10.1007/978-94-009-6795-3_21
4	https://link.springer.com/book/10.1007/978-3-030-83152-3
MOOCs Links and additional reading, learning, video material	
1	https://onlinecourses.swayam2.ac.in/nou22_bt06/preview
2	https://onlinecourses.swayam2.ac.in/cec22_hs41/preview
3	https://onlinecourses.swayam2.ac.in/nou22_mg05/preview

VI SEMESTER
22CV675__OE-IV : Disaster Management

Course Outcomes:

Upon successful completion of the course the students will be able to

1. Distinguish the nature & types of disaster.
2. Report its preparedness, role of different government & social agencies.
3. Predict methods of the extent of risk and cost assessment.
4. Conclude provisions, management of disaster, post disaster condition & its management

Unit:1	Understanding Natural Disasters	8 Hours

Understanding Natural Disasters: Natural disasters, category of disaster such as hydrological, wind-related, geo-physical, hydro-geological and climatic, causes and impacts, along with illustrations and geographical distribution. Flood, Drought, Cyclone, Earthquakes, Landslides, Avalanches, Volcanic Eruptions, Heat and Cold Waves, Climate Change: Global Warming, Sea Level Rise, Ozone layer Depletion.

Contemporary Issues related to Topic

Unit:2	Man-Made Disasters	5 Hours

Man-Made Disasters: Nuclear Disasters, Chemical Disasters, Biological Disasters, Building Fire, Coal Fire, Forest Fire, Oil Fire, Air Pollution, Water Pollution, Deforestation, Industrial Pollution, Road Accidents, Rail Accidents, Air Accidents, Sea Accidents, Green House Effect.

Contemporary Issues related to Topic

Unit:3	Risk & Cost Assessment	6 Hours

Risk & Cost Assessment: Geographical conditions, Population, Living habits, Threats, Extent of damages to the lives, agricultural area, industrial units, Awareness & Safety Program. Relief arrangement & essential components, Shelters, Rescue search tools and equipments, transport facilities. Method of Cost assessment.

Contemporary Issues related to Topic

Unit:4	Disaster Preparedness	7 Hours

Disaster Preparedness: Information Technology: Role in Disaster Preparedness with Special Reference to Geographical Information System, Use and Application of Emerging Technologies in Disaster Preparedness, Role of Information, Education, Communication.

Contemporary Issues related to Topic

Unit:5	Disaster Response	6 Hours

Disaster Response: Psychological Response, Trauma and Stress Management. Rumour and Panic Management, Minimum Standards of Relief, Managing Relief, Recovery.

Contemporary Issues related to Topic

Unit :6	Reconstruction and Rehabilitation	7 Hours
Reconstruction and Rehabilitation : Damage Assessment, Management and Development Information Structural, Development of Physical and Economic Infrastructure, Funding Arrangements for Reconstruction, Disaster Resistant House Construction, Role of Housing / Building Authorities, Education and Awareness Role of Information Dissemination, Participative Rehabilitation Process: Some Case Studies Long-term Recovery. **Contemporary Issues related to Topic**		
	Total Lecture	**39 Hours**

Text Books	
1	Satish Modh: Introduction to Disaster Management, Macmillan, 2009
2	Amit Awasthy: Disaster Management: Warning Response and Community Relocation, Global India Publications, 2009
3	Jyoti Purohit :Disaster Management in India: Structure and Challenges, 2013
4	Prakash Singh: Disaster Response in India, www.MilitaryBookshop.Companyuk, 2011
Reference Books	
1	D.B.N. Murthy: Disaster Management: Text and Case Studies, Deep and Deep Publications, 2007
2	National Policy on Disaster Management, NDMA, New Delhi, 2009.
3	A Global Report - Reducing Disaster Risk, A Challenge for Development; UNDP Publication, 2004.
4	Disaster Management Act. (2005), Ministry of Home Affairs, Government of India, New Delhi, 2005.
YCCE e- library book links [ACCESSIBLE FROM COLLEGE CAMPUS]	
1	
MOOCs Links and additional reading, learning, video material	
1	NPTEL
2	(PDF) Disaster Management (researchgate.net)
3	disaster-management-handbook.pdf

VI SEMESTER
22CV605__Project Phase-I

Course Outcomes :

Upon successful completion of the course the students will be able to

1. Illustrate a sound technical knowledge of their selected project topic.
2. Write problem identification, formulation and solution.
3. Design engineering solutions to complex problems utilizing a systems approach including ability to work in a team.
4. Express effectively about the solution of the problem to enhance writing and communication skill.

Project will be allotted to a group of students, (preferably not more than 06) as per their choice and previous scores. The project work will be carried out by the students as directed by their guides. Evaluation will be done by continuous assessment and will be based on involvement of the student in the work as per thrust area.

VI SEMESTER

Audit Course

MLC126__ YCAP6

Nagar Yuwak Shikshan Sanstha's

Yeshwantrao Chavan College of Engineering

(An Autonomous Institution affiliated to Rashtrasant Tukadoji Maharaj Nagpur University)

(Accredited 'A++' Grade by NAAC with a score of 3.25)

Hingna Road, Wanadongri, Nagpur - 441 110

Bachelor of Technology

SoE & Syllabus 2022

7th Semester

(Department of Civil Engineering)

B. Tech in Civil Engineering

Nagar Yuwak Shikshan Sanstha's

Yeshwantrao Chavan College of Engineering

(An Autonomous Institution affiliated to Rashtrasant Tukadoji Maharaj Nagpur University)

SoE No. 22CV-101

B.TECH SCHEME OF EXAMINATION 2022

(Scheme of Examination w.e.f. 2022-23 onward)

(Department of Civil Engineering)

B. Tech in Civil Engineering

SN	Sem	Type	BoS/ Deptt	Sub. Code	Subject	T/P	Contact Hours				Credits	% Weightage			ESE Duration Hours
							L	T	P	Hrs		MSEs*	TA**	ESE	
SEVENTH SEMESTER															
1	7	PC	CV	22CV701	Estimating & Costing	**T**	3	0	0	3	**3**	30	20	50	3 Hrs
2	7	PC	CV	22CV702	Lab:- Estimating andCosting	**P**	0	0	2	2	**1**		60	40	
3	7	PC	CV	22CV703	Project Planning and Quality Assurance	**T**	3	0	0	3	**3**	30	20	50	3 Hrs
4	7	PC	CV	22CV704	Irrigation Engineering	**T**	3	0	0	3	**3**	30	20	50	3 Hrs
5	7	PE	CV		**Professional Elective-IV**	**T**	3	0	0	3	**3**	30	20	50	3 Hrs
6	7	PE	CV		**Professional Elective-V**	**T**	3	0	0	3	**3**	30	20	50	3 Hrs
7	7	PE	CV		**Professional Elective-VI**	**T**	3	0	0	3	**3**	30	20	50	3 Hrs
8	7	PR	CV	22CV705	Project Phase-II	**P**	0	0	10	10	**5**		60	40	
9	7	STR	CV	22CV706	Campus Recruitment Training (CRT)	**P**	0	0	0	0	**2**		100		
					TOTAL SEVENTH SEM		**18**	**0**	**12**	**30**	**26**				

Professional Elective - IV

1	7	PE-IV	CV	22CV711	PE-IV : Natural Resources Management
2	7	PE-IV	CV	22CV712	PE-IV : Finite Element Method
3	7	PE-IV	CV	22CV713	PE-IV : Introduction to Structural Dynamics
4	7	PE-IV	CV	22CV714	PE-IV : Optimization Techniques
5	7	PE-IV	CV	22CV715	PE-IV : Environmental Legislation and Management System
6	7	PE-IV	CV	22CV716	PE-IV : Advanced Foundation Engineering
7	7	PE-IV	CV	22CV717	PE-IV :Advanced Transportation Engineering

Professional Elective - V

1	7	PE-V	CV	22CV731	PE-V : Maintenance and Rehabilitation Engineering
2	7	PE-V	CV	22CV732	PE-V : Modern Surveying Technique
3	7	PE-V	CV	22CV733	PE-V : Advanced Steel Design
4	7	PE-V	CV	22CV734	PE-V : Design of Bridge Structures
5	7	PE-V	CV	22CV735	PE-V : Industrial Waste Water Treatment and Reuse
6	7	PE-V	CV	22CV736	PE-V : Finite Element methods in Geotechnical Engineering
7	7	PE-V	CV	22CV737	PE-V : Structural Engineering Practices
8	7	PE-V	CV	22CV738	PE-V : Advanced Fluid Mechanics and Hydraulic Machines

Professional Elective - VI

1	7	PE-VI	CV	22CV751	PE-VI : Modern and Innovative Construction Materials
2	7	PE-VI	CV	22CV752	PE-VI : Building Services
3	7	PE-VI	CV	22CV753	PE-VI : Introduction to Remote Sensing
4	7	PE-VI	CV	22CV754	PE-VI : Advanced Hydraulics
5	7	PE-VI	CV	22CV755	PE-VI : Watershed Management
6	7	PE-VI	CV	22CV756	PE-VI : Pavement Design
7	7	PE-VI	CV	22CV757	PE-VI: Water Power Engineering

SN	Sem	Type	BoS/ Deptt	Sub. Code	Subject	T/P	L	T	P	Hrs	Credits	MSEs*	TA**	ESE	ESE Duration Hours
EIGHTH SEMESTER															
1	8	STR	CV	22CV801	Internship - training / Seminar & Report	**P**	0	0	0	0	**3**		60	40	
2	8	ER	CV	22CV802	Extracurricular Activity Evaluation	**P**	0	0	0	0	**2**		100		
					TOTAL EIGHTH SEM		**0**	**0**	**0**	**0**	**5**				
					GRAND TOTAL		**124**	**4**	**57**	**183**	**165**				

Chairperson	Dean (Acad. Matters)	June 2022	1.00
		Date of Release	Version

Applicable for AY 2022-23 Onwards

VII SEMESTER
22CV701__Estimating and Costing

Course Outcomes:

Upon successful completion of the course the students will be able to

1. Explain the definitions involved in estimates of structures.
2. Illustrate the specifications and quantities of materials in different items to prepare the estimate.
3. Estimate the quantity and costing of building, road, hill road and canal.
4. Calculate the valuation and rent of civil engineering structures.
5. Explain the tenders and carry out the construction of civil engineering structures.

Unit:1	**General** & **Proposal and Development of Project**	**6 Hours**

Importance of the subject, purpose of quantity estimates, mode and unit of measurement as per I.S.1200, methods and stages of estimates, items of a work and their description, approximate estimation of Civil engineering works.

Proposal and Development of Project: Project Management Consultant & their role, various important terminologies required like work charged establishment, muster roll, contingencies, percentage charges, measurement book, overheads etc**.**

Unit:2	**Specifications & Cost Build up**	**7 Hours**

Specifications: Purpose and principles of specifications, types of specifications, writing and developing detailed specifications of important items.

Cost Build up: Purpose and principles, importance of Schedule of rates (CSR) in cost estimates, factors affecting analysis of rates, information from National Building Organization, task work, factors affecting task work, market rates, escalation.

Unit:3	**Estimate of Various Structures**	**6 Hours**

Methods of detailed estimates, forms used for detailed estimates, working out the quantities of various materials required for construction of different Civil Engineering structures like building.

Unit:4	**Earthwork of Roads, Hill Roads & canals**	**7 Hours**

Definition, Different methods of earthwork, Cross & Longitudinal sections, fully filling, fully cutting & partly filling & partly cutting, volume of Earthwork in filling & Cutting, Mass Curve.

Unit:5	**Valuation**	**7 Hours**

Purpose of valuation, factors affecting value of property price and cost, market value, potential value, sentimental value, scrap value etc. real estate, net and gross return, freehold and leasehold, sinking fund, depreciation, capitalized value, methods of valuation, differed annuity, valuation tables and rent fixation.

Contemporary Issues related to Topic-Construction and Demolition (CD) waste.

Unit :6	Tenders and Contracts	6 Hours
Arranging Works: Pretender and contract planning, tender notice, acceptance of tender, Tender documents, various schedules in the tender document, essentials of contract, types of contracts, conditions of contract measurement and payment to contractor, arbitration.		
	Total Lecture	**39 Hours**

Text book	
1	Estimating, Costing, Specification & valuation in Civil Engineering, Chakraborti M. UBS Publication, Calcutta, 2010
Reference Books	
1	Estimating & Costing, Chandola S.P. &Vazirani V.N, Khanna Publishers 2-B, Nath market, Naisarak, Delhi, 2010
2	Estimating & Costing in civil Engineering, Dutta B.N, UBS Publishers distributors ltd., 5 Ansari road, New Delhi, February 1999
3	Estimating, Costing and valuation, Rangwala S.C, Charotar Publishing house, opposite Amul diary, court road, Anand, 2011
YCCE e- library book links [ACCESSIBLE FROM COLLEGE CAMPUS]	
1	https://link.springer.com/search?query=estimating+and+costing
2	https://web.p.ebscohost.com/ehost
MOOCs Links and additional reading, learning, video material	
1	

VII SEMESTER
22CV702__ Lab : Estimating and Costing

Course Outcomes:

Upon successful completion of the course the students will be able to

1. Illustrate the specifications and quantities of materials in different items to prepare the estimate.
2. Estimate the quantities in buildings, quantities of doors, windows, and steel in RCC beams and slab and roads.
3. Explain the tender documents and conditions of contracts.

S.N.	Experiments based on- (Any 8 of the following)
1	Study of IS-1200
2	Detailed specification of five major items.
3	Rate analysis of five major items.
4	Detailed estimate of Load bearing structures – Any Two Plans.
5	Detailed estimate of RCC frame structures – Any Two Plans.
6	Detailed estimate of Earth work of road for 1 km length.
7	A complete set of Tender documents.
8	Set of major Conditions of contracts.
9	Detailed estimate of woodwork for Doors and Windows.
10	Expert Lecture on "Role of Quantity Surveyor".

VII SEMESTER
22CV703__Project Planning and Quality Assurance

Course Outcomes :		
Upon successful completion of the course the students will be able to		
1. Apply the knowledge of planning & Execution of construction projects. 2. Explain Construction Scheduling & Network Analysis. 3. Explain the quality control aspect in planning & management with safety provisions. 4. Explain the legal aspects & various laws in construction projects.		
Unit:1	**Project Management**	**6 Hours**
Introduction to project planning, stages of planning, Various function of construction management, Resources, Classification of Civil Engineering Drawings.		
Unit:2	**Contracts, Specification & Scheduling**	**7 Hours**
Types of Contracts, Contract documents, Specification, condition of contract, Critical Path Method (CPM) and Project Evaluation and Review Technique (PERT), Bar Chart. Contemporary Issues related to Topic-Milestone chart.		
Unit:3	**Cost analysis and Construction Organization**	**7 Hours**
Cost analysis (direct/ indirect cost, total project cost, optimization), Principles of Organisation, its types, Organisation for construction firm and other services.		
Unit:4	**Construction Equipment**	
Introduction to different types of construction equipment like earth moving and hauling, material handling equipment, etc. used and their application.		
Unit:5	**Quality Control and Safety Management**	**7 Hours**
Inspection and Quality Control Need of Quality Control, Principles of Inspection, various methods and tests like NDT etc. Safety Management Importance of safety, introduction to various safety measures.		
Unit :6	**Legal Aspects in construction industry**	**6 Hours**
Introduction to Legal Aspects in Project Planning and Management.		
	Total Lecture	**39 Hours**

Text Books	
1	Construction Planning and Management – Purifoy
2	Construction Planning and Management – Dr U K Shrivastava, Galgotia Publ.
3	Project Planning & Management – B C Punmia
4	Laws related to buildings and engineering contracts in India- Gajaria G T, LexisNexis Butterworths India Publisher, 2000.
5	Punmia B.C. & Khandelwal K.K., Project Planning & Control with PERT&CPM, Laxmi Publications, New Delhi,1990.
Reference Books	
1	Construction Contracts- Jimmie Hinze McGraw Hill.
2	Contracts and the legal Environment for Engineers and Architects- Joseph T Bockrath, McGraw Hill.
3	Srinath L, CPM & PERT, Affiliated East-West Press Pvt. Ltd., New Delhi.
4	P.S. Gahlot & B.M. Dhir, Construction Planning and Management, New Age International.
5	Chaudhary Roy, Project Management, Tata McGraw Hill, New Delhi.

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YCCE e- library book links [ACCESSIBLE FROM COLLEGE CAMPUS]	
1	https://link.springer.com/search?query=project+planning+and+management
2	https://web.p.ebscohost.com/ehost
MOOCs Links and additional reading, learning, video material	
1	https://archive.nptel.ac.in/courses/105/106/105106149/

VII SEMESTER
22CV704__Irrigation Engineering

Course Outcomes :

Upon successful completion of the course the students will be able to

1. Determine the surface water runoff and ordinates of hydrographs.
2. Compute water requirement for various crop pattern.
3. Explain parameters and procedures adopted in reservoir planning and analysis of flood occurrence.
4. Analyse Gravity Dam, earthen dam and design of water conveyance canal system.

Unit:I	Water requirement for crops	7 Hours

General: Irrigation, necessity, importance, benefits of irrigation, types.
Water requirement for crops: Crop seasons and major crops of India, crop rotation, soils and their irrigation requirement, field capacity, wilting point, available moisture in soils for crops / plants, depth & frequency of irrigation, GCA, CCA, kor period, kor water depth, duty – delta relation, base period, Water Logging.

Contemporary Issues related to Topic

Unit:II	Reservoir Planning	6 Hours

Reservoir Planning: Selection of site for reservoirs, engineering surveys, geological and Hydrological investigations, fixing of LWL, FTL/FRL, HFL, TBL, dead storage, live storage, different storage zones in reservoirs, reservoir sedimentation and its removal.
Floods: Causes and effects, Factors affecting peak flows and its estimation, frequency analysis.
Contemporary Issues related to Topic

Unit:III	Canal Irrigation	7 Hours

Water Logging: Causes, effect, Preventive measure of water logging.
Canal Irrigation: types of canal system, stable canal, unstable canal, grading, lined, canal network
Canals In Alluvial Soils: Kennedy's silt theory–Design procedure, silt supporting capacity, drawbacks, Lacey's silt theory–definition of initial final and permanent regime channels, Lacey's Regime equations, channel design procedure, limitations.
Lined Canals: design procedure, types of lining, relative merits and demerits of canal lining, economics of canal lining.
Contemporary Issues related to Topic

Unit:IV	Earthen Dams	7 Hours

Introduction to Dams: Classification of dams, factors governing selection of type of dams
Diversion Head Works: Component parts of diversion head-works – fish ladder, divide wall, silt excluder and silt ejector.
Earthen Dams: Types of earthen dams, modes of failure and its remedial measures.
Contemporary Issues related to Topic

Unit :V	Gravity Dam	6 Hours

Gravity Dam: Definition: forces acting on gravity dam, stability requirements, theoretical & practical profile of gravity dam, low &high dam. Spillway, general profile of gravity dam.
Contemporary Issues related to Topic

Unit :VI	Canal Structures and Cross drainage works	6 Hours

Canal Structures: Canal Regulation Works: Purpose, components of Head Regulator, Cross regulators, canal escapes, Canal falls and canal outlets.Cross Drainage Works : Purpose aqueducts, siphon aqueducts, super passage, canal siphon, inlets and level crossings.

	Total Lecture	39 Hours

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VII SEMESTER
22CV704__Irrigation Engineering

Text Books	
1	Ojha, C.S.P., Berndtsson, R., and Bhunya, P., Engineering Hydrology, Oxford University Press.
2	Raghunath H.M., Hydrology, New Age International Publishers.
3	Reddy R., Hydrology, Tata McGraw-Hill New Delhi.
4	S.R. Sahastrabudhe, Irrigation Engineering and Hydraulic Structures, (1996), S.K. Kataria Publications New Delhi.
5	G.L. Asawa, Irrigation and Water Resources Engineering, 2005, New Age International Publishers, New Delhi.
6	Santosh Kumar Garg, Irrigation Engineering and Hydraulic Structures, 1998, Khanna Publisher New Delhi.
7	B.C. Punmia, Irrigation Engineering and Water power Engineering, 1993, Laxmi Publications, New Delhi.
Reference Books	
1	Linsley, R.K., Kohler, M.A. and Paulhas, Hydrology for Engineers, Tata McGraw-Hill Publishing Company Limited.
2	Todd, D.K., Ground Water Hydrology, John Wiley & Sons.
3	Subramnaya, K., Engineering Hydrology, Tata McGraw-Hill Publishing Company Limited.
4	Sharma R.K., Sharma T.K., Hydrology & Water Resources Engineering, Dhanpat Rai Publications.
5	R.S. Varshney, S.C. Gupta, R.L. Gupta, Theory and Design of Irrigation Structures, Vol – II, 1979, Nem Chand & Bros. Publications Roorkee.
6	N.N. Basak, Irrigation Engineering, 1999, Tata McGraw-Hill Publications New Delhi.
7	S.K. Sharma, Principles and Practice of Irrigation Engineering, 1988, S. Chand Publications New Delhi.
8	Arora K. R., Irrigation, Water Power & Water Resources Engineering, Standard Publishers Distributors.
9	Ghanshyam Das, Hydrology and Soil Conservation Engineering: Including Watershed Management, PHI Publication, 2009.
YCCE e- library book links [ACCESSIBLE FROM COLLEGE CAMPUS]	
1	https://link.springer.com/search?query=irrigation
2	https://link.springer.com/search?query=hydrology
3	https://web.p.ebscohost.com/ehost
MOOCs Links and additional reading, learning, video material	
1	https://archive.nptel.ac.in/course.html

VII SEMESTER

22CV711__PE-IV : Natural Resources Management

Course Outcomes :		
Upon successful completion of the course the students will be able to 1. Explain problems arising in implementation of Natural Resources Management. 2. Apply laws, policies & practice implementation for private and public resources owners and users. 3. Explain the role of Natural Resources Management in sustainable development. 4. Evaluate factors contributing to natural resources insecurity and degradation.		
UNIT:1	**Introduction to Natural Resource**	**07 Hrs**
Concept of resource, classification of natural resources, Factors influencing resource availability, distribution and uses. Forest resources, Land resources, Food resources, Mineral Resources Marine Resources.		
UNIT:2	**Overview of policies & Governance of Natural Resources**	**06 Hrs**
Environmental Protection Act, Wildlife Protection Act, National Conservation Policy, National Action Plan on Climate Change, Forest Protection Act, Air & Water pollution & prevention Act.		
UNIT:3	**Renewable and Non Renewable Energy**	**07 Hrs**
Sources of energy generation, Rural energy, Biomass to energy, fuel wood use, Biochemical conversion, Anaerobic digestion and biogas production, Thermo-chemical conversions, gasification, Ethanol, Bio-diesel.		
UNIT:4	**Programs for NRM**	**06 Hrs**
Rural development programs, Environmental Impact Assessment (EIA), Social Impact Assessment (SIA), Human Development Index (HDI), Environmental Clearance Program, Environmental Management Plan		
UNIT:5	**Sustainable Natural Resources Management and Development**	**07 Hrs**
Industrialization, Infrastructure development, globalization, urbanization and privatization, sustainability of modern developments Applications and case studies. Contemporary Issues – Environmental Economics		
UNIT:6	**Environmental issues in urbanizing world**	**06 Hrs**
Climate change and carbon trading, watershed management, wetland management, Urban Forestry, Biodiversity, migration & Rehabilitations, Urban poverty and livelihood.		
	Total Lecture Hours	**39 Hours**

Text books	
1	Tom Tietenberg and lynne lewis, 2013, Environmental and natural resource economics, Pearson education incorporation, publishing as Addison-wesley.
2	Knight, Richard L., editor, et al. 1995. A New Century for Natural Resources Management. Island Press.

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Reference Books	
1	Francois Ramade 1984. Ecology of Natural Resources. John Wiley & Sons Ltd.
2	Singh, Rajvir. 2000. Watershed Planning and Management
3	Harris, J.M. 2006. Environmental and Natural Resource Economics: A Contemporary Approach, 2nd edition.
YCCE e- library book links [ACCESSIBLE FROM COLLEGE CAMPUS]	
1	https://link.springer.com/book/10.1007/978-3-030-76624-5
2	https://link.springer.com/book/10.1007/978-3-030-55172-8
3	https://link.springer.com/book/10.1007/978-3-540-33187-2
4	https://link.springer.com/book/10.1007/978-981-16-5847-1
MOOCs Links and additional reading, learning, video material	
1	https://onlinecourses.nptel.ac.in/noc22_ag10/preview
2	https://onlinecourses.swayam2.ac.in/nou22_ge36/preview
3	https://onlinecourses.swayam2.ac.in/aic19_ge05/preview

VII SEMESTER
22CV712__PE-IV : Finite Element Method

Course Outcomes :		
Upon successful completion of the course the students will be able to 1. Explain basic concepts of finite element method. 2. Apply concepts of FEM for derivation of element equations. 3. Analyze civil engineering problems by finite element method. 4. Explain mathematical modeling and solution techniques in FEM		
Unit:1	**Introduction**	**7 Hours**
Introduction: Development and Applications, Advantages and Disadvantages of FEM, General steps of FEM, Direct equilibrium approach, Variational approach, Application of Raleigh - Ritz method to simple bar and beam problems.		
Unit:2	**Shape functions**	**6 Hours**
Shape functions: Introduction, Requirements of Ideal displacement functions, Derivation of shape functions using Cartesian Coordinates, Lagrange and Hermitian shape functions.		
Unit:3	**Application of FEM to 1D Problems**	**7 Hours**
Formulation of stiffness matrices and load vectors, Assembling, Application of FEM to bar and beam Problems.		
Unit:4	**Application of FEM to 2D problems**	**6 Hours**
Application of FEM to 2D problems: Triangular and Rectangular element formulation using Cartesian Coordinates, Application to two-dimensional stress analysis.		
Unit:5	**Isoparametric elements**	**7 Hours**
Isoparametric elements, Natural coordinates, Application to 1D and 2D Problems.		
Unit :6	**Modelling techniques**	**6 Hours**
Numerical integration, Modelling and storage techniques, Introduction to standard FEM software. **Contemporary Issues related to Topic**: One issue is the need to simulate damage and failure, with the final goal to estimate lifetime of a structure.		
	Total Lecture Hours	**39 Hours**

Text Books	
1	Chandrapatla T.R., Belegundu A. D., Introduction to Finite Elements in Engineering, Prentice Hall India,1991
2	Godbole P. N., Introduction to Finite Element Method, I. K. International Publishing House Pvt. Ltd., New Delhi, 2013
Reference Books	
1	Desai Y. M., Eldho T. I., Shah A. H., Finite Element Method with Application in Engineering, Dorling Kindersley (India) Pvt. Ltd, New Delhi , 2011
2	Cook R. D., Concepts and Applications of Finite Element Analysis, 3rd Edition, Wiley India Text books, Wiley India Pvt Limited, New Delhi , 1989
3	Rajasekaran S., *Finite Element Analysis in Engineering Design,* S. Chand & Co. Ltd. New Delhi, 1999.
YCCE e- library book links [ACCESSIBLE FROM COLLEGE CAMPUS]	
1	http://link.springer.com/openurl?genre=book&isbn=978-3-540-76342-0
2	http://link.springer.com/openurl?genre=book&isbn=978-3-211-81202-0
MOOCs Links and additional reading, learning, video material	
1	https://nptel.ac.in/courses/105105041
2	https://nptel.ac.in/courses/105107209

VII SEMESTER
22CV713__PE-IV : Introduction to Structural Dynamics

Course Outcomes :

Upon successful completion of the course the students will be able to

1. Relate the importance of vibratory structure with respect to safety and reliability of engineering systems.
2. Analyze problems having undamped and damped vibrations.
3. Analyze problems having forced vibrations.
4. Focus the basics knowledge of earthquake engineering.

Unit:1	**Elements of Vibration.**	**7 Hours**
Basic Concepts of vibrations, Dynamic loading. Causes of Dynamic effect. Fundamentals of Rigid / Deformable body dynamics, Natural frequency and time period, Formation of Equation of Motion, Types of Vibration, Equivalent stiffness of spring combination.		
Unit:2	**Undamped vibration of SDOF system.**	**7 Hours**
undamped systems, free vibrations, general solution, Analysis of undamped single degree freedom systems.		
Unit:3	**Damped free vibration of SDOF system.**	**6 Hours**
damped free vibrations, types of damping, damping coefficient, experimental determination of fundamental frequency and damping coefficient, general solution,		
Unit:4	**Forced vibration of SDOF system.**	**7 Hours**
Response of single degree freedom systems to harmonic loading, support motion and transmissibility, Response of single degree freedom systems to periodic loading. Fourier series and Analysis. Duhamels Integral(Impulsive loading)		
Unit:5	**Vibration of multiple-degree of freedom system**	**7 Hours**
Multiple degree of Freedom system: Vibration of undamped 2 DOF systems; Response of 2 DOF to harmonic excitation, mode superposition, vibration absorber, Free vibration of MDOF (up to 3 DOF) systems, Dynamic response of MDOF (2 DOF) systems-modal superposition method. Energy Principle, Rayleigh's method (2 DOF)		
Unit :6	**Elements of Seismology**	**7 Hours**
Introduction to earthquake engineering, response spectra, response of SDOF systems to earthquake excitation,		
	Total Lecture	**39 Hours**

Text Books	
1	Mario Paz, Structural Dynamics Theory & Application, CBS Publ.; N-Delhi, 1995.
2.	Chopra A. K., Dynamics of Structures, Theory & Application to Earthquake Engineering, 2nd Edition., Pearson Education (Singapore) Pvt. Ltd, New Delhi, 1995

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Reference Books	
1	Clough / Penzien, "Dynamics of Structures", McGraw Hill, 1993
2	Humar, J. L., "Dynamics of Structures", Prentice Hall, 1993
3	Timoshenko, S., "Advanced Dynamics", McGraw Hill Book Co; NY, 1948
4	Damodarasamy and Kavitha," Basics of structural Dyanamics and Aseismic design, Phi Publisher, New Delhi.
YCCE e- library book links [ACCESSIBLE FROM COLLEGE CAMPUS]	
1	http://link.springer.com/openurl?genre=book&isbn=978-1-4613-6193-0
2	https://onlinelibrary.wiley.com/doi/book/10.1002/9780470168042
MOOCs Links and additional reading, learning, video material	
1	https://nptel.ac.in/courses/105106151

VII SEMESTER

22CV714__PE-IV : Optimization Techniques

Course Outcomes :		
Upon successful completion of the course the students will be able to 1. Explain the need of optimization techniques in engineering. 2. Examine the optimization techniques used in engineering design 3. Apply the optimization techniques in engineering problem. 4. Analyze Nonlinear programing one dimensional minimization.		
Unit:1	**Introduction**	**6 Hours**
Introduction, types of optimization problems, Statement of the problem, design vector, constraints, objective function. Classification of optimization problems. Contemporary Issues related to Topic:		
Unit:2	**Optimization problems Formulation**	**7 Hours**
Formulation of some structural problems as programming problems like Minimum weight and optimum cost considerations in Structural design, Minimum weight design of Trusses and Frames based on elastic and limit state criteria Optimum reinforcement design of reinforced and prestressed concrete beams and slabs. Contemporary Issues related to Topic:		
Unit:3	**Classical optimisation techniques**	**6 Hours**
Classical optimisation techniques: Single variable optimisation, multivariable optimisation, with no constraints. Multivariable optimisation with equality and the inequality constraints.. Contemporary Issues related to Topic:		
Unit:4	**Linear Programming**	**7 Hours**
Linear Programming: Introduction, Standard form of the problem, feasible, basic and l solution, Canonical form of system of equations. Simplex method - Algorithm, two phases of the method, Identifying an optimal point, unbounded solution, degenerate solution. Contemporary Issues related to Topic:		
Unit:5	**Non - Linear Programming**	**6 Hours**
Non - Linear Programming: One dimensional minimization: Introduction, Unimodal function, Elimination methods-Various search methods, Fibonacci and Golden section methods. Contemporary Issues related to Topic:		
Unit :6	**Non - Linear Programming**	**7 Hours**
Non - Linear Programming: Unconstrained Optimization Techniques: Introduction, Direct Search methods-Random search, Univariate method. Descent methods-Steepest descent method, Conjugate gradient method, Variable metric method. Contemporary Issues related to Topic: The need to solve challenging large-scale optimization problems arising in various areas of science, engineering, and technology has led to breakthrough advancements in numerical optimization, including first-order methods and augmented Lagrangian methods.		
	Total Lecture	**39 Hours**

Text Books	
1	Rao S.S, Engineering Optimization: Theory and Practice, New Age International (P) Ltd., New Delhi.
2	Arora J S., Introduction to Optimum Design, McGraw Hill.

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Reference Books	
1	Fox R. L, Principles of Operation Research, Prentice Hall of India.
2	Wagner H.M., Principles of Operation Research, Prentice Hall of India
3	Uri Kirsch, Structural Optimization Fundamentals and Applications, Springer-Verlag Berlin Heidelberg 1993
YCCE e- library book links [ACCESSIBLE FROM COLLEGE CAMPUS]	
1	http://link.springer.com/openurl?genre=book&isbn=978-94-010-7132-1
2	http://link.springer.com/openurl?genre=book&isbn=978-0-387-95864-4
MOOCs Links and additional reading, learning, video material	
1	https://nptel.ac.in/courses/105103210
2	https://nptel.ac.in/courses/105108127

VII SEMESTER

22CV715__PE-IV : Environmental Legislation and Management System

Course Outcomes :		
Upon successful completion of the course the students will be able to 1. Explain legal aspects for environment protection. 2. Analyze legal provisions in various environmental acts. 3. Recommend environmental management plans, principles and standards 4. Differentiate powers of government, board & court judgment		
UNIT:1	**Introduction**	**07 Hrs**
Indian Constitution and Environmental Protection– National Environmental policies– Environmental agreements and Protocols – Montreal Protocol, Kyoto agreement, Rio declaration		
UNIT:2	**Water Act 1974**	**06 Hrs**
Power & functions of regulatory agencies - Provision relating to prevention and control, Legal sampling procedures, State Water Laboratory Penalties for violation of consent conditions.		
UNIT:3	**Air Act 1981**	**07 Hrs**
Power & functions of regulatory agencies Provision relating to prevention and control, Legal sampling procedures, State Air Laboratory Authority – Penalties for violation of consent conditions.		
UNIT:4	**Environment (Protection) Act 1986**	**06 Hrs**
Genesis of the Act – delegation of powers – Role of Central Government - Municipal Solid Waste Management - Responsibilities of Pollution Control Boards under Hazardous Waste rules, Biomedical waste rules – responsibilities of generators and role of Pollution Control Boards.		
UNIT:5	**Fundamentals of Environmental Management and ISO 14000 series**	**07 Hrs**
Background and development of ISO 14000 series. Environmental management Plans, principles and elements. The ISO 14001- Environmental management systems standard. Environmental law in India: Environmental policies and laws. Contemporary Issues – ISO 9000 & its importance		
UNIT:6	**Other Topics**	**06 Hrs**
Relevant Provisions of Indian Forest Act, Public Liability Insurance Act, The National Green Tribunal Act, 2010, The Wildlife (Protection) Act, 1972, The Forest (Conservation) Act, 1980 Contemporary Issues – Hazardous Waste management rules		
	Total Lecture	**39 Hours**

Text Books	
1	Shyam Divan and Armin Roseneranz "Environmental law and policy in India "Oxford University Press, New Delhi, 2001.
2	Greger I. Megregor, "Environmental law and enforcement", Lewis Publishers, London1994.
3	Constitution of India [Referred articles from part-III, part-IV and part-IV A]
4	Pares Distn. Environmental Laws in India (Deep, Lated edn.)
5	Handbook of environmental management and technology: Gwendolyn Holmes, Ben Ramnarine Singh, Louis Theodore.
Reference Books	
1	CPCB, "Pollution Control acts, Rules and Notifications issued there under "Pollution Control Series – PCL/2/1992, Central Pollution Control Board, Delhi, 1997.
2	The ISO 14000 Handbook: Joseph Cascio.
3	ISO 14004: Environmental management systems: General guidelines on principles, systems and supporting techniques (ISO 14004:1996 (E)).
4	ISO 14001: Environmental management systems: Specification with guidance for use (ISO 14001:1996b(E) (International organization for standardization-Switzerland)
YCCE e- library book links [ACCESSIBLE FROM COLLEGE CAMPUS]	
1	https://www.springer.com/series/5921
2	https://www.springer.com/series/15053
3	https://www.springer.com/series/5921/books?page=5
4	https://link.springer.com/book/10.1007/978-981-10-6952-9
5	https://link.springer.com/book/10.1007/978-981-10-3761-0
MOOCs Links and additional reading, learning, video material	
1	https://onlinecourses.nptel.ac.in/noc22_lw02/preview
2	https://onlinecourses.swayam2.ac.in/aic19_ge05/preview
3	https://onlinecourses.nptel.ac.in/noc22_hs126/preview
4	https://onlinecourses.nptel.ac.in/noc22_mm36/preview
5	https://onlinecourses.swayam2.ac.in/nou22_bt06/preview

VII SEMESTER
22CV716__PE-IV : Advanced Foundation Engineering

Course Outcomes		
Upon successful completion of the course the students will be able to 1. Apply the bearing capacity theories and settlement computation of shallow foundation. 2. Analyze and design combined footings, 3. Evaluate the load carrying capacity and settlement of vertically loaded piles. 4. Interpret the geotechnical testing data and summarize the report.		
Unit:1	**Bearing Capacity of Foundations**	**7 Hours**
Bearing Capacity of Foundations: Terzaghi's, Meyerhoff, Hansens bearing capacity theories, Bearing capacity based on SPT, SPT Correlations, Design N Values, eccentric and inclined loads, **Contemporary Issues related to Topic: Foundation design on expansive soil**		
Unit:2	**Foundation Settlements**	**6 Hours**
Foundation Settlements: The Settlement Problem, Stresses in Soil Mass Due to Footing Pressure, Immediate Settlement Computations, Alternative Methods of Computing Elastic Settlements, Consolidation or final settlement **Contemporary Issues related to Topic**		
Unit:3	**Combined Footing**	**7 Hours**
Geotechnical Design of rectangular footing, trapezoidal footing, strap footing. **Contemporary Issues related to Topic**		
Unit:4	**Vertically Loaded Pile**	**6 Hours**
Ultimate Bearing Capacity in Cohesionless Soils, Ultimate Capacity of Piles in Granular Soils based on SPT Value, Settlement of pile groups in sand, settlement of pile groups in cohesive soils **Contemporary Issues related to Topic**		
Unit:5	**Site Visit**	**7 Hours**
Plate load test / Standard penetration test / Vane shear test, Cone Penetration test/ Pressure meter, Geophysical methods- Seismic resistivity, Electric resistivity method. **Contemporary Issues related to Topic**		
Unit :6	**Data interpretation of field test**	**6 Hours**
Data interpretation of field test of Plate load test / Standard penetration test / Vane shear test, Cone Penetration test / Pressure meter, Geophysical methods- Seismic resistivity, Electric resistivity method. Various chemical properties of soil. **Contemporary Issues related to Topic**		
	Total Lecture	**39 Hours**

Text Books	
1	Geotechnical Engineering: Principles and Practices of Soil Mechanics and Foundation Engineering, 2003, VNS Murthy, CRC Press..
Reference Books	
1	Soil Mechanics & Foundation Engineering, 2009, Arora K.R., Standard Publisher Distributors
2	Analysis and Design of Foundations and Retaining Structures, 1979, Shamsher Prakash, Gopoal Ranjan and Swami Sharan, Sarita Prakashan.
3	Foundation Analysis & Design: Bowles J.E., McGraw Hill, (1996)
YCCE e- library book links [ACCESSIBLE FROM COLLEGE CAMPUS]	
1	http://103.152.199.179/YCCE/Suported%20file/Supprted%20file/e-copies%20of%20books/Civil%20Engineering/
2	https://drive.google.com/uc?id=152rovJSnSMcqsxwc5TbrPOShWrryn-4r&export=download
MOOCs Links and additional reading, learning, video material	
1	https://www.youtube.com/watch?v=FVvmL2hUjH4&list=PLbMVogVj5nJQtuLxDm2M3KdUTuB4ZOdXT
2	https://www.youtube.com/watch?v=FVvmL2hUjH4&list=PL3MO67NH2XxIKnqh_Q622HBcug2SOKST3
3	https://www.youtube.com/watch?v=0PrHDPooA-k&list=PLbMVogVj5nJSceP2UMlDQfntawRHnFfwd

VII SEMESTER

22CV717__PE-IV : Advanced Transportation Engineering

Course Outcomes		
Upon successful completion of the course the students will be able to 1. Illustrate the importance of railway transportation and its terminologies 2. Analyze and design the geometric element of railway track 3. Explain terminologies of air transportation 4. Explain about tunnel engineering.		
Unit:1	**Introduction to Permanent Way**	**7 Hours**
Transportation and its development, Alignment surveys, requirement, coning of wheels, stresses in railway track, high speed track, selection for rails, test on rail wear & defects, corrugation and creep of rails, rail joints.		
Unit:2	**Geometric Design of Railway track**	**6 Hours**
Gradients, speed, super elevation, cant deficiency, curves, length of transition curves, grade compensation, turnouts.		
Unit:3	**Station and Yards, signalling & controlling**	**7 Hours**
Station and Yards: Types, functions, facilities & equipment. Railway Signalling and interlocking: classification and types of signals, control and movement of trains, track circulation.		
Unit:4	**Air Transportation in India and Runway and taxiway**	**6 Hours**
History of Air Transportation in India: Comparison with other transportation modes, aircraft components and characteristics, airport site selection. Airport obstructions: Zoning laws, imaginary surfaces. Runway And taxiway design: Windrose diagram, cross wind component, runway orientation and configuration		
Unit:5	**Airport layout and classification, Visual Aids & Air traffic control**	**7 Hours**
Airport layout and classification: Terminal area, aircraft parking and parking systems, unit terminal concept, aprons, hangers. **Visual Aids:** Airport marking and lighting for runways, taxiways and other areas. **Air traffic control:** Need, networks, control aids, instrumented landing systems, advances in air traffic control.		
Unit :6	**Introduction to Tunnel Engineering**	**6 Hours**
Alignment, surveys, cross section of highway & railway tunnels, advantages of tunneling, drainage, ventilation and lighting of tunnels, advances in tunneling techniques.		
	Total Lecture	**39 Hours**

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Text Books	
1	S. C. Saxena and S. P. Arora, A Textbook of Railway Engineering, 8th Edition, Dhanpat Rai Publications (P) Ltd, 2015
2	S.K. Khanna, Airport Planning and Design, 6th Edition, Nem Chand and Brothers, Roorkee, 1999
3	S.C. Saxena, Tunnel Engineering, Dhanpat Rai Publications (P) Ltd, 2012
Reference Books	
1	S. P. CHANDOLA, Textbook on Transportation Engineering, 1st Edition S. Chand Publishers, New Delhi, 2001
2	Robert Horonjeff, Francis Mckelvey, William Sproule, Seth Young, Planning and Design of Airports,5th Edition, McGraw Hill Professionals, 2010
YCCE e- library book links [ACCESSIBLE FROM COLLEGE CAMPUS]	
1	http://103.152.199.179/YCCE/Suported%20file/Supprted%20file/e-copies%20of%20books/Civil%20Engineering/
MOOCs Links and additional reading, learning, video material	
1	https://nptel.ac.in/courses/105107123

VII SEMESTER

22CV731__PE-V : Maintenance and Rehabilitation Engineering

Course Outcomes		
Upon successful completion of the course the students will be able to 1. Explain the importance of maintenance, rehabilitation & its management 2. Explain various repairing materials used in rehabilitation of structures. 3. Describe the condition assessment of structures. 4. Apply Maintenance & Rehabilitation techniques for improve condition of existing structures		
UNIT:1	**Introduction of Maintenance & rehabilitation**	**07 Hrs**
Classification; Necessity, objectives, importance Influencing factors, Advantages and Limitations of maintenance and repairs; Approach of effective management for maintenance and repairs; Periodical maintenance, maintenance manual.		
UNIT:2	**Materials for Maintenance & rehabilitation**	**06 Hrs**
Factors influencing the material selection for maintenance and repairs, Repairing Materials: Grouting materials, FRP sheets, Adhesives and sealants, Anti-corrosion materials, Mortar repair materials, Special types of concrete etc.		
UNIT:3	**Repair Techniques**	**07 Hrs**
Techniques for Repair and Protection Methods: Shoring, Underpinning, Jacketing, FRP application, Grouting, Gunitting, Case studies.		
UNIT:4	**Damage diagnosis and assessment**	**06 Hrs**
Visual inspection, Non Destructive Testing using Rebound hammer, Ultra sonic pulse velocity, Half cell potentiometer test, Chloride penetration test, Rebar locator, Core testing. Contemporary issues- Structural audit and Budget		
UNIT:5	**Maintenance and repair methods for masonry structures**	**07 Hrs**
Causes of wall cracks, Probable crack location, Repair Techniques, Repairing Methods for minor and major cracks, Effect of dampness in wall and damping repairing techniques, Causes and remedies of foundation settlement and its improvement techniques		
UNIT:6	**Maintenance and repair methods for RCC structures**	**06 Hrs**
Nature & causes of RCC failures; Causes & repair techniques in roof slab, Repair methods in RCC structures; Causes & effects of Corrosion in RCC		
	Total Lecture	**39 Hours**

			July 2022	1.00	Applicable for AY 2022-23 Onwards
Chairperson	Dean (Acad. Matters)	Dean OBE	Date of Release	Version	

Text Books	
1	Concrete Technology, 2009, Shetty M.S., S.Chand Publication, New Delhi.
2	Concrete for Construction - Facts and Practice, 1999, Raina V.K, Tata McGraw-Hill Publishing Company Limited, New Delhi.
3	SP: 25 -1984 - Hand Book on Causes and Prevention of Cracks in Buildings, 1999, Bureau of Indian Standards, New Delhi.
4	Denison Campbell, Allen and Harold Roper, "Concrete Structures, Materials, Maintenance and Repair", Longman Scientific and Technical UK, 1991.
5	I.R.C./B.I.S./C.B.R.I. Publication.
Reference Books	
1	Concrete - Building Pathology, 2003, Macdonald S., Blackwell Science Limited, Oxford.
2	Common Building Defects, Diagnosis and Remedy, compiled by National Building agency, Construction press, London & New York.
3	CPWD hand book on Repairs and Rehabilitation of RCC buildings published by DG(Works), CPWD, Government of India (Nirman Bhawan), http://www.cpwd.gov.in/handbook.pdf
4	Concrete Repair, Rehabilitation and Retrofitting: M. Alexander, H. D. Beushausen, F.Dehn& P. Moyo, Taylor & Francis Publication
YCCE e- library book links [ACCESSIBLE FROM COLLEGE CAMPUS]	
1	https://link.springer.com/book/10.1007/978-981-10-5858-5
2	https://link.springer.com/book/10.1007/978-981-287-263-0
3	https://www.springer.com/series/10019/books?page=2
4	https://link.springer.com/book/10.1007/978-94-009-2153-5
5	https://link.springer.com/book/10.1007/978-3-642-39686-1
6	http://link.springer.com/openurl?genre=book&isbn=978-94-007-0337-7
MOOCs Links and additional reading, learning, video material	
1	https://onlinecourses.swayam2.ac.in/nou22_me07/preview
2	https://onlinecourses.swayam2.ac.in/nou22_ce10/preview

VII SEMESTER
22CV732__PE-V : Modern Surveying Technique

Course Outcomes		
Upon successful completion of the course the students will be able to 1. Explain the basic concept of GPS surveying 2. Illustrate the basic concept of GIS surveying 3. Classify the Remote sensing system 4. Illustrate the basic concept of Hydrography and Astronomical surveying		
Unit:1	**GPS Surveying**	**6 Hours**
Introduction to GPS, History, Satellite Navigations constellations today–GPS system, GLONASS system, Galileo System, GPS Errors Future of GPS.GPS surveying technique, Reference Systems and Coordinate systems, Datum transformations, software improvements.		
Unit:2	**GIS Surveying**	**7 Hours**
GIS Subway system, representation of data, Raster and vector data structure, advantages and Disadvantages Vector data over raster data, data format conversion, Spatial and Non-spatial data, Components of GIS, working of GIS, Hardware-Computing, printing and scanning systems, Introduction to Software – Standard Packages like Arcview, ArcGIS, Autocad Map, Map Info.		
Unit:3	**Physics of Remote Sensing**	**7 Hours**
Physics of Remote Sensing: Sources of Energy, Active and Passive Radiation, Ideal and real remote sensing, Electromagnetic Radiation, Transmission, Absorption, Thermal Emissions, Interaction with Atmosphere, IRS system, Advantages and application of remote sensing.		
Unit:4	**Microwave Remote Sensing**	**6 Hours**
Microwave Remote Sensing: Active and Passive Systems, Advantages, Concept of radar Equation, Surface Scattering, Errors in Radar, Imaging-non imaging system. Applications: passive microwave, Land use – Land cover.		
Unit:5	**Hydrography Introduction and Underground surveying**	**7 Hours**
Hydrography Introduction : Tides, Shore line survey, River Survey Soundings, Sounding Equipment, method oflocating soundings. Underground surveying : Correlation of underground and surface survey, transferring the level to underground and surface survey.		
Unit :6	**Astronomy**	**6 Hours**
Astronomy : The Earth, Solar system, Elements of spherical trigonometry, Napler's rule of circular parts, celestial sphere, astronomical terms.		
	Total Lecture	**39 Hours**

			July 2022	1.00	Applicable for AY 2022-23 Onwards
Chairperson	Dean (Acad. Matters)	Dean OBE	Date of Release	Version	

Text Books	
1	Punmia B.C., Jain A.K., Jain A.K, Surveying, (Vol. 2 & Vol. 3), Laxmi Publication, New Delhi. 1, 15th Edition
2	Dr. A.M. Chandra, Higher Surveying, New age international publishers , New Delhi
Reference Books	
1	Kanetkar T.P. & Kulkarni S. V, Surveying & Levelling (Vol.2 & Vol. 3), Pune Vidhyarthi Gruha Prakashan, Pune.
2	Reddy . A., Remote sensing & GIS, B. S. Publication, Hyderabad.
3	Thomas M. L., Ralph W. K., Jonathan W., Remote Sensing and Image Interpretation, Chipman Wiley & Sons, 5th Edition (2010).
YCCE e- library book links [ACCESSIBLE FROM COLLEGE CAMPUS]	
1	http://link.springer.com/openurl?genre=book&isbn=978-94-010-6763-8
2	http://link.springer.com/openurl?genre=book&isbn=978-1-4613-5858-9
MOOCs Links and additional reading, learning, video material	
1	https://nptel.ac.in/courses/105107157
2	https://archive.nptel.ac.in/courses/105/107/105107062/
3	https://nptel.ac.in/courses/105102015
4	https://www.digimat.in/nptel/courses/video/105107158/L17.html

VII SEMESTER

22CV733__PE-V : Advanced Steel Design

Course Outcomes :
Upon successful completion of the course the students will be able to
1. Explain different type of structural steel components
2. Apply Indian Standard code provisions for designing steel component.
3. Analyze and design Steel built-up sections.
4. Calculate different types of loading acting on Girders.

UNIT: 1	**Tension member**	**6 Hours**
Introduction to Tension member, design of built-up tension member **Contemporary Issues related to Corrosion of Steel section**		
UNIT: 2	**Column**	**7 Hours**
Introduction to Lacing and batten column, Design of Built-up Columns (Lacing and Batten)		
UNIT: 3	**Eccentric connection**	**6 Hours**
Introduction to bracket connection type-1, bracket type-2, framed connection, and seat connection. Design of bracket connection type-1, frame connection		
UNIT: 4	**Plate Girder**	**7 Hours**
Elements of Plate Girder, Types of Section, Design Aspect, Stability of Webs, Design of Welded Plate Girder.		
UNIT: 5	**Gantry Girder**	**6 Hours**
Introduction to Gantry Girder, loads acting on it and Design of gantry Girder		
UNIT: 6	**Water Tank**	**7 Hours**
Introduction, Structural design Criteria, Durability Consideration, design of rectangular water tank		
	Total Lecture	**39 Hours**

Text Books	
1	S. K. Duggal, Limit State Design of Steel Structures, McGraw-Hill, Third edition, 2019
2	Design of steel structures, By S. Arya and J. L. Ajmani, New Chand & Bros. Roorkee, 1992
3	Design of steel structures, By Dr P. Dayaratnam, S. Chand 2015
Reference Books	
1	S. S. Bhavikatti, Design of Steel Structures: By Limit State Method as Per IS: 800-2007, I K International Publishing House, Fifth edition, 2017
2	Jack C. McCormac, Structural Steel Design, Pearson, 5th edition, 2011
3	IS 800 (2007): General Construction in Steel - Code of Practice
YCCE e- library book links [ACCESSIBLE FROM COLLEGE CAMPUS]	
1	http://link.springer.com/openurl?genre=book&isbn=978-1-4613-5864-0
MOOCs Links and additional reading, learning, video material	
1	https://archive.nptel.ac.in/courses/105/105/105105162/
2	https://youtu.be/Om6ICuhwBo0
3	https://www.youtube.com/watch?v=Ch2vAzvXbKI

			July 2022	1.00	Applicable for AY 2022-23 Onwards
Chairperson	Dean (Acad. Matters)	Dean OBE	Date of Release	Version	

VII SEMESTER
22CV734__PE-V : Introduction to Bridge Engineering

Course Outcomes :
Upon successful completion of the course the students will be able to 1. Illustrate various types of bridges, loading conditions and their components. 2. Distinguish superstructure and substructure as per design standards. 3. Compare the suitability of long span bridges

UNIT: 1	**Introduction**	**7 Hours**
History of Bridges; Definition and Basic Forms, Components of a Bridge and its definitions. Classification of Road Bridges, related structures, span length; classification of road bridge, short history of bridge development.		
UNIT: 2	**Standard Loading for Road Bridge Design as per codes**	**6 Hours**
Introduction of IRC codes. Dead load, Live load, Impact factor, Centrifugal force, Wind loads, Longitudinal forces, Buoyancy, Water Current Forces, Thermal Forces, Deformation and Horizontal Forces, Erection Stresses, Seismic Forces, Load combinations for different working state and limit state designs. Understanding of flood discharge, waterway, scours depth & Afflux.		
UNIT: 3	**Types of Bridges**	**7 Hours**
Introduction to various types of culverts, Slab Bridges, Beam and Slab Bridges, Plate Girder Bridges, Prestressed Concrete Bridges, Composite Bridges, Introduction to their design. Erection of bridges.		
UNIT: 4	**Substructure**	**6 Hours**
Pier, Loads on Piers Abutment, Major types of abutments. Bridge Foundations: Open foundation, Pile foundation; Well foundation.		
UNIT: 5	**Bearings and Deck Joints**	**7 Hours**
Bearings, Forces on Bearings, Types of Bearings, Basis for Selection of Bearings. Different types of bridge expansion joints.		
UNIT: 6	**Long Span Bridges**	**6 Hours**
Suspension bridges: Components of suspension bridge, Structural behavior, Advantages. Cable Stayed Bridge: General Features, Components of cable stayed bridges, Towers or Pylons, Types of cable stays.		
	Total Lecture	**39 Hours**

			July 2022	1.00	Applicable for AY 2022-23 Onwards
Chairperson	Dean (Acad. Matters)	Dean OBE	Date of Release	Version	

Text Books	
1	T.R. Jagadeesh, M.A. Jayaram, Design of Bridge Structure, PHI publication.
2	Krishna Raju „ Bridge Engineering, UPD Publishers, New Delhi, 2000.
3	Baider Bakht and Leslie, G. Jaeger,' Bridge Analysis Simplied, Mcgraw Hill Book Co,1998.
4	V. K. Raina, Concrete Bridge Practice: Analysis, Design & Economics, Fourth Edition, Shroff Publishers.
Reference Books	
1	IRC 005, Standard Specifications and Code of Practice for Road Bridges, Section I (General Features of Design) (Seventh Revision), 1998.
2	IRC 006, Standard Specifications and Code of Practice for Road Bridges, Section II – Loads and Stresses (Fourth Revision), 2014.
3	IRC-21:2000; Standards specifications and code of practice for Road bridges.
4	IRC 078, Standard Specifications and Code of Practice for Road Bridges, Section VII – Foundations and Substructure (Revised Revision), 2014.
5	IRC 083-1, Standard Specifications and Code of Practice for Road Bridges, Section IX (Bearings), Part I (Metallic Bearings) (First Revision), 1999.
6	IRC 112, Code of Practice for Concrete Road Bridges, 2011.
7	Johnson Victor, 'Bridge Engineering', Oxford IBH, New Delhi, 2000.
8	Raina, R.K, 'Principles of Design of RCC Bridges, Tata McGraw Hill, 1999.Conrad P. Heins and Richard A. Lawrie, 'Design of Modern Concrete Highway Bridges, John Wiley andSons, 1999.
YCCE e- library book links [ACCESSIBLE FROM COLLEGE CAMPUS]	
1	http://103.152.199.179/YCCE/Suported%20file/Supprted%20file/e-copies%20of%20books/Civil%20Engineering/61.%20Bridge+Engineering+Handbook-+Seismic+Design,+Second+Edition-%20By%20EasyEngineering.net.pdf
2	https://onlinelibrary.wiley.com/doi/10.1002/9781118927595.ch2
3	https://link.springer.com/chapter/10.1007/3-540-32391-0_74
4	https://link.springer.com/chapter/10.1007/978-3-642-27963-8_21
MOOCs Links and additional reading, learning, video material	
1	https://nptel.ac.in/courses/105105165
2	https://archive.nptel.ac.in/courses/105/105/105105165/
3	https://nptel.ac.in/courses/105105216

VII SEMESTER

22CV735__PE-V : Industrial Waste Water Treatment and Reuse

Course Outcomes :		
Upon successful completion of the course, the students will be able to 1. Understand impact and environmental problems of industrial wastewater 2. Articulate the fundamentals of various treatment processes. 3. Review treatment methodologies for wastewaters of various industries 4. Analyse related data for design of various treatment units for Industrial wastewater treatment		
Unit:1	**Industrial Water Pollution**	**7 Hours**
Environmental impact due to industrial water pollution, problems associated with industrial wastewater, characterization of industrial wastewater. Sampling and analysis of wastewater, toxicity testing, statistical analysis of data, Indian standards for waste disposal **Contemporary Issues related to Topic**		
Unit:2	**Treatment Option**	**7 Hours**
Common effluent treatment plant. Recycle and reuse of industrial waste, volume and strength reduction, concept of zero liquid discharge **Contemporary Issues related to Topic**		
Unit:3		**7 Hours**
Equalization and proportioning of wastewater, design of equalization tank. Neutralization of wastewater, Oil and grease removal, Floatation **Contemporary Issues related to Topic**		
Unit:4		**6 Hours**
Stabilization pond, oxidation ponds **Contemporary Issues related to Topic**		
Unit:5	**Disinfection**	**7 Hours**
Anaerobic treatment, UASB, attached growth processes. **Contemporary Issues related to Topic**		
Unit :6	**Other Processess**	**7 Hours**
Treatment of specific industrial wastes: textile, dairy, tanning, sugar, brewery and distillery, iron and steel, food industries. **Contemporary Issues related to Topic**		
	Total Lecture	**39 Hours**

			July 2022	1.00	Applicable for AY 2022-23 Onwards
Chairperson	Dean (Acad. Matters)	Dean OBE	Date of Release	Version	

Text Books	
1	Metcalf and Eddy, Wastewater Engineering, Treatment, Disposal and Reuse, Inc. Third Edition McGraw Hill 1991
2	W.W. Eckenfelder, Industrial Pollution Control, McGraw Hill Int. Edition 1990
3	W.J. Weber, Physicochemical Processes for Water Quality Control, John Wiley and Sons, 1972
4	Culp R L et al, Handbook of Advanced Wastewater Treatment Van No Strand Reinhold Publ. N.Y
Reference Books	
1	Central pollution control board, India, comprehensive industry document series
2	World Bank Group (1998) "Pollution Prevention and Abatement Handbook–Towards Cleaner Production", World Bank and UNEP, Washington D.C
YCCE e- library book links [ACCESSIBLE FROM COLLEGE CAMPUS]	
1	http://link.springer.com/openurl?genre=book&isbn=978-1-4613-6193-0
2	https://onlinelibrary.wiley.com/doi/book/10.1002/9780470168042
MOOCs Links and additional reading, learning, video material	
1	https://nptel.ac.in/courses/105105048

VII SEMESTER

22CV736__PE-V : Finite Element methods in Geotechnical Engineering

Course Outcomes		
Upon successful completion of the course the students will be able to 1. Explain the principles of finite element method. 2. Apply principles of FEM for derivation of element equations 3. Analyze various elements by finite element method. 4. Evaluate the different geotechnical structures using software		
Unit:1	**Concepts of FEM**	**7 Hours**
Concepts of FEM, Steps involved in Finite Element Analysis Procedure, Merits and Demerits. Principles of Elasticity: Stress equations, Strain-Displacement relationships in matrix form.		
Unit:2	**FEM**	**6 Hours**
History and its applications Discretization of continuum, types of elements, displacement models, convergence requirements, Equations of equilibrium and compatibility, Plane stress, Plane strain and axi-symmetric bodies of revolution with axi-symmetric loading. **Contemporary Issues related to Topic:**		
Unit:3	**Generalized and Natural coordinates**	**7 Hours**
Computations of element properties shape function Strain displacement matrix and stiffness, bar elements beam elements, truss elements, constant strain triangle, linear strain triangle, Quadrilateral elements. **Contemporary Issues related to Topic**		
Unit:4	**Stages of numerical modelling**	**6 Hours**
Defining the modelling objective, developing conceptual model of the problem, Determining the appropriate theoretical models, Developing a mathematical description **Contemporary Issues related to Topic**		
Unit:5	**Introduction to nonlinear analysis**	**7 Hours**
Techniques of nonlinear analysis, Constitutive modeling for soils, Nonlinear- soil parameters. **Contemporary Issues related to Topic**		
Unit :6	**Application finite method**	**6 Hours**
Application finite method to different geotechnical structure. Use of different finite element software for geotechnical engineering, application, benefit. **Contemporary Issues related to Topic: Application of Finite Element methods for land slide**		
	Total Lecture	**39 Hours**

			July 2022	1.00	Applicable for AY 2022-23 Onwards
Chairperson	Dean (Acad. Matters)	Dean OBE	Date of Release	Version	

Textbooks	
1	Finite Element Method – Y. M. Desai, T. I. Eltho and A. H. Shah
Reference Books	
1	A First Course in the Finite Element Method – D. L. Logan
2	Introduction to Finite Elements in Engineering - Chandrupatla, R.T. & Belegundu, A.D.
3	Gere and Weaver, "Matrix Method of Structural Analysis", CBS Publication, 2004
YCCE e- library book links [ACCESSIBLE FROM COLLEGE CAMPUS]	
1	http://103.152.199.179/YCCE/Suported%20file/Supprted%20file/e-copies%20of%20books/Civil%20Engineering/
2	https://soaneemrana.com/onewebmedia/TEXT%20BOOKOF%20FINITE%20ELEMENT%20ANALYSIS%20BY%20P.%20SESHU%20(1).pdf
MOOCs Links and additional reading, learning, video material	
1	https://www.youtube.com/watch?v=KR74TQesUoQ&list=PLbMVogVj5nJRjnZA9oryBmDdUNe7lbnB0
2	https://www.youtube.com/watch?v=MldJ6WHCsvQ
3	https://www.youtube.com/watch?v=lbghRDnb-LQ&list=PLFA5C164D77D3B971

VII SEMESTER

22CV737__PE-V : Structural Engineering Practices

Course Outcomes :		
Upon successful completion of the course the students will be able to 1. Articulate structural engineering practices and pre-requisites. 2. Apply relevant standards and software related to structural design. 3. Explain important construction processes related to structural members. 4. Analyze and design building components and prepare detailed structural drawings		
Unit:1	**Pre-requisites in Structural Design**	**7 Hours**
Importance of various architectural building plans and sections for the structural design. Structural behaviour, Design basis, Design Intent, Standards, Manuals, Methods, material testing, Material Properties, Mix design, Quality Control, Different Tests & checks carried out at site, cube tests, buckling, creep, Shrinkage, etc. Professional ethics		
Unit:2	**Structural framing**	**6 Hours**
Preparation of the structural framing plan of the building, beam locations, column positions, column orientations, and shear walls locations. Introduction of SP16, IS:1893, IS:13920		
Unit:3	**Load Combination**	**6 Hours**
Importance, determination & calculation of different loads like Dead load, live load, wall load, seismic load, wind load, finish load, temperature load, vibratory load, etc. Various load combinations.		
Unit:4	**Analysis & Design of Structure**	**7 Hours**
Three dimensional Modelling of the Structure, Boundary Conditions, Section Properties, Applications of Loading, Static & Dynamic Analysis of structure, Design of structure, Understanding & Interpretation of the results, Deformation control, Mode Shapes, Vibrations, Acceptance Criteria's, Tolerances Contemporary Issues related to Topic		
Unit:5	**Introduction to Substructure**	**7 Hours**
Foundations – Importance of soil exploration, Various types of Foundation, Selection of type of foundation. Construction Methods.		
Unit :6	**Introduction to Code**	**6 Hours**
Reinforcement detailing of Structures as per SP34 and as per exposure conditions, Fire Rating, etc.		
	Total Lecture	**39 Hours**

Text Books	
1	P.C. Vergese, Limit State Design of Reinforced Concrete, Prentice Hall Publishers, 2nd edition, 2008
2	Shah and Karve, Reinforced Concrete Structures, Structures Publishers, Pune, 5th edition, 2015.
3	Sinha S.N, Reinforced Concrete Design, Tata McGraw Hill Publishing Company Limited, New Delhi, 2007
4	Ashok K. Jain, Reinforced Concrete –Limit State Design, Nem chand and Brothers, 7th edition,2012
Reference Books	
1	P.C. Varghese, Advanced Design of Structures, Prentice Hall Publishers,2009
2	Punmia B.C.,Jain A.K.,Jain A.K,Reinforced Concrete Structures (Vol-I),Laxmi Publications Pvt Ltd, New Delhi, 2007
3	N. Krishana Raju,Prestressed Concrete,Tata McGraw Hill Publishing Company Limited, New Delhi, 5th edition 2012
YCCE e- library book links [ACCESSIBLE FROM COLLEGE CAMPUS]	
1	http://103.152.199.179/YCCE/Suported%20file/Supprted%20file/e-copies%20of%20books/Civil%20Engineering/11.%20Design20of%20Concrete%20Structures,%2013th%20Edition%20-%20(Malestrom)
2	http://103.152.199.179/YCCE/Suported%20file/Supprted%20file/e-copies%20of%20books/Civil%20Engineering/16.% 20Reinforced%20concrete%20design%20theory%20&%20examples.pdf%20(%20PDFDrive%20).pdf
MOOCs Links and additional reading, learning, video material	
1	https://youtu.be/gaheNSbhD6w
2	https://youtu.be/wJWt0dcgafs
3	https://youtu.be/sDOzMkWGmhY

VII SEMESTER
22CV738__PE-V : Advanced Fluid Mechanics & Hydraulic Machines

Course Outcomes :

Upon successful completion of the course the students will be able to

1. Examine the fundamental principles of fluid mechanics and related applications to submerged object
2. Analyze the real fluid flow in pipe
3. Determine forces acting on the plate
4. Design the surge tank and evaluate the performance of hydraulic machines

Unit:1	Forces on Submerged bodies	7 Hours

Introduction, Force Exerted by a Flowing Fluid on a Body, Drag and Lift, Dimensional Analysis of Drag and Lift, Streamlined and Bluff Bodies, Drag on a Sphere, Terminal velocity, Applications of Stokes' law, Drag on a Cylinder, Circulation and Lift on a Circular Cylinder, Flow patterns and development of lift, Stagnation pressure at any point on the cylinder surface, Expression for lift on cylinder, Lift on Air foil.

Contemporary Issues related to Topic

Unit:2	Boundary layer theory	7 Hours

Introduction, Reynold's experiment, Critical Reynolds number, Boundary layer definitions and characteristics, flow of viscous fluid in circular pipes, Velocity profile and shears tress distribution, maximum velocity, average velocity, Drop of pressure, Hagen–Poiseuille equation.

Contemporary Issues related to Topic

Unit:3	Impact of Jet	6 Hours

Introduction, Force Exerted on a Stationary Flat Plate held Normal to jet, Inclined to jet, and Curved Plate. Force Exerted on Moving Flat Plate held Normal to Jet, inclined to the direction of Jet, Curved Vane, Jet Striking a Moving Curved Vane Tangentially at One Tip and Leaving at the Other.

Contemporary Issues related to Topic

Unit:4	Centrifugal Pump	6 Hours

Introduction, Classification of Pumps, Component Parts of a Centrifugal Pump, working of a Centrifugal Pump, Work done by the Impeller on Liquid, Heads of a Pump, Losses and Efficiencies of a Centrifugal Pump, Minimum Speed for Starting a Centrifugal Pump, Effect of Variation of Discharge on the Efficiency, Multi-stage Centrifugal Pumps, Specific Speed, Characteristics of Centrifugal Pumps, Cavitation in Centrifugal Pumps, Priming of a Centrifugal Pump, types of impeller.

Contemporary Issues related to Topic

Unit:5	Reciprocating Pump	7 Hours

Introduction, Classification of Reciprocating Pumps Components and Working, Discharge, Work Done and Power Requirement, Single-acting reciprocating pump, Double-acting reciprocating pump, Co-efficient of Discharge and Slip of Reciprocating Pump, Effect of Acceleration of Piston on Velocity and Pressure in the Suction and Delivery Pipes, Indicator Diagrams, Effect of acceleration, friction in suction and delivery pipes on indicator Diagram, Air Vessels, throttling, bladder vessel.

Unit :6	Surge Tank	6 Hours

Introduction, function, location, Types of Surge tank, stability analysis of surge tank, upsurge in tank with and without friction, time of oscillation, Thomas criteria, Design of simple surge tank.

Contemporary Issues related to Topic

	Total Lecture	**39 Hours**

Text Books	
1	Modi & Seth, Fluid mechanics and Machineries, Standard Book House, Delhi.
2	R.K. Rajput., A textbook of Fluid mechanics And Hydraulic machines, S. Chand & company ltd
Reference Books	
1	Subramanya K., Theory and application of Fluid mechanics including Hydraulic machines, Tata McGraw-Hill publishing company ltd. New Delhi.
2	Ramamrutham S, Hydraulics fluid mechanics & Fluid machines, Dhanpat Rai publishing company (P) ltd. New Delhi.
YCCE e- library book links [ACCESSIBLE FROM COLLEGE CAMPUS]	
1	http://103.152.199.179/YCCE/Suported%20file/Supprted%20file/e-copies%20of%20books/Civil%20Engineering/3.%20A%20Textbook%20of%20Fluid%20Mechanics%20%20By%20R%20K%20Rajput%20(%20PDFDrive.com%20).pdf
2	http://103.152.199.179/YCCE/Suported%20file/Supprted%20file/ecopies%20of%20books/Civil%20Engineering/54.%20FLUID%20MECHANICS%20AND%20MACHINERY%20-%20KOTHANDARAMAN%20AND%20MOORTHY.pdf
MOOCs Links and additional reading, learning, video material	
1	http://103.152.199.179/YCCE/Suported%20file/Supprted%20file/e-copies%20of%20books/Civil%20Engineering/50.%20FLUID%20MECHANICS%20AND%20HYDRAULIC%20MACHINES-R.%20K.%20RAJPUT.pdf
2	http://103.152.199.179/YCCE/Suported%20file/Supprted%20file/ecopies%20of%20books/Civil%20Engineering/51.%20%20FLUID%20MECHANICS%20AND%20HYDRAULIC%20MACHINES-S.%20K.%20SOM.pdf

VII SEMESTER

22CV751__PE-VI : Modern & Innovative Construction Materials

Course Outcomes :
Upon successful completion of the course the students will be able to 1. Appraise appropriateness and sustainability of materials for construction projects. 2. Explain about innovative sustainable construction materials and their uses in construction 3. Design and develop smart intelligent buildings.

Unit:1	**SPECIAL CONCRETE & SUPPEMENTRY MATERIALS**	**7 Hours**
Heat of Hydration of Cement and Thermal Stresses, Anti washout Under water Concrete, Concreting under water, Rheology, Self Compacting Concrete, Fibre Reinforced Concrete, Shotcrete, High strength Concrete, using Polymers in concrete. Supplementary cementitious materials, substitutes of fine & coarse aggregates in concrete.		
Unit:2	**METALS**	**7 Hours**
Steels HYSD, TMT, Tendons, Light Gauge Steel, Steel Fastenings, New Alloy Steels – Aluminium and Its Products, Protective Coatings to Reinforcement.		
Unit:3	**COMPOSITES**	**7 Hours**
A) Steel-concrete composites B) Polymer and its composites C) Ceramic and its composite, FRP, FRC, Ferro cement etc. D) Timber, bamboo, veneer, Laminates, Particle boards. E) Thermal and Sound insulating materials.		
Unit:4	**CONSTRUCTION CHEMICALS**	**6 Hours**
Chemical Admixtures and Adhesives, Water Proofing Compounds – Non Weathering Materials, Flooring & Facade Materials, Geo-Synthetics, Geo-Membranes, Asphalt, Tar & Bituminous Materials		
Unit:5	**SMART AND INTELLIGENT MATERIALS**	**6 Hours**
Smart and Intelligent Materials-Piezoelectric Materials, Shape Memory Alloys & Polymers, Magnetostrictive Materials, Temperature Responsive Polymer, Halo chromic Materials, Smart Hydro-gels, Chromomeric Systems, Photomechanical Materials, Self Healing Materials, Dielectric Elastomers.Bio cement, Phase change material.		
Unit:6	**INTRODUCTION TO SUSTAINABLE AND INNOVATIVE MATERIALS**	**6 Hours**
Cross Laminated Timber Rammed Earth, Pigmented Concrete, The Cabkoma Strand Rod, Light generating Cement, Cigarette Butt Bricks. Hollow Clay Bricks, Transparent Wood, Modular Bamboo, Aluminum Foam. Contemporary issues related to Construction Materials: Environmental, social, economic, building material management for adaptation project, building material information		
	Total Lecture	**39 Hours**

Text Books	
1	Properties of Concrete, Neville A. M., Pearson Education Limited
2	Special Concretes, Rafatsiddhequi, Galgotia Publications
3	Concrete Technology, M Gambhir, Tata Mcgraw Hill Education Private Limited
Reference Books	
1	Mehta P, Concrete Technology, Tata Mcgraw Hill Education Private Limited.
2	Shetty M. S, Concrete Technology, S. Chand Publisher
3	Composite Construction Engineering by Gajanan M. Sabnis.
4	Santhakumar A.R., Concrete Technology, Oxford University Press, New Delhi. 2007.
5	Ashby, M.F. and Jones.D.R.H.H. "Engineering Materials 1: An Introduction to Properties, applications and designs", Elsevier Publications, 2005.
6	Shan Somayaji, Civil Engineering Materials, Prentice Hall Inc., 2001
7	Aitkens , High Performance Concrete, McGraw Hill, 1999
YCCE e- library book links [ACCESSIBLE FROM COLLEGE CAMPUS]	
1	http://link.springer.com/openurl?genre=book&isbn=978-1-4613-6193-0
2	https://onlinelibrary.wiley.com/doi/book/10.1002/9780470168042
MOOCs Links and additional reading, learning, video material	
1	https://archive.nptel.ac.in/courses/105/106/105106053/
2	https://archive.nptel.ac.in/courses/105/102/105102206/
3	https://nptel.ac.in/courses/112104251
4	https://nptel.ac.in/courses/105102088

VII SEMESTER
22CV752__PE-VI : Building Services

Course Outcomes :		
Upon successful completion of the course the students will be able to 1. Articulate relevance of plumbing services, causes of fire and protection strategies. 2. Simulate special installations in buildings. relevance of lighting, ventilation & acoustics 3. Illustrate specifications, usage of mechanical installations and facilities for physically challenged, aged people. 4. Explain water treatment services.		
Unit:1	**Plumbing Services**	**7 Hours**
Domestic water system, flushing, sewage water system, rain water system, water treatment, sewage water treatment, all piping & sanitary fixtures that provide water for any Use (drinking, cooking, bathing, laundry, process, etc.)		
Unit:2	**Fire Protection**	**6 Hours**
Causes of fire in building, Fire resisting properties of materials. Fire resistant construction. Fire protection requirements for multistoried building. Safety against fire in theaters and cinema halls. Fire detecting and extinguishing system.		
Unit:3	**Electrical Installations & Air Conditioning**	**7 Hours**
Different types of wiring need of Earthing, comparison between fuse and MCB, substation, types of lightening fixtures, Building protection against lightening. Requirement of air conditioning, air conditioning system, Pressure-Enthalpy (heat) Diagram of vapor compression cycle, refrigeration effect, Thermodynamics of human body. Psychometric chart. **Contemporary Issues related to Topic:** arcing and overheating issues due to Loose connections		
Unit:4	**Lighting, Ventilation, Acoustics, Sound Insulation and Noise Control**	**6 Hours**
Day lighting, Fenestration, Daylight Factor. Functions of ventilation, Stack effect, wind effect, Air flow through buildings, cross-ventilation. Basic terminology and definitions, Physics of sound. Behaviour of sound in an enclosed space, Noise and its control.		
Unit:5	**Mechanical Equipment & Installation**	**7 Hours**
Vertical transportation such as stairs, elevators, escalators, ramp, Conveyors, Vibrators, Concrete mixers, facilities for physically handicapped and elder.		
Unit :6	**Water Services**	**6 Hours**
Introduction, Water treatment, Base exchange, Demineralization, Cold-water services, Hot-water services, Pipe sizing, Materials for water services, water supply sanitation, Drain systems.		
	Total Lecture	**39 Hours**

			July 2022	1.00	Applicable for AY 2022-23 Onwards
Chairperson	Dean (Acad. Matters)	Dean OBE	Date of Release	Version	

Text Books	
1	B.S. Patil, Building services, Orient Longman.
2	Fred Hall, Roger Greeno, Building Services Engineering, Butterworth-heinemann.
3	David V. Chadderton, Building Services Engineering, Taylor & Francis Group.
Reference Books	
1	E.R. Ambrose, "Heat Pumps and Electric Heating", John and Wiley and Sons, Inc., New York, 1968.
2	Handbook for Building Engineers in Metric systems, NBC, New Delhi, 1968.
3	R.G. Hopkinson and J.D. Kay, "The Lighting of buildings", Faber and Faber, London, 1969.
YCCE e- library book links [ACCESSIBLE FROM COLLEGE CAMPUS]	
1	https://link.springer.com/book/10.1007/978-3-030-64781-0
2	https://onlinelibrary.wiley.com/doi/10.1002/9781118511022.ch0
MOOCs Links and additional reading, learning, video material	
1	https://nptel.ac.in/courses/105102176
2	https://www.youtube.com/watch?v=MmW2407MSlQ
3	https://www.youtube.com/watch?v=9u5m-EK55tI

VII SEMESTER
22CV753__PE-VI : Introduction To Remote Sensing

Course Outcomes :		
Upon successful completion of the course the students will be able to 1. Illustrate the principles of Remote sensing, GIS and GPS 2. Explain the role of various elements of Remote sensing, GIS and GPS. 3. Interpret the process of data acquisition in remote sensing, GIS and GPS. 4. Illustrate the use of remote sensing and GIS in various Civil Engineering Applications.		
Unit:1	**Basics of Remote Sensing**	**6 Hours**
Definition of Remote sensing, Principles of Remote Sensing, Electromagnetic spectrum, Interaction of EM Radiation with atmosphere, and target, Atmospheric Widows, Spectral signature of various land cover features.,		
Unit:2	**Elements of Remote Sensing System**	**7 Hours**
Platforms : Types of platforms, ground, airborne, and space born platforms, Orbit of satellites, satellites for Earth observations studies, Sensors : Types and classification of sensors, sensor resolutions. Scanners : Types of scanners push broom scanner, whiskbroom scanner.		
Unit:3	**Visual Image Interpretation and Aerial Photogrammetry**	**7 Hours**
Elements of interpretation, interpretation key . Basics of Aerial Photogrammetry, Determination and calculation of elevation from RS data**,** Relief displacement, image parallax and vertical exaggeration.		
Unit:4	Digital Image Processing	**7 Hours**
Basics of DIP, Image Rectification and Registration, Image Enhancement, Image Classification. Remote Sensing Data Formats**.**		
Unit:5	**GIS and GPS**	**6 Hours**
Introduction to Geographical Information System, Introduction to Global Positioning System (GPS)		
Unit :6	**Remote Sensing and GIS Applications**	**6 Hours**
Role of Remote Sensing and GIS in Natural Resources Management, Environmental Impact Assessments, Agriculture, Land use & Land Cover, Disaster Management. **Contemporary Issues related to Topic**		
	Total Lecture	**39 Hours**

Text Books	
1	Basudeb Bhatta, Remote sensing and GIS, Oxford University Press, Third Edition 2020
2	Anji Reddy , Remote sensing and GIS, BS Publications, Third Edition 2008
Reference Books	
1	Floyd F.Sabins,Remote Sensing: Principles and Interpretation, Waveland Pr Inc; 3rd edition (5 April 2007)
2	Thomas Lillesand, Ralph W. Kiefer, Jonathan Chipman,Remote Sensing and Image Interpretation, Wiley Publication,7th Edition,2015
YCCE e- library book links [ACCESSIBLE FROM COLLEGE CAMPUS]	
1	http://link.springer.com/openurl?genre=book&isbn=978-3-642-30061-5
MOOCs Links and additional reading, learning, video material	
1	https://nptel.ac.in/courses/105103193
2	https://nptel.ac.in/courses/105107201
3	https://nptel.ac.in/courses/105108077
4.	https://nptel.ac.in/courses/121107009

VII SEMESTER
22CV754__PE-VI : Advanced Hydraulics

Course Outcomes :

Upon successful completion of the course the students will be able to

1. Calculate various flow parameters in open channel.
2. Analyze the practical flow profiles and profile length in open channel.
3. Apply model theory to know in advance the performance of prototype.
4. Compute time flow establishment for unsteady flow and water hammer pressure in pipe flow

Unit:1	**Uniform Flow in Channel**	**6 Hours**

Types of channels, classification of channel, criteria for Critical flow, specific energy & specific energy curve, velocity distribution, wide rectangular channel, conveyance of channel, section factor, Hydraulic exponent M & N.

Contemporary Issues related to Topic

Unit:2	**Gradually varied Flow**	**7 Hours**

Dynamic equation of GVF in terms of normal depth & critical depth, conveyance K & section factor Z, hydraulic exponent M & N, channel transitions for subcritical and supercritical flow: hump in channel, reduction in channel width, chocking conditions in channel.

Contemporary Issues related to Topic

Unit:3	**Gradually varied Flow**	**7 Hours**

Gradually varied flow, channel slope, back water curve, drawdown curve. Characteristic of GVF profiles, break in grade, composite GVF profiles, Various gradually varied flow profiles in channel, standard practical profiles, sluice gates and their effects on GVF profile

Contemporary Issues related to Topic

Unit:4	**Gradually varied Flow Computations**	**6 Hours**

Computation of gradually varied flow length in channel, direct step method, Bresse's method, Chow's method.

Contemporary Issues related to Topic

Unit:5	**Hydraulic similitude and model investigation**	**6 Hours**

Dimensionless numbers and their significance, Model investigation, model laws, similitude-types of similarities i.e. Geometric, Kinematics and Dynamic, Force ratio, types of model, merits and limitations of distorted and undistorted model, scale effect in models.

Contemporary Issues related to Topic

Unit :6	**Unsteady flow in a pipe**	**7 Hours**

Bernoulli's Equation of unsteady flow in a pipeline for incompressible fluid flow, Time flow establishment, rigid water column theory of water hammer, computation of water hammer pressures, methods of characteristics.

Contemporary Issues related to Topic

Total Lecture	**39 Hours**

			July 2022	1.00	Applicable for AY 2022-23 Onwards
Chairperson	Dean (Acad. Matters)	Dean OBE	Date of Release	Version	

Text Books	
1	VenTe Chow, Open channel hydraulics, International Student Edition. McGraw Hill,
2	Subramanya K., Flow in open channels, 2009, Tata McGraw Hill Publication
3	Modi & Seth, Fluid mechanics and Machineries, Standard Book House, Delhi.
4	V. L. Streeter & E. B. Wylie, Fluid Mechanics, McGraw Hill Higher Education; 8th edition (1 February 1985)
Reference Books	
1	Ranga Raju K.G. Tata McGraw Hill. K.G., Flow through open channels, 1998, Tata McGraw Hill Publications
2	Fluid Mechanics for engineers-Volume 2 P N Chatterjee Macmillan India Limited Banglore
YCCE e- library book links [ACCESSIBLE FROM COLLEGE CAMPUS]	
1	http://103.152.199.179/YCCE/Suported%20file/Supprted%20file/e-copies%20of%20books/Civil%20Engineering/2.%20FLOW_IN_OPEN_CHANNELS_Third_Edition.pdf
2	http://103.152.199.179/YCCE/Suported%20file/Supprted%20file/e-copies%20of%20books/Civil%20Engineering/50.%20FLUID%20MECHANICS%20AND%20HYDRAULIC%20MACHINES-R.%20K.%20RAJPUT.pdf
MOOCs Links and additional reading, learning, video material	
1	http://103.152.199.179/YCCE/Suported%20file/Supprted%20file/ecopies%20of%20books/Civil%20Engineering/51.%20%20FLUID%20MECHANICS%20AND%20HYDRAULIC%20MACHINES-S.%20K.%20SOM.pdf
2	http://103.152.199.179/YCCE/Suported%20file/Supprted%20file/ecopies%20of%20books/Civil%20Engineering/54.%20FLUID%20MECHANICS%20AND%20MACHINERY%20%20KOTHANDARAMAN%20AND%20MOORTHY.pdf
3	https://onlinecourses.nptel.ac.in/noc20_ce30/course

VII SEMESTER
22CV755__PE-VI : Watershed Management

Course Outcomes :		
Upon successful completion of the course the students will be able to 1. Explain the watershed characteristics and need of watershed management. 2. Classify soil and soil erosion and relate the relationship between soil and water. 3. Analyze Watershed management components and implement water conservation techniques. 4. Compare watershed Modeling techniques and monitoring tools.		
Unit:1	**Watershed**	**7 Hours**
Watershed characteristics, causes of watershed deterioration, effects of watershed deterioration on community. Concepts of watershed management. Water resources regions in India. Principles of watershed management, Integrated Watershed Management Approach (IWMA), Objectives of IWMA, selection of watershed village, equity issues for watershed policies and Resilliance. **Contemporary Issues related to Topic**		
Unit:2	**Surveys**	**7 Hours**
Benchmark surveys for Integrated Watershed Management, application of Remote Sensing in Watershed Management. Land capability classification: objectives and factors affecting, Stakeholder participation: Modes of participation, Appraisals: Types, Rapid Rural Appraisal (RRA) and Participatory Rural Appraisal (PRA), **Contemporary Issues related to Topic**		
Unit:3	**Soil Erosion**	**6 Hours**
Factors affecting soil erosion, Types of soil erosion, Damages (losses) due to soil erosion, Estimation of losses using Universal Soil Loss Equation (USLE) and Revised Universal Soil Loss Equation (R-USLE) methods. Control measures for reducing soil erosion. **Contemporary Issues related to Topic**		
Unit:4	**Watershed components management**	**6 Hours**
Management of natural drainages in watershed using check dams, Gully stabilization and storage, River training works, Guide bank, Pitched island, Retards, Revetments, Gabion, Reservoir sedimentation, factors affecting and measurement, Urban Storm Water Management. **Contemporary Issues related to Topic**		
Unit:5	**Water conservation and Harvesting**	**7 Hours**
Management of arable land: Bench terracing, Conservation Bench terracing, ditches, land levelling, hydraulic measures, retaining wall, biological or vegetative measures. mulching, mixed cropping, alley cropping and tillage. Management of non arable land: contour trenching. Orchard terraces, stone Walls, Diversion Drain, Vegetative Control Measures, Half Moon Terraces, Geojute, Retaining Walls, Wattling, Crib Structures, Micro Watershed Treatment. **Contemporary Issues related to Topic**		
Unit :6	**Watershed Modeling**	**6 Hours**
Watershed Modeling: Data required, watershed models and its application, Rainfall-Runoff modeling, Curve Number Method, Models using GIS. Case studies on watershed management. **Contemporary Issues related to Topic**		
	Total Lecture	**39 Hours**

			July 2022	1.00	Applicable for AY 2022-23 Onwards
Chairperson	Dean (Acad. Matters)	Dean OBE	Date of Release	Version	

Text Books	
1	J. V. S Murthy, Watershed Management, New Age International Publishers, 1998.
2	Suresh Rao, Soil and Water Conservation Practices, Standard Publishers, 2003.
3	V.V. N. Murthy, Land and Water Management, Kalyani Publishers, 1994.
Reference Books	
1	Ghanshyam Das, Hydrology & Soil Conservation Engineering, PHI Publication.
YCCE e- library book links [ACCESSIBLE FROM COLLEGE CAMPUS]	
1	Buy Watershed Management Book Online at Low Prices in India | Watershed Management Reviews & Ratings - Amazon.in
2	103.152.199.179/YCCE/Suported file/Supprted file/e-copies of books/Civil Engineering/9. Irriagtion Engineering and Hydraulic Structures by Santosh Kuma- By EasyEngineering.net.pdf
MOOCs Links and additional reading, learning, video material	
1	NPTEL :: Civil Engineering - Watershed Management
2	https://nptel.ac.in/courses/105102159
3	https://onlinecourses.nptel.ac.in/noc22_ce44/preview

VII SEMESTER
22CV756__PE-VI : Pavement Design

Course Outcomes:		
Upon successful completion of the course the students will be able to 1. Explain various types of pavement, different design parameters and specifications for flexible and rigid pavements. 2. Analyze and design flexible and rigid pavements. 3. Explain various specification and standard for highway and airfield constructions and pavement management system. 4. Examine pavement condition and Explain techniques for strengthening of the pavement.		
Unit:1	**Types of Pavements and Deign Parameters**	**7 Hours**
Introduction to Various types of pavement: Flexible, semi flexible and rigid pavements, composite pavement, Introduction to Ultrathin thin white topping & perpetual pavement. Design Parameters: Standard Axle load, wheel assemblies for road vehicles, Type and contact pressure, contact area imprints, Computations of ESWL.		
Unit:2	**Analysis of Pavement**	**7 Hours**
Analysis of Flexible and Rigid Pavements: Stress, strain, deflection analysis for single, two, three and multi layered flexible pavement systems, stress and deflections for rigid pavements due to load and temperature.		
Unit:3	**Specifications and standards**	**7 Hours**
IRC, MORTH, ICAO, IAAI specification and standard for highway and airfield constructions. Pavement management system.		
Unit:4	**Highway Pavement Design**	**6 Hours**
Flexible Pavement: IRC-37, Brumister, AASHTO method of design. Rigid Pavement: IRC 58, rigid pavement joints and reinforcement.		
Unit:5	**Arfield Pavement Design**	**7 Hours**
Flexible Pavement: US Corps of Engineering, CBR and FAA. Rigid Pavement: PCA, FAA & LCN. Cost Estimates: Cost evaluation and comparative study.		
Unit :6	**Pavement Evaluation and Maintenance**	**7 Hours**
Pavement Evaluation: International roughness Index (IRI), rut depth, profilometers, Bump integrator, Benkelman Beam Deflection study. Strengthening of Pavements: Introduction to overlay design, repair, maintenance, and rehabilitation of pavement.		
	Total Lecture	**39 Hours**

			July 2022	1.00	Applicable for AY 2022-23 Onwards
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Text Books	
1	Pavement Design by R. Srinivasa Kumar
2	Principles And Practices of Highway Engineering: (Including Expressways and Airport Engineering) by L.R. Kadiyali), N.B. Lal
3	N.J. Garber and L. A. Hoel, Traffic and Highway Engineering, Thomson Learning, Inc., 2002.
4	E.J. Yoder and M. W. Witczak, Principles of Pavement Design, John Willey, Inc., 1975.
5	F.L. Roberts, P. S. Kandhal, E. R. Brown, DY Lee, and T. W. Kennedy, Hot
Reference Books	
1	IRC Handbook and MORTH Specifications, Indian Road Congress publications.
2	Association of State Highway and Transportation Officials (AASHTO) Specifications and Guides, 2002. Y. H. Huang, Pavement Analysis and Design, Prentice Hall, 1993.
3	Institute of Transportation Engineers, 'Manual of Transportation Engineering Studies', Prentice Hall
YCCE e- library book links [ACCESSIBLE FROM COLLEGE CAMPUS]	
1	http://103.152.199.179/YCCE/Suported%20file/Supprted%20file/e-copies%20of%20books/Civil%20Engineering/62.%20Pavement%20Design%20-%20A%20Guide%20to%20the%20Structural%20Design%20of%20Road%20Pavements%20(%20PDFDrive%20).pdf
2	http://103.152.199.179/YCCE/Suported%20file/Supprted%20file/e-copies%20of%20books/Civil%20Engineering/63.%20Principles-of-Pavement-Engineering.pdf
3	https://link.springer.com/chapter/10.1007/978-1-4615-1729-0_13
4	https://onlinelibrary.wiley.com/doi/10.1002/9781119038849.ch20
MOOCs Links and additional reading, learning, video material	
1	https://archive.nptel.ac.in/courses/105/105/105105107/
2	https://www.civil.iitb.ac.in/tvm/nptel/401_InTse/web/web.html

VII SEMESTER
22CV757__PE-VI : Water Power Engineering

Course Outcomes:

Upon successful completion of the course the students will be able to

1. Examine fundamentals of hydropower and hydropower potential.
2. Explain components of intake structure and surge tank.
3. Determine the flow parameters of turbines.
4. Explain the pump storage plant and its economics.

Unit:1	**Sources of energy**	**7 Hours**

Introduction: Sources of energy, types of power station, choice of type of generation, components of water power project, types and general layouts of various hydropower schemes, General arrangements of a power station, powerhouse, sub-structure and super structure, underground power station–necessity, principal, types, development, need of hydropower.

Contemporary Issues related to Topic

Unit:2	**Power potential**	**6 Hours**

Power potential, storage and structures related to hydro-power, Nature of demand: Load curve, load duration curves, load factor, plant factor, plant use factor, firm power secondary power.

Contemporary Issues related to Topic

Unit:3	**Intake structures**	**6 Hours**

Intake structures: Types, level of intake, hydraulics of intake structures, trash rack, transition, types of gates. Conduits: Types, economic section, power canals, pen-stock types and diameter pipe supports, anchor blocks, tunnels classification, location and tunnel linings.

Contemporary Issues related to Topic

Unit:4	**Surge Tank**	**6 Hours**

Simple surge tank, Functions and behavior of the surge tanks, location, types of surge tanks, fore-bay.

Contemporary Issues related to Topic

Unit:5	**Turbines**	**7 Hours**

Turbines: Classification of turbines, characteristics of different types, choice of type of turbine, turbine setting and cavitation, Tail race: Functions, types, channel and tunnel, draft tubes-function and principal types.

Contemporary Issues related to Topic

Unit :6	**Pumped storage plants**	**7 Hours**

Pumped storage plants, purpose and general layout of pumped storage schemes, main types, typical arrangements of the upper reservoirs, economics of pumped storage plants.

Contemporary Issues related to Topic

Total Lecture	**39 Hours**

			July 2022	1.00	Applicable for AY 2022-23 Onwards
Chairperson	Dean (Acad. Matters)	Dean OBE	Date of Release	Version	

Text Books	
1	Dandekar M. M. & Sharma K. N, Water Power Engineering, Vikas Publishing House Pvt. Ltd., New Delhi.
2	Sharma R.K. & Sharma T.K., Water Power Engineering, S. Chand Publication.
3	S. K Garg, Irrigation Engineering & Hydraulic Structure (Volume-I & II), Khanna Publications.
4	Arora K. R., Irrigation, Water Power & Water Resources Engineering, Standard Publishers Distributors.
Reference Books	
1	A.K. Raja, A. P. Srivastava, M. Dwivedi, Power Plant Engineering, New age International publishers
YCCE e- library book links [ACCESSIBLE FROM COLLEGE CAMPUS]	
1	Irrigation and Water Power Engineering By Dr. B. C. Punmia Dr. Pande Brij Basi Lal Ashok Kumar Jain Arun Kumar Jain | Meg Nas - Academia.edu
2	https://ia802309.us.archive.org/30/items/hydro-dandekar-pdf/hydro dandekar pdf.pdf
3	103.152.199.179/YCCE/Suported file/Supprted file/e-copies of books/Civil Engineering/9. Irriagtion Engineering and Hydraulic Structures by Santosh Kuma- By EasyEngineering.net.pdf
MOOCs Links and additional reading, learning, video material	
1	Turbine - Wikipedia

VII SEMESTER
22CV705__Project Phase-II

Course Outcomes :
Upon successful completion of the course the students will be able to 1.Illustrate a sound technical knowledge of their selected project topic. 2.Write problem identification, formulation and solution. 3.Design engineering solutions to complex problems utilizing a systems approach including ability to work in a team. 4.Express effectively about the solution of the problem to enhance writing and communication skill.
The group of students will continue to work for the project allotted previously as per thrust area and will submit a project report (thesis) based on their studies. Evaluation will be done continuously, and viva voce conducted at the end of the semester.

VII SEMESTER

22CV706__Campus Recruitment Training

Course Outcomes :

Upon successful completion of the course the students will be able to

1. Make detailed notes and reports.
2. Compute the problems on quants
3. Illustrate the problems on logical, technical and verbal
4. Apply the field knowledge to the practical applications.

SN.	Contain
1	Quantitative Aptitude
2	Logical Reasoning
3	Verbal Ability
4	Technical

Student would be required to undergo a practical training for One months during the summer vacation after 6th semester. They would submit a report about the same and also make the presentation for evaluation.

Nagar Yuwak Shikshan Sanstha's

Yeshwantrao Chavan College of Engineering

(An Autonomous Institution affiliated to Rashtrasant Tukadoji Maharaj Nagpur University)

(Accredited 'A++' Grade by NAAC with a score of 3.25)

Hingna Road, Wanadongri, Nagpur - 441 110

Bachelor of Technology

SoE & Syllabus 2022

8th Semester

(Department of Civil Engineering)

B. Tech in Civil Engineering

VIII SEMESTER

22CV801__Internship - training / Seminar & Report

Course Outcomes :
Upon successful completion of the course the students will be able to 1.Manage and handle the practical situations and demonstrate internship project. 2.Draw Civil Engineering Drawings using AUTOCAD, MAP 3D etc. 3.Analyse and Design basic Civil Engineering Structures. 4.Write a detailed project report (DPR). 5.Compare theoretical knowledge with practical approach.
Students would be required to undergo internship in a reputed industry or organization for at least 4 months after VII semester. The evaluation will be continuous through internship seminars. They would submit a report, give seminar to present the work done during internship followed by viva voce for final evaluation.

VIII SEMESTER

22CV802__Extracurricular Activity Evaluation

Course Outcomes :

Upon successful completion of the course the students will be able to

1. Develop leadership through the engagement of collaboration, and then put it into action to complete the task
2. Employ with a diverse range of individuals
3. Operate to the advancement of society and the identification of health-related problems
4. Produce independently as well as member of a team in order to achieve established goals

Due credits will be given to the students based on their performance and involvement in different extra and co-curricular activities conducted within the college or by other organizations/ institutions. Due credit will also be given to the student if they are successful in different competitive examinations conducted by different organizations. The guidelines as given in academic regulations will be followed for evaluation.