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 3.6)

Hingna Road, Wanadongri, Nagpur - 441 110

Bachelor of Technology

SoE & Syllabus 2023

1st to 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)

B.TECH SCHEME OF EXAMINATION 2023

(Scheme of Examination w.e.f. 2023-24 onward)

(Department of Civil Engineering)

B. Tech. in Civil Engineering

SoE No. 23CV-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 (GROUP-A)															
1	1	BS	GE	23GE1101	Calculus and Vector	T	3	0	0	3	3	30	20	50	3
2	1	BS	GE	23GE1104	Applied Chemistry	T	3	0	0	3	3	30	20	50	3
3	1	BS	GE	23GE1105	**Lab:** Applied Chemistry	P	0	0	2	2	1		60	40	
4	1	HS/AEC1	GE	23GE1112	Professional Communication	T	2	0	0	2	2	30	20	50	2
5	1	HS/IKS	GE	23GE1115	Indian Knowledge System	T	2	0	0	2	2	30	20	50	2
6	1	BES	CV	23CV1101	Engineering Mechanics	T	3	0	0	3	3	30	20	50	3
7	1	BES	CV	23CV1102	**Lab:** Engineering Mechanics	P	0	0	2	2	1		60	40	
8	1	BES	IT	23IT1103	Programming for Problem Solving	T	2	0	0	2	2	30	20	50	2
9	1	BES	IT	23IT1104	**Lab:** Programming for Problem Solving	P	0	0	2	2	1		60	40	
10	1	VSEC	GE	23GE1117	Get Set Go	…	…	…	…	…	2		60	40	
11	1	CC1	GE		**Liberal Learning Course (LLC1)**	…	…	…	…	…	2		60	40	
					TOTAL FIRST SEM		**15**	**0**	**6**	**21**	**22**				
SECOND SEMESTER (GROUP-A)															
1	2	BS	GE	23GE1202	Differential Equations, Matrices and Statistics	T	3	0	0	3	3	30	20	50	3
2	2	BS	GE	23GE1208	Engineering Physics	T	3	0	0	3	3	30	20	50	3
3	2	BS	GE	23GE1209	**Lab:** Engineering Physics	P	0	0	2	2	1		60	40	
4	2	BES	ME	23ME1201	Engineering Graphics	T	1	0	0	1	1	30	20	50	3
5	2	BES	ME	23ME1202	**Lab :** Engineering Graphics	P	0	0	4	4	2		60	40	
6	2	BES	EL	23EL1201	Basic Electrical and Electronics Engineering	T	3	0	0	3	3	30	20	50	3
7	2	BES	ME	23ME1207	**Lab :** FAB Shop	P	0	0	2	2	1		60	40	
8	2	PC	CV	23CV1203	Strength of Materials	T	3	0	0	3	3	30	20	50	3
9	2	PC	CV	23CV1204	**Lab :** Strength of Materials	P	0	0	2	2	1		60	40	
10	2	VSEC	GE	23GE1218	Functional English	…	…	…	…	…	2		60	40	
11	2	CC2	GE		**Liberal Learning Course (LLC2)**	…	…	…	…	…	2		60	40	
					TOTAL SECOND SEM		**13**	**0**	**10**	**23**	**22**				

Liberal Learning Course

SN	Sem	Type	BoS/ Deptt	Sub. Code	Subject
1	1	CC1	GE	23LLC1101	Music (Vocal)
2	1	CC1	GE	23LLC1102	Music (Instrumental)
3	1	CC1	GE	23LLC1103	Indian Classical Dance
4	1	CC1	GE	23LLC1104	Other forms of Dances
5	1	CC1	GE	23LLC1105	Painting
6	1	CC1	GE	23LLC1106	Theatre and acting
7	1	CC1	GE	23LLC1107	Photography
8	1	CC1	GE	23LLC1108	Yoga
9	1	CC1	GE	23LLC1109	Chess
10	1	CC1	GE	23LLC1110	Athletics
11	1	CC1	GE	23LLC1111	Basket Ball
12	1	CC1	GE	23LLC1112	Judo
13	1	CC1	GE	23LLC1113	Elements of Japanese Language
14	1	CC1	GE	23LLC1114	Elements of German Language
15	1	CC1	GE	23LLC1115	Elements of French Language
16	1	CC1	GE	23LLC1116	Elements of Spanish Language
17	1	CC1	GE	23LLC1117	Basics of Vedic Maths
18	1	CC1	GE	23LLC1118	Skilling in Microsoft Visio and Inkscape

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(Scheme of Examination w.e.f. 2023-24 onward)

(Department of Civil Engineering)

B. Tech. in Civil Engineering

SoE No. 23CV-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	

Liberal Learning Course

SN	Sem	Type	BoS/ Deptt	Sub. Code	Subject
1	2	CC2	GE	23LLC1201	Music (Vocal)
2	2	CC2	GE	23LLC1202	Music (Instrumental)
3	2	CC2	GE	23LLC1203	Indian Classical Dance
4	2	CC2	GE	23LLC1204	Other forms of Dances
5	2	CC2	GE	23LLC1205	Painting
6	2	CC2	GE	23LLC1206	Theatre and acting
7	2	CC2	GE	23LLC1207	Photography
8	2	CC2	GE	23LLC1208	Yoga
9	2	CC2	GE	23LLC1209	Chess
10	2	CC2	GE	23LLC1210	Athletics
11	2	CC2	GE	23LLC1211	Basket Ball
12	2	CC2	GE	23LLC1212	Judo
13	2	CC2	GE	23LLC1213	Elements of Japanese Language
14	2	CC2	GE	23LLC1214	Elements of German Language
15	2	CC2	GE	23LLC1215	Elements of French Language
16	2	CC2	GE	23LLC1216	Elements of Spanish Language
17	2	CC2	GE	23LLC1217	Basics of Vedic Maths
18	2	CC2	GE	23LLC1218	Skilling in Microsoft Visio and Inkscape

MANDATORY LEARNING COURSES													
1	2	HS		GE2131	Universal Human Values (UHV)	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**

Chairperson	Dean (Acad. Matters)	July, 2023	1.00	Applicable for AY 2023-24 Onwards
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							L	T	P	Hrs		MSEs*	TA**	ESE	
THIRD SEMESTER															
1	3	BS	GE	23GE1302	Integral Transform	T	3	0	0	3	3	30	20	50	3
2	3	**HSSM-1**	GE	23GE1301	Fundamentals of Management & Economics	T	2	0	0	2	2	30	20	50	3
3	3	PC	CV	23CV1301	Concrete Technology	T	3	0	0	3	3	30	20	50	3
4	3	PC	CV	23CV1302	**Lab :** Concrete Technology	P	0	0	2	2	1		60	40	
5	3	PC	CV	23CV1303	Fluid Mechanics	T	3	0	0	3	3	30	20	50	3
6	3	PC	CV	23CV1304	**Lab :** Fluid Mechanics	P	0	0	2	2	1		60	40	
7	3	CEP	CV	23CV1305	Community Engagement Project	P	0	0	2	4	2		60	40	
8	3	**VEC-1**	CV	23CV1311	Environmental Sustainability, Pollution and Management	T	2	0	0	2	2	30	20	50	3
9	3	**OE1**	OE		**Open Elective -I**	T	2	0	0	2	2	30	20	50	3
10	3	MDM	CV		**MD Minor Course-I**	T	2	0	0	2	2	30	20	50	3
						TOTAL	**17**	**0**	**6**	**25**	**21**				
List of Mandatory Learning Course (MLC)															
1	3	HS	T&P	MLC2123	**YCAP3 :** YCCE Communication Aptitude Preparation	**A**	3	0	0	3	**0**				

Open Elective - I

SN	Sem	Type	BoS/ Deptt	Sub. Code	Subject
1	3	OE1	GE	23OE1301	OE-I : Combinatorics
2	3	OE1	GE	23OE1302	OE-I : Fuzzy Set Theory, Arithmetic And Logic
3	3	OE1	GE	23OE1303	OE-I : Green Chemistry & Sustainability
4	3	OE1	GE	23OE1304	OE-I : Hydrogen Fuel
5	3	OE1	GE	23OE1305	OE-I : Electronic Materials And Applications
6	3	OE1	GE	23OE1306	OE-I : Laser Technology And Applications
7	3	OE1	MGT	23OE1307	OE-I : Finance and Cost Management
8	3	OE1	MGT	23OE1308	OE-I : Operation Research Techniques
9	3	OE1	MGT	23OE1309	OE-I : Project Evaluation & Management
10	3	OE1	MGT	23OE1310	OE-I : Total Quality Management
11	3	OE1	MGT	23OE1311	OE-I : Value Engineering
12	3	OE1	MGT	23OE1312	OE-I : Maintenance Management
13	3	OE1	MGT	23OE1313	OE-I : Industrial Safety
14	3	OE1	MGT	23OE1314	OE-I : Industry 4.0
15	3	OE1	MGT	23OE1315	OE-I : Operation Management
16	3	OE1	MGT	23OE1316	OE-I : Material Management
17	3	OE1	MGT	23OE1317	OE-I : Hospitality Management
18	3	OE1	MGT	23OE1318	OE-I : Human Resource Management & Organizational Behaviour
19	3	OE1	MGT	23OE1319	OE-I : Agri-Business Management
20	3	OE1	MGT	23OE1320	OE-I : Rural Marketing
21	3	OE1	MGT	23OE1321	OE-I : Marketing Management
22	3	OE1	MGT	23OE1322	OE-I : Health Care Management
23	3	OE1	MGT	23OE1323	OE-I : Designated approved online NPTEL/KKSU Course
24	3	OE1	MGT	23OE1324	OE-I : Indian Archeology
25	3	OE1	MGT	23OE1325	OE-I : Social & Positive Psychology
26	3	OE1	MGT	23OE1326	OE-I : Seismology & Earthquake

		July, 2023	**1.00**	**Applicable for AY 2023-24 Onwards**
Chairperson	**Dean (Acad. Matters)**	**Date of Release**	**Version**	

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SoE No. 23CV-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	
FOURTH SEMESTER															
1	4	**HSSM-2**	GE	23GE1401	Entrepreneurship Development	T	2	0	0	2	2	30	20	50	3
2	4	**AEC-2**	GE	23GE1405 23GE1406	Marathi Language / Hindi Language	T	2	0	0	2	2	30	20	50	3
3	4	**VSEC-3**	CV	23CV1401	**Lab :** Computer Aided Drawing with REVIT Architecture	P	0	0	2	4	2		60	40	
4	4	**VEC-2**	CV	23CV1402	Applications of AIML in Civil Engineering	T	2	0	0	2	2	30	20	50	3
5	4	PC	CV	23CV1403	Building Construction and Materials	T	2	0	0	2	2	30	20	50	3
5	4	PC	CV	23CV1404	Structural Analysis	T	3	0	0	3	3	30	20	50	3
6	4	PC	CV	23CV1405	**Lab :** Structural Analysis	P	0	0	2	2	1		60	40	
7	4	PC	CV	23CV1406	Surveying	T	3	0	0	3	3	30	20	50	3
8	4	PC	CV	23CV1407	**Lab :** Surveying	P	0	0	2	2	1		60	40	
9	4	**OE-2**	OE		**Open Elective-II**	T	2	0	0	2	2	30	20	50	3
11	4	MDM	CV		**MD Minor Course-II**	T	2	0	0	2	2	30	20	50	3
						TOTAL	**18**	**0**	**6**	**26**	**22**				

List of Mandatory Learning Course (MLC)															
1	4	HS	T&P	MLC2124	**YCAP4 :** YCCE Communication Aptitude Preparation	**A**	3	0	0	3	**0**				

Open Elective - II

SN	Sem	Type	BoS/ Deptt	Sub. Code	Subject
1	4	OE2	GE	23OE2401	OE-II : Combinatorics
2	4	OE2	GE	23OE2402	OE-II : Fuzzy Set Theory, Arithmetic And Logic
3	4	OE2	GE	23OE2403	OE-II : Green Chem. & Sustainability
4	4	OE2	GE	23OE2404	OE-II : Hydrogen Fuel
5	4	OE2	GE	23OE2405	OE-II : Electronic Materials And Applications
6	4	OE2	GE	23OE2406	OE-II : Laser Technology And Applications
7	4	OE2	MGT	23OE2407	OE-II : Finance And Cost Management
8	4	OE2	MGT	23OE2408	OE-II : Operation Research Techniques
9	4	OE2	MGT	23OE2409	OE-II : Project Evaluation & Management
10	4	OE2	MGT	23OE2410	OE-II : Total Quality Management
11	4	OE2	MGT	23OE2411	OE-II : Value Engineering
12	4	OE2	MGT	23OE2412	OE-II : Maintenance Management
13	4	OE2	MGT	23OE2413	OE-II : Industrial Safety
14	4	OE2	MGT	23OE2414	OE-II : Industry 4.0
15	4	OE2	MGT	23OE2415	OE-II : Operation Management
16	4	OE2	MGT	23OE2416	OE-II : Material Management
17	4	OE2	MGT	23OE2417	OE-II : Hospitality Management
18	4	OE2	MGT	23OE2418	OE-II : Human Resource Management & Organizational Behaviour
19	4	OE2	MGT	23OE2419	OE-II : Agri-Business Management
20	4	OE2	MGT	23OE2420	OE-II : Rural Marketing
21	4	OE2	MGT	23OE2421	OE-II : Marketing Management
22	4	OE2	MGT	23OE2422	OE-II : Health Care Management
23	4	OE2	MGT	23OE2423	OE-II : Designated approved online NPTEL/KKSU Course
24	4	OE2	MGT	23OE2424	OE-II : Indian Archeology
25	4	OE2	MGT	23OE2425	OE-II : Social & Positive Psychology
26	4	OE2	MGT	23OE2426	OE-II : Seismology & Earthquake

		July, 2023	1.00	Applicable for AY 2023-24 Onwards
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SoE No. 23CV-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	
FIFTH SEMESTER															
1	5	PC	CV	23CV1501	Reinforced Concrete Structures	T	3	0	0	3	3	30	20	50	3
2	5	PC	CV	23CV1502	Geotechnical Engineering	T	3	0	0	3	3	30	20	50	3
3	5	PC	CV	23CV1503	**Lab :** Geotechnical Engineering	P	0	0	2	2	1		60	40	
4	5	PC	CV	23CV1504	Water Supply & Treatment	T	3	0	0	3	3	30	20	50	3
5	5	PC	CV	23CV1505	**Lab :** Water Quality Analysis	P	0	0	2	2	1		60	40	
6	5	PC	CV	23CV1506	Highway Engineering and Materials	T	3	0	0	3	3	30	20	50	3
7	5	PC	CV	23CV1507	**Lab :** Highway Material Testing	P	0	0	2	2	1		60	40	
8	5	PC	CV	23CV1508	**Lab :** Building Design Drawing	P	0	0	2	2	1		60	40	
9	5	PE	CV		**Professional Elective-I**	T	3	0	0	3	3	30	20	50	3
11	5	OE-3	OE		**Open Elective-III**	T	3	0	0	3	3	30	20	50	3
12	5	MDM	CV		**MD Minor Course-III**	T	3	0	0	3	3	30	20	50	3
10	5	STR	CV	23CV1509	Internship and Industrial Visit	P	0	0	2	2	1		60	40	
					TOTAL		**21**	**0**	**10**	**31**	**26**				
List of Mandatory Learning Course (MLC)															
1	5	HS	T&P	MLC2125	**YCAP5 :** YCCE Communication Aptitude Preparation	**A**	3	0	0	3	**0**				

Professional Elective - I

1	5	PE-I	CV	23CV1521	**PE-I :** Numerial Methods and Computational Techniques
2	5	PE-I	CV	23CV1522	**PE-I :** Basics of Structural Fire Engineering
3	5	PE-I	CV	23CV1523	**PE-I :** Environmental Management
4	5	PE-I	CV	23CV1524	**PE-I :** Introduction to Remote Sensing
5	5	PE-I	CV	23CV1525	**PE-I :** Modern & Innovative Construction Materials
6	5	PE-I	CV	23CV1526	**PE-I :** Air Pollution and Solid Waste Management
7	5	PE-I	CV	23CV1527	**PE-I :** Elements of Water Power Engineering
8	5	PE-I	CV	23CV1528	**PE-I :** Building Services
9	5	PE-I	CV	23CV1529	**PE-I :** Construction Management And Machinery

Open Elective - III

SN	Sem	Type	BoS/Deptt	Sub. Code	Subject	FACULTY
1	5	OE3	CSE	23OE3501	OE-III : Social Reformers in Modern Maharashtra	ARTS
2	5	OE3	CSE	23OE3502	OE-III : Independent India 1948-2010	ARTS
3	5	OE3	CT	23OE3503	OE-III : Introduction To Cognitive Psychology	ARTS
4	5	OE3	CT	23OE3504	OE-III : Introduction To Engineering Psychology	ARTS
5	5	OE3	CT	23OE3505	OE-III : Introduction To Behavioural Psychology	ARTS
6	5	OE3	CT	23OE3506	OE-III : Introduction To Emotional Psychology	ARTS
7	5	OE3	EL	23OE3507	OE-III : Elements of Public Administration	ARTS
8	5	OE3	ETC	23OE3508	OE-III : Ancient Indian History	ARTS
9	5	OE3	IT	23OE3509	OE-III : Consciousness Studies	ARTS
10	5	OE3	IT	23OE3510	OE-III : Psychology for Professionals	ARTS
11	5	OE3	IT	23OE3511	OE-III : Introduction to Sociology and Human Behavior	ARTS
12	5	OE3	GE	23OE3512	OE-III : Economics of Money and Banking	ARTS
13	5	OE3	GE	23OE3513	OE-III : Economics of Capital Market	ARTS
14	5	OE3	GE	23OE3514	OE-III : Digital Humanities	ARTS
15	5	OE3	GE	23OE3515	OE-III : Introduction to Political Science	ARTS
16	5	OE3	CT	23OE3516	OE-III : Bhagwat Geeta - An Engineer's Interpretation	ARTS - IKS
17	5	OE3	CT	23OE3517	OE-III : Artha shastra by Kautiliya	ARTS - IKS
18	5	OE3	CSD	23OE3518	OE-III : Glimpses of Ancient science and Technology	ARTS - IKS
19	5	OE3	CV	23OE3519	OE-III : Indian taxation system	COMMERCE
20	5	OE3	CV	23OE3520	OE-III : Elements of share trading	COMMERCE
21	5	OE3	EE	23OE3521	OE-III : Introduction to Fintech	COMMERCE
22	5	OE3	EE	23OE3522	OE-III : Financial Analytics	COMMERCE
23	5	OE3	ETC	23OE3523	OE-III : Fundamentals of Investments	COMMERCE
24	5	OE3	EE	23OE3524	OE-III : Lifestyle Diseases	HEALTHCARE & MEDICINE
25	5	OE3	EE	23OE3525	OE-III : Holistic Nutrition	HOME SCIENCE
26	5	OE3	EL	23OE3526	OE-III : Community Organization & Development	HOME SCIENCE
27	5	OE3	CSE	23OE3527	OE-III : Human Rights & International Laws	LAW
28	5	OE3	CSE	23OE3528	OE-III : Cyber Crime Administration	LAW
29	5	OE3	MATHS	23OE3529	OE-III : Finite Differences & Numerical Methods	SCIENCE
30	5	OE3	MATHS	23OE3530	OE-III : Business Statistics	SCIENCE
31	5	OE3	PHY	23OE3531	OE-III : Crystalline Solids: Properties and Applications.	SCIENCE
32	5	OE3	PHY	23OE3532	OE-III : Nanotechnology: Fundamental to Applications	SCIENCE
33	5	OE3	CHE	23OE3533	OE-III : Chemistry in daily life	SCIENCE
34	5	OE3	CHE	23OE3534	OE-III : Battery Systems and Management	SCIENCE
35	5	OE3	NPTEL	23OE3535	OE-III : Designated approved online NPTEL Course	NPTEL

Chairperson	Dean (Acad. Matters)	July, 2023	1.00	Applicable for AY 2023-24 Onwards
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							L	T	P	Hrs		MSEs*	TA**	ESE	
SIXTH SEMESTER															
1	6	PC	CV	23CV1601	Estimating and Costing	T	2	0	0	3	2	30	20	50	3
2	6	PC	CV	23CV1602	**Lab :** Estimating and Costing	P	0	0	2	2	1		60	40	
3	6	PC	CV	23CV1603	Hydraulic Engineering	T	3	0	0	3	3	30	20	50	3
4	6	PC	CV	23CV1604	**Lab :** Hydraulic Engineering	P	0	0	2	2	1		60	40	
5	6	PC	CV	23CV1605	Steel Design	T	3	0	0	3	3	30	20	50	3
6	6	PC	CV	23CV1606	Design Thinking and Research Methodology	T	2	0	0	2	2	30	20	50	3
7	6	PE	CV		**Professional Elective-II**	T	2	0	0	2	2	30	20	50	3
8	6	PE	CV		**Professional Elective-III**	T	2	0	0	2	2	30	20	50	3
9	6	PE	CV		**Lab :** Professional Elective-III	P	0	0	2	2	1		60	40	
10	6	MDM	CV		**MD Minor Course-IV**	T	3	0	0	3	3	30	20	50	3
11	6	**VSEC-4**	CV	23CV1607	**Lab :** Digital Mapping	P	0	0	2	4	2		60	40	
12	6	STR	CV	23CV1608	Project Phase-I	P	0	0	4	4	2		60	40	
						TOTAL	**17**	**0**	**12**	**32**	**24**				

List of Mandatory Learning Course (MLC)															
1	6	HS		MLC126	**YCAP6 :**	**A**	3	0	0	3	**0**				

Professional Elective - II					
1	6	PE-II	CV	23CV1621	**PE-II :** Earthquake Engineering
2	6	PE-II	CV	23CV1622	**PE-II :** Prestressed Concrete
3	6	PE-II	CV	23CV1623	**PE-II** : Disaster Management
4	6	PE-II	CV	23CV1624	**PE-II :** Energy Conversion and Management
5	6	PE-II	CV	23CV1625	**PE-II :** Watershed Management
6	6	PE-II	CV	23CV1626	**PE-II :** Urban Transportation Planning

Professional Elective - III					
1	6	PE-III	CV	23CV1641	**PE-III :** Advanced RCC
2	6	PE-III	CV	23CV1642	**PE-III : Lab :** Advanced RCC
3	6	PE-III	CV	23CV1643	**PE-III :** Computer Applications in Civil Engineering
4	6	PE-III	CV	23CV1644	**PE-III : Lab :** Computer Applications in Civil Engineering
5	6	PE-III	CV	23CV1645	**PE-III :** Water Transmission and Distribution Systems
6	6	PE-III	CV	23CV1646	**PE-III : Lab :** Water Transmission and Distribution Systems
7	6	PE-III	CV	23CV1647	**PE-III :** Geotechnical Investigation and Improvement
8	6	PE-III	CV	23CV1648	**PE-III : Lab :** Geotechnical Investigation and Improvement
9	6	PE-III	CV	23CV1649	**PE-III :** Advanced Water Treatment
10	6	PE-III	CV	23CV1650	**PE-III : Lab :** Advanced Water Treatment
11	6	PE-III	CV	23CV1651	**PE-III :** Traffic Engineering
12	6	PE-III	CV	23CV1652	**PE-III : Lab :** Traffic Engineering

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

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 3.6)

Hingna Road, Wanadongri, Nagpur - 441 110

Bachelor of Technology

SoE & Syllabus 2023

1st 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 2023

(Scheme of Examination w.e.f. 2023-24 onward)

(Department of Civil Engineering)

B. Tech. in Civil Engineering

SoE No. 23CV-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 (GROUP-A)															
1	1	BS	GE	23GE1101	Calculus and Vector	T	3	0	0	3	3	30	20	50	3
2	1	BS	GE	23GE1104	Applied Chemistry	T	3	0	0	3	3	30	20	50	3
3	1	BS	GE	23GE1105	**Lab:** Applied Chemistry	P	0	0	2	2	1		60	40	
4	1	HS/AEC1	GE	23GE1112	Professional Communication	T	2	0	0	2	2	30	20	50	2
5	1	HS/IKS	GE	23GE1115	Indian Knowledge System	T	2	0	0	2	2	30	20	50	2
6	1	BES	CV	23CV1101	Engineering Mechanics	T	3	0	0	3	3	30	20	50	3
7	1	BES	CV	23CV1102	**Lab:** Engineering Mechanics	P	0	0	2	2	1		60	40	
8	1	BES	IT	23IT1103	Programming for Problem Solving	T	2	0	0	2	2	30	20	50	2
9	1	BES	IT	23IT1104	**Lab:** Programming for Problem Solving	P	0	0	2	2	1		60	40	
10	1	VSEC	GE	23GE1117	Get Set Go	…	…	…	…	…	2		60	40	
11	1	CC1	GE		**Liberal Learning Course (LLC1)**	…	…	…	…	…	2		60	40	
					TOTAL FIRST SEM		**15**	**0**	**6**	**21**	**22**				
SECOND SEMESTER (GROUP-A)															
1	2	BS	GE	23GE1202	Differential Equations, Matrices and Statistics	T	3	0	0	3	3	30	20	50	3
2	2	BS	GE	23GE1208	Engineering Physics	T	3	0	0	3	3	30	20	50	3
3	2	BS	GE	23GE1209	**Lab:** Engineering Physics	P	0	0	2	2	1		60	40	
4	2	BES	ME	23ME1201	Engineering Graphics	T	1	0	0	1	1	30	20	50	3
5	2	BES	ME	23ME1202	**Lab :** Engineering Graphics	P	0	0	4	4	2		60	40	
6	2	BES	EL	23EL1201	Basic Electrical and Electronics Engineering	T	3	0	0	3	3	30	20	50	3
7	2	BES	ME	23ME1207	**Lab :** FAB Shop	P	0	0	2	2	1		60	40	
8	2	PC	CV	23CV1203	Strength of Materials	T	3	0	0	3	3	30	20	50	3
9	2	PC	CV	23CV1204	**Lab :** Strength of Materials	P	0	0	2	2	1		60	40	
10	2	VSEC	GE	23GE1218	Functional English	…	…	…	…	…	2		60	40	
11	2	CC2	GE		**Liberal Learning Course (LLC2)**	…	…	…	…	…	2		60	40	
					TOTAL SECOND SEM		**13**	**0**	**10**	**23**	**22**				

Liberal Learning Course

SN	Sem	Type	BoS/ Deptt	Sub. Code	Subject
1	1	CC1	GE	23LLC1101	Music (Vocal)
2	1	CC1	GE	23LLC1102	Music (Instrumental)
3	1	CC1	GE	23LLC1103	Indian Classical Dance
4	1	CC1	GE	23LLC1104	Other forms of Dances
5	1	CC1	GE	23LLC1105	Painting
6	1	CC1	GE	23LLC1106	Theatre and acting
7	1	CC1	GE	23LLC1107	Photography
8	1	CC1	GE	23LLC1108	Yoga
9	1	CC1	GE	23LLC1109	Chess
10	1	CC1	GE	23LLC1110	Athletics
11	1	CC1	GE	23LLC1111	Basket Ball
12	1	CC1	GE	23LLC1112	Judo
13	1	CC1	GE	23LLC1113	Elements of Japanese Language
14	1	CC1	GE	23LLC1114	Elements of German Language
15	1	CC1	GE	23LLC1115	Elements of French Language
16	1	CC1	GE	23LLC1116	Elements of Spanish Language
17	1	CC1	GE	23LLC1117	Basics of Vedic Maths
18	1	CC1	GE	23LLC1118	Skilling in Microsoft Visio and Inkscape

Nagar Yuwak Shikshan Sanstha's

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B.TECH SCHEME OF EXAMINATION 2023

(Scheme of Examination w.e.f. 2023-24 onward)

(Department of Civil Engineering)

B. Tech. in Civil Engineering

SoE No. 23CV-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	

Liberal Learning Course

SN	Sem	Type	BoS/ Deptt	Sub. Code	Subject
1	2	CC2	GE	23LLC1201	Music (Vocal)
2	2	CC2	GE	23LLC1202	Music (Instrumental)
3	2	CC2	GE	23LLC1203	Indian Classical Dance
4	2	CC2	GE	23LLC1204	Other forms of Dances
5	2	CC2	GE	23LLC1205	Painting
6	2	CC2	GE	23LLC1206	Theatre and acting
7	2	CC2	GE	23LLC1207	Photography
8	2	CC2	GE	23LLC1208	Yoga
9	2	CC2	GE	23LLC1209	Chess
10	2	CC2	GE	23LLC1210	Athletics
11	2	CC2	GE	23LLC1211	Basket Ball
12	2	CC2	GE	23LLC1212	Judo
13	2	CC2	GE	23LLC1213	Elements of Japanese Language
14	2	CC2	GE	23LLC1214	Elements of German Language
15	2	CC2	GE	23LLC1215	Elements of French Language
16	2	CC2	GE	23LLC1216	Elements of Spanish Language
17	2	CC2	GE	23LLC1217	Basics of Vedic Maths
18	2	CC2	GE	23LLC1218	Skilling in Microsoft Visio and Inkscape

MANDATORY LEARNING COURSES													
1	2	HS		GE2131	Universal Human Values (UHV)	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**

Chairperson	Dean (Acad. Matters)	July, 2023	1.00	Applicable for AY 2023-24 Onwards
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B. Tech SoE and Syllabus 2023

(Scheme of Examination w.e.f. 2023-24 onward)

(Department of Mathematics & Humanities)

B.Tech First Year

SoE No. 23FY-101

I SEMESTER

23GE1101: Calculus and Vector

Course Outcomes :
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	**(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: 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. Jacobians. **(Contemporary Issues related to Topic)**	
Unit III: Integral Calculus	**(6 Hrs.)**
Improper integrals: Gamma and Beta functions, applications of integral calculus in computing area, length, volumes, and surface of solids of revolutions. **(Contemporary Issues related to Topic)**	
Unit IV: Multiple integrals	**(6 Hrs.)**
Double integral, change of order of integral, change of variables, triple integrals and its applications. **(Contemporary Issues related to Topic)**	
Unit V: Vector Calculus	**(7 Hrs.)**
Vector fields, Vector differentiation, Gradient, Divergence and Curl, Directional derivatives with physical interpretation, Solenoidal and irrotational motions. **(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**

Textbooks:	
1.	Erwin Kreyzig, Advance Engineering Mathematics, 10th 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

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B. Tech SoE and Syllabus 2023

(Scheme of Examination w.e.f. 2023-24 onward)

(Department of Applied Chemistry)

B.Tech First Year

SoE No. 23FY-101

I/II SEMESTER

23GE1104/23GE1204: Applied Chemistry

Course Outcomes:

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

1. **Build** the knowledge of qualitative and quantitative aspects of water for industrial and domestic applications. (L3)
2. **Apply** fundamental principles of electrochemistry to understand corrosion, energy storage devices and their industrial applications. (L3)
3. **Develop** insight into engineering materials for industrial applications. (L3)
4. **Utilize** knowledge of advanced engineering materials for technological applications. (L3).

Unit I: Water Chemistry	**(8 Hrs.)**
Introduction, Potable water quality parameters. Hardness, Types of hardness. Sterilization. Desalination of water by R.O. Softening of water by Zeolite process and Ion Exchange Process (principle, advantages, and limitations). Numerical based on Hardness and Zeolite process. Boiler trouble (Scale and sludge). Contemporary issues related to the topic	
Unit II: Electrochemistry	**(8 Hrs.)**
Introduction, Redox reactions, EMF of a cell, standard electrode potential, Nernst equation, numerical and applications to chemical cells. Conductance in electrolytic solutions, specific and molar conductivity, variations of conductivity with concentration, Electrolysis, laws of electrolysis and numerical. Industrial applications: Electroplating, Electrolytic refining. **Corrosion:** Definition, Causes, theories of corrosion- dry, wet and differential aeration. Contemporary issues related to the topic	
Unit III: Energy storage devices	**(7 Hrs.)**
Battery: Introduction, Characteristics, and General applications Lithium-ion battery, Glass battery, H_2-O_2 Fuel cell. Differences between Battery and Fuel cell. Recycling and safe disposal of batteries. **Supercapacitors:** Definition, Types, Characteristics,and Application. **H_2 as a green fuel:** Introduction, Production, Storage, and Utilization.Contemporary issues related to the topic	
Unit IV: Fuels	**(8 Hrs.)**
Introduction, Calorific value, HCV & LCV. Determination of calorific value of fuels by Bomb & Boy's calorimeter. Dulong's formula Numerical. 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. Catalytic cracking & advantages. Contemporary issues related to the topic	
Unit V: Engineering Materials	**(7 Hrs.)**
Cement: Introduction, Manufacturing of Portland cement. 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. Ready-mix concrete.	

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Lubricants: Introduction, Classification, Mechanism of Lubrication.
Properties & Significance of liquid lubricants–Viscosity and viscosity index, Flash and fire point, Cloud and pour point, Aniline point, acid value, saponification number. Numerical on V.I. Contemporary issues related to the topic.

Unit VI: Advanced Materials	**(7 Hrs.)**

Nanomaterials: Definition, Carbon Nanotubes and types. Applications of Nanomaterials in Electronics, Environment and Medicine.
Liquid Crystal Polymers: Introduction**,** General properties and applications.
Polymers in electronic industries: Introduction**,** Piezo, pyroelectric, Ferroelectric polymers.
Smart materials: Introduction**,** Properties and applications of Chromoactive, Photoactive and Magneto rheological materials.
Spectroscopic techniques: Introduction and applications. Contemporary issues related to the topic

Total Lecture	**45 Hours**

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=XTt3gXB0a84
2.	https://www.youtube.com/watch?v=iihYXx79QiE
3.	https://www.youtube.com/watch?v=JfJ7MlP9Dco
4.	https://www.youtube.com/watch?v=L2VSOccUrSk
5.	https://www.youtube.com/watch?v=p5pk4Um6lsk
6.	https://youtu.be/-R7s17hD104
7.	https://youtu.be/Bmj85Ihfv7w

I/II SEMESTER
23GE1105/23GE1205: Applied Chemistry Lab

Course Objectives (PR)

1) Develop analytical ability.
2) Integrate chemistry fundamentals with practical applications.

Course Outcomes

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

1. **Apply** the knowledge of quantitative and qualitative chemical analysis to perform record and analyze the results. (L3)
2. **Experiment** with instrumental and analytical techniques in Chemistry to solve engineering problems related to sustainability. (L3)
3. **Write** effective reports and communicate through oral presentations. (L3)
4. **Review a**nd apply laboratory safety protocols and procedures to acquire the ability for independent and lifelong learning. (L3)

Total 9 experiments are to be performed
(4 each from Lab I and Lab II and one demonstration experiment)

SN	Experiments based on
	List of Experiments-Lab- I
1	Estimation of Nickel.
2	Estimation of Fe^{2+} ions by redox titration
3	Determination of copper by iodometric titration
4	Determination of Cation exchange capacity of an ion exchange resin
5	To determine the strength of a given potassium dichromate solution with N/20 sodium thiosulphate solution
6	Determination of COD of water sample.
	List of Experiments-Lab- II
1	Determination of viscosity of lubricating oil by Redwood Viscometer I or II
2	Determination of molecular weight of a polymer.
3	Proximate analysis of coal

4	Determination of electrochemical equivalence of copper using Faradays Law
5	Determination of strength of the given acid conductometrically.
6	To verify Beer-Lambert law for $KMnO_4$ calorimetrically and determine the concentration of the given solution of $KMnO_4$.
	List of Demonstration Experiments
1	Synthesis of urea formaldehyde.
	Advanced Topics (CBS)
1.	To Determine optimum alum dosage for water or wastewater treatment by turbidity measurement using nephelometer and residual chlorine testing using chloroscope.
2.	Comparative study of effects of different drying techniques on the quality of fruits and vegetables.

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B. Tech SoE and Syllabus 2023

(Scheme of Examination w.e.f. 2023-24 onward)

(Department of Mathematics & Humanities)

B.Tech First Year

SoE No. 23FY-101

I SEMESTER

23GE1112 : Professional Communication

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

Unit I: Basics of Communication	**(6 Hrs.)**
Process of Communication, Levels of Communication, Flow of Communication, Networks of Communication, Classification of Barriers (Intrapersonal, Interpersonal, Organizational).	
Unit II: English Phonetics	**(7 Hrs.)**
Speech Mechanism, Organs of speech, Consonant and Vowels sounds symbols, word stress rules	
Unit III: Presentation & Interview Skills	**(6 Hrs.)**
Presentation-Nuances of presentation- Kinesics, Proxemics, Chronemics, Vocalics, Modes of Presentation, Interview-Purpose , expectations of employer and preparation for Interview, Types, Types of Questions &Answering Techniques, Telephonic Interviews – preparation and guidelines	
Unit IV: Technical Reports, Memo & E-Mail Etiquettes	**(7 Hrs.)**
Report -Types, Characteristics, prewriting aspects of report and preparing writing of reports Memo- Objectives, Types, Structure and Layout Email-Etiquettes, acronyms.	
Total Lecture	**26 Hours**

Textbooks:	
1.	Meenakshi Raman & Sangeeta Sharma, Technical Communication, Raman & Sharma, Oxford University Press Orford University Press
2.	T. Balasubramaniam, Textbook of English Phonetics for Indian Students, Macmillan India Ltd
3.	

Reference Books:	
1.	Dale Carnegie ,How to Develop Self – Confidence & Influence People by Public Speaking
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-superiorvocabulary-e157841139.html
3.	https://www.pdfdrive.com/improve-your-communication-skills-present-with-confidence-write-with-stylelearn-skills-of-persuasion-e156963640.html
4.	https://www.pdfdrive.com/21-days-of-effective-communication-everyday-habits-and-exercises-to-improveyour-communication-skills-and-social-intelligence-e158273760.html

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(Department of Mathematics & Humanities)

B.Tech First Year

SoE No. 23FY-101

I SEMESTER

23GE1115 : Indian Knowledge System

Course Outcomes:
Upon successful completion of the course the students will be able to
1. Apply primary requirements pertaining towards awareness of Indian Knowledge System.
2. Analyze various Indian society, culture and literature to enhance their traditions.
3. Evaluate structure of Indian art.
4. Understand Indian heritage and architectural skills.

Unit:1	**Introduction to Indian Civilization**	**6 Hours**
Development of Human Civilization with specific reference: Stone age: Tool Technology and Cultural Development, Indus Valley civilization, Vedic Civilization. **(Contemporary Issues related to Topic)**		
Unit:2	**Indian Society, Culture and Literature**	**6 Hours**
Society and its types, Culture and its Characteristics, Foundational Literature. **(Contemporary Issues related to Topic)**		
Unit:3	**Tradition of Indian Art and Painting**	**7 Hours**
Indian Traditional Painting, Art style folk, mural with Gandhara and Mathura school of art. **(Contemporary Issues related to Topic)**		
Unit:4	**Indic Traditions of Architecture, Design and Planning**	**7 Hours**
Monumental studies of architectural skill: Rock Cut Caves, Stupa and Temple Architecture, The Ancient cities of Indus Saraswati region. Town Planning and drainage system. **(Contemporary Issues related to Topic)**		
	Total Lecture Hours	**26 Hours**

Textbooks	
1	Reader's Digest: Vanished Civilizations, THE READER'S DIGEST ASSOCIATION LIMITED, LONDON,NEWYORK.
2	Qaiser Zoha Alam ; Language and Literature Divers Indian Experience
3	Bal Ram Singh (Author), Nath Girish (Author) ; Science and Technology in Ancient Indian Texts
4	NCERT Books

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Reference Books	
1	B S Harishankar; Art and Archaeology of India: Stone Age to the Present, 2003.
2	Gupte R S and Mahajan B D; Ajanta, Ellora and Aurangabad, 1962.
3	Dharampal, Some Aspects of Earlier Indian Society and Polity and Their Relevance Today, New Quest Publications, Pune, 1987.
4	Michel Lorblanchet, "Rock Art In The Old World" IGNCA series, in India
5	Percy Brown, "Indian Architecture" D. B. Taraporevala sons & co. Pvt. Ltd. Bombay(1959).

PPT's/Research papers	
1	https://www.researchgate.net/publication/360889208_STONE_AGE_TOOL_TECHNOLOGY_and_CULTURAL_DEVELOPMENT
2	https://scholar.google.com/citations?view_op=view_citation&hl=en&user=iT1KSV8AAAAJ&sortby=pubdate&citation_for_view=iT1KSV8AAAAJ:UeHWp8X0CEIC

MOOCs Links and additional reading, learning, video material	
1	https://prepp.in/news/e-492-indian-architecture-art-and-culture-notes
2	https://www.artzolo.com/blog/most-famous-indian-painting-styles
3	https://www.researchgate.net/publication/360889332_Stone_Age_Tool_Technology_Cultural_Development
4	https://testbook.com/ias-preparation/ancient-history-16-mahajanapadas

I SEMESTER
23CV1101 : 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. **(Contemporary Issues related to Topic)**	
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**

			July,2023	1.00	Applicable for AY 2023-24 Onwards
Chairperson	Dean (Acad. Matters)	Dean OBE	Date of Release	Version	

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

23CV1102 : 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

23IT1103 : Programming for Problem Solving

Course Outcomes :
1) Understand the basics of computer system operations and algorithms, flowcharts.
2) Apply the basics of C programming for problem solving.
3) Apply and analyze the different dimensional arrays for problem solving.
4) Understand the basics of string, structure, and union and apply them to problem solving.

Unit I: Computer System Basics:	**(3 Hrs.)**
Basics of programming and problem solving. Introduction to algorithms and flowcharts, Types of programming errors, basic input/output statements and functions (scanf, printf, getch, putch, gets, puts), Introduction to library functions,	
Unit II: Basic of C Programming	**(6 Hrs.)**
Basic building blocks of C: Character set, variables, identifiers & keywords, Data types, Operators: arithmetic, logical and relational operators, , bitwise operators, precedence of operators, Expressions, sizeof() operator, constants, typedef statement, writing straight line programs. Decision control statements: if, if - else and nested if-else statements, else-if ladder statement, switch-case control statement.	
Unit III: Loop Structures:	**(5 Hrs.)**
While, do while and for loops, break and continue statement, "goto" statement, real life programming examples based on these loop structures, real life programming examples.	
Unit IV: Modular Programming:	**(6 Hrs.)**
Concept of functions, user defined functions, function prototypes, formal parameters, actual parameters, return types, call by value , call by reference, C programs using functions, Recursive functions, comparing recursion against iteration, C programs using recursive functions, real life programming examples	
Unit V: Arrays:	**(6 Hrs.)**
One dimensional array, array manipulation, insertion, deletion of an element, searching techniques- Linear and binary search, sorting technique – Bubble sort. Two-dimensional arrays: matrix representation, programs for basic matrix operations such as addition, multiplication and transpose, Array as function arguments. real life programming examples	
Unit VI: String, Structure and Union:	**(4 Hrs.)**
Strings: string representation and string handling functions, Introduction to pointer, structure and union. real life programming examples	
Total Lecture	**30 Hours**

			July,2023	1.00	Applicable for AY 2023-24 Onwards
Chairperson	Dean (Acad. Matters)	Dean OBE	Date of Release	Version	

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

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/Suported%20file/Supprted%20file/e-copies%20of%20books

MOOCs Links and additional reading, learning, video material	
1	https://nptel.ac.in/courses/106104128
2	https://nptel.ac.in/courses/106104128
3	https://www.youtube.com/watch?v=rQoqCP7LX60&list=PLxgZQoSe9cg1drBnejUaDD9GEJBGQ5hMt

Nagar Yuwak Shikshan Sanstha's

Yeshwantrao Chavan College of Engineering

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

B. Tech SoE and Syllabus 2023

(Scheme of Examination w.e.f. 2023-24 onward)

(Department of Information Technology)

B.Tech in Information Technology

SoE No. 23IT-101

I SEMESTER

23IT1104 : Lab. Programming for Problem Solving

Course Outcomes: Students will be able to
1) Understand the basics of computer system operations and algorithms, flowcharts.
2) Apply the basics of C programming for problem solving.
3) Apply and analyze the different dimensional arrays for problem solving.
4) Understand the basics of string, structure, and union and apply them to problem solving.

Unit I: Computer System Basics:	**(3 Hrs.)**
Basics of programming and problem solving. Introduction to algorithms and flowcharts, Types of programming errors, basic input/output statements and functions (scanf, printf, getch, putch, gets, puts), Introduction to library functions,	
Unit II: Basic of C Programming	**(6 Hrs.)**
Basic building blocks of C: Character set, variables, identifiers & keywords, Data types, Operators: arithmetic, logical and relational operators, , bitwise operators, precedence of operators, Expressions, sizeof() operator, constants, typedef statement, writing straight line programs. Decision control statements: if, if - else and nested if-else statements, else-if ladder statement, switch-case control statement.	
Unit III: Loop Structures:	**(5 Hrs.)**
While, do while and for loops, break and continue statement, "goto" statement, real life programming examples based on these loop structures, real life programming examples.	
Unit IV: Modular Programming:	**(6 Hrs.)**
Concept of functions, user defined functions, function prototypes, formal parameters, actual parameters, return types, call by value , call by reference, C programs using functions, Recursive functions, comparing recursion against iteration, C programs using recursive functions, real life programming examples	
Unit V: Arrays:	**(6 Hrs.)**
One dimensional array, array manipulation, insertion, deletion of an element, searching techniques- Linear and binary search, sorting technique – Bubble sort. Two-dimensional arrays: matrix representation, programs for basic matrix operations such as addition, multiplication and transpose, Array as function arguments. real life programming examples	
Unit VI: String, Structure and Union:	**(4 Hrs.)**
Strings: string representation and string handling functions, Introduction to pointer, structure and union. real life programming examples	
Total Lecture	30 Hours

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2	Mastering C, K.R.Venugopal & S.R. Prasad, TMH, 2007.
3	Programming in ANSI C, E. Balaguruswamy, Mc Graw Hill Education

Reference Books	
1	Problem Solving And Program Design In C, Jeri. R. Hanly, Elliot B. Koffman, Pearson Education.
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1	https://nptel.ac.in/courses/106104128
2	https://nptel.ac.in/courses/106104128
3	https://www.youtube.com/watch?v=rQoqCP7LX60&list=PLxgZQoSe9cg1drBnejUaDD9GEJBGQ5hMt

List of Practical

SN	Unit	Name Of The Practical	Remark	CO'S Mapped	PO'S Mapped
1(A)		Introduction to Linux Operating system & it's different commands.	**Manual**	**CO 1**	**PO1**
1(B)		Introduction to Vi editor, Compilation and Execution of a program in Linux.	**Manual**	**CO 1**	**PO1**
2	**II**	Practical based on Arithmetic and Conditional operators.	**Operators**	**CO 1**	**PO1**
3	**II**	Practical based on Conditional and Unconditional Statements.	**Conditional Statements**	**CO 1**	**PO1**
4	**III**	Practical based on Entry Controlled Looping Statements.	**For / While Loop**	**CO 2**	**PO 1, PO 2**
5	**III**	Practical based on Exit Controlled Looping Statement	**Do while Loop**	**CO 2**	**PO 1, PO 2**
6	**IV**	Practical based on Functions and Recursion.	**Functions / Recursion**	**CO 3**	**PO2, PO3**
7	**V**	Practical based on 1-D Array.	**1D Array**	**CO 3**	**PO2, PO3**
8	**V**	Practical based on 2-D Array.	**2D Array**	**CO 3**	**PO2, PO3**
9	**VI**	Practical based on Strings.	**Strings & Pointers**	**CO 3**	**PO2, PO3**
10	**VI**	Practical based on Structures.	**Structures**	**CO 4**	**PO1, PO2, PO3**

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B. Tech SoE and Syllabus 2023

(Scheme of Examination w.e.f. 2023-24 onward)

(Department of Civil Engineering)

B.Tech in FYC

SoE No. 23FY-101

I SEMESTER

23GE1117-Get Set Go

Course Outcomes:

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

1. Students will understand the importance of building trust in communication and learn how to use the 3Vs of communication (Visual, Vocal, Verbal) to energize their interactions.
2. The course will focus on leadership principles and styles, emphasizing how effective communication can motivate others and gain willing cooperation. Students will participate in activities like skits and team presentations to demonstrate their leadership skills.
3. The course will equip students with team management and organization skills, enabling them to lead and participate in team-building activities effectively.

Unit:1	Build a foundation for success	6 Hours
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" 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 Activity – Practice Conversations, Pause-Part-Punch, Group Activity		
Unit:2	**Increase Self Confidence**	**6 Hours**
Use our experiences to communicate more confidently • Communicate with clarity and conciseness • Discover how past experiences influence behaviour ,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 Individual Activity – Sharing of defining moment, Skit to demonstrate Leadership Principles, Stranded on Island .		
Unit:3	**Fundamentals of Communication**	**6 Hours**
Fundamentals of Communication (Earn the right – Excite -Eagerness) ♣ Elevator Pitch ♣ Develop more Flexibility, ♣ Recap and Summarize Activities - – Individual Presentation, Flexibility Drills, Individual Presentations – My Vision Assignment		
Unit:4	**Team Management and Organization skills**	**5 Hours**
Team Management and Organization skills, Leadership Styles, Effective Communication Activity- Team Presentation, Team building activities.		
EVALUATION	**1 Hour**	**EVALUATION**
WRITTEN TEST		
Total Lecture Hours		**24 Hours**

			July,2023	1.00	Applicable for AY 2023-24 Onwards
Chairperson	Dean (Acad. Matters)	Dean OBE	Date of Release	Version	

Reference Books	
1	Soft Skills - Enhancing Employability: Connecting Campus with Corporate. - M S Rao
2	Soft Skills Training: A Workbook to Develop Skills for Employment - Frederick H Wentz
3	Soft Skills: Know Yourself and Know the World - Alex

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Yeshwantrao Chavan College of Engineering

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(Accredited 'A++' Grade by NAAC with a score of 3.6)

Hingna Road, Wanadongri, Nagpur - 441 110

Bachelor of Technology

SoE & Syllabus 2023

2nd 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 2023

(Scheme of Examination w.e.f. 2023-24 onward)

(Department of Civil Engineering)

B. Tech. in Civil Engineering

SoE No. 23CV-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 (GROUP-A)															
1	1	BS	GE	23GE1101	Calculus and Vector	T	3	0	0	3	3	30	20	50	3
2	1	BS	GE	23GE1104	Applied Chemistry	T	3	0	0	3	3	30	20	50	3
3	1	BS	GE	23GE1105	**Lab:** Applied Chemistry	P	0	0	2	2	1		60	40	
4	1	HS/AEC1	GE	23GE1112	Professional Communication	T	2	0	0	2	2	30	20	50	2
5	1	HS/IKS	GE	23GE1115	Indian Knowledge System	T	2	0	0	2	2	30	20	50	2
6	1	BES	CV	23CV1101	Engineering Mechanics	T	3	0	0	3	3	30	20	50	3
7	1	BES	CV	23CV1102	**Lab:** Engineering Mechanics	P	0	0	2	2	1		60	40	
8	1	BES	IT	23IT1103	Programming for Problem Solving	T	2	0	0	2	2	30	20	50	2
9	1	BES	IT	23IT1104	**Lab:** Programming for Problem Solving	P	0	0	2	2	1		60	40	
10	1	VSEC	GE	23GE1117	Get Set Go	…	…	…	…	…	2		60	40	
11	1	CC1	GE		**Liberal Learning Course (LLC1)**	…	…	…	…	…	2		60	40	
					TOTAL FIRST SEM		**15**	**0**	**6**	**21**	**22**				
SECOND SEMESTER (GROUP-A)															
1	2	BS	GE	23GE1202	Differential Equations, Matrices and Statistics	T	3	0	0	3	3	30	20	50	3
2	2	BS	GE	23GE1208	Engineering Physics	T	3	0	0	3	3	30	20	50	3
3	2	BS	GE	23GE1209	**Lab:** Engineering Physics	P	0	0	2	2	1		60	40	
4	2	BES	ME	23ME1201	Engineering Graphics	T	1	0	0	1	1	30	20	50	3
5	2	BES	ME	23ME1202	**Lab :** Engineering Graphics	P	0	0	4	4	2		60	40	
6	2	BES	EL	23EL1201	Basic Electrical and Electronics Engineering	T	3	0	0	3	3	30	20	50	3
7	2	BES	ME	23ME1207	**Lab :** FAB Shop	P	0	0	2	2	1		60	40	
8	2	PC	CV	23CV1203	Strength of Materials	T	3	0	0	3	3	30	20	50	3
9	2	PC	CV	23CV1204	**Lab :** Strength of Materials	P	0	0	2	2	1		60	40	
10	2	VSEC	GE	23GE1218	Functional English	…	…	…	…	…	2		60	40	
11	2	CC2	GE		**Liberal Learning Course (LLC2)**	…	…	…	…	…	2		60	40	
					TOTAL SECOND SEM		**13**	**0**	**10**	**23**	**22**				

Liberal Learning Course

SN	Sem	Type	BoS/ Deptt	Sub. Code	Subject
1	1	CC1	GE	23LLC1101	Music (Vocal)
2	1	CC1	GE	23LLC1102	Music (Instrumental)
3	1	CC1	GE	23LLC1103	Indian Classical Dance
4	1	CC1	GE	23LLC1104	Other forms of Dances
5	1	CC1	GE	23LLC1105	Painting
6	1	CC1	GE	23LLC1106	Theatre and acting
7	1	CC1	GE	23LLC1107	Photography
8	1	CC1	GE	23LLC1108	Yoga
9	1	CC1	GE	23LLC1109	Chess
10	1	CC1	GE	23LLC1110	Athletics
11	1	CC1	GE	23LLC1111	Basket Ball
12	1	CC1	GE	23LLC1112	Judo
13	1	CC1	GE	23LLC1113	Elements of Japanese Language
14	1	CC1	GE	23LLC1114	Elements of German Language
15	1	CC1	GE	23LLC1115	Elements of French Language
16	1	CC1	GE	23LLC1116	Elements of Spanish Language
17	1	CC1	GE	23LLC1117	Basics of Vedic Maths
18	1	CC1	GE	23LLC1118	Skilling in Microsoft Visio and Inkscape

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(Scheme of Examination w.e.f. 2023-24 onward)

(Department of Civil Engineering)

B. Tech. in Civil Engineering

SoE No. 23CV-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	

Liberal Learning Course

SN	Sem	Type	BoS/ Deptt	Sub. Code	Subject
1	2	CC2	GE	23LLC1201	Music (Vocal)
2	2	CC2	GE	23LLC1202	Music (Instrumental)
3	2	CC2	GE	23LLC1203	Indian Classical Dance
4	2	CC2	GE	23LLC1204	Other forms of Dances
5	2	CC2	GE	23LLC1205	Painting
6	2	CC2	GE	23LLC1206	Theatre and acting
7	2	CC2	GE	23LLC1207	Photography
8	2	CC2	GE	23LLC1208	Yoga
9	2	CC2	GE	23LLC1209	Chess
10	2	CC2	GE	23LLC1210	Athletics
11	2	CC2	GE	23LLC1211	Basket Ball
12	2	CC2	GE	23LLC1212	Judo
13	2	CC2	GE	23LLC1213	Elements of Japanese Language
14	2	CC2	GE	23LLC1214	Elements of German Language
15	2	CC2	GE	23LLC1215	Elements of French Language
16	2	CC2	GE	23LLC1216	Elements of Spanish Language
17	2	CC2	GE	23LLC1217	Basics of Vedic Maths
18	2	CC2	GE	23LLC1218	Skilling in Microsoft Visio and Inkscape

MANDATORY LEARNING COURSES													
1	2	HS		GE2131	Universal Human Values (UHV)	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**

Chairperson	Dean (Acad. Matters)	July, 2023	1.00	Applicable for AY 2023-24 Onwards
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II SEMESTER
23GE1202 : Differential Equations, Matrices and Statistics

Course Outcomes
The students will be able to
1. Use appropriate Methods to solve first order and higher order differential equations and apply it to find solution 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 fields (only up to second order). **(Contemporary Issues related to Topic)**	
Unit IV: Partial Differential Equations	**(6 Hrs.)**
Partial Differential Equations of first order, 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 IV: Matrices	**(7 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 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/

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B. Tech SoE and Syllabus 2023

(Scheme of Examination w.e.f. 2023-24 onward)

(Department of Physics)

B.Tech First Year

SoE No. 23FY-101

II SEMESTER

23GE1208 : Engineering Physics

Course Outcomes :

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

1. Correlate fundamentals of quantum mechanics to solve problems dealing with quantum particles.
2. Assess the characteristics of semiconductor materials in terms of crystal structures, charge carriers and Energy bands.
3. Examine the intensity variation of light due to interference, diffraction, laser and its applications.
4. Analyze the motion of charged particles in electric and magnetic field and its applications to electron optic devices.
5. Illustrate the nature and characterization of magnetic materials and superconductors for engineering applications.

Unit I: Quantum Physics	**(7 Hrs.)**
Wave-particle duality, de-Broglie's hypothesis, Wave packet, Heisenberg's uncertainty principle: significance and applications, Wave function and its probability interpretation, Schrodinger Equation, Particle in infinite potential well. **(Contemporary Issues related to Topic)**	
Unit II: Semiconductor Physics	**(7 Hrs.)**
Formation of energy bands in solids; Classification of solids, Energy band diagram of Si and Ge, Intrinsic and extrinsic semiconductors, Conductivity, Law of mass action, Fermi function, Fermi level in intrinsic and extrinsic semiconductors, Dependence of Fermi level on impurity concentration and temperature, Hall effect. **(Contemporary Issues related to Topic)**	
Unit III: Geometrical Optics	**(7 Hrs.)**
Interference: Interference in thin films, Wedge shaped film, Newton's rings, Applications of interference Diffraction: Fraunhofer diffraction from a single slit. **(Contemporary Issues related to Topic)**	
Unit IV: Laser	**(6 Hrs.)**
Coherence and its types, Interaction of radiation with matter, Population Inversion, Pumping: methods and schemes, Optical resonant cavity, Ruby laser, Semiconductor diode laser, Properties and engineering applications of laser. **(Contemporary Issues related to Topic)**	
Unit V: Electron Ballistics	**(7 Hrs.)**
Motion of a charged particle in uniform electric and magnetic field, Cross field configuration; Electron refraction, Electron lens. Cathode ray oscilloscope and its application. **(Contemporary Issues related to Topic)**	
Unit VI: Magnetic Materials & Superconductors	**(6 Hrs.)**
Introduction to magnetic materials, Interpretation of Hysteresis curves, Superconductors: Type-I and Type-II, Meissner effect, Applications. **(Contemporary Issues related to Topic)**	
Total Lecture	**40 Hours**

			July,2023	1.00	Applicable for AY 2023-24 Onwards
Chairperson	Dean (Acad. Matters)	Dean OBE	Date of Release	Version	

Textbooks	
1	M. N. Avadhanulu, P.G.Kshirsagar, A Textbook of Engg. Physics, S.Chand and Company.
2	Hitendra K Malik , A K Singh , Engineering Physics, 2nd Edition, Tata McGraw Hill Education Private Limited,

Reference Books	
1	David Halliday, Robert Resnick and Jerle Walker, John-Wiley India, Fundamentals of Physics, 10th John Wiley & Sons Inc.
2	Brijlal and Subramanyam, Text Book of Optics, Revised edition, S. Chand and Company.
3	M.N. Avadhanulu, 2nd Edition, Laser, S.Chand and Company.
4	A.Beiser, Concept of Modern Physics, 6th Edition, Laser, Tata McGraw-Hill.
5	Thyagarajan K. and Ghatak A.K, LASERS: Theory and Applications, 2nd Edition, Macmillan Publication
6	S.O.Pillai, Solid State Physics, 9th Edition, New Edge International Publishers.
7	Palanisamy, Solid State Physics, 8th Edition, New Edge International Publishers.
8	C. Kittel, Solid State Physics, 8th Edition, Willey Publication.
9	B. K. Pandey, S. Chaturvedi, Engineering Physics, 1st Edition, Cengage Learning.
10	John Allision, Electronic Engineering Materials and Devices, TMH edition, 10th reprint, Tata 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/Applied%20Sciences%20&%20Humanities/Physics/Eisberg%20&%20Resnick%20-%20Quantum%20Physics.pdf
2	http://103.152.199.179/YCCE/Suported%20file/Supprted%20file/e-copies%20of%20books/Applied%20Sciences%20&%20Humanities/Physics/2016_Book_ThePhysicsOfSemiconductors.pdf
3	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://nptel.ac.in/courses/115106066 - Quantum Physics
2	https://archive.nptel.ac.in/courses/115/105/115105121/ -CRO
3	www.digimat.in/nptel/courses/video/115102124/L36.html- Laser

II SEMESTER
23GE1209 : Lab. Engineering Physics

Course Outcomes:
Upon successful completion of the course the students will be able to 1. Correlate fundamentals of quantum mechanics to solve problems dealing with quantum particles. 2. Assess the characteristics of semiconductor materials in terms of crystal structures, charge carriers and Energy bands. 3. Examine the intensity variation of light due to interference, diffraction, laser and its applications. 4. Analyze the motion in electric field and magnetic field and its applications to electron optic devices. 5. Illustrate the nature and characterization of magnetic materials and superconductors for engineering Applications.

List of Experiments :

Sr. No.	Experiments based on
1	Determination of Planck's constant.
2	Study of Tunnel Diode.
3	Determination of Hall coefficient and density of charge carriers using Hall effect.
4	Dependence of Hall coefficient on temperature.
5	Determination of Band gap in a semiconductor by four probe method.
6	Determination of Band gap in a semiconductor using reverse biased p-n junction diode.
7	Determination of radius of curvature of Plano convex lens using Newton's rings.
8	Determination of thickness of thin paper using air wedge.
9	Determination of wavelength of sodium light using diffraction grating.
10	Determination of wavelength of laser using diffraction grating.
11	Determination of divergence of laser beam.
12	Determination of amplitude and frequency of sinusoidal signal using CRO.
13	To measure the phase shift introduced by a phase shift network using Dual beam CRO.
14	Determination of the velocity of Ultrasonic waves in a non -electrolytic liquid by ultrasonic interferometer.

II SEMESTER

23ME1201 : 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.

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,	
Unit II: Theory of Isometric Projections:	**(2 Hrs.)**
Theory of isometric projection, Method for drawing isometric views, Different problems on isometric projections.	
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.	
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	
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.	
Unit VI: Intersection of Surfaces of solids:	**(2 Hrs.)**
Intersection between similar solids, Intersection between dissimilar solids, Lines and Curves of Intersection.	
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

23ME1202 : 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**

Nagar Yuwak Shikshan Sanstha's

Yeshwantrao Chavan College of Engineering

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B. Tech SoE and Syllabus 2023

(Scheme of Examination w.e.f. 2023-24 onward)

(Department of Electrical Engineering)

B.Tech in Electrical Engineering

SoE No. 23EL-101

II SEMESTER

23EL1201 : Basic Electrical and Electronics Engineering

Course Outcomes:

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. Analyze 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, Thevenin's Theorem **(Contemporary Issues related to Topic)**	
Unit III: Generator and Motors	**(7 Hrs.)**
Introduction to Generator, Construction, working principle, Types of Generators, Introduction to DC Motor,Working Principle of DC Motor, Types of Motors. **(Contemporary Issues related to Topic)**	
Unit IV: Diode and Transistor	**(6 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,. **(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	**(6 Hrs.)**
Introduction to Measurement System, Generalized block diagram of Measurement System, Static & dynamic characteristics of measurement system, Types of errors & their sources, Statistical analysis. **(ContemporaryIssues related to Topic)**	
Total Lecture	**40 Hours**

			July,2023	1.00	Applicable for AY 2023-24 Onwards
Chairperson	Dean (Acad. Matters)	Dean OBE	Date of Release	Version	

Textbooks:	
1.	Basic Electrical Engineering, T. K. Nagsarkar and M. S. Sukhija, Oxford Higher Education, First Edition2005
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

II SEMESTER
23ME1207 : Lab. 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, smithy/foundry and welding, etc.
3. Demonstrate practical knowledge of the dimensional accuracies and tolerances applicable for different manufacturing processes.
4. Produce simple/small devices of their interest in 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, smithy/foundry, welding and machining shop.	I	L-II
3	Create simple job/part/pattern in fitting, plumbing, carpentry, smithy/foundry 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	**Demonstration of Advance Machining Facility:** (With manufacturing of sample job on any one machine)	I	L-II
	a) Lathe, Drilling, Milling, Shaper, Press etc **OR**		
	b) CNC Trainer Lathe/Milling Machines **OR**		
	c) CNC Router **OR**		
	d) EDM		

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

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

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
23CV1203 : 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**

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
23CV1204 : 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

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B. Tech SoE and Syllabus 2023

(Scheme of Examination w.e.f. 2023-24 onward)

(Department of Mathematics & Humanities)

SoE No. 23FY-101

B.Tech First Year

II SEMESTER

23GE1218 : Functional English

Course Outcomes:
Upon successful completion of the course the students will be able to 1. Understand the concept of FE (Functional English) and its application in various real-life scenarios. 2. Develop basic interactive communication skills, including greetings, asking for information, stating opinions, and providing feedback. 3. Acquire knowledge of social networking, texting, instant messaging, blogs, and discussion boards, along with the ethical considerations associated with online communication. 4. Successfully complete quizzes and assignments assessing knowledge in the covered topics of FE, social media, tenses, and effective communication.

Unit:1	Introduction to Functional English	6 Hours
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. 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. Practice exercises, Practice Conversations, Script Activity		
Unit:2	**Internet & Social Media Communication**	**6 Hours**
Introduction & Basics to Social Networking, Texting & Instant messaging, Blogs & Discussion Board- discussion with examples, Ethics of social media & communication Topic: Introduction to Creative Ads Why Ads, What's in it for me? Characteristics of ads. Assignment Quiz on the above Topics, Exercises for Evaluation		
Unit:3	**TENSES**	**6 Hours**
Introduction & Basics, Simple Tense (Past, Present, Future), Continuous Tense (Past, Present, Future) – discussion with examples. Introduction & Basics, Perfect Tense (Past, Present, Future), Perfect Continuous Tense (Past, Present, Future) – discussion with examples Introduction to Movie Magic, Learn English with films, Film Vocabulary, Describing a film, Types of Films Assessment – Letter and Email Writing, Tenses – Quiz		
Unit:4	**Written Communication**	**5 Hours**
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.		

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Assignment Presentation on Mad Ads, Quiz on Tenses and social media-Internet Communication
Topic: Activity Extempore

EVALUATION			**1 Hour**
WRITTEN TEST	**TA=60**	**ESE=40**	**TOTAL=100**
Total Lecture Hours			**24 Hours**

Reference Books	
1	How to win friends & influence people – Dale Carnegie
2.	Functional English for Communication - Ujjwala Kakarla
3	Functional English for Technical Students – Dr Prathibha Mahato & Dr Dora Thompson

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 3.6)

Hingna Road, Wanadongri, Nagpur - 441 110

Bachelor of Technology

SoE & Syllabus 2023

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)

B.TECH SCHEME OF EXAMINATION 2023

(Scheme of Examination w.e.f. 2023-24 onward)

(Department of Civil Engineering)

B. Tech. in Civil Engineering

SoE No. 23CV-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	
THIRD SEMESTER															
1	3	BS	GE	23GE1302	Integral Transform	T	3	0	0	3	3	30	20	50	3
2	3	**HSSM-1**	GE	23GE1301	Fundamentals of Management & Economics	T	2	0	0	2	2	30	20	50	3
3	3	PC	CV	23CV1301	Concrete Technology	T	3	0	0	3	3	30	20	50	3
4	3	PC	CV	23CV1302	**Lab :** Concrete Technology	P	0	0	2	2	1		60	40	
5	3	PC	CV	23CV1303	Fluid Mechanics	T	3	0	0	3	3	30	20	50	3
6	3	PC	CV	23CV1304	**Lab :** Fluid Mechanics	P	0	0	2	2	1		60	40	
7	3	CEP	CV	23CV1305	Community Engagement Project	P	0	0	2	4	2		60	40	
8	3	**VEC-1**	CV	23CV1311	Environmental Sustainability, Pollution and Management	T	2	0	0	2	2	30	20	50	3
9	3	**OE1**	OE		**Open Elective -I**	T	2	0	0	2	2	30	20	50	3
10	3	MDM	CV		**MD Minor Course-I**	T	2	0	0	2	2	30	20	50	3
						TOTAL	**17**	**0**	**6**	**25**	**21**				
List of Mandatory Learning Course (MLC)															
1	3	HS	T&P	MLC2123	**YCAP3 :** YCCE Communication Aptitude Preparation	**A**	3	0	0	3	**0**				

Open Elective - I

SN	Sem	Type	BoS/ Deptt	Sub. Code	Subject
1	3	OE1	GE	23OE1301	OE-I : Combinatorics
2	3	OE1	GE	23OE1302	OE-I : Fuzzy Set Theory, Arithmetic And Logic
3	3	OE1	GE	23OE1303	OE-I : Green Chemistry & Sustainability
4	3	OE1	GE	23OE1304	OE-I : Hydrogen Fuel
5	3	OE1	GE	23OE1305	OE-I : Electronic Materials And Applications
6	3	OE1	GE	23OE1306	OE-I : Laser Technology And Applications
7	3	OE1	MGT	23OE1307	OE-I : Finance and Cost Management
8	3	OE1	MGT	23OE1308	OE-I : Operation Research Techniques
9	3	OE1	MGT	23OE1309	OE-I : Project Evaluation & Management
10	3	OE1	MGT	23OE1310	OE-I : Total Quality Management
11	3	OE1	MGT	23OE1311	OE-I : Value Engineering
12	3	OE1	MGT	23OE1312	OE-I : Maintenance Management
13	3	OE1	MGT	23OE1313	OE-I : Industrial Safety
14	3	OE1	MGT	23OE1314	OE-I : Industry 4.0
15	3	OE1	MGT	23OE1315	OE-I : Operation Management
16	3	OE1	MGT	23OE1316	OE-I : Material Management
17	3	OE1	MGT	23OE1317	OE-I : Hospitality Management
18	3	OE1	MGT	23OE1318	OE-I : Human Resource Management & Organizational Behaviour
19	3	OE1	MGT	23OE1319	OE-I : Agri-Business Management
20	3	OE1	MGT	23OE1320	OE-I : Rural Marketing
21	3	OE1	MGT	23OE1321	OE-I : Marketing Management
22	3	OE1	MGT	23OE1322	OE-I : Health Care Management
23	3	OE1	MGT	23OE1323	OE-I : Designated approved online NPTEL/KKSU Course
24	3	OE1	MGT	23OE1324	OE-I : Indian Archeology
25	3	OE1	MGT	23OE1325	OE-I : Social & Positive Psychology
26	3	OE1	MGT	23OE1326	OE-I : Seismology & Earthquake

		July, 2023	**1.00**	**Applicable for AY 2023-24 Onwards**
Chairperson	**Dean (Acad. Matters)**	**Date of Release**	**Version**	

III /IV SEMESTER
23GE1302/23GE1402 : Integral Transforms

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 I:	**7 Hrs.**
Laplace Transforms : Definition and examples of Laplace transforms, properties of Laplace transforms, Examples by using properties of Laplace transforms, Unit step function, periodic function.	
Unit II:	**8 Hrs.**
Inverse of Laplace Transform: 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.	
Unit III:	**7 Hrs.**
Z-Transform: 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.	
Unit IV:	**8 Hrs.**
Fourier Series: 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.	
Unit V:	**8 Hrs.**
Fourier Integral: Fourier Integral of a function formula and examples, Fourier Cosine integral, Fourier Sine integral, Complex Fourier integral, Evaluation of integration using Fourier integral.	

Unit VI:	7 Hrs.
Fourier Transforms: Fourier Transform, Fourier sine and cosine transformation and its examples, Properties of Fourier sine and cosine transform and its examples, Application of Fourier sine and cosine transform on Partial differential equation, Parseval's Identity.	
Total Lecture	45 Hours

Textbooks:	
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
23GE1301: Fundamentals of Management & Economics

Course Outcomes:
Upon successful completion of the course the students will be able to 1. Develop the Managerial Perspective and perform the various functions of management for optimum utilization of Engineering Resources 2. Identify and Analyze the role of Financial Accountancy and Marketing 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 I:	**7 Hrs.**
Principles of Management: Evolution of Management Thought: Scientific and Administrative Theory of Management, Definition and Concept of Management, Functions of Management: Planning, Organizing, Directing, Staffing and Controlling, Motivational Theories, Concept of Leadership.	
Unit II:	**8 Hrs.**
Marketing and Financial Management: Marketing and Financial Management –Marketing Theories and Concept-Marketing Mix, Market Segmentation, Targeting and Positioning and Functions Financial Management and Accountancy- Accountancy Rules and Capital, Preparation of Books of Account- Journal posting of Transaction into ledger and preparation of trial Balance, Introduction of Trading Account, Profit and loss account and balance sheet.	
Unit III:	**7 Hrs.**
Introduction to Microeconomics: Nature and Scope of Microeconomics, Demand Analysis: Meaning and determinants of demand, law of demand, Elasticity of Demand - types and degrees, Utility analysis, Law of diminishing marginal utility, supply- law of supply, Law of Variable proportions and Return to Scale, Classification of market structure.	
Unit IV:	**8 Hrs.**
Introduction to Macroeconomics: Nature and Scope of Macroeconomics, Concept of GDP, GNP, NDP, NNP, Measurement of GDP; Economic Growth and development, Money – definition, types and function of money, Inflation – meaning, types, causes and measure to control, concept of deflation, functions of central and commercial bank , Sources of public revenue - direct and indirect taxes.	
	Total Lecture **30 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	Fundamentals of Accounting Gupta R.L. & Radhaswamy ;
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

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://archive.nptel.ac.in/courses/110/101/110101131/
3	https://onlinecourses.nptel.ac.in/noc23_mg122/preview
4	https://onlinecourses.nptel.ac.in/noc21_hs52/preview
5	https://onlinecourses.nptel.ac.in/noc22_hs67/preview

III SEMESTER
23CV1301 : 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**	**8 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**	**7 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**	**8 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**	**7 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**	**8 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	7 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	**45 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/

III SEMESTER
23CV1302 : 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.

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

III SEMESTER
23CV1303 : 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**	**8 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.		
Unit:2	**Fluids Pressure and its Measurement**	**7 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.		
Unit:3	**Hydrostatics**	**7 Hours**
Total pressure & centre of pressure, Forces on a Horizontal submerged surfaces, Vertical submerged surfaces, Inclined submerged surfaces, Curved submerged surfaces.		
Unit:4	**Kinematics of Flow**	**8 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.		
Unit:5	**Kinetics of Flow**	**7 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.		
Unit :6	**Flow through Orifices and mouthpieces:**	**8 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.		
	Total Lecture	**45 Hours**

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
23CV1304 : 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.

S.N.	Minimum of **Ten** practical from the list given below shall be performed.
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
23CV1305 : Lab_Data Collection from field & Report writing

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 site visit covering various construction methodologies. 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.

III/IV SEMESTER

23CV1311/23CV1411
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 and Sustainable Development**	**8 Hours**
The man-environment interaction; Overview of natural resources: renewable, and non-renewable energy resources; Introduction to sustainable development: Sustainable Development Goals (SDGs)- targets and indicators, challenges and strategies for SDGs; Environmental issues: Global change, Climate Change and Mitigation.		
Unit:2	**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 biotic and abiotic things.		
Unit:3	**Environmental Management**	**8 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:4	**Environmental Treaties and Legislation**	**7 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	**30 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
YCCE e- library book links [ACCESSIBLE FROM COLLEGE CAMPUS]	
1	https://link.springer.com/book/10.1007/978-1-349-22169-1
MOOCs Links and additional reading, learning, video material	
1	https://nptel.ac.in/courses/109105203

III SEMESTER

Multidisciplinary Minor Courses

Track 1

Courses	Sem	MDMT1CV101 : Sustainable Green Technology
MDM-I	3	(MDM1CV101) Fundamentals of Green Technology
MDM-II	4	(MDM2CV102) Sustainable Materials & Green Building
MDM-III	5	(MDM3CV103) Sustainable Environmental Technology
MDM-IV	6	(MDM4CV104) Sustainable Energy Management
MDM-V	7	(MDM5CV105) Green Building Rating System
MDM-VI	8	(MDM6CV106) Life Cycle Assessment

Track 2

Courses	Sem	MDMT2CV201 :Smart Urban Management
MDM-I	3	(MDM1CV201) Smart Infrastructure Planning
MDM-II	4	(MDM2CV202) Socio-economic Management
MDM-III	5	(MDM3CV203) Intelligent Transport System
MDM-IV	6	(MDM4CV204) Urban Energy Systems
MDM-V	7	(MDM5CV205) Water Management
MDM-VI	8	(MDM6CV206) Urban Policy Framework

III SEMESTER
MDM1CV101 : Fundamentals of Green Technology

Course Outcomes :		
Upon successful completion of the course, the students will be able to		
The student will be able to 1. Understand the concept of green technology, cleaner production 2. Understand the concept of life cycle assessment 3. Understand the importance of green fuels and its impact on environment		
Unit:1		**7 Hours**
Introduction to green technology:Concept of green technology; defination,importance,history and evolution of green technology;advantages and limitations ,factors affecting green technologies;Role of indsutry,government and institutions in green technology		
Unit:2		**8 Hours**
Cleaner Production (CP): Concept of cleaner production; definition, importance, principles, benefits of cleaner production; Role of indsutry,government and institutions in cleaner production, clean development mechanism		
Unit:3		**7 Hours**
Green fuels:Concept of green fuels;defination,benefuts,challeneges.Comparision of green fuels with conventional fossil fuels with reference to environmental,economic and social impacts.		
Unit:4		**8 Hours**
Wind,tidal and geothermal energy:Introduction to wind,tidal and geothermal energy.energy conversion technologies ,principles and their suitabilty in Indian context and various regions .		
	Total Lecture	**30 Hours**

Text books	
1	Paul Bishop, Pollution Prevention: Fundamentals and Practice.McGraw Hill International,2000
2	Pollution Prevention and Abatment Handbook-Towards Cleaner Production,World bank Group,World Bank and UNEP,Washington D.C.,1998
3	Prasad Modak,C.Visvanathan and Mandar Parasnis,Cleaner Production Audit,Enviornmental System revies,No,38,Asian institute of Technology,Bangkok,1995
4	Bewik M.W.M.,Handbook of organic waste conversion.
Reference Books	
1	Green Technology: An A-to-Z Guide, Dustin Mulvaney, SAGE Publications,2011
YCCE e- library book links [ACCESSIBLE FROM COLLEGE CAMPUS]	
1	https://ndl.iitkgp.ac.in/
2	https://nptel.ac.in/courses/109104181

III SEMESTER
MDM1CV102 : Smart Infrastructure Planning

Course Outcomes :

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

The student will be able to

1. Understand the necessity of infrastructural development for smart cities.
2. Identify components of infrastructure and Prepare infrastructure plan for smart city.
3. Understand smart transport system for smart cities and its application study of water resources systems for smart city and its application.
4. Understand National and Global policies to implement for smart city development.

Unit:1	**7 Hours**
Fundamental of smart city & Infrastructure: Introduction of Smart City, Concept of smart city, Objective for smart cities, History of Smart city world and India. Need to develop smart city, Challenges of managing infrastructure in India and world, various types of Infrastructure systems, Infrastructures need assessment.	
Unit:2	**8 Hours**
Planning and development of Smart city Infrastructure: Energy and ecology, solar energy for smart city, Housing, sustainable green building, safety, security, disaster management, economy, cyber security, Project management.	
Unit:3	**7 Hours**
Intelligent transport systems: Smart vehicles and fuels, GIS, GPS, Navigation system, traffic safety management, mobility services, E-ticketing.	
Unit:4	**8 Hours**
Management of water resources and related infrastructure: Storage and conveyance system of water, sustainable water and sanitation, sewerage system, flood management, conservation system.	
Total Lecture	**30 Hours**

Text books / Reference 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.
6	Peurifoy, M.H, Construction Management, McGraw Hill, New York.
7	Srinath L, CPM & PERT, Affiliated East-West Press Pvt. Ltd., New Delhi.
8	P.S. Gahlot & B.M.Dhir, Construction Planning and Management, New Age International.
9	Chaudhary Roy, Project Management, Tata McGraw Hill, New Delhi.
YCCE e- library book links [ACCESSIBLE FROM COLLEGE CAMPUS]	
1	https://www.researchgate.net/publication/377721796_THE_KEY_COMPONENTS_OF_A_SMART_CITY
2	https://ebooks.inflibnet.ac.in/esp12/chapter/concept-of-smart-cities-in-india/
3	https://tec.gov.in/pdf/M2M/Design%20Planning%20Smart%20Cities%20with%20IoT%20ICT.pdf

III SEMESTER
MDM1CV103 : Introduction to Seismology

Course Outcomes :		
Upon successful completion of the course the students will be able to 1. Express the necessity and importance of earthquake Engineering 2. Examine the provision of IS codes used for earthquake resistant design and strengthening of the structure. 3. Illustrate the damages caused due to past earthquakes in & outside India and remedial measures. 4. Explain the social aspects of earthquake disasters & their management.		
Unit:1	**Introduction to Seismology**	**7 Hours**
Definition and scope of seismology; Importance and applications of seismology; Geology of earth, configuration of tectonic plates in a globe, behavior of plates, their motion and effects		
Unit:2	**Basics of Seismology**	**8 Hours**
Earthquake occurrence and distribution, location of epicenter, Faults and faulting mechanisms; Types of seismic waves; Seismicity and earthquake magnitude and intensity scales		
Unit:3	**Seismic Data**	**7 Hours**
Seismometers and accelerometers, Seismic networks and monitoring systems, Introduction to seismograph, recording of earthquakes,		
Unit:4	**seismic zones and Seismic Case Studies**	**8 Hours**
seismic zoning of India (IS 1893) , seismic coefficients for different zones , Seismicity of the world, history of earthquakes in India and abroad, case studies of effects of earthquakes		
	Total Lecture	**30 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/ecopies%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/

III SEMESTER
Open Elective -I : Basket

SN	Sem	Type	BoS/ Deptt	Sub. Code	Subject
1	3	OE1	GE	23OE1301	OE-I : Combinatorics
2	3	OE1	GE	23OE1302	OE-I : Fuzzy Set Theory, Arithmetic And Logic
3	3	OE1	GE	23OE1303	OE-I : Green Chem. & Sustainability
4	3	OE1	GE	23OE1304	OE-I : Hydrogen Fuel
5	3	OE1	GE	23OE1305	OE-I : Electronic Materials And Applications
6	3	OE1	GE	23OE1306	OE-I : Laser Technology And Applications
7	3	OE1	MGT	23OE1307	OE-I : Finance And Cost Management
8	3	OE1	MGT	23OE1308	OE-I : Operation Research Techniques
9	3	OE1	MGT	23OE1309	OE-I : Project Evaluation & Management
10	3	OE1	MGT	23OE1310	OE-I : Total Quality Management
11	3	OE1	MGT	23OE1311	OE-I : Value Engineering
12	3	OE1	MGT	23OE1312	OE-I : Maintenance Management
13	3	OE1	MGT	23OE1313	OE-I : Industrial Safety
14	3	OE1	MGT	23OE1314	OE-I : Industry 4.0
15	3	OE1	MGT	23OE1315	OE-I : Operation Management
16	3	OE1	MGT	23OE1316	OE-I : Material Management
17	3	OE1	MGT	23OE1317	OE-I : Hospitality Management
18	3	OE1	MGT	23OE1318	OE-I : Human Resource Management & Organizational Behaviour
19	3	OE1	MGT	23OE1319	OE-I : Agri-Business Management
20	3	OE1	MGT	23OE1320	OE-I : Rural Marketing
21	3	OE1	MGT	23OE1321	OE-I : Marketing Management
22	3	OE1	MGT	23OE1322	OE-I : Health Care Management

Link for Open Electives syllabus: https://ycce.edu/syllabus/

III SEMESTER
Mandatory Learning Course (Audit Course)
MLC2123 : YCAP3

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 3.6)

Hingna Road, Wanadongri, Nagpur - 441 110

Bachelor of Technology

SoE & Syllabus 2023

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)

B.TECH SCHEME OF EXAMINATION 2023

(Scheme of Examination w.e.f. 2023-24 onward)

(Department of Civil Engineering)

B. Tech. in Civil Engineering

SoE No. 23CV-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	
FOURTH SEMESTER															
1	4	**HSSM-2**	GE	23GE1401	Entrepreneurship Development	T	2	0	0	2	2	30	20	50	3
2	4	**AEC-2**	GE	23GE1405 23GE1406	Marathi Language / Hindi Language	T	2	0	0	2	2	30	20	50	3
3	4	**VSEC-3**	CV	23CV1401	**Lab :** Computer Aided Drawing with REVIT Architecture	P	0	0	2	4	2		60	40	
4	4	**VEC-2**	CV	23CV1402	Applications of AIML in Civil Engineering	T	2	0	0	2	2	30	20	50	3
5	4	PC	CV	23CV1403	Building Construction and Materials	T	2	0	0	2	2	30	20	50	3
5	4	PC	CV	23CV1404	Structural Analysis	T	3	0	0	3	3	30	20	50	3
6	4	PC	CV	23CV1405	**Lab :** Structural Analysis	P	0	0	2	2	1		60	40	
7	4	PC	CV	23CV1406	Surveying	T	3	0	0	3	3	30	20	50	3
8	4	PC	CV	23CV1407	**Lab :** Surveying	P	0	0	2	2	1		60	40	
9	4	**OE-2**	OE		**Open Elective-II**	T	2	0	0	2	2	30	20	50	3
11	4	MDM	CV		**MD Minor Course-II**	T	2	0	0	2	2	30	20	50	3
						TOTAL	**18**	**0**	**6**	**26**	**22**				

List of Mandatory Learning Course (MLC)															
1	4	HS	T&P	MLC2124	**YCAP4 :** YCCE Communication Aptitude Preparation	**A**	3	0	0	3	**0**				

Open Elective - II

SN	Sem	Type	BoS/ Deptt	Sub. Code	Subject
1	4	OE2	GE	23OE2401	OE-II : Combinatorics
2	4	OE2	GE	23OE2402	OE-II : Fuzzy Set Theory, Arithmetic And Logic
3	4	OE2	GE	23OE2403	OE-II : Green Chem. & Sustainability
4	4	OE2	GE	23OE2404	OE-II : Hydrogen Fuel
5	4	OE2	GE	23OE2405	OE-II : Electronic Materials And Applications
6	4	OE2	GE	23OE2406	OE-II : Laser Technology And Applications
7	4	OE2	MGT	23OE2407	OE-II : Finance And Cost Management
8	4	OE2	MGT	23OE2408	OE-II : Operation Research Techniques
9	4	OE2	MGT	23OE2409	OE-II : Project Evaluation & Management
10	4	OE2	MGT	23OE2410	OE-II : Total Quality Management
11	4	OE2	MGT	23OE2411	OE-II : Value Engineering
12	4	OE2	MGT	23OE2412	OE-II : Maintenance Management
13	4	OE2	MGT	23OE2413	OE-II : Industrial Safety
14	4	OE2	MGT	23OE2414	OE-II : Industry 4.0
15	4	OE2	MGT	23OE2415	OE-II : Operation Management
16	4	OE2	MGT	23OE2416	OE-II : Material Management
17	4	OE2	MGT	23OE2417	OE-II : Hospitality Management
18	4	OE2	MGT	23OE2418	OE-II : Human Resource Management & Organizational Behaviour
19	4	OE2	MGT	23OE2419	OE-II : Agri-Business Management
20	4	OE2	MGT	23OE2420	OE-II : Rural Marketing
21	4	OE2	MGT	23OE2421	OE-II : Marketing Management
22	4	OE2	MGT	23OE2422	OE-II : Health Care Management
23	4	OE2	MGT	23OE2423	OE-II : Designated approved online NPTEL/KKSU Course
24	4	OE2	MGT	23OE2424	OE-II : Indian Archeology
25	4	OE2	MGT	23OE2425	OE-II : Social & Positive Psychology
26	4	OE2	MGT	23OE2426	OE-II : Seismology & Earthquake

		July, 2023	1.00	Applicable for AY 2023-24 Onwards
Chairperson	Dean (Acad. Matters)	Date of Release	Version	

IV SEMESTER
23GE1401 : Entrepreneurship Development

Course Outcomes:
Upon successful completion of the course the students will be able to
1. Appreciate role of entrepreneurs in society and develop entrepreneurial abilities by providing information about skill sets. 2. Develop an understanding of how and what form of business organization to choose for start up. 3. Stimulate to innovate, develop prototypes or ideas by applying theory into practice. 4. Identify the Support rendered by various Government Agencies.

Unit I:	**7 Hrs.**
Entrepreneur & Entrepreneurship: Meaning of Entrepreneur, Evolution of the concept – Theories and Models, Types of Entrepreneur, Stages in entrepreneurial process- Idea Generation, Screening, Selection and Managing Resources.	
Unit II:	**8 Hrs.**
Legal Compliances for Incorporating Start up: Fundamentals of choosing the Business Organization form for startup, Incorporation of Partnership, LL.P & Co – operative, Incorporation of One Person Company, Pvt. Ltd., Pub. Ltd. and not for profit company, Financing the legal Venture and Legal Compliances.	
Unit III:	**7 Hrs.**
Entrepreneurship and IP Strategy: Intellectual Property : Definition and Concept of Trade Mark, Patent, Copyright, Industrial Design, IP Strategy and Entrepreneurship.	
Unit IV:	**8 Hrs.**
Support to Entrepreneurs: Financing new ventures, Business Incubators – Government Policy for Small Scale Enterprises, Growth Strategies in small industry – Expansion, Diversification, Joint Venture, Merger and Subcontracting.	
Total Lecture	**30 Hours**

Student activities:	
1.	Interview at least four entrepreneurs or businessman and identify Traits of successful entrepreneurs.
2.	Analyse case studies of any two successful entrepreneurs.
3.	Download product development and innovative films from internet.
4.	Identify your hobbies and interests and convert them into business idea
Textbooks	
1.	Khanka. S.S., "Entrepreneurial Development" S.Chand & Co. Ltd.,Ram Nagar, New Delhi, 2013.
2.	Donald F Kuratko, "Entrepreneurship – Theory, Process and Practice", 9th Edition, Cengage Learning 2014.
3.	Corporate Law, 33rd ed. 2016, Taxman New Delhi.
4.	Narayanan, V. K., Managing technology and innovation for competitive advantage, first edition, Pearson education, New Delhi, (2006)
5.	Idris, K. (2003), Intellectual property: a power tool for economic growth, second edition, WIPO publication no. 888, Switzerland
6.	Khanka. S.S., "Entrepreneurial Development" S.Chand & Co. Ltd.,Ram Nagar, New Delhi, 2013.
7.	Ramaiya's Guide to the Companies Act, 18th ed. 2014, Lexis Nexis New Delhi.
Reference Books	
1.	Mehta, Monica- The Entrepreneurial Instinct : How everyone has the innate ability to start a successful small business – McGraw – Hill Education, New Delhi 2012, ISBN 978-0-07-179742-9
2	Prasanna Chandra "Protect Preparation, Appraisal, Implementation" Tata McGraw Hill. New Delhi
3	S Anil Kumar "Entrepreneurship Development" New Age International Publishers
4	Nishith Dubey "Entrepreneurship Development" PHI Learning
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.swayam2.ac.in/cec23_mg24/course- entrepreneurship development
2	https://onlinecourses.nptel.ac.in/noc23_mg74/announcements?force=true-entrepreneur
3	https://onlinecourses.nptel.ac.in/noc23_mg126/announcements?force=true- Business fundamentals for entrepreneurship

IV SEMESTER
23GE1405 : Marathi Language

Course Objectives
1. मराठी भाषेच्या समृद्धीची जाणीव करून देणे. 2. विद्यार्थ्यांमध्ये भाषा कौशल्याचा विकास करणे आणि त्यातून रोजगाराच्या संधींचा शोध घेणे.
Course Outcomes
3. भाषेचा जीवन व्यवहारात योग्य पद्धतीने वापर करण्याचा प्रयत्न करणे. 4. संत साहित्याच्या शिकवणुकीमुळे मानवता आणि मानवी व्यवहाराची सांगड घालणे, नैतिक मूल्ये रुजविणे. 5. विद्यार्थ्यांना रोजगाराभिमुख बनविणे.

Unit:1	**गद्य विभाग**	8 Hours

१. भारतीय लोकशाहीचे भवितव्य काय? - डॉ. बाबासाहेब आंबेडकर
२. काळी आई - व्यंकटेश माडगूळकर
३. संत तुकारामांचे अभंग - निर्मलकुमार फडकुले
४. माझी शाळा - प्रकाश खरात
५. समतेचे वारकरी संत गाडगेबाबा आणि राष्ट्रसंत तुकडोजी महाराज - अशोक राणा
६. लोककल्याणकारी राजा : - शरयू तायवाडे

Unit:2	**पद्य विभाग**	8 Hours

१. ज्ञानेश्वरांचे अभंग - संत ज्ञानेश्वर
२. वनसुधा - वामन पंडित
३. नवा शिपाई - केशवसुत
४. मेंढरं - विठ्ठल वाघ
५. पोरी - अनुराधा पाटील
६. गाव - हेमंतकुमार कांबळे

Unit:3	व्यावहारिक मराठी	7 Hours

१. म्हणी
२. मुलाखतलेखन - डॉ. वैशाली धनविजय
३. वाक्प्रचार
४. जाहिरातलेखन - डॉ. अजय देशपांडे

Unit:4	रोजगाराभिमुख मराठी व्यावहारिक कौशल्ये	7 Hours

१. प्रत्यक्ष मुलाखत कौशल्य
२. वाचन कौशल्य - (अ) बातमी वाचन (ब) कथा वाचन
३. ऑनलाईन कौशल्य - (अ) ग्राहक सेवा केंद्राशी संवाद, (ब) ऑनलाईन अर्ज करणे

Reference Books

1. पाठ्यपुस्तक : **शब्दसाधना - भाग १**
2. रोजगाराभिमुख मराठी व्यावहारिक कौशल्ये

IV SEMESTER
23GE1406 : Hindi Language

Course Objectives
6. विद्यार्थियों में देशभक्तिपरक एवं पारिवारिक मूल्यों का विकास। 7. विद्यार्थियों पर्यावरण-संरक्षण के प्रति सजग करना। 8. एकांकी, कहानी, निबंध आदि विधाओं के मध्य का अंतर अवगत कराना। 9. हिंदी के प्रयोजनमूलक स्वरूप से परिचित कराना। 10. विद्यार्थियों को आधुनिक प्रौद्योगिकी (तकनीक) का प्रयोग करने में सक्षम बनाना।.

Course Outcomes
1. पौराणिक अथवा ऐतिहासिक घटनाओं को तार्किक आधार पर स्वीकार करेंगे। अपने परिवेश के उचित और अनुचित व्यवहारों के प्रति आकलन शक्ति बढ़ेगी। 2. एकांकी, कहानी, निबंध आदि विधाओं के मध्य का अंतर बताने में सक्षम होंगे। 3. कविता का रसास्वादन करने में समर्थ होंगे। 4. 'अनुवाद' के स्वरूप एवं प्रक्रिया से अवगत होंगे। 5. 'मार्गिक नक़्शे' का दैनिक जीवन में उपयोग करने में सक्षम होंगे।

Unit:1	**गद्य विभाग**	8 Hours

१. भाईसाहब (कहानी) - प्रेमचंद
२. स्मृति (निबंध) - श्रीराम शर्मा
३. गिल्लू (रेखाचित्र) - महादेवी वर्मा
४. अभाव (कहानी) - विष्णु प्रभाकर
५. महाभारत की साँझ (एकांकी) - भारतभूषण
६. उखड़े खंबे (व्यंग्य)। - हरिशंकर परसाई

Unit:2	**पद्य विभाग**	8 Hours

१. कबीर के दोहे - कबीरदास
२. ले चल यहाँ भुलावा देकर - जयशंकर प्रसाद
३. स्नेह-निर्झर बह गया - हैसूर्यकांत त्रिपाठी "निराला"
४. प्रथम रश्मि - सुमित्रानंदन पंत
५. जीवन का झरना - आरसीप्रसाद सिंह
६. कविता के साथ - दामोदर खड़से

Unit:3	**अन्य पाठ्य सामग्री**	7 Hours

१. मुहावरे और लोकोक्तियाँ: पाठ्यपुस्तक में मुहावरे और लोकोक्तियाँ का अर्थ एवं वाक्य प्रयोग

२. विज्ञापन कला : अर्थ, परिभाषा, प्रकार, शीर्षक का महत्त्व, विज्ञापन के प्रयोजन, सत्य, लक्ष्य, विज्ञापन की भाषा, अच्छे विज्ञापन के गुण इत्यादि ।

Unit:4	**कौशल्य आधारित घटक**	7 Hours

१. वाचन कौशल्य (समाचार-वाचन, कहानी-वाचन)
२. सोशल मीडिया के शिष्टाचार
३. ऑनलाइन आवेदन, ग्राहक-सेवा केंद्र से संवाद

Reference Books

3. पाठ्यपुस्तक : **"पलाश"**

IV SEMESTER

23CV1401 : Lab_Computer Aided Drawing with REVIT Architecture

Course Outcomes:
Upon successful completion of the course the students will be able to
1. Understand the principles and significance of BIM in architectural design.
2. Navigate and utilize the Revit interface proficiently.
3. Create 2D and 3D architectural elements using Revit tools..

S.N.	Experimental based on
1	**Module 1: Introduction to Revit Architecture** Understanding Revit interface and navigation, Understanding Units and levels, creating walls, floors, roofs, and ceilings Modifying elements using editing tools.
2	**Module 2: Basic Drawing and Editing Tools** Creation of doors, windows, furniture, curtain walls, curtain grids, Wall Editing
3	**Module 3: Building Components and Families** Creating roofs, ceilings, stairs, railings, Paints, Introduction to families and their types.
4	**Module 4: Working with Views and Sheets** Creating and managing different views (floor plans, elevations, sections).
5	**Module 5: Annotations and Schedules** Adding text, dimensions, and annotations, Creating schedules for elements

01 Assignment for G+1 Building is to be submitted by applying all parameters explained in Module1 to Module 5.

IV SEMESTER
23CV1402 : Applications of AIML in Civil Engineering

Course Outcomes :
Upon successful completion of the course the students will be able to 1. Develop an understanding what is involved in AIML. 2. Develop an understanding of fundamentals of Machine Learning. 3. Apply the Knowledge of AI in Civil Engineering

Unit:1	**Introduction to AI and ML:**	**8 Hours**
Definitions and basic concepts, Historical development, Overview of AI and ML applications in various fields including Civil Engineering		
Unit:2	**Fundamentals of Machine Learning:**	**8 Hours**
Machine Learning: Supervised learning, Unsupervised learning, Reinforcement learning: Model based learning,		
Unit:3	**Civil Engineering Application**	**7 Hours**
Structural health monitoring, Predictive maintenance Failure prediction and analysis, Project scheduling and optimization		
Unit:4	**Case Studies and Real-world Applications:**	**7 Hours**
Industry applications , Practical implementation of AI and ML in Civil Engineering projects		
	Total Lecture	**30 Hours**

Text Books	
1	Wolfgang Ertel, "Introduction to Artificial Intelligence 2nd Edition", UTiCS, Springer
2	Ethem Alpaydın, "Introduction to Machine Learning", The MIT Press, Cambridge, Massachusetts London, England
Reference Books	
1	John Paul Mueller, Luca Massaron , "Artificial Intelligence for Dummies ", First, 2018 John Wiley & Sons
YCCE e- library book links [ACCESSIBLE FROM COLLEGE CAMPUS]	
1	https://www.benthamscience.com/ebook_volume/3615/related-ebooks
MOOCs Links and additional reading, learning, video material	
1	https://logicmojo.com/supervised-and-unsupervised-learning
2	https://nptel.ac.in/courses/106106198
3	https://nptel.ac.in/courses/106102220

IV SEMESTER
23CV1403 : Building Construction and Materials

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**	**8 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,		
Unit:2	Brick and Stone Masonry	**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. Drawing Book Activity: Types of bonds		
Unit:3	**Chajja, lintel, arches and trusses**	**8 Hours**
Arches and Lintels : Terminology in construction, Types of Arches, Types of chajjas and canopies, Types of lintels, **Truss**: Terminology, different types of trusses. Drawing Book Activity: Types of Trusses, Arches and Lintels		
Unit:4	**Stairs ,Doors, Window, Formwork:**	**7 Hours**
Stairs: Terminology**,** requirements of good staircase, classification, Types of stairs, functional design of stairs. **Doors and Windows:** Terminology, Purpose, materials and types. **Formwork:** Centering shuttering, shoring, underpinning, scaffolding. Drawing Book Activity: Stairs, Doors and Windows		
	Total Lecture	**30 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%20 Engineering/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/

IV SEMESTER
23CV1404 : 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**	**8 Hours**
Slope deflection method as applied to indeterminate beams & continuous beams, portal frames.		
Unit:2	**Three Moment Theorem**	**7 Hours**
Analysis of fixed and continuous beams by theorem of three moments including effect of sinking of support.		
Unit:3	**Moment Distribution Method**	**7 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**	**8 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**	**7 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**	**8 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	**45 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
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-opies%20of%20books/Civil%0Engineering /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
23CV1405 : 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.

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

23CV1406 : 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**	**8 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**	**7 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**	**8 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**	**8 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.		
	Total Lecture	**45 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

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
23CV1407 : 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.

Sr. No.	Following Practical's will be conducted: (Any Ten of the following)
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
Multidisciplinary Minor Courses

Track 1

Courses	Sem	MDMT1CV101 : Sustainable Green Technology
MDM-I	3	(MDM1CV101) Fundamentals of Green Technology
MDM-II	4	(MDM2CV102) Sustainable Materials & Green Building
MDM-III	5	(MDM3CV103) Sustainable Environmental Technology
MDM-IV	6	(MDM4CV104) Sustainable Energy Management
MDM-V	7	(MDM5CV105) Green Building Rating System
MDM-VI	8	(MDM6CV106) Life Cycle Assessment

Track 2

Courses	Sem	MDMT2CV201 :Smart Urban Management
MDM-I	3	(MDM1CV201) Smart Infrastructure Planning
MDM-II	4	(MDM2CV202) Socio-economic Management
MDM-III	5	(MDM3CV203) Intelligent Transport System
MDM-IV	6	(MDM4CV204) Urban Energy Systems
MDM-V	7	(MDM5CV205) Water Management
MDM-VI	8	(MDM6CV206) Urban Policy Framework

IV SEMESTER
MDM2CV101 : Sustainable Materials & Green Building

Course Outcomes :
Upon successful completion of the course, the students will be able to
The student will be able to
1. Understand the Environmental Impact of Building Materials
2. Integrate Sustainable Design and Resource Efficiency
3. Analyze the impact of materials on indoor air quality
4. Understand the criteria and requirements for green building certifications

Unit:1	Introduction to Sustainable Materials	7 Hours
Embodied energy and operational energy in building and Life cycle energy. Ecological footprint, Bio-capacity and calculation of planet equivalent, Role of Material:Carbon from Cement,alternative cements and cementitious material, Alternative fuel for cements for reduction in carbon emission. Sustainability issues for concrete		
Unit:2	**Introduction to Sustainable Materials**	**8 Hours**
Role of quality, minimization of natural resource utilization, High volume fly ash concrete, geo-polymer concrete etc. concrete with alternative material for sustainability', Reduction in water consumption in concrete, Recycled aggregate, Energy for grinding crushing of cement aggregate etc. and reduction.Operational energy in building role of materials and thermal conductivity, : Clay Bricks, Types kilns.		
Unit:3	**The Concept of Green Building**	**8 Hours**
Indoor air quality: : Paints,Adhesive and sealants for use in building,Volatile organic content (VOC) emission issues and indoor air quality for Sustainability and Health hazard, Operational energy reduction and net zero building, Radiation budget,Surface water balance, Effects of trees and microclimatic modification through greening		
Unit:4	**The Concept of Green Building**	**7 Hours**
Use of Building Integrated Photo Voltaic (BIPV) and other renewable energy in buildings, basic concepts and efficiency, Energy codes ECBC requirement, Concepts of OTTV etc, Green Performance rating, requirements of LEED, GRIHA etc.		
	Total Lecture	**30 Hours**

Text books	
1	Allen, D.T. and Shonnard D.R, Sustainability Engineering: Concepts ,design and Case Studies, Prentice Hall
2	Bradly A.S., Adebayo A.O, Maria, Engineering applications in sustainable design and development, Cengagae learning
3	Environmental Impact Assessment Guidelines, Notification of Government of India,2006
4	Mackenthan K.M., Basic Concepts in Environmental Management, Lewis Publication.London,1998
Reference Books	
1	Steve Goodhew,Sustainable Construction Processes: A Resource Text, 2016 John Wiley & Sons, Ltd.
YCCE e- library book links [ACCESSIBLE FROM COLLEGE CAMPUS]	
1	https://nptel.ac.in/courses/105102195
2	https://onlinelibrary.wiley.com/doi/book/10.1002/9781119247937

IV SEMESTER

MDM2CV102 : Socio-economic Management

Course Outcomes :
Upon successful completion of the course, the students will be able to
The student will be able to 1. Explain sociological concepts & its importance in development of smart cities 2. Describe the problems in urban and rural social transformation. 3. Explain the local financial system & role of capital budget. 4. Analyze economic management in different domains of smart cities.

Unit:1		**7 Hours**
Sociological concepts and methods, man and environment relationships. Sociocultural profile of Indian society and urban transformation and Traditions and modernity in the context of urban and rural settlements.		
Unit:2		**8 Hours**
Social problems of slums and squatters communities, urban and rural social transformation and its effects on social life, safety, security and crime in urban areas and its spatial planning implications, social structure and spatial planning.		
Unit:3		**7 Hours**
Local financial system: Taxation and fees, state and local fiscal relations, financing local fiscal services, local expenditure, Capital budgeting, performance budgeting, Financial resource mobilization.		
Unit:4		**8 Hours**
Economic management in various domains like energy, infrastructure, transportation, communication, water, health, safety, etc.		
	Total Lecture	**30 Hours**

Text books / Reference Books	
1	K.Seeta Prabhu (2001): Economic Reform and Social Sector Development,(N. Delhi: Sage Publications)
2	K.Seeta Prabhu & R. Sudarshan (2002):Reforming India's Social Sector,(N. Delhi: Social Science Press)
3	Economics of Health: An Introductory Review P. R. Panchamukhi, Indian Economic Association Trust for Research and Development, 2002.
4	Kundu, Amitabh (2006): India Social Development Report,(N. Delhi: Oxford University Press).
5	Handbook of the Economics of Education Vol.2 (Edited) Eric Hanushek, Finis Welch Isledeler (2006)
6	Henderson, J. W. (2007): Health Economics & Policy, (3e), Thomson South-Western, U.K
YCCE e- library book links [ACCESSIBLE FROM COLLEGE CAMPUS]	
1	https://nptel.ac.in/courses/109105196

IV SEMESTER
MDM2CV103 : Seismic Disaster Management

Course Outcomes :
Upon successful completion of the course the students will be able to
1. Understand impact of Earthquake Disaster.
2. Explain Disaster Management Cycle
3. Determine the extent of risk and cost assessment.
4. Summarize Preparedness and role of different agencies in disaster management.

Unit:1	**Introduction to Earthquake Disasters**	**7 Hours**
Definition and characteristics of earthquake disasters, Historical examples of devastating earthquakes, impact of earthquakes on society and the environment.		
Unit:2	**Social and Economic Impacts of Earthquake Disasters & Damage Assessment:**	**8 Hours**
Social vulnerability and resilience, Economic consequences and recovery challenges, Psychological and societal impacts, Purpose of assessment, Rapid assessment, Investigation of damage, Evaluation of surface and structural cracks, Damage assessment procedure		
Unit:3	**Disaster Management Cycle**	**7 Hours**
Risk and Vulnerability Analysis: Its concept and analysis, Risk Reduction, Vulnerability: Its concept and analysis, Strategic Development for Vulnerability Reduction.		
Unit:4	**Disaster Preparedness**	**8 Hours**
Concept and Nature, Disaster Preparedness Plan, Prediction, Early Warnings and Safety Measures of Disaster, Role of Information, Education, Communication, and Training, Role of Government, International and NGO Bodies. Role of IT in Disaster Preparedness, Role of Engineers on Disaster Management		
	Total Lecture	**30 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/ecopies%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/

IV SEMESTER
Open Elective -II : Basket

SN	Sem	Type	BoS/ Deptt	Sub. Code	Subject
1	4	OE2	GE	23OE2401	OE-II : Combinatorics
2	4	OE2	GE	23OE2402	OE-II : Fuzzy Set Theory, Arithmetic And Logic
3	4	OE2	GE	23OE2403	OE-II : Green Chem. & Sustainability
4	4	OE2	GE	23OE2404	OE-II : Hydrogen Fuel
5	4	OE2	GE	23OE2405	OE-II : Electronic Materials And Applications
6	4	OE2	GE	23OE2406	OE-II : Laser Technology And Applications
7	4	OE2	MGT	23OE2407	OE-II : Finance And Cost Management
8	4	OE2	MGT	23OE2408	OE-II : Operation Research Techniques
9	4	OE2	MGT	23OE2409	OE-II : Project Evaluation & Management
10	4	OE2	MGT	23OE2410	OE-II : Total Quality Management
11	4	OE2	MGT	23OE2411	OE-II : Value Engineering
12	4	OE2	MGT	23OE2412	OE-II : Maintenance Management
13	4	OE2	MGT	23OE2413	OE-II : Industrial Safety
14	4	OE2	MGT	23OE2414	OE-II : Industry 4.0
15	4	OE2	MGT	23OE2415	OE-II : Operation Management
16	4	OE2	MGT	23OE2416	OE-II : Material Management
17	4	OE2	MGT	23OE2417	OE-II : Hospitality Management
18	4	OE2	MGT	23OE2418	OE-II : Human Resource Management & Organizational Behaviour
19	4	OE2	MGT	23OE2419	OE-II : Agri-Business Management
20	4	OE2	MGT	23OE2420	OE-II : Rural Marketing
21	4	OE2	MGT	23OE2421	OE-II : Marketing Management
22	4	OE2	MGT	23OE2422	OE-II : Health Care Management

Link for Open Electives syllabus: https://ycce.edu/syllabus/

IV SEMESTER
Mandatory Learning Course (Audit Course)
MLC2124 : YCAP4

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 3.6)

Hingna Road, Wanadongri, Nagpur - 441 110

Bachelor of Technology

SoE & Syllabus 2023

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)

B.TECH SCHEME OF EXAMINATION 2023

(Scheme of Examination w.e.f. 2023-24 onward)

(Department of Civil Engineering)

B. Tech. in Civil Engineering

SoE No. 23CV-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	
FIFTH SEMESTER															
1	5	PC	CV	23CV1501	Reinforced Concrete Structures	T	3	0	0	3	3	30	20	50	3
2	5	PC	CV	23CV1502	Geotechnical Engineering	T	3	0	0	3	3	30	20	50	3
3	5	PC	CV	23CV1503	**Lab :** Geotechnical Engineering	P	0	0	2	2	1		60	40	
4	5	PC	CV	23CV1504	Water Supply & Treatment	T	3	0	0	3	3	30	20	50	3
5	5	PC	CV	23CV1505	**Lab :** Water Quality Analysis	P	0	0	2	2	1		60	40	
6	5	PC	CV	23CV1506	Highway Engineering and Materials	T	3	0	0	3	3	30	20	50	3
7	5	PC	CV	23CV1507	**Lab :** Highway Material Testing	P	0	0	2	2	1		60	40	
8	5	PC	CV	23CV1508	**Lab :** Building Design Drawing	P	0	0	2	2	1		60	40	
9	5	PE	CV		**Professional Elective-I**	T	3	0	0	3	3	30	20	50	3
11	5	OE-3	OE		**Open Elective-III**	T	3	0	0	3	3	30	20	50	3
12	5	MDM	CV		**MD Minor Course-III**	T	3	0	0	3	3	30	20	50	3
10	5	STR	CV	23CV1509	Internship and Industrial Visit	P	0	0	2	2	1		60	40	
					TOTAL		**21**	**0**	**10**	**31**	**26**				
List of Mandatory Learning Course (MLC)															
1	5	HS	T&P	MLC2125	**YCAP5 :** YCCE Communication Aptitude Preparation	**A**	3	0	0	3	**0**				

Professional Elective - I

1	5	PE-I	CV	23CV1521	**PE-I :** Numerial Methods and Computational Techniques
2	5	PE-I	CV	23CV1522	**PE-I :** Basics of Structural Fire Engineering
3	5	PE-I	CV	23CV1523	**PE-I :** Environmental Management
4	5	PE-I	CV	23CV1524	**PE-I :** Introduction to Remote Sensing
5	5	PE-I	CV	23CV1525	**PE-I :** Modern & Innovative Construction Materials
6	5	PE-I	CV	23CV1526	**PE-I :** Air Pollution and Solid Waste Management
7	5	PE-I	CV	23CV1527	**PE-I :** Elements of Water Power Engineering
8	5	PE-I	CV	23CV1528	**PE-I :** Building Services
9	5	PE-I	CV	23CV1529	**PE-I :** Construction Management And Machinery

Open Elective - III

SN	Sem	Type	BoS/Deptt	Sub. Code	Subject	FACULTY
1	5	OE3	CSE	23OE3501	OE-III : Social Reformers in Modern Maharashtra	ARTS
2	5	OE3	CSE	23OE3502	OE-III : Independent India 1948-2010	ARTS
3	5	OE3	CT	23OE3503	OE-III : Introduction To Cognitive Psychology	ARTS
4	5	OE3	CT	23OE3504	OE-III : Introduction To Engineering Psychology	ARTS
5	5	OE3	CT	23OE3505	OE-III : Introduction To Behavioural Psychology	ARTS
6	5	OE3	CT	23OE3506	OE-III : Introduction To Emotional Psychology	ARTS
7	5	OE3	EL	23OE3507	OE-III : Elements of Public Administration	ARTS
8	5	OE3	ETC	23OE3508	OE-III : Ancient Indian History	ARTS
9	5	OE3	IT	23OE3509	OE-III : Consciousness Studies	ARTS
10	5	OE3	IT	23OE3510	OE-III : Psychology for Professionals	ARTS
11	5	OE3	IT	23OE3511	OE-III : Introduction to Sociology and Human Behavior	ARTS
12	5	OE3	GE	23OE3512	OE-III : Economics of Money and Banking	ARTS
13	5	OE3	GE	23OE3513	OE-III : Economics of Capital Market	ARTS
14	5	OE3	GE	23OE3514	OE-III : Digital Humanities	ARTS
15	5	OE3	GE	23OE3515	OE-III : Introduction to Political Science	ARTS
16	5	OE3	CT	23OE3516	OE-III : Bhagwat Geeta - An Engineer's Interpretation	ARTS - IKS
17	5	OE3	CT	23OE3517	OE-III : Artha shastra by Kautiliya	ARTS - IKS
18	5	OE3	CSD	23OE3518	OE-III : Glimpses of Ancient science and Technology	ARTS - IKS
19	5	OE3	CV	23OE3519	OE-III : Indian taxation system	COMMERCE
20	5	OE3	CV	23OE3520	OE-III : Elements of share trading	COMMERCE
21	5	OE3	EE	23OE3521	OE-III : Introduction to Fintech	COMMERCE
22	5	OE3	EE	23OE3522	OE-III : Financial Analytics	COMMERCE
23	5	OE3	ETC	23OE3523	OE-III : Fundamentals of Investments	COMMERCE
24	5	OE3	EE	23OE3524	OE-III : Lifestyle Diseases	HEALTHCARE & MEDICINE
25	5	OE3	EE	23OE3525	OE-III : Holistic Nutrition	HOME SCIENCE
26	5	OE3	EL	23OE3526	OE-III : Community Organization & Development	HOME SCIENCE
27	5	OE3	CSE	23OE3527	OE-III : Human Rights & International Laws	LAW
28	5	OE3	CSE	23OE3528	OE-III : Cyber Crime Administration	LAW
29	5	OE3	MATHS	23OE3529	OE-III : Finite Differences & Numerical Methods	SCIENCE
30	5	OE3	MATHS	23OE3530	OE-III : Business Statistics	SCIENCE
31	5	OE3	PHY	23OE3531	OE-III : Crystalline Solids: Properties and Applications.	SCIENCE
32	5	OE3	PHY	23OE3532	OE-III : Nanotechnology: Fundamental to Applications	SCIENCE
33	5	OE3	CHE	23OE3533	OE-III : Chemistry in daily life	SCIENCE
34	5	OE3	CHE	23OE3534	OE-III : Battery Systems and Management	SCIENCE
35	5	OE3	NPTEL	23OE3535	OE-III : Designated approved online NPTEL Course	NPTEL

Chairperson	Dean (Acad. Matters)	July, 2023	1.00	Applicable for AY 2023-24 Onwards
		Date of Release	Version	

V SEMESTER
23CV1501__Reinforced Concrete Structures

Course Outcomes :
1. Understand the properties of concrete and steel, basics of structural planning, and use of IS codes for analyzing and designing beams using Working Stress and Limit State Methods 2. Analyze and design reinforced concrete beams and slabs using the limit state method. 3. Design short columns and isolated footings under various loading conditions using Limit State Method. 4. Understand concepts of prestressed concrete, including types, advantages, limitations, and prestress losses.

Unit:1	Introduction and Design Methodology	7 Hours
Properties of different grades of concrete and steel, Structural planning of building structure, Introduction to IS 456-2000, SP16, SP34. Working stress method: Assumptions, Behavior of beam under flexure, Stress distribution diagram, design constant, analysis of rectangular singly reinforced sections.		
Unit:2	**Beam**	**8 Hours**
Limit state method: Assumptions, Characteristic values, partial safety factor, stress strain relationship, stress block parameters. Analysis and design of singly and doubly reinforced rectangular section, T section beam for flexure. (Using Limit State Method)		
Unit:3	**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, cantilever slabs.		
Unit:4	**Column**	**8 Hours**
Limit state of collapse in compression; basic assumptions. Analysis and design of short columns subjected to axial load, uni-axial and biaxial moments.		
Unit:5	**Footing**	**8 Hours**
Design of isolated footing for column subjected to axial loads. Types of piles and combined footing.		
Unit :6	**Introduction to prestressed concrete**	**7 Hours**
Types of prestressing, Advantages and limitations of Prestressing, systems, Numerical on losses in Prestress, IS1343 –2012 codal provisions. **Contemporary Issues related to Topic: Prestressing system in Bridges**		
	Total Lecture	**45 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

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

V SEMESTER
23CV1502__Geotechnical Engineering

Course Outcomes:
Upon successful completion of the course the students will be able to 1. Classify soil based on its index properties. 2. Identify Analyze and evaluate the engineering properties of soil. 3. Evaluate soil compaction & consolidation behavior under different conditions. 4. Compute and interpret vertical stresses and shear strength of soil for engineering applications.

Unit I:	**7 Hrs.**
Phases of Soil: Formation of soil, residual & transported soil, Role of Geotechnical engineer in construction industry, Soil as three-phase system. Various soil weight & volume inter–relationship.	
Unit II:	**8 Hrs.**
Properties & Classification of Soil: Water content, specific gravity, sieve analysis, particle size distribution curve, Density, Consistency of soil, Unified & I.S. classification system.	
Unit III:	**7 Hrs.**
Permeability and Seepage: Darcy's law & its validity, Discharge & seepage velocity, factors affecting Permeability, permeability tests, permeability of stratified soil, Seepage pressure, quicksand condition, flow nets.	
Unit IV:	**8 Hrs.**
Stress Distribution: Boussinesq's point load theory, uniformly loaded circular areas, Equivalent point load method, Newmark's charts.	
Unit V:	**8 Hrs.**
Compaction and Consolidation: 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.	
Unit VI:	**7 Hrs.**
Shear Strength: Introduction, Mohr-Coulomb's failure theory, Direct shear test, Triaxial test, Unconfined compression test, Vane shear test, and different drainage conditions.	
Total Lecture	**45 Hours**

Textbooks:	
1	Soil Mechanics & Foundations, Punmia B. C., Jain A.K., Jain A.K., 16th edition, Laxmi Publications, New Delhi, 2005.
2	Soil Mechanics & Foundation Engineering, 2009, Arora K.R., Standard Publisher Distributors
Reference Books:	
1	Principles and Practices of Soil Mechanics and Foundation Engineering, Murthy V.N.S., CRC Press, 2003.
2	Physical and Geotechnical Properties of Soils, Joseph E. Bowles, 2nd Revised edition (March 1984), McGraw-Hill College
3	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-HsF1A0&list=PLOzRYVm0a65dtbpo_DP7acjsLYdmWT99r&index=3

V SEMESTER
23CV1503__Lab : Geotechnical Engineering

Course Outcomes :

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

1. Evaluate index properties of soil by laboratory test for its classification.
2. Calculate the engineering properties of soil by laboratory testing
3. Evaluate soil compaction and consolidation behaviour under different conditions.
4. Compute vertical stresses and shear strength of soil for engineering

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
12	To find F.S.W. and D.F.S. of soil. Identification of swelling Soil.
13	To study the Consolidation characteristics of soil

V SEMESTER
23CV1504__Water Supply and Treatment

Course Outcomes :

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

1. Illustrate the importance of water supply schemes, distribution systems and forecast water demand for efficient system design.
2. Outline the important appurtenances for the water conveyance and distribution systems for effective water management.
3. Inspect water quality parameters and treatment processes for ensuring safe drinking water
4. Analyze important water distribution and storage parameters for efficient water supply management.

Unit:1	**Water Supply Scheme**	**8 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.

Unit:2	**Water Quality and Conveyance of Water**	**7 Hours**

Water quality: Physical, Chemical, and bacteriological characteristics and analysis of water, Standards of drinking water. Conveyance of water: Types of pipes, joints in pipes, valves and fittings, Intake structures: Location types – river, lake, canal reservoir.

Unit:3	**Water Treatment units**	**8 Hours**

Objective of water treatment, unit operations and processes, Flow sheet of conventional water treatment plant.

Design of Intake well and jackwell, Pump: Classification, working, merits, demerits & selection of pumps, Hydraulic design of rising mains. Aeration: Purpose, types of aerators, Design of cascade aerator.

Unit:4	**Water Treatment units**	**7 Hours**

Coagulation and Flocculation: Definition, Principles, types of coagulants and reactions, coagulant doses, types of mixing and flocculation devices Sedimentation: Principles, types of settling basins, inlet and outlet arrangements, Design of Clariflocculator.

Unit:5	**Water Treatment units**	**8Hours**

Filtration: Mechanism of filtration, types of filters, working, operational problems in filters.

Disinfection: Purpose, Mechanism, criteria for good disinfectant, types of disinfectants, chlorination.

Packaged water treatment units.

Unit :6	**Water Distribution**	**7 Hours**

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.

Total Lecture	**45 Hours**

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	CPHEEO Manual on Water Supply and Treatment Systems , Part A: Engineering - Planning, Design and Implementation Fourth Edition - Revised and Updated, Dec 2023
6	CPHEEO Manual on Water Supply and Treatment Systems , Part B: Operation and Maintenance Second Edition - Revised and Updated,Dec 2023
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

V SEMESTER
23CV1505__Lab : Water Quality Analysis

Course Outcomes :
Upon successful completion of the course, the students will be able to 1. Assess water quality based on standard parameters 2. Conduct experiments to analyze various water characteristics 3. Examine key water quality indicators 4. Compare water quality results with permissible standards .

PRACTICAL

Minimum of Ten practical from the list given below shall be performed.

SN	Name of Experiments
1	Determination of pH of water sample .
2	Determination of turbidity of water sample.
3	Determination of optimum coagulant dose by Jar test.
4	Determination of available chlorine in bleaching powder solution.
5	Determination of residual chlorine of water sample.
6	Determination of dissolved oxygen present in water sample.
7	Determination of Hardness of water sample.
8	Determination of acidity of water sample.
9	Determination of alkalinity of water sample
10	Determination of MPN index of water sample.
11	Determination of population density of bacteria by Standard Plate count test.
12	Determination of BOD for the wastewater sample.
13	Determination of COD for the wastewater sample.

V SEMESTER
23CV1506__Highway Engineering and Materials

Course Outcomes :		
Upon successful completion of the course the students will be able to 1. Explain the basic concepts of highway engineering and geometric design elements. 2. Examine characteristics and properties of highway construction materials. 3. Classify various types of pavements considering various design approaches. 4. Evaluate various types and requirements of tunneling.		
Unit:1	**Introduction to Transportation Engineering**	**7 Hours**
Introduction and importance of transportation, Road transport characteristics, Classification of roads, network patterns, Principles of alignment. Traffic Engineering: Introduction to traffic engineering, Various Traffic Surveys, Intersection-types, Parking		
Unit:2	**Geometric Design of Highway**	**8 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**	**8 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**	**7 Hours**
IRC, MORTH 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 Pavement Design**	**7 Hours**
Necessity of pavement design, Classification of pavement types, performance criteria, and Introduction to various pavement design approaches.		
Unit :6	**Introduction to Tunnel Engineering**	**8 Hours**
Alignment, surveys, cross section of highway & railway tunnels, tunneling methods in hard rock and soft grounds, tunnel lining, drainage, ventilation and lighting of tunnels, advances in tunneling techniques.		
	Total Lecture	**45 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, 2008
3	S. C. Saxena and S. P. Arora, A Text Book of Railway Engineering, 8th Edition, Dhanpat Rai Publications (P) Ltd, 2015
4	S.C. Saxena, Tunnel Engineering, Dhanpat Rai Publications (P) Ltd, 2012
Reference Books	
1	K. L. Bhanot Highway Engineering,3rd edition, S. Chand & Company (P) Ltd. New Delhi,1997
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://103.152.199.189/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/105105108
2	https://nptel.ac.in/courses/105105217
3	https://nptel.ac.in/courses/105108123

V SEMESTER
23CV1507____Lab : Highway Material Testing

Course Outcomes :
Upon successful completion of the course the students will be able to 1. Examine basic properties of aggregates and soil. 2. Evaluate the strength of aggregates using parameters. 3. Examine basic properties of bitumen and conduct speed and OD studies. 4. Determine temperature susceptibility of bitumen.

Sr. No.	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.
7	To perform water absorption test on given aggregate sample.
8	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	Speed studies
14	OD studies

V SEMESTER
23CV1508__Lab : Building Design Drawing

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

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
23CV1521_ PE-I : Numerical Methods and Computational Techniques

Course Outcomes:		
Upon successful completion of the course the students will be able to 1. Explain the basic elements underlying development and use of numerical methods in engineering applications. 2. Compute numerical solutions for various problems such as Roots of equations, Systems of linear simultaneous equations, Numerical Differentiation and integration, Eigen value problems, etc. 3. Analyze algorithms to solve problems using modern computational tools. 4. Evaluate the direct integration method and compare it with basic method.		
UNIT:1	**Solution of algebraic and transcendental equation:**	**08 Hrs**
Regula Falsi Method, Newton-Raphson method		
UNIT:2	**Solution of linear algebraic equations:**	**07 Hrs**
Gauss elimination, Cholesky method, Given's method, Householder's method.		
UNIT:3	**Eigenvalue problems**	**08 Hrs**
Direct, Jacobi, Rutishauser's LR method, and QR method.		
UNIT:4	**Initial & two-point boundary value problem**:	**07 Hrs**
Euler's, Runge-Kutta, Milne's Methods,		
UNIT:5	**Numerical Integration:**	**08 Hrs**
Trapezoidal Method, Simpson's Method, Gauss Quadrature		
UNIT:6	**Direct Integration Methods:**	**07 Hrs**
Central difference method, Houbolt method, Newmark's method, Wilson - θ method.		
Total Lecture		**45 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.
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://www.springer.com/series/15901
2	https://www.springer.com/series/15433
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

V SEMESTER
23CV1522__PE-I : Basics of Structural Fire Engineering

Course Outcomes :
Upon successful completion of the course the students will be able to
1. Explain fundamental concepts of fire science, combustion, and heat transfer in structural contexts.
2. Analyze the behavior of building materials and structural systems under fire conditions.
3. Evaluate passive and active fire protection systems for compliance with safety standards.
4. Propose fire safety strategies for Indian construction practices using codes and contemporary solutions

Unit:1	**Introduction to Fire Engineering**	**7 Hours**
Overview of fire science and behaviour, Historical perspective and regulatory framework, Fundamentals of combustion and heat transfer, understanding fire growth and spread Contemporary Issues related to Topic		
Unit:2	**Material Response to Fire**	**8 Hours**
Behaviour of common building materials in fire conditions, Fire resistance and testing methods, Contemporary Issues related to Topic		
Unit:3	**Structural Response to Fire**	**7 Hours**
Effects of fire on structural elements and systems, Analysis of structural behaviour during fire events Contemporary Issues related to Topic		
Unit:4	**Fire Protection Measures**	**8 Hours**
Passive fire protection systems (fire-rated materials, compartmentation), Active fire protection systems (sprinklers, alarms) Contemporary Issues related to Topic		
Unit:5	**Fire Codes and Standards**	**7 Hours**
Overview of relevant fire codes and standards, Regulatory requirements and compliance Contemporary Issues Related to Topic		
Unit :6	**Fire Safety Compliance and Implementation in India**	**8 Hours**
Overview of fire safety audits and compliance checks in Indian buildings, Challenges and opportunities for improving fire safety in Indian construction practices Contemporary Issues Related to Topic		
	Total Lecture	**45 Hours**

Text Books	
1	Fire Safety in Buildings: Principles and Practice, Colin S. Todd, Anthony K. P. Wong, John Wiley & Sons, 2020
2	Introduction to Fire Safety Management, Andrew Furness, Martin Muckett, Routledge, 2008
Reference Books	
1	Fire Engineering and Safety Management, Dr. K. Bhattacharya, CBS Publishers & Distributors, 2010
2	Fire Safety and Risk Management: A Holistic Approach, Dr. V. K. Jain, Ventus Publishing ApS,

	2015
YCCE e- library book links [ACCESSIBLE FROM COLLEGE CAMPUS]	
1	
MOOCs Links and additional reading, learning, video material	
1	

V SEMESTER
23CV1523__PE-I : Environmental Management

Course Outcomes :

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

1. Relate the relationship between development and the environment, and classify environmental impacts while analyzing strategies for sustainable development.
2. Apply Environmental Impact Assessment (EIA) methodologies, and develop Environmental Management Plans (EMPs) in line with legal and procedural requirements
3. Analyze the role of environmental management tools in ensuring compliance and fostering sustainable practices.
4. Analyze resource depletion issues and categorize strategies for optimal resource utilization and conservation.

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

Unit:2	**Environmental Impact Assessment**	**8 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

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

Unit:4	**Environmental Legislation**	**8 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**,** amendments in the regulations and guidelines**.**

Unit:5	**Environmental Audit**	**7 Hours**

Environmental Audit- Concept of EA, procedural aspects of conducting environmental audit, EMS. ISO 14001,
Introduction to life cycle assessment.

Unit :6	**Resources Management**	**8 Hours**

Depletion of resources – causes & effects, resource utilization, optimal use of resources. **Contemporary Issues related to Topic**

	Total Lecture	**45 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
23CV1524__PE-I : 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. **Outline** the use of Remote Sensing and GIS in various Civil Engineering applications.		
Unit:1	**Basics of Remote Sensing**	**8 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	**8 Hours**
Basics of DIP, Image Rectification and Registration, Image Enhancement, Image Classification. Remote Sensing Data Formats**.**		
Unit:5	**GIS and GPS**	**7 Hours**
Introduction to Geographical Information System, Introduction to Global Positioning System (GPS)		
Unit :6	**Remote Sensing and GIS Applications**	**8 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	**45 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

V SEMESTER
23CV1525__PE-I : Modern and Innovative Construction Materials

Course Outcomes:		
Upon successful completion of the course the students will be able to **1**: Understand and Explain Special Concrete & Supplementary Materials **2**: Analyze and Compare the Properties of Metals and Composites. **3**: Apply Construction Chemicals for Performance Enhancement **4:** Assess Smart, Intelligent, and Sustainable Materials for Future Construction.		
Unit:1	**SPECIAL CONCRETE & SUPPEMENTRY MATERIALS**	**08Hours**
SCC, HSC,HPC, Light Weight Concrete, High density concrete , Anti washout Under water Concrete, Concreting under water, Rheology, SCC Shot Crete, FRC using Polymers in concrete. Supplementary cementitious materials, substitutes of fine & coarse aggregates in concrete.		
Unit:2	**METALS**	**07 Hours**
Steels HYSD, TMT, Tendons, Light Gauge Steel, Steel Fastenings, New Alloy Steels – Aluminum and Its Products, Protective Coatings to Reinforcement.		
Unit:3	**COMPOSITES & Insulation Materials**	**8 Hours**
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**	**07 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**	**07 Hours**
Segregation of Materials and material recovery. 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**	**08Hours**
Waste to Energy , Introduction to Sustainability in Materials, Environmental Impact of Conventional Materials, Classification of Sustainable Materials as : 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. Innovative Materials in Construction and Industry . Performance Evaluation and Life Cycle Assessment . **Contemporary issues related to Waste Management and Material Lifecycle.**		
	Total Lecture	**45 Hours**

Text book	
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": 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
8	P.K. Mehta and P.J.M. Monteiro – *Concrete: Microstructure, Properties and Materials*, McGraw-Hill
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

V SEMESTER
23CV1526__PE-I : Air Pollution and Solid Waste Management

Course Outcomes :		
Upon successful completion of the course the students will be able to 1. Explain the basic concepts and key facts related to outdoor air pollution and noise pollution. 2. Illustrate the principles of pollution control methods and equipment. 3. Explain the fundamentals of solid waste management. 4. Discuss the equipments, various treatments, and disposal methods for solid waste.		
Unit:1	**Introduction to air pollution**	**8 Hours**
Introduction, Air pollution episodes, Atmosphere and its zones, classification and sources of air pollutants, effects of air pollutants on man, plants animal & materials.		
Unit:2	**Meteorological Aspects**	**7 Hours**
Atmospheric stability, plume behaviour**,** Ambient air sampling and stack sampling, collection of particulates and gaseous pollutants.		
Unit:3	**Air pollution control methods and equipment**	**8 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.		
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**	**7 Hours**
Equipment used for collection and transportation, transfer stations, solid waste processing and management.		
Unit :6	**Treatment for solid waste**	**8 Hours**
Treatment and disposal methods: composting, sanitary landfills, Incineration – concept, components and applications, leachate management.**Contemporary Issues related to Topic**		
	Total Lecture	**45 Hours**

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
23CV1527__PE-I : Elements of Water Power Engineering

Course Outcomes:		
Upon successful completion of the course the students will be able to 1. Interpret the fundamentals of hydropower and hydropower potential. 2. Explain components of intake structure and surge tank. 3. Determine the flow parameters of turbines. 4. Apply the principles of pump storage plants to analyze their economic feasibility.		
Unit:1	**Sources of energy**	**8 Hours**
Introduction: Sources of energy, types of power station, choice of type of generation, components of waterpower 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.		
Unit:2	**Power potential**	**7Hours**
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.		
Unit:3	**Intake structures**	**7 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.		
Unit:4	**Surge Tank**	**7 Hours**
Simple surge tank, Functions and behavior of the surge tanks, location, types of surge tanks, fore-bay.		
Unit:5	**Turbines**	**8 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.		
Unit :6	**Pumped storage plants**	**8 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.		
	Total Lecture	**45 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

V Semester
23CV1528__PE-I : Building Services

COURSE OUTCOME
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	**[07 Hrs.]**
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	**[08 Hrs.]**
Basic terminology and definitions, Physics of sound. Behaviour of sound in an enclosed space, Noise and its control.	
UNIT–3 Electrical Installations	**[08 Hrs.]**
Different types of wiring need of Earthing, comparison between fuse and MCB, substation, types of lightening fixtures, Building protection against lightening.	
UNIT–4 : Mechanical Services	**[07 Hrs.]**
Air Conditioning: Requirement of air conditioning, air conditioning system, Pressure Enthalpy (heat) Diagram of vapor compression cycle, refrigeration effect, Thermodynamics of human body. Psychometric chart.	
UNIT–5 : Plumbing Services	**[07 Hrs.]**
Introduction to Plumbing, Types of Plumbing Systems, Materials Used in Plumbing, Maintenance and Troubleshooting, Safety in Plumbing Work, Emerging Trends in Plumbing	
UNIT–6 : Fire Protection	**[08 Hrs.]**
Causes of fire in building, Fire classification, Portable extinguishers, fire escapes, Fire detectors and alarm system	
Total Lecture	**45 Hours**

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	
MOOCs Links and additional reading, learning, video material	
1	

V SEMESTER
23CV1529__PE-I : Construction Management and Machinery

Course Outcomes :

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

1. Illustrate the scope and role of civil engineer in developing economy of Nation and construction industry.
2. Development of network technique of major projects, material and equipment and its safety management.
3. Develop knowledge about quality and finance management system carried out in industry.
4. Classify various major construction equipment used in construction and economics of demand and supply.

Unit:1	**Construction Industry and Management**	**8 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**	**8 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**	**8 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**	**7 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	**45 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	

V Semester
23OE3519__OE-III Indian Taxation System

Course Outcomes :	
Upon successful completion of the course the students will be able to 1. Understand the Evolution and Framework of Indian Taxation 2. Evaluate Direct and Indirect Taxation Mechanisms 3. Explore the Socio-Economic Impact of Tax Policies 4. Investigate Tax Evasion and Compliance Issues	
Unit I: Basics of Taxation and Residential Status	**(8 Hrs.)**
Introduction to Tax Calculations - Key Definitions: Assessee, Assessment Year, Previous Year. - Tax Slabs and Rates for Individuals, HUF, and Corporates. Residential Status and Tax Incidence - Determining Residential Status of Individuals and Companies. - Impact on Global Income Taxability. Computation of Gross Total Income (GTI) - Overview of Taxable and Exempted Incomes.	
Unit II: Computation of Income under Different Heads	**(7 Hrs.)**
Income from Salary - Allowances, Perquisites, and Exemptions. - Gratuity and Pension Calculations. Income from House Property - Annual Value Computation. - Deductions for Self-Occupied and Let-Out Properties. Profits and Gains of Business or Profession - Depreciation, Allowable Expenses, and Disallowances.	
Unit III: Tax on Capital Gains and Other Sources	**(8 Hrs.)**
Capital Gains - Short-Term and Long-Term Capital Gains. - Indexation of Cost of Acquisition and Improvement. Income from Other Sources - Interest on Securities, Dividends, and Gifts. - Deductions and Taxable Amounts.	
Unit IV: Goods and Services Tax (GST)	**(7 Hrs.)**
Basics of GST Calculations - CGST, SGST, IGST. - GST Slabs for Different Goods and Services. Input Tax Credit (ITC) - Eligibility and Utilization of ITC. GST Returns and Penalties - GST Payment and Filing Procedures.	
Unit V: Tax Deducted at Source (TDS) and Advance Tax	**(8 Hrs.)**
TDS Overview - Rates and Applicability for Different Payments. - Filing TDS Returns. Advance Tax Calculations - Applicability for Individuals and Corporates. - Interest on Non-Payment or Delayed Payment.	
Unit VI: Tax Planning and Assessment Procedures	**(7 Hrs.)**
Tax Planning and Savings - Tax-Advantaged Investments (Section 80C, 80D, 80G). - Strategies for Reducing Tax Liability. Assessments and Penalties - Scrutiny Assessments and Appeals. - Interest and Penalties under Sections 234A, 234B, 234C.	
Total Lecture	**45 Hours**

Text Books	
1	M. M. Sury, Tax System in India: Evolution and Present Structure: Evolution & Present Structure, New century Publication New Delhi, 2025
2	M.C. Purohit, Handbook of Tax System In India, Oxford University Press, 2014
3	S.Ramamurthy, Introduction to Taxation, Company Law Institute,2023
Reference Books	
1.	A.R. Lakshmanan, Taxation Laws, 2015
2.	R.S. Adukia, Handbook on Indian Accounting Standards, 2017
3.	S. Rajaratnam,Tax Planning-Issues, Ideas, Innovations,2015
4.	S. Datta, A Treatise on Taxation of Real Estate Cases,2016
YCCE e- library book links [ACCESSIBLE FROM COLLEGE CAMPUS]	
MOOCs Links and additional reading, learning, video material	
1	https://www.hciseychelles.gov.in/taxation-system-in-india.php
2	https://www.eoiparis.gov.in/content/A-Key-Pillar-of-Nation-Building.pdf
3	https://www.nipfp.org.in/media/medialibrary/2014/10/OVERVIEW_OF_TAX_SYSTEMS_IN_INDIAN_STATES.pdf
4	https://onlinecourses.swayam2.ac.in/cec23_cm03/preview

V SEMESTER
23OE3520__OE-III : Elements of Share Trading

Course Outcomes :	
Upon successful completion of the course the students will be able to: 1. Develop a basic understanding of how the stock market works 2. Make informed decisions about investing small amounts of money 3. Identify fundamental chart patterns to start analyzing market behavior 4. Interpret simple market patterns and trends	
Unit I: Introduction to Share Market	**(8 Hrs.)**
Savings and Investment, Types of Investments, Share: Concept and types, Participants in the Share Market, SEBI- Powers and functions, Capital Market: Primary Market, Secondary Market, Stock exchanges in India, Index: Sensex, Nifty and Sectors Indices, How the Indian Stock Market Works.	
Unit II: Components In Share Market	**(7 Hrs.)**
Demat Account Opening- requirement, Types of Brokers, Stock Market Important Terminologies: Bonus, share, stock split, Dividend, Market Trends, Correction, Crash, Types of Trading, Types of Order, Diversification (Building Ideal Portfolio), Factors affecting the stock market	
Unit III: Basics of Technical Analysis	**(8 Hrs.)**
Types of Charts, Candle formation, Types of Candles, Types of Candlestick Pattern- Single and Double Candlestick Pattern, Chart Patterns- Reversal pattern and Continuation Pattern, Technical Indicators- Moving averages, MACD, RSI	
Unit IV: Equity Market	**(7 Hrs.)**
Risk and Return, Stock valuation, Fundamental Analysis: Economic analysis, Industry analysis and Company analysis. Financial Statement Analysis: shareholder's equity- balance sheet and Income statement –cash flow – analysis of growth and sustainable earnings, Financial and Valuation Modeling: price earnings ratio	
Unit V: Derivatives	**(8 Hrs.)**
Derivatives Markets - Derivatives: Meaning, History & functions of derivatives market, participants in Derivative market, Legal framework of derivatives market in India with respect to equity, Currency, Futures contract.	
Unit VI: Options	**(7 Hrs.)**
Call & put options, In-the-money, At-the-money, Out-of-the money, Option valuation - Intrinsic and time values - Determinants of Option values, The Greeks, Index options, futures options, breakeven calculation, open interest NSE, OI change, call writer put writer data using OI.	
Total Lecture	**45 Hours**

Text books:	
1.	Making Money by Selling Options — Simplified, Ashish Sing, First Edition, September 2022, Vision Books Pvt. Ltd
2.	Futures & Options Blueprint - Beginner's Everything Guide to Futures and Options, 28 February 2023 Zebralearn Pvt Ltd.

3.	The Complete Guide to Option Selling: How Selling Options Can Lead to Stellar Returns in Bull and Bear Markets, Edition 3, 16 November 2014, McGraw Hill.
Reference Books:	
1.	"The Intelligent Investor" by Benjamin Graham
2.	"Common Stocks and Uncommon Profits" by Philip Fisher
3.	"A Random Walk Down Wall Street" by Burton G. Malkiel
4.	"The Art of Options Trading" by Michael C. Khouw and Mark W. Vance
YCCE e- library book links [ACCESSIBLE FROM COLLEGE CAMPUS]	
MOOCs Links and additional reading, learning, video material	
1	https://www.youtube.com/watch?v=3BOE1A8HXeE
2	https://www.youtube.com/watch?v=RFP3ooXIiyI
3	https://www.youtube.com/watch?v=8rIviI0ZKNA
4	http://www.youtube.com/watch?v=S7TL8k5nd8o&list=PLxNHpNhDaEFLVdIqUuQ97764TCbwEDsWT

V SEMESTER
23CV1509__Internship and Industrial Visit

Course Outcomes:

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

1. To demonstrate internship project and Manage and handle the practical situations on site.
2. To summarize a detailed project report (DPR).
3. To develop Civil Engineering Drawings using AUTOCAD, MAP 3D etc.
4. To apply the theoretical knowledge in practical applications and *compare* theoretical knowledge with practical situation.

Students would be required to undergo internship in a reputed industry or organization for at least 1 month after IV 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.

V SEMESTER
MDM3CV103__Sustainable Environmental Technology

Course Outcomes :

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

1. Explain sustainable technologies for environmental protection and resource conservation.
2. Recommend integrated engineering solutions for water, air, soil, and waste management.
3. Explain green infrastructure and renewable technologies aligned with sustainability goals.
4. Adapt lifecycle approaches and eco-design in engineering projects.

Unit:1	Introduction to Sustainability and Environmental Technology	8 Hours

Concept of sustainability and sustainable development, Role of engineering in sustainable development, Overview of environmental technologies and their evolution, UN Sustainable Development Goals (SDGs) and their relevance to engineering, Environmental impact assessment and life cycle assessment (LCA)

Unit:2	Sustainable Water and Wastewater Management	7 Hours

Water footprint and water-energy nexus, Sustainable urban drainage systems (SUDS), Green and decentralized wastewater treatment (e.g., constructed wetlands, root zone treatment), Low-cost and eco-friendly water purification technologies, Rainwater harvesting and aquifer recharge techniques, Smart water grids and leak detection systems

Unit:3	Sustainable Solid and Hazardous Waste Management	7 Hours

Waste hierarchy: reduce, reuse, recycle (3Rs), Composting, anaerobic digestion, and waste-to-energy systems, Sustainable landfill design and leachate control, E-waste, biomedical waste, and plastic waste management technologies, Resource recovery from waste (urban mining), Circular economy principles in waste management

Unit:4	Sustainable Energy and Air Pollution Control Technologies	8 Hours

Overview of renewable energy sources in urban settings, Solar PV, solar thermal, and building-integrated systems, Bioenergy, small wind turbines, and hybrid systems, Indoor air quality and passive ventilation, Green technologies for air pollution mitigation (scrubbers, filters, electrostatic precipitators), Low-emission building materials and construction practices

Unit:5	Green Infrastructure and Urban Environmental Systems	7 Hours

Urban green spaces, green roofs, and vertical gardens, Sustainable transport and non-motorized mobility, Green building certification systems (LEED, GRIHA, IGBC), Eco-cities and climate-resilient infrastructure, Role of GIS and remote sensing in environmental monitoring, Nature-based solutions for urban environmental challenges

Unit :6	Environmental Policy, Regulation, and Innovation	8 Hours

National Environmental Policy (India) and EIA notification, Environmental legislations and standards (Air, Water, Waste Acts), Climate action policies (National Action Plan on Climate Change – NAPCC), Environmental audits and ISO 14001, Green innovation and entrepreneurship, Case studies of successful sustainable technology interventions in India and abroad

	Total Lecture	45 Hours

Text Books	
1	Nicholas A. Ashford and Ralph P. Hall, Technology, Globalization, and Sustainable Development, Yale University Press, 1st edition.
2	Suresh T. Nesaratnam and Roger Perry, Sustainable Development: Science, Ethics and Public Policy, Springer, 1st edition.
3	G. Tchobanoglous and H. Theisen, Integrated Solid Waste Management: Engineering Principles and Management Issues, McGraw-Hill, 1st edition.
4	Metcalf & Eddy, Wastewater Engineering: Treatment and Resource Recovery, McGraw-Hill, 5th edition.
5	Kibert, Charles J., Sustainable Construction: Green Building Design and Delivery, Wiley, 4th edition.
6	MNRE, Renewable Energy in India: Status and Policies, Government of India publications.
7	MoEF&CC, Environmental Impact Assessment Guidelines, Government of India.
Reference Books	
YCCE e- library book links [ACCESSIBLE FROM COLLEGE CAMPUS]	
MOOCs Links and additional reading, learning, video material	

V SEMESTER
MDM3CV203__Intelligent Transport System

COURSE OUTCOMES	
The students will be able to 1. Explain the necessity of ITS & ATIS. 2. Explain about Advanced Transportation Management System & new technology 3. Illustrate regional architecture, integration of infrastructure and operational planning 4. Summarizes about ITS issues in terms of various factors and emerging issues.	
UNIT–1	**[06 Hrs.]**
Introduction to ITS, including where ITS fits; roles and responsibilities Advanced Traveller Information Systems (ATIS), including functionality; Smart Route Systems	
UNIT–2	**[07 Hrs.]**
Advanced Transportation Management Systems (ATMS), including network operations; incident detection; congestion pricing, tolling.	
UNIT–3 .	**[07 Hrs.]**
Fleet-oriented ITS services, including Advanced Public Transportation Systems (APTS); BRT; Commercial Vehicle Operation s (CVO); Intermodal Freight, including International Operations and Supply Chains	
UNIT–4	**[06 Hrs.]**
ITS and Technology, including automated highway systems (AHS); sensors, electronic toll collection (ETC); dedicated short range communication and standards	
UNIT–5	**[06 Hrs.]**
Regionally-scaled ITS deployment, including regional architecture; organizational and institutional issues; standards; ITS and strategic regional transportation planning; Integrating infrastructure and operations planning.	
UNIT–6	**[07 Hrs.]**
Critical ITS Issues, ITS and security; safety; human factors; privacy; sustainability; the future of ITS; applications in bus transport, metro and highways; Emerging Issues.	
Total Lecture	**45 Hours**

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, 1988
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://103.152.199.189/YCCE/Suported%20file/Supprted%20file/e-copies%20of%20books/Civil%20Engineering/58.%20Principles%20of%20Highway%20Engineering%20and%20Traffic%20Analysis%20(%20PDFDrive%20).pdf
2	http://103.152.199.189/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/10.1008/988-1-349-10800-8
4	https://onlinelibrary.wiley.com/doi/10.1002/9881119184838.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/128/105/128105008/

V SEMESTER
Mandatory Learning Course (Audit Course)
MLC2125 : YCAP5

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 3.6)

Hingna Road, Wanadongri, Nagpur - 441 110

Bachelor of Technology

SoE & Syllabus 2023

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)

B.TECH SCHEME OF EXAMINATION 2023

(Scheme of Examination w.e.f. 2023-24 onward)

(Department of Civil Engineering)

B. Tech. in Civil Engineering

SoE No. 23CV-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	
SIXTH SEMESTER															
1	6	PC	CV	23CV1601	Estimating and Costing	T	2	0	0	3	2	30	20	50	3
2	6	PC	CV	23CV1602	**Lab :** Estimating and Costing	P	0	0	2	2	1		60	40	
3	6	PC	CV	23CV1603	Hydraulic Engineering	T	3	0	0	3	3	30	20	50	3
4	6	PC	CV	23CV1604	**Lab :** Hydraulic Engineering	P	0	0	2	2	1		60	40	
5	6	PC	CV	23CV1605	Steel Design	T	3	0	0	3	3	30	20	50	3
6	6	PC	CV	23CV1606	Design Thinking and Research Methodology	T	2	0	0	2	2	30	20	50	3
7	6	PE	CV		**Professional Elective-II**	T	2	0	0	2	2	30	20	50	3
8	6	PE	CV		**Professional Elective-III**	T	2	0	0	2	2	30	20	50	3
9	6	PE	CV		**Lab :** Professional Elective-III	P	0	0	2	2	1		60	40	
10	6	MDM	CV		**MD Minor Course-IV**	T	3	0	0	3	3	30	20	50	3
11	6	**VSEC-4**	CV	23CV1607	**Lab :** Digital Mapping	P	0	0	2	4	2		60	40	
12	6	STR	CV	23CV1608	Project Phase-I	P	0	0	4	4	2		60	40	
						TOTAL	**17**	**0**	**12**	**32**	**24**				

List of Mandatory Learning Course (MLC)															
1	6	HS		MLC126	**YCAP6 :**	**A**	3	0	0	3	**0**				

Professional Elective - II					
1	6	PE-II	CV	23CV1621	**PE-II :** Earthquake Engineering
2	6	PE-II	CV	23CV1622	**PE-II :** Prestressed Concrete
3	6	PE-II	CV	23CV1623	**PE-II** : Disaster Management
4	6	PE-II	CV	23CV1624	**PE-II :** Energy Conversion and Management
5	6	PE-II	CV	23CV1625	**PE-II :** Watershed Management
6	6	PE-II	CV	23CV1626	**PE-II :** Urban Transportation Planning

Professional Elective - III					
1	6	PE-III	CV	23CV1641	**PE-III :** Advanced RCC
2	6	PE-III	CV	23CV1642	**PE-III : Lab :** Advanced RCC
3	6	PE-III	CV	23CV1643	**PE-III :** Computer Applications in Civil Engineering
4	6	PE-III	CV	23CV1644	**PE-III : Lab :** Computer Applications in Civil Engineering
5	6	PE-III	CV	23CV1645	**PE-III :** Water Transmission and Distribution Systems
6	6	PE-III	CV	23CV1646	**PE-III : Lab :** Water Transmission and Distribution Systems
7	6	PE-III	CV	23CV1647	**PE-III :** Geotechnical Investigation and Improvement
8	6	PE-III	CV	23CV1648	**PE-III : Lab :** Geotechnical Investigation and Improvement
9	6	PE-III	CV	23CV1649	**PE-III :** Advanced Water Treatment
10	6	PE-III	CV	23CV1650	**PE-III : Lab :** Advanced Water Treatment
11	6	PE-III	CV	23CV1651	**PE-III :** Traffic Engineering
12	6	PE-III	CV	23CV1652	**PE-III : Lab :** Traffic Engineering

		July, 2023	**1.00**	**Applicable for AY 2023-24 Onwards**
Chairperson	**Dean (Acad. Matters)**	**Date of Release**	**Version**	

VI SEMESTER
23CV1601__Estimating and Costing

Course Outcomes:

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

1. Analyze various estimation methods, cost components, and project development frameworks to optimize resource allocation in civil engineering projects.
2. Evaluate the impact of specifications, cost buildup techniques, and GST on estimation accuracy and financial planning in construction projects.
3. Develop comprehensive cost estimates, including earthwork calculations, material quantity assessments, and valuation methods for various civil structures.
4. Formulate effective contract strategies, tendering processes, and regulatory compliance measures (including RERA) to enhance project execution and cost efficiency.

Unit:1 **08 Hours**

General: 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**.**

Specifications & Rate Analysis:

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

Rate Analysis: 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.

Concept of GST on Construction Services and Materials: Introduction to GST in Construction Sector, GST Applicability on Construction Services, GST on Construction Materials. GST Impact on Estimation and Costing.

Unit:2 **08 Hours**

Estimate of Various Structures: 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:3 **7 Hours**

Earthwork of Roads, Hill Roads & canals : 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:4 **07 Hours**

Valuation : 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.

Tenders and Contracts: 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. **Introduction to RERA** (Real Estate Regulatory Authority); RERA Act, 2016 – Overview and Importance, Impact of RERA on Estimation and Costing. **Contemporary Issues related to** E-Tendering and Digital BOQ Preparation / Ethical and Legal Aspects in Estimating and Tendering

Total Lecture	**30 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	https://www.youtube.com/watch?v=maVrNLYp7nw
2	https://youtu.be/r0aDjTLxy5cbuilding
3	https://www.youtube.com/watch?v=ocZu5wjh-88
4	https://youtu.be/maVrNLYp7nw?si=5fVUrEkuIGAxRtdm

VI SEMESTER
23CV1602__ Lab : Estimating and Costing

Course Outcomes:
Upon successful completion of the course the students will be able to CO 1 : **Interpret** IS-1200 standards, detailed specifications, and rate analysis to ensure accuracy in quantity estimation and cost assessment of construction projects. CO 2 : **Prepare** comprehensive detailed estimates for various structures, including load-bearing buildings, RCC frame structures, and earthwork for road projects, using industry-standard methods. CO 3 : **Develop** essential contract documents, including tender documents, conditions of contracts, and GST/RERA case studies, to enhance legal and financial compliance in construction projects. CO 4 : **Demonstrate** proficiency in modern estimation practices through expert lectures and practical case studies on e-tendering, valuation, and quantity surveying, integrating real-world applications.

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	Case Studies on GST Implementation in Construction Projects / Case studies on RERA implementation in real estate projects
10	Expert Lecture on Tender Filing / Role of Quantity Surveyor/ Valuer/ and Report submission.

VI SEMESTER
23CV1603__Hydraulic Engineering

Course Outcomes:

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

1. **Classify** various pipe systems and **Find** discharge through pipes in different conditions.
2. **Analyze** the dimensional homogeneity of fundamental and derived physical quantities.
3. **Determine** out flow through open channel using various flow measuring devices and **Examine** uniform flow conditions for most efficient sections
4. **Explain** and **determine** various parameters of rapidly varied flow.

Unit :1	**Flow Through Pipes-I**	**8 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.		
Unit:2	**Flow Through Pipes-II**	**7 Hours**
Flow Through Pipes: Syphon, Branched pipes, Three reservoir, pipe networks, Hardy – Cross method, Water hammer phenomenon.		
Unit:3	**Dimensional Analysis**	**7 Hours**
Introduction, fundamental quantity, derived quantity, dimensions, dimensional homogeneity, methods of dimensional analysis, repeated variable, Buckingham pi method.		
Unit:4	**Notches and weirs**	**8 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.		
Unit:5	**Uniform flow in Open Channel**	**7 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.		
Unit :6	**Critical Flow and Rapidly Varied Flow**	**8 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.		
	Total Lecture	**45 Hours**

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.

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.%20 RAJPUT.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
23CV1604__ Lab : Hydraulic Engineering

Course Outcomes:

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

1. *Determine* coefficients of major and minor losses in pipes.
2. *Evaluate* velocity of flow in open channel using current meter.
3. *Analyze* pipe network using Hardy Cross Method and *estimate* flow in pipes.
4. *Judge* the performance of open channel by finding Manning's and Chezy's Constants, specific energy, critical depth, Hydraulic Jump, behavior under horizontal contraction and flow profiles.

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
23CV1605__Steel Design

Course Outcomes :		
Upon successful completion of the course the students will be able to 1. Identify type of section, material, connection and its design methodology. 2. Apply IS code provisions for the design of steel structure components. 3. Analyze bolted and welded connections, tension, compression & flexural members 4. Design connections, simple sections and column bases.		
UNIT:1	**Steel as a Structural Material**	**08 Hrs**
Physical and mechanical properties of Structural Steel, Merits and Demerits of Steel as a Structural Material, Grades of Structural Steel, Structural Steel Sections, IS 800:2007, Introduction to Limit State Method.		
UNIT:2	**Connection:**	**07 Hrs**
Types and Failure of Connections, Riveted Connection, Bolted Connection, Welded Connection, Strength and Efficiency of Joint.		
UNIT:3	**Tension Member:**	**08 Hrs**
Types of Tension Member, Stresses, Design of Tension Member.		
UNIT:4	**Compression Member:**	**07 Hrs**
Effective length, Slenderness ratio, Design of Compression Member Design of Axially loaded columns		
UNIT:5	**Design of Beam:**	**07 Hrs**
Types of Beams, Lateral Stability of beams, Types of section, Stresses on Beam, Design of Laterally Supported Beam, Design of Laterally Unsupported Beam		
UNIT:6	**Design of Column Base:**	**08 Hrs**
Types of Column Base, Design of column base, Introduction to Pre-Engineered Building (PEB).		
Total Lecture		**45 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://www.udemy.com/course/design-of-steel-structures-as-per-is-800/
3	https://www.youtube.com/watch?v=Ch2vAzvXbKI

VI SEMESTER
23CV1606__Design Thinking and Research Methodology

Course Outcomes:
Upon successful completion of the course the students will be able to 1. Explain the principles and approach of design thinking and its application in creative problem-solving. 2. Apply various processes and methods to generate and develop innovative design ideas. 3. Analyse creative and innovative thinking techniques to address complex design challenges. 4. Demonstrate creative problem-solving and design development through practical projects and teamwork.

Unit I:	**7 Hrs.**
Stages of Design Thinking Process, Traditional Designs, Fundamental Principles of Design Thinking, Sample Design Projects, Study of Design, Structure of Design, Innovative Design, Breaking Pattern of Design, Reframing of Designs, Principles of Creativity, Empathy, Insight-leaving, Basis for Design Thinking, Design Thinking Framework.	
Unit II:	**8 Hrs.**
Defining and formulating the problem, selecting the problem, necessity of defining the problem, importance of literature review in defining a problem, literature review-primary and secondary sources, reviews, monograph, patents, research databases, web as a source, searching the web, critical literature review, identifying gap areas from literature and research database, development of working hypothesis. Basics of project, concept note, problem solving techniques, research tools.	
Unit III:	**7 Hrs.**
Ethics-ethical issues, ethical committees (human & animal); IPR- intellectual property rights and patent law, commercialization, copy right, royalty, trade related aspects of intellectual property rights (TRIPS); scholarly publishing- IMRAD concept and design of research paper, citation and acknowledgement, plagiarism, reproducibility and accountability.	
Unit IV:	**8 Hrs.**
Opportunities & statutory requirements – information of Government Regulations – Gomasta, Company formation – types, Startups, entrepreneurial decision process, business opportunities, preparing business plan & feasibility, financing. (Inputs from CA may also be incorporated)	
	Total Lecture **30 Hours**

Textbooks:	
1	H. S. Fogler and S. E. LeBlanc, Strategies for Creative Problem Solving, 2nd edition, Pearson, Upper Saddle River, NJ, 2008.
2	Garg, B.L., Karadia, R., Agarwal, F. and Agarwal, U.K., 2002. An introduction to Research Methodology, RBSA Publishers.
3	Levine, Effective Problem Solving, 2nd edition, Prentice Hall, Upper Saddle River, NJ,1994
Reference Books:	
1	Activities for Teaching creativity and Problem Solving - By Arthur B Vangundy - Pfeiffer

2	Whimbey and J. Lochhead, Problem Solving & Comprehension, 6th edition, Lawrence Erlbaum, Mahwah, NJ, 1999.
3	Kothari, C.R., 1990. Research Methodology: Methods and Techniques. New Age International.
4	Sinha, S.C. and Dhiman, A.K., 2002. Research Methodology, Ess Ess Publications. 2 volumes.
5	Trochim, W.M.K., 2005. Research Methods: the concise knowledge base, Atomic Dog Publishing.
6	Wadehra, B.L. 2000. Law relating to patents, trademarks, copyright designs and geographical indications. Universal Law Publishing
7	Yousef Haik and Tamer M.Shahin, "Engineering Design Process", Cengage Learning, Second Edition, 2011.
8	Jeanne Liedtka (Author), Andrew King (Author), Kevin Bennett , "Solving Problems with Design Thinking - Ten Stories of What Works" (Columbia Business School Publishing) Hardcover 2013
9	H. S. Fogler and S.E. LeBlanc, Strategies for Creative Problem Solving, Prentice Hall
10	E. Lumsdaine and M. Lumsdaine, Creative Problem Solving, McGraw Hill
11	J. Goldenberg and D. Mazursky, Creativity in product innovation. Cambridge University Press, 2002.
YCCE e- library book links [ACCESSIBLE FROM COLLEGE CAMPUS]	
1	https://drive.google.com/file/d/1O34NfmtQHJgRBGXuXn4cvwDsqVvpV76X/view
MOOCs Links and additional reading, learning, video material	
1	www.nptelvideos.in
2	www.coursera.com
3	www.udemy.com
4	swayam.gov.in

VI SEMESTER
23CV1621__ PE-II : Earthquake Engineering

Course Outcomes:		
Upon successful completion of the course the students will be able to 1. Explain the fundamental concepts of seismology, earthquake generation, and quantification of seismic events. 2. Apply standard methods of earthquake load analysis on structures using IS 1893-2016 guidelines. 3. Analyze the behavior of structures during earthquakes, considering effects of inertia forces, torsion, irregularities, and soil liquefaction. 4. Design earthquake-resistant RCC structural elements with appropriate ductile detailing as per IS 13920-2016.		
Unit:1	**Basics of Seismology**	**7 Hours**
Origin of earthquakes, Engineering geology, Seismicity of the world, Faults, Propagation of earthquake waves. Quantification of earthquake (magnitude, energy, intensity of earthquake), Determination of magnitude, Epicentral distance, focal depth, etc.		
Unit:2	**Behavior of Structures During Earthquake**	**7 Hours**
Inertia forces and dynamic response of structures, Effects of structural irregularities: Torsional effects, soft storey behavior, Floating columns, Soil-structure interaction and Soil Liquefaction		
Unit:3	**Earthquake Load Analysis on Structures**	**8 Hours**
Introduction to Earthquake Load Analysis, Seismic Coefficient Method (Linear Static Method) as per IS 1893-2016, Basic example calculations.		
Unit:4	**Ductility Design on Structures as per Indian Standards**	**8 Hours**
Concept and philosophy of Earthquake Resistant Design, Ductility requirements in RCC structures, Design and detailing of beams and columns as per IS 13920-2016, Virtues of earthquake-resistant structures (strength, stiffness, ductility, redundancy)		
	Total Lecture Hours	**30 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
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 PracticeIS 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
23CV1622_PE-II: Prestressed Concrete

Course Outcomes:

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

1. Explain the principles of prestressed concrete, including types, materials, prestressing systems, losses, and codal provisions.
2. Analyze the basic structural members in prestressed concrete, including resultant stresses, load balancing, cracking moment, kern point, pressure line, and shear resistance.
3. Examine deflections and prestress transmission in structural members, applying codal provisions for safety and performance.
4. Design prestressed concrete sections for axial tension, flexure, and shear.

Unit:1	**Introduction to prestressed concrete**	**7 Hours**
Types of prestressing, advantages and limitations of Prestressing, systems and devices. Materials: High-strength concrete and prestressing steel, UHPFRC, HPFRCC, CFRP Losses in prestress, IS1343 –2012 codal provisions.		
Unit:2	**Analysis and Design of Member**	**8 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**	**8 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.		
	Total Lecture	**30 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
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
23CV1623_PE-II : Disaster Management

Course Outcomes:

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

1. Identify and explain various types of natural and man-made disasters, their causes, impacts, and geographical distribution.
2. Apply knowledge of risk and cost assessment methods to evaluate the vulnerability of communities and infrastructure in disaster-prone areas.
3. Analyze the role of technology, particularly Geographic Information Systems (GIS), and communication tools in disaster preparedness and early warning systems.
4. Evaluate disaster response and rehabilitation strategies and propose effective, sustainable solutions for long-term recovery and resilience building.

Unit:1	Understanding Natural Disasters and Man-Made Disasters	8 Hours

Understanding Natural Disasters: Natural disasters; category of disasters such as hydrological, wind-related, geo-physical, hydro-geological, and climatic; causes and impacts, with illustrations and geographical distribution.

Flood, Drought, Cyclone, Earthquakes, Landslides, Avalanches, Volcanic Eruptions, Heat and Cold Waves.

Man-Made Disasters: Nuclear Disasters, Chemical Disasters, Biological Disasters, Building Fire, Coal Fire, Forest Fire, Oil Fire. Air Pollution, Water Pollution, Deforestation, Industrial Pollution, Greenhouse Effect.

Road Accidents, Rail Accidents, Air Accidents, Sea Accidents.

Contemporary Issues related to Topic

Unit:2	Risk & Cost Assessment	7 Hours

Risk & Cost Assessment: Geographical conditions, Population, Living habits, Threats, Extent of damages to lives, agricultural areas, and industrial units. Method of cost assessment.

Safety and Relief Planning: Awareness and Safety Programs, Relief arrangements and essential components.

Shelters, Rescue search tools and equipment, Transport facilities.

Contemporary Issues related to Topic

Unit:3	Disaster Preparedness and Technology	7 Hours

Disaster Preparedness: Role of Information Technology in Disaster Preparedness with special reference to Geographical Information Systems (GIS). Use and application of emerging technologies in disaster preparedness.

Role of Information, Education, and Communication.

Contemporary Issues related to Topic

Unit:4	Disaster Response and Rehabilitation	8Hours

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

Reconstruction and Rehabilitation: Damage Assessment, Management and Development Information Structures. 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, Case Studies, Long-term Recovery. **Contemporary Issues related to Topic**	
Total Lecture	**30 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
23CV1624__ PE-II : Energy Conversion and Management

Course Outcomes :		
Upon successful completion of the course the students will be able to 1. Compare different sustainable energy sources 2. Explain energy management and importance of energy conversion. 3. Recommend different energy conversion method. 4. Choose modern technologies of Waste to Energy conversion		
UNIT:1	**Significance of Energy Conversion and Environment**	**08 Hrs**
Overview of Global and Indian Energy Scenario; Energy Conversion Methods: solar, wind, tidal and geothermal, Energy economics and Energy audit.		
UNIT:2	**Thermochemical processes**	**07 Hrs**
Combustion, Gasification, pyrolysis, Hydrothermal Carbonization, Torrefaction.		
UNIT:3	**Biochemical processes**	**08 Hrs**
Biofuels, Waste to Energy Systems, Landfills Gas Generations, Compressed Biogas, ethanol & aerobic composting.		
UNIT:4	**Other Energy options**	**07 Hrs**
Microbial Fuel cell, Energy from Green Hydrogen , Energy aspects of Green Building.		
	Total Lecture	**30 Hours**

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
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

VI SEMESTER
23CV1625__PE-II : Watershed Management

Course Outcomes :		
Upon successful completion of the course the students will be able to 1. Explain Watershed characteristics and importance of Integrated Watershed Management policies. 2. Choose and apply different surveys and stakeholder involvement in Watershed management. 3. Apply various methods of Watershed components management. 4. Categorize different land types and their management measures and Examine Watershed Projects		
Unit:1	**Watershed**	**8 Hours**
Watershed characteristics, causes & effects of watershed deterioration on community. Soil Erosion Types and causes, Concepts of watershed management. Principles of watershed management, Integrated Watershed Management Approach (IWMA), Selection of watershed village, equity issues for watershed policies, soil erosion, of soil erosion.		
Unit:2	**Surveys**	**8 Hours**
Benchmark surveys, Remote Sensing survey in Watershed Management and its applications. Land capability classification, Stakeholder participation, Rapid Rural Appraisal (RRA) and Participatory Rural Appraisal (PRA).		
Unit:3	**Watershed components management & Water conservation and Harvesting**	**7 Hours**
Watershed components management: Management of natural drainages in watershed, Check dams, Gully stabilization and storage, River training works, Guide bank, Pitched island, Retards, Water conservation and Harvesting, Wasteland, causes and remedial measures, waterlogging, causes and effects, landslide: adverse effects and management. Urban storm water management using rain water harvesting.		
Unit:4	**Watershed management and Modeling**	**7 Hours**
Management of arable land: Bench terracing, biological or vegetative measures mulching, mixed cropping, Case studies on arable land. Management of non arable land: Contour trenching. Orchard terraces, stone Walls, Diversion Drain, Vegetative Control Measures, Micro Watershed Treatment, Case studies on non arable land. Watershed Projects Modelling, Monitoring and Evaluation.		
	Total Lecture	**30 Hours**

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

VI SEMESTER
23CV1626 PE-II : Urban Transportation Planning

Course Outcomes :		
Upon successful completion of the course the students will be able to 1. Explain the importance of urban transport planning and analyze the transport planning process, including the scope, stages, and challenges. 2. Explain methods of traffic forecasting and assess the impact of traffic on environment. 3. Apply methods for trip generation, distribution, and model split to solve urban transportation planning problems. 4. Conclude importance of four stages of urban transportation planning.		
Unit:1	**Transport Planning Process**	**8 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**	**8 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**	**7 Hours**
General consideration, factors affecting, Model split in transport planning process, recent development. Mode choice analysis. Introduction to Various modes of urban transportation.		
	Total Lecture	**30 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://103.152.199.189/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/10.1002/9881119184838.ch4
3	https://onlinelibrary.wiley.com/doi/10.1002/9881119184838.ch1
4	https://link.springer.com/book/10.1008/988-94-015-8293-3
MOOCs Links and additional reading, learning, video material	
1	https://archive.nptel.ac.in/courses/105/108/105108078/
2	https://archive.nptel.ac.in/courses/105/107/105107058/

VI SEMESTER
23CV1641__PE-III : Advanced RCC

Course Outcomes :		
Upon successful completion of the course the students will be able to 1. Apply design principles and analyze RCC beams under combined torsion, flexure, and shear, ensuring proper reinforcement detailing as per IS codes. 2. Analyze two-way slab for different end conditions and flat slabs, incorporating punching shear considerations. 3. Evaluate forces acting on the water tank and design it by following codal provisions. 4. Design safe and stable combined Slab and footings ensuring IS code provisions.		
UNIT:1	**Analysis and Design of Beam**	**08 Hrs**
Limit state of collapse in torsion with flexure and shear: Design of beam section for torsion combined with flexure and shear, Reinforcement detailing for beams due to torsion combined with flexure and shear. Design of Long span cantilever beam		
UNIT:2	**Analysis and Design of Slab**	**07 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.		
UNIT:3	**Design of Water Tank**	**08 Hrs**
Types of water tank, design of water tank		
UNIT:4	**Analysis and Design of Combined Footing**	**07 Hrs**
Design of footing for two columns, i) Rectangular footing ii) Strap beam footing iii)Trapezoidal footing.		
	Total Lecture	**30 Hours**

Textbooks	
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	SP 16 (1980): Design Aids for Reinforced Concrete to IS 456, Bureau of Indian Standards (BIS), New Delhi, India.
4	IS 456 : 2000, "Plain and Reinforced Concrete - Code of Practice", Fourth Revision, Bureau of Indian Standards (BIS), New Delhi, India.

YCCE e- library book links [ACCESSIBLE FROM COLLEGE CAMPUS]	
1	https://classroom.google.com/u/0/w/NTM5MDQxOTg1ODI1/t/all
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

V SEMESTER
23CV1642__ PE-III : Lab : Advanced RCC

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

Sr. No.	Following Practical's will be conducted:
1	Introduction to STAAD. Pro Software.
2	Manual analysis of RCC cantilever retaining wall. **(01 Assignments)**
3	Manual design of RCC cantilever retaining wall. **(02 Assignment)**
4	Analysis of RCC cantilever retaining wall in STAAD. Pro. **(03 Assignment)**
5	Design of RCC cantilever retaining wall in STAAD. Pro. **(04 Assignment)**
6	Analysis of water tank in STAAD. Pro. **(05 Assignment)**
7	Design of different water tanks in STAAD. Pro. **(06 Assignment)**

Nagar Yuwak Shikshan Sanstha's

Yeshwantrao Chavan College of Engineering

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

B. Tech SoE and Syllabus 2023

(Scheme of Examination w.e.f. 2023-24 onward)

(Department of Civil Engineering)

B.Tech in Civil Engineering

SoE No. 23CV-101

VI SEMESTER

23CV1643__PE-III : Computer Applications in Civil Engineering

Course Outcomes:
Upon successful completion of the course, the students will be able to 1. Understand the fundamental concepts of the Python programming language and its application in problem-solving. 2. Develop computer programs to solve Civil Engineering problems using structured programming techniques. 3. Implement numerical methods by writing reusable and efficient program modules in Python. 4. Enhance technical understanding, programming logic, and presentation skills for effective communication of solutions.

Unit I:	**7 Hrs.**
Fundamentals OF Python: Character set data type, constants and variables, expressions, Statements, Symbolic constants. Operator and Expression, Arithmetic operator, Unary operator, Relation and Logical operator, Conditional operator. Data input & output.	
Unit II:	**8 Hrs.**
Control statements and their applications: WHILE statements, do-while, for nested loop, if–else, switch, break, continue, go to statements.	
Unit III:	**7 Hrs.**
Advanced Python Programming: User-defined functions, library functions, arrays, pointers, structures and unions, data files, and file handling. Application to Numerical Methods.	
Unit IV:	**8 Hrs.**
Application of Python Language: Computer program based on Transportation Engineering, Geotechnical Engineering, Hydraulic Engineering, Irrigation Engineering, Surveying, Estimating & costing, Structural analysis	
Total Lecture	**30 Hours**

Textbooks:	
1	Python Essentials for Beginners.by Shawn Peters (Author) **Vibrant Publishers**
Reference Books:	
1	Python Simplified with Generative AI by Du c T Haba (Author), Ashley R Haba (Author), Evan M Haba (Author) BPB publications
2	Data Science From Scratch: First Principles with Python, Second Edition,by Joel Grus (Author) SPD publication
MOOCs Links and additional reading, learning, video material	
1	https://www.youtube.com/watch?v=tA42nHmmEKw&list=PLyqSpQzTE6M_fFg1zZmeGIkenMDgXKGYi
2	https://www.youtube.com/watch?v=c235EsGFcZs&list=PLyqSpQzTE6M_fFg1zZmeGIkenMDgXKGYi&index=2
3	https://www.youtube.com/watch?v=MuYlV9C1BHg&list=PLyqSpQzTE6M_fFg1zZmeGIkenMD

	gXKGYi&index=3
4	https://www.youtube.com/watch?v=LtvkYFRGqME&list=PLyqSpQzTE6M_fFg1zZmeGIkenMDgXKGYi&index=4
5	https://www.youtube.com/watch?v=9mRNPlbmjx8&list=PLyqSpQzTE6M_fFg1zZmeGIkenMDgXKGYi&index=5

VI SEMESTER
23CV1644_ PE-III : Lab : Computer Applications in Civil Engineering

Course Outcomes :

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

1. Understand the fundamental concepts of the Python programming language through laboratory exercises and recognise its application in problem-solving.
2. Develop and test computer programs in the laboratory to solve Civil Engineering problems using structured programming techniques.
3. Implement numerical methods by writing reusable and efficient Python program modules in the laboratory environment.
4. Enhance technical understanding, programming logic, and presentation skills through laboratory-based activities for effective communication of solutions.

SN	Experiments based on
	At-least **one** assignment from each and a maximum of **two** assignments to be submitted from the following topics using programming language, Total 10 assignments to be done.
1	Basic programming examples based on Python
2	Determination of Bending Moment. Deflections for different loading conditions for a Simply Supported Beam and a Cantilever Beam. Determination of fixed end moments for different loading conditions of a fixed beam.
3	Determination of Water demand, empirical formulae, variation in demand, design of period and population forecasting methods.
4	Determination of coefficient of permeability, Degree of Consolidation and Shear Strength. Estimation of Settlement of foundations in Cohesive Soil, Stability Analysis of Slopes. Estimation of Earth Pressures in Cohesive and Cohesion less soils.
5	Computation of water surface profiles in open channel flows. Estimation of Friction factor for Laminar and Turbulent flows, Minor losses in pipe flow. Application of problems in Hydraulics such as Hardy cross method in the Analysis of pipe network,
6	Geometric design of roads, stopping and overtaking distances, design of super-elevation, design of summit and valley curves, Horizontal and vertical curves.
7	Design of Slabs using I.S. Code method. Analysis and Design of Beams using Limit state method. Design of columns subjected to axial load and Uni-axial Moment. Design of Isolated Footing. Design of rolled steel columns, built up columns, Beams and built up Beams.
8	Interpolation & extrapolation methods, Solution of non Linear Equations (Newton Raphson Schemes), Solution of Linear Algebric Equations, Gauss Elimination method.
9	Numerical Integration (Simpson's method, Trapezoidal method) , Initial & Two point boundary value problem , Euler's Runge-kutta, Milnes etc.
10	Preparation of Estimating & Costing in Excel Develop design module of Structural design in Excel.

VI SEMESTER

23CV1645__PE-III : Water Transmission And Distribution Systems

Course Outcomes :

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

1. Explain general hydraulic principles and evaluate head losses in water distribution systems.
2. Formulate and analyze equations for flow in looped water distribution networks considering various network types and configurations.
3. Apply Node Flow Analysis (NFA) techniques to assess flow compatibility and head-discharge relationships in serial networks.
4. Design single-source branching water distribution networks and develop optimal solutions

Unit:1	**Reservoirs, pump,Valves**	**8 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**	**8 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	**Design of water distribution networks**	**7 Hours**

Design of single source branching network using Critical path method, Cost head loss Ratio (CHR) method – CHR criterion, Problem formulation CHR methodology (for single source branching networks).**Contemporary Issues related to Topic**

Total Lecture	**30 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

VI SEMESTER
23CV1646__ PE-III : Lab : Water Transmission And Distribution Systems

Course Outcomes:

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

1. Apply fundamental hydraulic principles to compute head losses, flow continuity, and design rising mains using appropriate empirical and analytical equations.
2. Analyze complex water distribution networks including serial, branched, and looped systems using both analytical methods (Hardy-Cross, Newton-Raphson).
3. Examine water distribution systems using EPANET for flow distribution, pressure variation, pump/valve behavior, and reservoir interactions.
4. Design and optimize economical water distribution networks by applying CHR methods and critical path-based decision-making using modern engineering tools.

S.N.	Minimum of **Six** practical from the list given below shall be performed.
1	Head Loss Calculation Using Darcy-Weisbach & Hazen-Williams Equations
2	Design and Analysis of a Pumping Main
3	Node Flow Analysis & Classification
4	Looped Network Analysis Using Hardy-Cross Method
5	Basic Network Creation and Flow Simulation in EPANET
6	Looped Network Flow Analysis using EPANET
7	Pump and Valve Integration in EPANET
8	Design and Analysis of Serial Network Using NFA in EPANET

VI SEMESTER
23CV1647__PE-III : Geotechnical Investigation and Improvement

Course Outcomes:
Upon successful completion of the course the students will be able to
1. Calculate soil consolidation, settlement behavior
2. Explain ground improvement methods for soil stabilization
3. Explain geotechnical objectives and various methods of exploration
4. Explain field instrumentation techniques and basic numerical modeling

Unit I:	**7 Hrs.**
Consolidation and settlement: Determination of Coefficient of Consolidation (cv) and calculation of time rate of consolidation, Estimation of Primary and Secondary settlements, Settlement prediction for clayey soils under shallow foundations.	
Unit II:	**8 Hrs.**
Ground Improvement Techniques: Methods of soil stabilization, Reinforced earth, Geotextile materials - types, functions and applications, Deep compaction, Vibroflotation, Sand drains, Pre-loading and surcharging.	
Unit III:	**7 Hrs.**
Subsurface Exploration and Testing: Objectives of field exploration, Stages of subsurface exploration, Types of boring, Open excavation method, Number, Lateral extent, and Depth of exploration for different structures, Types of soil samples and samplers, Bore logs, Geophysical methods, Standard Penetration Test (SPT), Plate load test, Settlement assessment of foundations.	
Unit IV:	**8 Hrs.**
Field Applications, Instrumentation, and Numerical Modeling: Introduction to Geotechnical Field Instrumentation and Monitoring Techniques, Geotechnical Physical and Numerical Modeling, Basics of Finite Element Method (FEM) in Geotechnical Engineering, Design application using PLAXIS 2D.	
Total Lecture	**30 Hours**

Textbooks:	
1	**Soil Mechanics & Foundations**, Punmia B. C., Jain A.K., Jain A.K., 16th edition, Laxmi Publications, New Delhi, 2005.
2	**Soil Mechanics and Foundation Engineering,** Arora K. R., 1st edition, Standard Publishers Distributors, New Delhi, 2020.
3	**Principles of Geotechnical Engineering**, Das B.M., 9th Edition, Cengage Learning, Boston, 2018.
Reference Books:	
1	**Fundamentals of Soil Mechanics, Taylor D.W., 1st Edition, Asia Publishing House, New Delhi, 1948.**
2	**Soil Mechanics in Engineering Practice**, Terzaghi K., Peck R.B., Mesri G., 3rd Edition, Wiley-India, New Delhi, 1996.
3	**Field Instrumentation in Geotechnical Engineering**, Dunnicliff J., 1st Edition, Wiley-Interscience, New York, 1988.

4	**Finite Element Analysis in Geotechnical Engineering: Theory and Application, Potts D.M., Zdravkovic L., 1st Edition, Thomas Telford Publishing, London, 1999.**
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1	https://unacademy.com/content/gate/videos/civil-engineering/geotechnical-engineering/
2	https://www.geoengineer.org/videos
3	https://edurev.in/courses/25683_Geotechnical-Engineering

VI SEMESTER
23CV1648____ PE-III : Lab : Geotechnical Investigation and Improvement

Course Outcomes:
Upon successful completion of the course the students will be able to 1. Apply basic geotechnical tests to determine soil properties. 2. Analyze seepage and consolidation behavior of soils. 3. Evaluate field instruments and sensor systems for geotechnical investigations. 4. Develop geotechnical solutions using modeling techniques and geotextile materials.

SN	List of Experiments (Any 8)
1.	Determine Index Properties of Soil Using Sensors
2.	Conduct Modified Proctor Compaction Test
3.	Identify and Classify Swelling Soil (F.S.W. and D.F.S.)
4.	Perform Vane Shear Test to Assess Shear Strength
5.	Analyze Seepage Using Laboratory Model Test
6.	Evaluate Consolidation Characteristics Using Oedometer Test
7.	Interpret Field Data from Standard Penetration Test (SPT)
8.	Assess Load-Bearing Capacity Using Plate Load Test
9.	Demonstrate Installation and Monitoring Using Piezometers and Settlement Plates
10.	Evaluate Data Acquisition Using Wireless Sensors
11.	Characterize Geotextile Materials for Engineering Applications
12.	Develop Numerical Models for Geotechnical Analysis

Textbooks:	
1	Soil Mechanics and Foundations, Punmia B. C., Jain A.K., Jain A.K., 16th Edition, Laxmi Publications, New Delhi, 2005.
2	Foundation Analysis and Design, Bowles J. E., 5th Edition, McGraw-Hill International Editions, 1996.
Reference Books:	
1	Principles of Geotechnical Engineering, Braja M. Das, 9th Edition, Cengage Learning, 2017
2	Basic and Applied Soil Mechanics, Gopal Ranjan and A. S. R. Rao, 3rd Edition, New Age International Publishers, 2016.
3	Geotechnical Engineering: Principles and Practices, Donald P. Coduto, 2nd Edition, Pearson Education, 2010.
YCCE e- library book links [ACCESSIBLE FROM COLLEGE CAMPUS]	
1	https://ycce.edu/central-library/
2	https://ycce.knimbus.com/librarian
MOOCs Links and additional reading, learning, video material	
1	https://nptel.ac.in/courses/105105168
2	https://nptel.ac.in/courses/105104161
3	https://nptel.ac.in/courses/105106160

VI SEMESTER
23CV1649__PE-III : Advanced Water Treatment

Course Outcomes :		
Upon successful completion of the course, the students will be able to 1. Explain the working principles and significance of various water treatment units. 2. Analyze the working principles, design parameters, and operational issues of various water treatment units. 3. Design various water treatment units considering process requirements and operational constraints. 4. Apply advanced water treatment methods for specific water quality improvements		
Unit:1	**Water Quality and Treatment**	**8 Hours**
Significance of Advanced water treatment, water quality requirement and specific treatment for industries. Softening of water and TDS removal: Boiler feed water, lime soda process, ion exchange process, Membrane filtration, High Rate Solid Contact Clarifier (HRSCC).		
Unit:2	**Desalination**	**7 Hours**
Theory of desalination, various methods of Desalination- Distillation, Electro dialysis, Freezing, Demineralization, Solar evaporation. Membrane filtration .		
Unit:3	**Adsorption**	**8 Hours**
Theory, types of activated carbon, Performance and Reactivation. Materials and Reactions, Kinetics, Applications. Water treatment for Swimming Pool.		
Unit:4	**Metals removal**	**7 Hours**
Removal of Fluoride , Arsenic, Fe and Mn, Taste, odor and colour removal, Algae control, Corrosion control.		
	Total Lecture	**30 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 Systems , Part B: Operation and Maintenance Second Edition - Revised and Updated,Dec 2023
2	Fair, Geyer and Okun, Water and wastewater engineering Vol. 2, John Wiley and Sons, New York , 2015
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

VI SEMESTER
23CV1650__ PE-III : Lab : Advanced Water Treatment

Course Outcomes :
Upon successful completion of the course, the students will be able to
1.Assess water quality based on standard parameters
2.Conduct experiments to analyze various water characteristics
3.Examine key water quality indicators
4.Compare water quality results with permissible standards

PRACTICAL

S.N.	Minimum of Six practical from the list given below shall be performed.
1	Determination of pH and alkalinity of water sample
2	Determination of total, dissolved and suspended solids in given water sample.
3	Determination of Hardness of Water (Total, Calcium & Magnesium)
4	Removal of Hardness by Lime soda softening process
5	Determination of Phosphates in given water samples
6	Determination of Sulphates in given water sample.
7	Determination of Chlorides in a given water sample.
8	Determination of effective size and co-efficient of uniformity of a given sand sample and to separate required sand from given stack of sand for required effective size and coefficient of uniformity.
9	To determine Maximum Probable Number (MPN) of coli form bacteria present in water sample by Multiple Tube Dilution (MTD) technique-presumptive test and confirmation tests
10	To determine Density of bacteria in a water sample pour plate (Standard Plate Count) method.

V SEMESTER
23CV1651__PE-III : 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. Illustrate characteristics of road geometry. 3. Justify various types of traffic control devices. 4. Demonstrate parking studies and theory of traffic flow		
Unit:1	**Traffic Surveys and Traffic Studies**	**8 Hours**
Road, road user & road vehicle characteristics. Traffic Surveys: speed, journey time and delay studies highway capacity, level of service.		
Unit:2	**Road geometry:**	**8 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.		
Unit:3	**Traffic control:**	**7 Hours**
Traffic sign, signals, road markings, miscellaneous traffic control aids and street furniture, traffic regulation and safety.		
Unit :4	**Parking and Theory of Traffic Flow:**	**7 Hours**
Parking surveys, On & Off-street parking systems, parking demand, underground & multi-storied parking. Introduction to theory of Traffic Flow		
	Total Lecture	**30 Hours**

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, 1988
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://103.152.199.189/YCCE/Suported%20file/Supprted%20file/e-copies%20of%20books/Civil%20Engineering/58.%20Principles%20of%20Highway%20Engineering%20and%20Traffic%20Analysis%20(%20PDFDrive%20).pdf
2	http://103.152.199.189/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/10.1008/988-1-349-10800-8
4	https://onlinelibrary.wiley.com/doi/10.1002/9881119184838.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/128/105/128105008/

VI SEMESTER
23CV1652__ PE-III : Lab : Traffic Engineering

Course Outcomes :
Upon successful completion of the course the students will be able to 1. Examine speed studies. 2. Evaluate OD matrix. 3. Design Intersection and Rotaries. 4. Assess traffic volume, safety & parking studies.

Sr. No.	Experiments based on
1	Speed studies
2	OD studies
3	Design of traffic signals
4	Design of intersection
5	Design of Rotaries
6	Road safety studies
7	Traffic volume studies
8	Parking studies

VI SEMESTER
MDM4CV104__Sustainable Energy Management

Course Outcomes :

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

1. Explain the concepts of sustainability in energy generation technologies and the role of SDGs and energy access challenges.
2. Differentiate and analyze various conventional and non-conventional energy sources based on their energy density, environmental impact, and socio-economic relevance.
3. Apply principles of energy auditing and management to suggest efficiency improvements in industrial and building systems.
4. Evaluate life cycle environmental impacts of energy systems and assess recycling opportunities of energy materials using policy, economic, and regulatory frameworks.

Unit:1	**Sustainability Concepts**	**7 Hours**
Sustainable Development Goals for Clean Energy (SDGS), Emerging Issues in Energy Access, Technologies,. Sustainability Concepts of Energy Generation Technologies, Energy and Resource Utilization.		
Unit:2	**Energy Sources**	**8 Hours**
Energy, economy and social development, classification of energy sources, energy chain, conventional energy sources, non-conventional energy sources, energy densities (heating values) of various fuels, environmental aspects of energy, energy-environment-economy, world energy status, energy scenario in India.		
Unit:3	**Energy Management**	**7 Hours**
Energy Auditing and Energy Management Systems (ENMS), Energy Efficiency Measures in Buildings, Energy Efficiency Measures in Industrial Processes.		
Unit:4	**Life Cycle Assessment (LCA) and Energy Management**	**8 Hours**
Definition and Principles of Life Cycle Assessment, , Importance and Benefits of LCA and Energy Management, Regulatory and Industry Standards Related to LCA and Energy Management.		
Unit:5	**Introduction to Recycling of Energy Materials**	**7 Hours**
Definition and Significance of Recycling in the Energy Sector, Environmental Benefits of Recycling Energy Materials, Overview of Energy Materials used in different systems , Analysis of Material Composition and Recyclability.		
Unit :6	**Policy, Regulation, and Economic Aspects of Energy Material Recycling**	**8 Hours**
National and International Policies Promoting Recycling and Waste Management, Regulations Specific to Energy Material Recycling, Economic Considerations for Energy Material Recycling Businesses, Market Potential and Growth Opportunities in the Recycling Sector, Environmental Impacts and Future Trends in Energy Material Recycling.		
	Total Lecture	**45 Hours**

Text books	
1	Allen, D.T. and Shonnard D.R, Sustainability Engineering: Concepts ,design and Case Studies, Prentice Hall
2	Bradly A.S., Adebayo A.O, Maria, Engineering applications in sustainable design and development, Cengagae learning
3	Environmental Impact Assessment Guidelines, Notification of Government of India,2006
4	Mackenthan K.M., Basic Concepts in Environmental Management, Lewis Publication.London,1998
Reference Books	
1	
YCCE e- library book links [ACCESSIBLE FROM COLLEGE CAMPUS]	
1	

VI SEMESTER
MDM4CV204__Urban Energy Systems

Course Outcomes :		
Upon successful completion of the course, the students will be able to 1. Illustrate the knowledge of urban energy systems in infrastructure and as per planning perspective. 2. Analyze urban energy demands and sustainable supply strategies. 3. Explain design, modeling, and policy frameworks influencing urban energy infrastructure. 4. Adapt interdisciplinary learning with emphasis on engineering roles in energy systems.		
Unit:1	**Fundamentals of Urban Energy Systems**	**7 Hours**
Definition and scope of urban energy systems, energy in urban infrastructure, Urban metabolism and energy flows, Energy consumption patterns in urban settings, Key stakeholders and system components, Overview of urbanization and energy demand growth		
Unit:2	**Urban Infrastructure and Energy Supply**	**8 Hours**
Energy-related urban infrastructure: roads, buildings, utilities, power generation and distribution (substations, conduits, solar farms, wind bases), Integration of renewable energy in urban design (solar roofs, microgrids, wind corridors), Decentralized systems: rooftop solar, biogas, geothermal heating, District energy systems (district heating and cooling networks)		
Unit:3	**Energy Demand and Urban Built Environment**	**8 Hours**
Energy usage in residential, commercial, and public buildings, Building envelope and energy efficiency, Urban heat island effect and passive design strategies, Green buildings, LEED/GRIHA certification frameworks, Retrofitting existing infrastructure for energy efficiency, materials and construction techniques for energy-efficient design.		
Unit:4	**Urban Transport and Energy**	**7 Hours**
Transport infrastructure and energy linkages, Non-motorized transport and pedestrian planning, Electric vehicle infrastructure: charging stations and grid interface, Transit-oriented development (TOD) and energy optimization, Role of public transportation in reducing urban energy demand, infrastructure for low-carbon mobility		
Unit:5	**Planning, Policy, and Governance**	**7 Hours**
Integration of energy systems in urban planning, Urban master plans and energy zoning, National and international energy and urban development policies (e.g., Smart Cities Mission, AMRUT, SDGs), Regulatory mechanisms: building codes, ECBC, energy audits, Urban energy financing and public-private partnerships		
Unit :6	**Modeling, Innovation, and Case Studies**	**8 Hours**
Introduction to modeling tools for urban energy systems, Data-driven urban energy management (IoT, smart meters, GIS), Energy resilience and climate adaptation in cities, Case studies from Indian and global cities, Innovative projects: smart grids, solar cities, net-zero communities		
	Total Lecture	**45 Hours**

Text Books / Reference Books	
1	James Keirstead and Nilay Shah, Urban Energy Systems: An Integrated Approach, Earthscan (Routledge), 1st edition.
2	Peter Droege (Editor), Urban Energy Transition: From Fossil Fuels to Renewable Power, Elsevier, 1st edition.
3	Tony Owen and Malcolm Eames, Sustainable Infrastructure: Principles into Practice, ICE Publishing, 1st edition.
4	M. R. Islam and A. B. M. Sharif Hossain, Energy for Sustainable Development: A Technology and Policy Perspective, Springer, 1st edition.
5	Harry Lehmann, Sustainable Urban Energy Policy: Heat Supply and the Politics of Decarbonization, Routledge, 1st edition.
6	Ministry of Housing and Urban Affairs, Smart Cities Mission Guidelines, Government of India, 1st edition.
7	Bureau of Energy Efficiency (BEE), Energy Conservation Building Code (ECBC), Ministry of Power, Government of India, 1st edition.
8	Ministry of New and Renewable Energy (MNRE), Renewable Energy in Urban Areas: Framework and Recommendations, Government of India, 1st edition.
9	International Energy Agency (IEA), Energy Technology Perspectives: Urban Energy Systems, IEA Publications, 1st edition.
10	Intergovernmental Panel on Climate Change (IPCC), Sixth Assessment Report – Mitigation of Climate Change (Chapters on Energy Systems and Urban Areas), IPCC, 1st edition.
YCCE e- library book links [ACCESSIBLE FROM COLLEGE CAMPUS]	
MOOCs Links and additional reading, learning, video material	

VI SEMESTER
23CV1607__Lab : Digital Mapping

Course Outcomes
Upon successful completion of the course the students will be able to 1. Illustrate the key digital mapping tools and techniques used in geographic information analysis. 2. Demonstrate the concepts of spatial data, including types, formats, and collection methods. 3. Apply digital mapping tools to solve real-world geographic problems and analyze spatial data. 4. Utilize GIS, remote sensing, and related technologies to address environmental, urban, and natural resource management challenges.

Sr. No.	Experiments based on
1	Digital surveying tools and techniques through QGIS, Avenza Mobile Application, Google Earth
2	Image Interpretation- Information Extraction from Satellite Images- Image classification
3	Spatial data exploring using Diva GIS, Bhuban, USGS
4	Digital Image Processing (DIP)
5	Geoinformatics Applications in Natural Resource Management

VI SEMESTER
23CV1608__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.