Government College of Engineering Aurangabad Chhatrapati Sambhajinagar

(An Autonomous Institute of Government of Maharashtra)
Station Road, Osmanpura, Aurangabad – 431005 (M.S.)
Phone – (0240) 2366101, 2366111, Fax (0240) 2332835

Structure for First Year, Second Year, Third Year and Final Year B. Tech. in Civil Engineering with Multidisciplinary Minor Degree

(NEP Compliant)

(With Effect from Academic Year 2023-24)

Dr. S. S. Koranne
Head, Civil Engg.

Dr. Anil Karwankar
Dean , Academics

Approved Curriculum in XXXth Academic Council Meeting
Dated: 5th July 2025

Vision of the Institute

- In pursuit of global competitiveness, the institute is committed to excel in engineering education and research with concern for environment and society.

Mission of the Institute

- Provide conducive environment for academic excellence in engineering education.
- Enhance research and development along with promotion to sponsored projects and industrial consultancy.
- Foster development of students by creating awareness for needs of society, sustainable development and human values.

Motto of the Civil Engineering Department

To Build Strong Nation through Dedication

Vision of the Civil Engineering Department

To create, preserve and promulgate knowledge of civil engineering and thereby, contribute to the social, cultural, and economic well-being of the society.

Mission of the Civil Engineering Department

1. To maintain highest possible quality of civil engineering courses for developing competent, cultured, and responsible human resource.
2. To design, develop and direct activities of civil engineering discipline.
3. To extend civil engineering facilities to stakeholders.
4. To undertake Research & Development activities in civil engineering.
5. To develop entrepreneurship amongst the students.

Program Outcomes

After the successful completion of the civil engineering Programme the graduates will have:

1. an ability to apply knowledge of mathematics, science and engineering to solve civil engineering problems.
2. an ability to identify, formulate and analyze civil engineering problems.
3. an ability to develop and design system components and processes related with civil engineering to meet desired standards
4. an ability to conduct experiments and to analyze and interpret experimental results and data
5. an ability to use techniques, skills and modern engineering tools for successful engineering practice
6. an ability to supervise and direct activities of civil engineering works as per rules, regulations and standards
7. an ability to complete task to meet desire needs, within realistic constraints such as financial, environmental, social, and sustainability.
8. an understanding of professional and ethical responsibility
9. an ability to function on multidisciplinary project or research team
10. an ability to communicate and interact effectively with the stakeholders.
11. an understanding of the elements of project management and finance.
12. an ability to recognize the need for lifelong learning to keep pace with technological advancement

GENERAL COURSE STRUCTURE & THEME

A. Definition of Credit:

1 Hr. Lecture (L) per week	1 Credit
1 Hr. Tutorial (T) per week	1 Credit
1 Hr. Practical (P) per week	0.5 Credit
2 Hours Practical (P) per week	1 Credit

B. Range of Credits: (B.E./B.Tech. or Equivalent) in Engg. /Tech. with Multidisciplinary Minor:

In the light of the fact that a typical NEP Compliant Model Four-year Under Graduate degree program in Engineering has about 170 credits, the total number of credits proposed for the four-year B.Tech. in Civil Engineering with Multidisciplinary minor degree is kept as **170**

C. Semester wise Credit Distribution Structure for Four Year UG Program in Civil Engineering with One Multidisciplinary Minor:

Semester		I	II	III	IV	V	VI	VII	VIII	Total Credits
Basic Science Course	BSC/ESC	08	08	-	-	-	-	-	-	**16**
Engineering Science Course		07	06	-	-	-	-	-	-	**13**
Programme Core Course (PCC)	Program Courses	-	03	12	11	12	15	-	-	**53**
Programme Elective Course (PEC)		-	-	-	-	04	04	12	-	**20**
Multidisciplinary Minor (MD M)	Multidisciplinary Courses	-	-	02	02	04	02	02	02	**14**
Open Elective (OE) Other than a particular program		-	-	04	02	02	-	-	-	**08**
Vocational and Skill Enhancement Course (VSEC)	Skill Courses	02	02	-	02	-	02	-	-	**08**
Ability Enhancement Course (AEC -01, AEC-02)	Humanities Social Science and Management (HSSM)	-	02	-	02	-	-	-	-	**04**
Entrepreneurship/Economics/ Management Courses		-	-	02	02	-	-	-	-	**04**
Indian Knowledge System (IKS)		02	-	-	-	-	-	-	-	**02**
Value Education Course (VEC)		-	-	02	02	-	-	-	-	**04**
Research Methodology	Experiential Learning Courses	-	-	-	-	-	-	02	-	**02**
Comm. Engg. Project (CEP)/Field Project (FP)		-	-	02	-	-	-	-	-	**02**
Project		-	-	-	-	-	-	-	04	**04**
Internship/ OJT		-	-	-	-	-	-	-	12	**12**
Co-curricular Courses (CC)	Liberal Learning Courses	02	02	-	-	-	-	-	-	**04**
Total Credits (Major)		**21**	**23**	**24**	**23**	**22**	**23**	**16**	**18**	**170**

Students can opt for any of the following as per the rules and regulations given by institute:

1. B. Tech with Multidisciplinary Minor = Total 176 Credits
2. B. Tech with Multidisciplinary Minor and One Honor = Total 194 Credits
3. B. Tech with one Multidisciplinary Minor and Honor by Research = Total 194 Credits
4. B. Tech with two Multidisciplinary Minors = Total 194 Credits

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D. Category-wise Courses

D1. BASIC SCIENCE COURSE [BSC]

S. No	Category	Course Title	Semester	Hours per week			Total Credits
				Lecture	Tutorial	Practical	
1	BSC	Mathematics – I	I	3	1	0	**04**
2	BSC	Optics, Acoustics and Engineering materials	I	3	0	0	**03**
3	BSC	Lab Physics	I	0	0	2	**01**
4	BSC	Mathematics – II	II	3	1	0	**04**
5	BSC	Battery Science, Lubricants and Green Chemistry	II	3	0	0	**03**
6	BSC	Lab Chemistry	II	0	0	2	**01**
Total Credits							**16**

D2. ENGINEERING SCIENCE COURSE [ESC]

S. No	Category	Course Title	Semester	Hours per week			Total Credits
				Lecture	Tutorial	Practical	
1	ESC	Engineering Mechanics	I	3	0	0	**03**
2	ESC	Lab- Engineering Mechanics	I	0	0	2	**01**
3	ESC	Basics of Civil Engineering	I	2	0	0	**02**
4	ESC	Lab- Basics of Civil Engineering	I	0	0	2	**01**
5	ESC	Civil Engineering Drawing	II	2	0	0	**02**
6	ESC	Lab-Civil Engineering Drawing	II	0	0	2	**01**
7	ESC	Programming for Problem Solving	II	2	0	0	**02**
8	ESC	Lab- Programming for Problem Solving	II	0	0	2	**01**
Total Credits							**13**

D3. VOCATIONAL AND SKILL ENHANCEMENT COURSE (VSEC)

S. No	Category	Course Title	Semester	Hours per week			Total Credits
				Lecture	Tutorial	Practical	
1	VSEC	Engineering Exploration	I	0	0	4	**02**
2	VSEC	Civil Engineering Workshop	II	0	0	4	**02**
3	VSEC	Python Programming	IV	0	0	4	**02**
4	VSEC	Software for Civil Engineering	VI	0	0	4	**02**
Total Credits							**08**

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D4. HUMANITIES & SOCIAL SCIENCES COURSES [HSSM]

S. No	Category	Course Title	Semester	Hours per week			Total Credits
				Lecture	Tutorial	Practical	
1	Indian Knowledge System (IKS)	Indian Knowledge System (IKS)	I	2	0	0	**02**
2	Ability Enhancement Course (AEC)	Communication Skills	II	2	0	0	**02**
3	Entrepreneurship/Economics/ Management Courses	Engineering Economics	III	2	0	0	**02**
4	Value Education Course (VEC)	Environmental Science	III	2	0	0	**02**
5	Ability Enhancement Course (AEC)	Technical Report Writing	IV	0	0	4	**02**
6	Entrepreneurship/Economics/ Management Courses	Finance and Accounting	IV	2	0	0	**02**
7	Value Education Course (VEC)	Universal Human Values -II	IV	2	0	0	**02**
Total Credits							**14**

D5. EXPERIENTIAL LEARNING COURSES (ELC)

S. No	Category	Course Title	Semester	Hours per week			Total Credits
				Lecture	Tutorial	Practical	
1	Comm. Engg. Project (CEP)/ Field Project (FP)	Mini Project	III	0	0	4	**02**
2	Research Methodology	Research Methodology	VII	2	1	0	**02**
3	Project	Project	VIII	0	0	8	**04**
4	Internship/ OJT	Internship	VIII	-	-	-	**12**
Total Credits							**20**

D6. LIBERAL LEARNING COURSES (CO-CURRICULAR COURSES (CC))

S. No	Category	Course Title	Semester	Hours per week			Total Credits
				Lecture	Tutorial	Practical	
1	CC	Yoga	I	1	0	2	**02**
2	CC	NSS/ Sports/ Clubs Activities	II	0	0	4	**02**
Total Credits							**04**

D7. MULTIDISCIPLINARY MINOR (MD M) and OPEN ELECTIVE (OE) OTHER THAN A PARTICULAR PROGRAM

List of Multidisciplinary Minor Courses from other faculties: Total 14 Credits
Open electives of 8 credits can be offered from these other faculties.

Specialization	Dramatics	Film Making	Fine Art	Music
Multi-disciplinary Minor - 01	Dramatic Theory, Literature	Videography + Cinematography	Applied Art (Digital Art)	Theory of Indian Music
Multi-disciplinary Minor – 02	Acting	Video Editing and Lighting	Painting (Generative Art)	Ancient and Modern Poetry
Multi-disciplinary Minor – 03	Directing	Story telling Story Boarding	Sculpture (3D-Space)	The Evolution of music
Multi-disciplinary Minor – 04	Playwriting	UI/UX and Animation	Visual Communication (Evolutionary Art)	Music and Film
Multi-disciplinary Minor – 05	Applied Interactive Theatre	Art of Visual Communication	Graphics Art (Print & Printing Art)	Introduction to Electronic & Computer Music
Multi-disciplinary Minor - 06	Technical Theatre	Film & TV Directing	Art Culture	Analysis of Tonal Music

Specialization	Management & Finance	Law	Social Science	Journalism
Multi-disciplinary Minor - 01	Microeconomics	Constitutional Law	Indian Economics	Principles of Communication
Multi-disciplinary Minor – 02	Corporate Social Responsibility	Human Rights & International Law	Introduction to Sociology	Fundamentals of Journalism
Multi-disciplinary Minor – 03	Principles of Accounting	Environmental Law	Geo-Informatics	Cyber Journalism
Multi-disciplinary Minor – 04	Business Intelligence	Civil Procedure Code (CPC)	Introduction to Political Sciences	Basics of Design & Graphics
Multi-disciplinary Minor – 05	Marketing Research	Land Laws including ceiling and other local laws	Corporate sociology	Mass Communication: Concepts & Processes
Multi-disciplinary Minor - 06	Corporate Governance and Business Ethics	Cyber Law	Modern India- Political, Economic & Social Ethos	IT and Online Journalism

Following courses are offered as Multidisciplinary Minor by Civil Engineering Department

A) Civil Engineering Group

S. No	Category	Course Title	Semester	Hours per week			Total Credits
				Lecture	Tutorial	Practical	
1	MD M	Artificial Intelligence in Civil Engineering	III	3	0	0	**03**
2	MD M	Lab. Artificial Intelligence in Civil Engineering	III	0	0	2	**01**
3	MD M	AI Powered Hydrologic Systems	IV	3	0	0	**03**
4	MD M	Application of AI in Surveying	V	3	0	0	**03**
5	MD M	Lab- Application of AI in Surveying	V	0	0	2	**01**
6	MD M	Transportation Infrastructure and Smart Technologies	VI	3	0	0	**03**
Total Credits							**14**

*Equivalent online courses (NPTEL/SWAYAM/MOOC/COURSERA/OTHERS) will be approved by BoS

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Following courses are offered as Open Electives (OE) by Civil Engineering Department

S. No	Category	Course Title	Semester	Hours per week			Total Credits
				Lecture	Tutorial	Practical	
1	OE	Rural Technology	III	3	0	0	**03**
3	OE	**Disaster Management**	IV	3	0	0	**03**
4	OE	**Watershed Management**	V	2	0	0	**02**
Total Credits							**08**

D8. HONORS

Student has to choose One Honor out of the Honor groups provided below

D8A: Honors: Structural Engineering

Sr. No.	Course Code	Course Title	Semester	Scheme of Teaching (Hrs/week)			Total Credit
				Theory	Tutorial	Practical	
1	AMHNC7001	Advanced Concrete Technology	V	3	0	0	3
2	AMHNC7005	Lab- Advanced Concrete Technology	V	0	0	2	1
3	AMHNC7002	Advanced Structural Analysis	VI	4	0	0	4
4	AMHNC7003	Pre-stressed Concrete Design	VI	3	0	0	3
5	AMHNC7006	Lab-Pre-stressed Concrete Design	VII	0	0	2	1
6	AMHNC7004	Earthquake Analysis and Design of Structures	VII	3	0	0	3
7	AMHNC7007	Lab-Earthquake Analysis and Design of Structures	VIII	0	0	2	1
8	AMHNC7008	Mini Project	VIII	0	0	4	2
Total Credits							18

D8B: Honors: Environmental Engineering

Sr. No.	Course Code	Course Title	Semester	Scheme of Teaching (Hrs/week)			Total Credits
				Theory	Tutorial	Practical	
1	CEHNC7001	Advanced Water and Waste Water Treatment	V	3	0	0	3
2	CEHNC7005	Lab-Advanced Water and Waste Water Treatment	V	0	0	2	1
3	CEHNC7002	Air Pollution and Control	VI	3	0	0	3
4	CEHNC7006	Lab- Air Pollution and Control	VI	0	0	2	1
5	CEHNC7003	Solid Waste Management	VII	3	0	0	3
6	CEHNC7007	Lab- Solid Waste Management	VII	0	0	2	1
7	CEHNC7004	Environmental Impact Assessment	VIII	3	0	0	3
8	CEHNC7008	Lab-Environmental Impact Assessment	VIII	0	0	2	1
9	CEHNC7009	Mini Project	VIII	0	0	4	2
Total Credits							18

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D8C: Honors: Water Resources Engineering

Sr. No.	Course Code	Course Title	Semester	Scheme of Teaching (Hrs/week)			Credit
				Theory	Tutorial	Practical	
1	CEHNC7010	Advanced Fluid Mechanics and Hydraulic Machinery	V	3	0	0	3
2	CEHNC7014	Lab- Advanced Fluid Mechanics and Hydraulic Machinery	V	0	0	2	1
3	CEHNC7011	Open Channel Hydraulics	VI	3	0	0	3
4	CEHNC7015	Lab-Open Channel Hydraulics	VI	0	0	2	1
5	CEHNC7012	Ground Water Engineering	VII	3	0	0	3
6	CEHNC7016	Lab- Ground Water Engineering	VII	0	0	2	1
7	CEHNC7013	Water Resources Systems and Management	VIII	3	0	0	3
8	CEHNC7017	Lab-Water Resources Systems and Management	VIII	0	0	2	1
9	CEHNC7018	Mini Project	VIII	0	0	4	2
Total Credits							18

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B. Tech. Program in Civil Engineering with Multidisciplinary Minor

First Year

Semester –I											
			Teaching Scheme			Continuous Evaluation in terms of Marks					
	Course Code	Course Name	TH	T	PR	Credits	ISE I	ISE II	ISE III	ESE	Total
BSC-01	MABSC1001	Mathematics I	3	1	-	4	15	15	10	60	100
BSC-02	PHBSC1001	Optics, Acoustics and Engineering Materials	3	-	0	3	15	15	10	60	100
BSC-03	PHBSC1003	Lab Physics			2	1			25		25
ESC-01	AMESC1001	Engineering Mechanics	3	0		3	15	15	10	60	100
ESC-02	AMESC1003	Lab- Engineering Mechanics			2	1			50		50
ESC-03	CEESC1001	Basics of Civil Engineering	2	0	0	2	10	10	0	30	50
ESC-04	CEESC1002	Lab- Basics of Civil Engineering	0	0	2	1			50		50
VSEC-01	ETVSE1002	Engineering Exploration	0	0	4	2	20	20	10		50
CC-01	INCCC1101	Yoga and Meditation	1	0	2	2	20	20	10		50
IKS	CEIKS1001	IKS	2	0	0	2	10	10		30	100
Total			13	1	14	21	105	105	175	240	675
Semester –II											
	Course Code	Course Name	TH	T	PR	Credits	ISE I	ISE II	ISE III	ESE	Total
BSC-04	MABSC1003	Mathematics II	3	1	-	4	15	15	10	60	100
BSC-05	CHBSC1002	Battery Science, Lubricants and Green Chemistry	3	-	0	3	15	15	10	60	100
BSC-06	CHBSC1003	Lab Chemistry			2	1			25		25
ESC-05	CEESC1003	Civil Engineering Drawing	2	0		2	10	10		30	50
ESC-06	CEESC1004	Lab-Civil Engineering Drawing			2	1			25		25
ESC-07	CSESC1005	Programming for Problem Solving	2	0	0	2	10	10		30	50
ESC-08	CSESC1006	Lab- Programming for Problem Solving	0	0	2	1			25		25
VSEC-2	CEVSE1001	Civil Engineering Workshop	0	0	4	2			50		50
AEC-01	INAEC1001	Communication Skill	2	0	0	2	10	10		30	50
CC-02	INCCC1002 /INCC1003/ INCCC1004	NSS/ Sports/ Club Activities	0	-	4	2	20	20	10		50
PCC-01	CEPCC1001	Engineering Geology	2	0	0	2	10	10		30	50
PCC-02	CEPCC1002	Lab-Engineering Geology	0	0	2	1			25		25
Total			15	1	14	23	100	100	190	210	600

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Second Year

Semester –III											
			Teaching Scheme			Continuous Evaluation in terms of Marks					
	Course Code	Course Name	TH	T	PR	Credits	ISE I	ISE II	ISE III	ESE	Total
PCC	CEPCC2001	Surveying	3	0	0	3	15	15	10	60	100
PCC	CEPCC2003	Lab-Surveying	0	0	2	1			25	25	50
PCC	CEPCC2002	Fluid Mechanics	3	0	0	3	15	15	10	60	100
PCC	CEPCC2004	Lab-Fluid Mechanics	0	0	2	1			25	25	50
MD(M)	CEMDM5001	Multidisciplinary Minor	3	0	0	3	15	15	10	60	100
MD(M)	CEMDM5002	Lab. Multidisciplinary Minor	0	0	2	1			25	25	50
OE	CEOEC0010	Open Elective-I	3	0	0	3	15	15	10	60	100
HSSM	CEEEM0010	Engineering Economics	2	0	0	2	10	10		30	50
VEC	CEVEC0010	Environmental Science	2	0	0	2	10	10		30	50
PCC	AMPCC2001	Solid Mechanics	3	0	0	3	15	15	10	60	100
PCC	AMPCC2002	Lab-Solid sMechanics	0	0	2	1			25	25	50
FP/CEP	CECEP1001	Mini Project	0	0	4	2		-	50	50	100
Total			19	0	12	25	95	95	200	510	900
		Multidisciplinary Minor:									
	CEMDM5001	Artificial Intelligence in Civil Engineering									
	CEMDM5002	Lab. Artificial Intelligence in Civil Engineering									
		Open Elective-I:									
	CEOEC0010:	Rural Technology									
Semester –IV											
	Course Code	Course Name	TH	T	PR	Credits	ISE I	ISE II	ISE III	ESE	Total
PCC	AMPCC2003	Concrete Technology	3	0	0	2	15	15	10	60	100
PCC	AMPCC2004	Lab-Concrete Technology	0	0	2	1			25	25	50
PCC	CEPCC2005	Building, Planning and Design	3	0	0	3	15	15	10	60	100
PCC	CEPCC2007	Lab- Building, Planning and Design	0	0	2	1			25	25	50
PCC	CEPCC2006	Environmental Engineering	3	0	0	3	15	15	10	60	100
PCC	CEPCC2008	Lab-Environmental Engineering	0	0	2	1			25	25	50
OE	CEOEC1020	Open Elective-II	3	0	0	3	15	15	10	60	100
MD(M)-2	CEMDM5003	Multidisciplinary Minor	3	0	0	3	15	15	10	60	100
HSSM	CEEEM1020	Finance and Accounting	2	0	0	2	10	10		30	50
VSEC	CEVSE2001	Lab-Python Programming	0	0	4	2			50		50
AEC- 02	INAEC1002	Lab-Technical Report Writing	0	0	4	2		0	50	0	50
VEC	CEVEC1010	Universal Human Values-II	2	0	0	2	10	10		30	50
Total			19	0	14	25	95	95	225	435	850
		Multidisciplinary Minor:									
	CEMDM5003	AI Powered Hydrologic Systems									
		Open Elective-II:									
	CEOEC1020	Disaster Management									

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B. Tech. Program in Civil Engineering with Multidisciplinary Minor
Third Year

Semester –V											
			Teaching Scheme			Continuous Evaluation in terms of Marks					
	Course Code	Course Name	TH	T	PR	Credits	ISE I	ISE II	ISE III	ESE	Total
PCC	CEPCC3001	Transportation Engineering	3	0	0	3	15	15	10	60	100
PCC	CEPCC3003	Lab-Transportation Engineering	0	0	2	1			25	25	50
PCC	CEPCC3002	Geotechnical Engineering	3	0	0	3	15	15	10	60	100
PCC	CEPCC3004	Lab-Geotechnical Engineering	0	0	2	1			25	25	50
PCC	AMPCC3001	Design of Steel Structures	3	0	0	3	15	15	10	60	100
PCC	AMPCC3002	Lab-Design of Steel Structures	0	0	2	1			25	25	50
PEC		Program Elective- I	3	0	0	3	15	15	10	60	100
PEC		Lab-Program Elective-I	0	0	2	1			25	25	50
OE	CEOEC0030	Open Elective-III	2	0	0	2	10	10		30	50
MD(M)	CEMDM5004	Multidisciplinary Minor	3	0	0	3	15	15	10	60	100
MD(M)	CEMDM5005	Lab-MD(M)	0	0	2	1		0	25	25	50
Total			17	0	10	22	85	85	175	455	800
		Multidisciplinary Minor:									
	CEMDM5004	Basics of Surveying									
	CEMDM5005	Lab-Basics of surveying									
		Open Elective-III									
	CEOEC0030	Watershed Management									
Semester –VI											
	Course Code	Course Name	TH	T	PR	Credits	ISE I	ISE II	ISE III	ESE	Total
PCC	AMPCC3003	Structural Analysis	3	0	0	3	15	15	10	60	100
PCC	AMPCC3004	Design of R.C.C. Structures	3	0	0	3	15	15	10	60	100
PCC	AMPCC3005	Lab-Design of R.C.C. Structures	0	0	2	1			25	25	50
PCC	CEPCC3005	Water Resources Engineering	3	0	0	3	15	15	10	60	100
PCC	CEPCC3007	Lab-Water Resources Engineering	0	0	2	1			25	25	50
PCC	CEPCC3006	Estimating, Costing and Valuation	3	0	0	3	15	15	10	60	100
PCC	CEPCC3008	Lab-Estimating, Costing and Valuation	0	0	2	1			25	25	50
PEC		Program Elective II	3	0	0	3	15	15	10	60	100
PEC		Lab-program Elective II	0	0	2	1			25	25	50
MD(M)	CEMDM5006	Multidisciplinary Minor	3	0	0	3	15	15	10	60	100
VSEC	CEVSE3001	Software for Civil Engineering	0	0	4	2			50		50
Total			18	0	12	24	90	90	210	460	850
		Multidisciplinary Minor:									
	CEMDM5006	Transportation Infrastructure and Smart Technologies									

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Fourth Year

Semester –VII											
			Teaching Scheme			Continuous Evaluation in terms of Marks					
	Course Code	Course Name	TH	T	PR	Credits	ISE I	ISE II	ISE III	ESE	Total
PEC		Programme Elective- III	3	0	0	3	15	15	10	60	100
PEC		Lab-Programme Elective-III	0	0	2	1			25	25	50
ELC	CERMC4001	Research Methodology	3	1	0	2	10	10		30	50
PEC		Programme Elective-IV	3	0	0	3	15	15	10	60	100
PEC		Lab-Programme Elective-IV	0	0	2	1			25	25	50
PEC		Programme Elective-V	3	0	0	3	15	15	10	60	100
PEC		Lab-Programme Elective-V	0	0	2	1			25	25	50
Total			12	1	6	14	55	55	105	285	500
Semester –VIII											
	Course Code	Course Name	TH	T	PR	Credits	ISE I	ISE II	ISE III	ESE	Total
OJT	CEINT4001	Internship	-	-	-	12			50	50	100
Project	CEPRJ4001	Project	0	0	8	4		0	100	100	200
Total			0	0	8	16	0	0	150	150	300

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Bridge Courses for Exit:-

After First Year:	The candidate should complete the internship of two months for 8 credits
After Second Year:	The candidate should complete the internship of two months for 8 credits
After Third Year:	The candidate should complete the internship of two months for 8 credits

Programme Elective-I

Sr. No.	Course Code	Course Title	Scheme of Teaching (Hrs/week)			Credit
			Theory	Tutorial	Practical	
1	AMPEC3001	Advanced Concrete Technology	3	0	0	3
2	CEPEC3001	Advanced Surveying	3	0	0	3
3	CEPEC3002	Town Planning	4	0	0	4
4	CEPEC3003	Advanced Fluid Mechanics and Hydraulic Machinery	3	0	0	3
5	CEPEC3004	Advanced Water and Waste Water Treatment	3	0	0	3
6	AMPEC3002	Design of Precast and Composite Structures	3	0	0	3
7	AMPEC3003	Lab- Advanced Concrete Technology	0	0	2	1
8	CEPEC3005	Lab-Advanced Surveying	0	0	2	1
9	CEPEC3006	Lab- Advanced Fluid Mechanics and Hydraulic Machinery	0	0	2	1
10	CEPEC3007	Lab-Advanced Water and Waste Water Treatment	0	0	2	1
11	AMPEC3004	Design of Precast and Composite Structures	0	0	2	1

Programme Elective-II

Sr. No.	Course Code	Course Title	Scheme of Teaching (Hrs/week)			Credit
			Theory	Tutorial	Practical	
1	CEPEC3008	Ground Improvement Techniques	3	0	0	3
2	CEPEC3009	Open Channel Hydraulics	3	0	0	3
3	CEPEC3010	Air Pollution and Control	3	0	0	3
4	CEPEC3011	Advanced Transportation Engineering	3	0	0	3
5	CEPEC3012	Civil Engineering Laws	4	0	0	4
6	AMPEC3006	Design of Advanced Steel Structures	3	0	0	3
7	CEPEC3013	Lab-Ground Improvement Techniques	0	0	2	1
8	CEPEC3014	Lab-Open Channel Hydraulics	0	0	2	1
9	CEPEC3015	Lab- Air Pollution and Control	0	0	2	1
10	CEPEC3016	Lab- Advanced Transportation Engineering	0	0	2	1
11	AMPEC3007	Lab - Design of Advanced Steel Structures	0	0	2	1

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Programme Elective-III

Sr. No.	Course Code	Course Title	Scheme of Teaching (Hrs/week)			Credit
			Theory	Tutorial	Practical	
1	AMPEC4001	Design of Bridges	3	0	0	3
2	CEPEC4001	Ground Water Engineering	3	0	0	3
3	CEPEC4002	Water Power Engineering	3	0	0	3
4	AMPEC4002	Design of Advanced RC Structures	3	0	0	3
5	CEPEC4003	Solid Waste Management	3	0	0	3
6	CEPEC4004	Construction Management	3	0	0	3
7	AMPEC4003	Lab-Design of Bridges	0	0	2	1
8	CEPEC4005	Lab- Ground Water Engineering	0	0	2	1
9	CEPEC4006	Lab-Water Power Engineering	0	0	2	1
10	AMPEC4004	Lab- Design of Advanced RC Structures	0	0	2	1
11	CEPEC4006	Lab- Solid Waste Management	0	0	2	1
12	CEPEC4007	Lab- Construction Management	0	0	2	1

Programme Elective-IV

Sr. No.	Course Code	Course Title	Scheme of Teaching (Hrs/week)			Credit
			Theory	Tutorial	Practical	
1	AMPEC4005	Pre-stressed Concrete Design	3	0	0	3
2	CEPEC4008	Industrial Waste Management	3	0	0	3
3	CEPEC4009	Infrastructural Development	3	0	0	3
4	CEPEC4010	Advanced Geotechnical Engineering	3	0	0	3
5	AMPEC4006	Building Maintenance and Repairs	3	0	0	3
6	AMPEC4007	Lab-Pre-stressed Concrete Design	0	0	2	1
7	CEPEC40111	Lab-Industrial Waste Management	0	0	2	1
8	CEPEC4012	Lab-Infrastructural Development	0	0	2	1
9	CEPEC4013	Lab-Advanced Geotechnical Engineering	0	0	2	1
10	AMPEC4008	Lab-Building Maintenance and Repairs	0	0	2	1

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Programme Elective-V

Sr. No.	Course Code	Course Title	Scheme of Teaching (Hrs/week)			Credit
			Theory	Tutorial	Practical	
1	AMPEC4009	Earthquake Analysis and Design of Structures	3	0	0	3
2	AMPEC3005	Advanced Structural Analysis	4	0	0	4
3	CEPEC4014	Water Resources Systems and Management	3	0	0	3
4	CEPEC4015	Environmental Impact Assessment	3	0	0	3
5	CEPEC4016	Engineering Optimization	3	0	0	3
6	AMPEC4010	Finite Element Method				
7	AMPEC4011	Lab-Earthquake Analysis and Design of Structures	0	0	2	1
8	CEPEC4017	Lab-Water Resources Systems and Management	0	0	2	1
9	CEPEC4018	Lab-Environmental Impact Assessment	0	0	2	1
10	CEPEC4019	Lab-Engineering Optimization	0	0	2	1
11	AMPEC4012	Lab – Finite Element Method				

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MABSC1001: Mathematics – I		
Teaching Scheme	Examination Scheme	
Lectures: 03 Hrs / Week	ISE I	15 Marks
Tutorial: 01 Hrs / Week	ISE II	15 Marks
Credits: 04	ISE III	10 Marks
	End Semester Examination	60 Marks

Course Description: MABSC1001: Mathematics-I is compulsory course for first year B. Tech. Civil Engineering, Mechanical Engineering., Computer Science & Engineering and Information Technology students.

Course Outcomes:

After completing the course students will able to

Course Outcomes		Bloom's Taxonomy Level	Unit
CO1	Define Beta, Gamma and error functions and find the roots of Complex Numbers, Rank of Matrix, limit of function, series expansion and maxima – minima of functions, asymptotes of given curves.	K1	1,2,3,4,5
CO2	Summaries the Complex Numbers; Explain the Rank of Matrix, successive differentiation, Special functions (Beta and Gamma functions)	K2	1,2,3,4,5
CO3	Identify the real and imaginary part of logarithm of complex numbers, eigen values and eigen vectors.	K2	1,2
CO4	Solve the system of linear equations using Gauss elimination and Gauss Jordan Method, Leibnitz's theorem, definite integrals using Beta and Gamma functions and definite integrals using rule of Differentiation under integral sign.	K2	2,3,4
CO5	Apply De-Moivre's theorem, Cayley Hamilton theorem, knowledge of integral calculus and sketch the approximate shape of the curves.	K3	1,2,4,5

Detailed Syllabus:

Unit 1	**Complex Numbers** Definition of complex numbers, Argand Diagram, De-Moivre's theorem and its application to find roots of algebraic equations, expansions of trigonometric functions, Circular and Hyperbolic functions inverse Hyperbolic functions, Logarithm of complex numbers, separation into real and imaginary parts.
Unit 2	**Matrices** Rank of matrix, echelon form of matrix, normal form of matrix, algebraic system of m linear equations in n unknowns, Gauss elimination and Gauss Jordan elimination method, linear dependence and independence of vectors, orthogonal matrix, linear transformations, matrix of linear transformation, rank nulity theorem, Eigen values and Eigen vectors, Cayley Hamilton theorem and its applications.
Unit 3	**Differential Calculus** nth order ordinary derivatives of elementary functions, Leibnitz's theorem, expansion of function in power series, Taylor's series, Maclaurin's series indeterminate forms and L'hospital rule, maxima and minima, converge of sequence and series, range of convergence of power series, test of convergence – ratio test and comparison test.
Unit 4	**Integral Calculus** Beta function, Gamma function, rules of Differentiation Under Integral Sign, error function, application of definite integrals to evaluate surface area and volume of revolutions.
Unit 5	**Curve Tracing and its applications** Tracing of cartesian curves, polar curves and parametric equations, rectification of plane curves: cartesian and polar.

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Text and Reference Books

1. Erwin Kreyszing, Advanced Engineering Mathematics,10th Edition, Mumbai: Willey Eastern Ltd. 2015.
2. B. S. Grewal, Higher Engineering Mathematics, 44th Edition, New Delhi: Khanna publication, 2017.
3. Ramana B.V. Higher Engineering Mathematics,11 th Reprint, New Delhi: Tata McGraw Hill, 2010.
4. David Poole, Linear Algebra: A Modern Introduction, 3rd Edition, USA: BROOKS/COLE CENGAGE Learning, 2011.
5. Ravish R. Singh, Mukul Bhatt, Engineering Mathematics- A tutorial approach, 4th Edition, New Delhi: Tata McGraw Hill Education Pvt. Ltd.2018.
6. Dass H. K. Advanced Engineering Mathematics, 22nd Edition, New Delhi: S. Chand publications, 2018.
7. P. N. Wartikar and J. N. Wartikar, A text book of Engineering Mathematics (Vol. 1 & 2), Reprint, Pune: Pune Vidhyarthi Griha Prakashan, 2013.

Assessment: ISEI, II, III (Class Test-1, Class Test-2, TA) & ESE

TA: Students will perform one or more of the following activities

1. Surprise Test
2. Assignment using Mathematical tools like Mathematica/MATLAB or similar.
3. Quiz
4. Any other activity suggested by course coordinator

Assessment Pattern:

Assessment Pattern Level No.	Knowledge Level	ISE I (Class Test-1)	ISE II (Class Test-2)	ISE III (TA + Surprise Test)	End Semester Examination
K1	Remember	5	5		
K2	Understand	10	10		60
K3	Apply			10	
K4	Analyze				
K5	Evaluate				
K6	Create				
Total Marks 100		15	15	10	60

Mapping of Course outcomes with Program outcomes:

Course Outcomes	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	2	2	1									1
CO2	2	2	1									1
CO3	2	2	1									1
CO4	2	3	1		2				2			1
CO5	3	3	1		2				2			1

1 – Low, 2 – Medium, 3 – High

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PHBSC1001: Optics, Acoustics and Engineering Materials		
Teaching Scheme	Examination Scheme	
Lectures: 03 Hrs. / Week	ISE I	15 Marks
Credits: 03	ISE II	15 Marks
	ISE III	10 Marks
	End Semester Examination	60 Marks

Course Description: The course is mandatory course for first year B. Tech. Civil, Mechanical and Electrical Engineering programs in first semester. The course objective is to teach fundamental principles in Physics and relate the understanding to applications.

Course Outcomes:

After completing the course students will able to

	Course Outcomes	BT Level
CO1	Define interference, thin film interference, Fraunhofer diffraction, resolving power, polarization, double refraction, Free, damped and forced oscillations, resonance, state features of magnetic and dielectric materials, acoustical demands of building, methods of production of ultrasonics, types of energy bands.	K1
CO2	Explain the concepts interference, diffraction, polarization, dielectric and magnetic properties, semiconductors, architectural acoustics and ultrasonics, oscillations, resonance, wave motion,	K2
CO3	Illustrate the engineering applications of interference, diffraction, polarization, dielectric and magnetic properties, semiconductors and ultrasonics	K3
CO4	Identify, formulate and solve physical problems related to engineering	K4
CO5	Apply the fundamental principles of interference, diffraction, polarization, dielectric and magnetic properties, semiconductors, architectural acoustic and ultrasonic in engineering context	K5

Detailed Syllabus:

Unit 1	**Optics-** Interference- Interference due to thin film of uniform thickness, wedge shaped film, Newton's rings formation and theory, Anti-reflection coating. Diffraction- Fraunhofer diffraction at single slit (geometrical method), Conditions for maxima and minima, Double slit Diffraction, Plane diffraction grating, Rayleigh's criterion of resolution, resolving power of grating. Polarization- Polarization by reflection, Polarization by double refraction, Phase difference and path difference, Quarter wave plate, Half wave plate, Superposition of e-ray and o-ray, Production of circularly and elliptically polarized light, Polaroid sheets.
Unit 2	**Acoustics and ultrasonics** Acoustics- classification of sound, musical sound, noise, characteristics of musical sounds-pitch, loudness or intensity, measurement of intensity level, decibel, quality or timbre, reflection of sound, echo, reverberation, reverberation time, absorption of sound, absorption coefficient, Sabine's formula with derivation, factors affecting architectural acoustics. Ultrasonics- Production of ultrasonic waves by piezoelectric and magnetostriction method, engineering applications of ultrasonic waves.
Unit 3	**Engineering Materials-** Dielectric properties of material- dielectric constant, induced dipole, permanent dipole, polarization in dielectric materials, types of polarization, polar and non-polar dielectrics, frequency dependence of dielectric constant, applications of dielectric materials.

	Magnetic materials- review of basic concepts magnetization, magnetic susceptibility, relative permeability, classification of diamagnetic, paramagnetic and ferromagnetic materials, domain hypothesis, hysteresis or BH curve in ferromagnetic materials, soft and hard magnetic materials, applications.
Unit 4	**Semiconductors-** Band theory of Solids, Classification of solids on the basis of energy band theory, Fermi- Dirac statistics, Concept of Fermi level and its variation with temperature, Density of states, Position of Fermi level in intrinsic semiconductor (with derivation) and in extrinsic semiconductor, Conductivity of semiconductor, Working of p-n junction from energy band diagram- forward and reverse biased, Hall effect in semiconductor.
Unit 5	**Oscillations -** Free, damped and forced oscillations, resonance, theory of resonant oscillations- condition for amplitude resonance, sharpness of resonance, differential equation of wave motion, damped harmonic motion- over damped, critically damped and under damped cases, transverse vibrations of stretched string.

Text and Reference Books

1. M. N. Avadhanulu, and P. G. Kshirsagar. *A Textbook Of Engineering Physics*, 5th ed. New Delhi: S. Chand and company Ltd., 2014
2. R. K. Gaur, S. L. Gupta. *Engineering Physics*, 14th ed. New Delhi: Dhanpat Rai and Sons Publications, 2012
3. M. R. Srinivasan, *Physics for Engineers*, 2nd ed. New Delhi: New Age International Publishers, 2009.
4. D. Halliday, and R. Resnic. *Fundamentals of Physics*, 9th ed. Noida: John–Wiley and Sons, 2010
5. Arthur Beiser, *Perspectives of modern Physics*, Mc-Graw Hill, US, 1969

Assessment: ISE I-Class Test-I of Maximum Marks-15
ISE II-Class Test-II of Maximum Marks-15
ISE III- Teacher's Assessment: Teachers Assessment of 10 marks is based on one of the / or combination of surprise test, assignment, quiz, any other activity suggested by course coordinator

Assessment Pattern:

Assessment Pattern Level No.	Knowledge Level	ISE I	ISE II	ISE III	End Semester Examination
K1	Remember	5	5	2	12
K2	Understand	5	5	6	18
K3	Apply	5	5	2	12
K4	Analyze				12
K5	Evaluate				6
K6	Create				
Total Marks 100		15	15	10	60

Assessment table:

Course Outcome	CO1	CO2	CO3	CO4	CO5
Assessment Tool	K1	K2	K3	K4	K5
ISEI Class Test-I (15 Marks)	5	5	5		
ISEII Class Test-II (15 Marks)	5	5	5		
IS III TA(10 Marks)	2	6	2		
ESE Assessment (60 Marks)	12	18	12	12	6
Total Marks 100	24	34	24	12	6

Mapping of Course outcomes with Program outcomes:

Course Outcomes	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	2									2		
CO2	2											
CO3	2											
CO4	2											
CO5	2											

1 – Low, 2 – Medium, 3 – High

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PHBSC1003: Lab Physics		
Teaching Scheme	Examination Scheme	
Practical: 02 Hrs. / Week	ISE III	25 Marks
Credit: 01		

Course Outcomes:

After completing the course students will able to

Course Outcomes	
CO1	Demonstrate basic laws of Physics with experimental process
CO2	Conduct experiments to understand the relationship between variables in physical problems
CO3	Interpret experimental data to examine the physical laws
CO4	Illustrate the relevance between theoretical knowledge and means to imply it in a practical manner by performing various experiments
CO5	Work in teams and understand the effective team dynamics.

List of the Experiments:

The student shall perform minimum eight experiments of the following:

Sr. No.	Title of the Experiments	Skill / Knowledge Level	CO
1	e/m by Thomson's method.	S1/K2	CO3
2	Determination of radius of curvature of Plano-convex lens by Newton's ring.	S1/K1	CO1
3	Determination of the wavelength of light of a given source using diffraction grating.	S1/K2	CO1
4	Resolving power of telescope.	S1/K2	CO3
5	Study of C.R.O (amplitude and frequency measurement).	S1/K1	CO5
6	Specific rotation of sugar solution by Laurent's half shade polarimeter.	S1/K2	CO4
7	Determination of band gap of a semiconductor.	S1/K2	CO3
8	To study temperature dependence of resistivity of a semiconductor using four probe method.	S1/K2	CO3, CO5
9	To determine the Hall coefficient of a semiconductor material and then evaluate carrier type and its density of charge carrier.	S1, S3/K2	CO1
10	Study of solar cell characteristics.	S1/K1	CO2, CO5
11	Determination of wavelength of Laser using grating.	S1, S2/K2	CO3
12	Determination of numerical aperture of an optical fiber.	S1, S3/K2	CO3
13	To plot the hysteresis loop of a given magnetic material (iron).	S1/K2	CO2
14	To study characteristics of photovoltaic cell.	S1/K2	CO3
15	Study of divergence of Laser beam.	S2, S3/K2	CO2, CO5
16	To measure thickness of fine wire and grating element with the help of Laser source.	S1/K2	CO1
17	To draw V/I characteristics of forward & reverse biased P-N junction diode.	S1, S3/K2	CO3
18	Determination of velocity of sound through water using ultrasonic interferometer.	S1, S3/K2	CO3

Assessment:

ISE III- Continuous Assessment of individual student in a batch during each experiment Maximum Marks-25

Assessment Pattern:

Assessment Pattern Level No.	Knowledge Level	ISE III
K1	Remember	10
K2	Understand	15
K3	Apply	
K4	Analyze	
K5	Evaluate	
K6	Create	
Total Marks		25

Assessment Pattern Level No.	Knowledge Level	ISE III
S1	Imitation	15
S2	Manipulation	05
S3	Precision	05
Total Marks		25

Mapping of Course outcomes with Program outcomes:

Course Outcomes	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	3			2					3			
CO2	3			2								
CO3	3	3	2	2								
CO4	3	3	2	2								
CO5									2			

1 – Low, 2 – Medium, 3 – High

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AMESC1001: Engineering Mechanics

Teaching Scheme		Evaluation Scheme	
Theory	03 hrs/week	ISE I	15 Marks
Tutorial	00	ISE II	15 Marks
Total Credits	03	ISE III	10 Marks
		End Semester Examination	60 Marks
		Total	100 Marks

Prerequisites: Knowledge of vectors and scalars and preliminary knowledge of motion.

Course description: Engineering Mechanics is one of the basic subjects for the students of engineering, irrespective of their branches, since it helps them to develop the logical thinking, analytical ability and enhance the imagination power. It introduces the students to various types of forces, their resultant, equilibrium of forces, analysis of various force system and the effect of forces on the state of motion of the body. Students will be exposed to C.G. and M.I. of the area and mass M.I of the bodies. They will also be exposed to dynamics of particle and rigid body.

Course Outcomes:

After completing the course, students will be able to:

	Course Outcomes
CO1	State and explain the relevant laws of statics and dynamics.
CO2	Determine resultant, identify the force system acting on bodies and perform static analysis of a given system.
CO3	Determine the member forces of a truss. Determine the centroid and compute moment of inertia of area and centre of gravity and mass moment of inertia of regular bodies.
CO4	Establish relations between kinematic parameters for different types of motion and compute the motion characteristics.
CO5	Apply the principles of kinetics to compute the motion parameters or related forces of a given system.

Detailed Syllabus:

Unit 1	**Fundamental Concepts, Forces and Their resultant**: Fundamental Concepts and Principles, Types of Force systems, Composition and Resolution of Forces, Moment of force, Couple, Resultant of Planar and Spatial force systems, Analytical and Graphical methods.
Unit 2	**Equilibrium of Forces and Friction:** Free body diagrams, Equations of Equilibrium, Types of Supports and support reactions, Equilibrium of Co-planer force systems, Applications to beams and frames. Equilibrium of non-coplanar concurrent force systems. Theory and Laws of Friction, Cone of friction, wedge friction, rolling friction, Belt friction and their applications.
Unit 3	**C.G. and MI of area of plane sections and regular Bodies:** Centroid of Plane figures and lines, Moment of Inertia of plane sections, Transformation theorems, Radius of gyration, Centre of gravity and Mass Moment of Inertia of regular bodies.
Unit 4	**Kinematics of particles :** Rectilinear Motion, Equations of Motion, Motion curves and their applications, Curvilinear motion in Cartesian and Polar Co-ordinates, Motion of projectile, Relative motion, Fixed axis rotation.
Unit 5	**Kinetics of particles:** Newton's laws of Motion, D'Alembert's Principle, Equations of motion of particle and rigid body, motion of connected bodies, Fixed axis rotation.

	Principle of work and Energy, Principle of Impulse and Momentum and their applications to particles, Direct central impact.

Text Books

1. Beer and Johnston, Mechanics for Engineers (Statics and Dynamics), McGraw Hill Co.Ltd.
2. A.K.Tayal, Engineering Mechanics, Umesh publications.
3. V.S. Mokashi, Engineering Mechanics Vol. I and II, Tata McGraw Hill Publishing Co. ltd., New Delhi.
4. S.S.Bhavikutti and K.G. Rajashekarappa, Engineering Mechanics, New Age International (P) Limited Publishers, New Delhi.

Reference Books:

1. F.L. Singer, Engineering Mechanics, Harper and Row Publishers, USA
2. Timoshenko and Young, Engineering Mechanics, McGraw Hill Co.Ltd.
3. R.C. Hibbeler, Engineering Mechanics (Statics and Dynamics), McMillan publications
4. McLean and Nelson, Engineering Mechanics, Schaum's Outline Series, McGraw Hill Co.Ltd. New Delhi

Mapping of Course outcome with Program Outcomes and Program Specific Outcomes

BE-Civil Engineering

Course Outcome	PO 1	PO 2	PO3	PO4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12	PSO 1	PSO 2
CO1	3	2	1											2
CO2	3	3	1										1	3
CO3	3	1	1											2
CO4	3	3	2										1	2
CO5	3	3	2										1	2

1 : Low 2:Medium 3: High

BE-Mechanical Engineering

Course Outcome	PO 1	PO 2	PO3	PO4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12	PSO 1	PSO 2	PSO 3
CO1	3	2	2												
CO2	3	3	2												
CO3	3	2	2												
CO4	3	3	2												
CO5	3	3	2												

1 : Low 2:Medium 3: High

Assessment: 1) For assessment under ISE-I and ISE-II, two test of 15 marks each, Test-I and Test-II, will be conducted on prescribed syllabus (around first 1.5 to 2 Units for Test-I and 3rd and some portion of 4th Unit for Test- II).

2) Under ISE-III- Teachers Assessment of 10 marks may be based on one or more of the following

i. Technical quizzes.
ii. Assignments-Numerical solution.
iii. Punctuality.

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Assessment Pattern:

Assessment Pattern Level No.	Knowledge Level	ISE I	ISE II	ISE III	End Semester Examination

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K1	Remember	02	02		06
K2	Understand	03	03	02	10
K3	Apply	10	10	08	44
K4	Analyze				
K5	Evaluate				
K6	Create				
Total Marks 100		15	15	10	60

Assessment table:

Assessment Tool	K1 , K2	K3	K2, K3	K3	K3
	CO1	CO2	CO3	CO4	CO5
ISE I (15 Marks)	05	10	-	-	-
ISE II (15 Marks)	02		09	04	
ISE III (10 Marks)	02	02	02	02	02
ESE Assessment (60 Marks)	12	12	12	12	12
Total Marks 100	21	24	23	18	14

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AMESC1003: Lab - Engineering Mechanics

Teaching Scheme	Examination Scheme	
Practical: 2Hrs/Week	ISE I	25 Marks
Credits:01	ISE II	25 Marks
	End Semester Evaluation	-

Course Outcomes:

After completion of this course students will be able to:

	Course Outcomes
CO1	Apply graphical method to solve problems of statics.
CO2	Demonstrate the principles of Engineering Mechanics experimentally and interpret the experimental results.
CO3	Solve numerical examples in statics and dynamics.

List of the Experiments/ Term Work

The student shall use graphical method to solve the problems of engineering mechanics (Sr. No. 1) and perform the experiments given below. They should also complete the tutorial problems of the subject Engineering Mechanics given by the teacher as a part of laboratory work.

Sr. No.	Title of the Experiments/Term Work	Level	CO	Marks for ISE
1	Graphical solutions for the following problems a. Resultant of Coplanar Non Concurrent force system: i) At least one problem with resultant as a force ii) At least one problem with resultant as a couple b. Equilibrium of Coplanar Non Concurrent force system: At least one Problem c. Friction: At least one Problem	K2, K3	CO1	15
2	Following experiments shall be conducted. a. Polygon law of forces b. Law of moments c. Jib crane d. Beam reaction e. Friction f. Screw jack g. Fly wheel	K1, K2, K3	CO2	30
3	Tutorial Problems At least three problem on each unit of the theory course of Engineering Mechanics	K1,K2, K3	CO3	05

Assessment: ISE-I and ISE II: Assessment will be based on understanding of theory/experiment, the performance of practical, completion of term work, completion of tutorial problems, participation in group activity etc.

Assessment Pattern:

Assessment Pattern Level No.	Knowledge Level	ISE I	End Semester Examination

K1	Remember	05	-
K2	Understand	15	-
K3	Apply	30	-
K4	Analyze	-	-
K5	Evaluate	-	-
K6	Create	-	-
Total Marks			-

Mapping of Course outcome with Program Outcomes and Program Specific Outcomes:

BE-Civil Engineering

Course Outcome	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12	PSO 1	PSO 2
CO1	3	2	1	1	1								-	2
CO2	3	1	1	3	2								1	3
CO3	3	2	2	1	1								1	3

1 : Low 2:Medium 3: High

BE-Mechanical Engineering

Course Outcome	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO 1	PSO 2	PSO 3
CO1	3	1	1												
CO2	3	2	2	1	1										
CO3	3	2	2												

1 : Low 2:Medium 3: High

BE- Computer Science & Engineering

Course Outcome	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO 1	PSO 2	PSO 3
CO1	1	1									1				
CO2	2	3									1				
CO3	2	1									1				

1 : Low 2:Medium 3: High

BE-Information Technology

Course Outcome	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO 1	PSO 2	PSO 3
CO1	1			1					1						
CO2	2			3					1						
CO3	2			1					1						

1 : Low 2:Medium 3: High

Head Dr. S. S. Koranne Head, Civil Engg. Dr. Anil Karwankar Dean , Academics mics

Approved Curriculum in XXXth Academic Council Meeting Dated: 5th July 2025

CEESC1001: Basic of Civil Engineering

Teaching Scheme		**Evaluation Scheme**	
Theory	02 hrs/week	ISE I	10 Marks
Tutorial	00	ISE II	10 Marks
Total Credits	02	ISE III	
		End Semester Examination	30 Marks
		Total	50 Marks

Pre-requisites – Nil

Course Description: Objective of this course is to provide an insight and inculcate the essentials of civil engineering discipline to the students of all branches of Engineering and to provide the students an illustration of the significance of the civil engineering profession in satisfying the societal needs. Civil engineers plan, design, build, supervise and maintain infrastructure projects such as public and private utility buildings, roads, bridges, water supply and sewage treatment schemes, irrigation projects, etc. This course will give an understanding to the students of the vast breadth and various areas of engagement available in overall field of civil engineering.

Course Outcomes:

After completing the course, students will able to:

	Course outcomes
CO1	Explain terms related with building construction
CO2	Illustrate various surveying techniques
CO3	Explain the uses of civil engineering materials and explain the types of roads
CO4	Demonstrate construction equipments and term related with earthquake
CO5	Sketch Environment and Irrigation works

Detailed syllabus:

Unit I	Building Construction Early constructions and developments over time, ancient monuments and modern marvels, development of various materials of constructions and methods of constructions Site selection, principles of planning, typical plan of residential building, plinth area, carpet area, floor space index, cost of building, building bye-laws. Loads coming on structure, types of construction a) load bearing structure b) framed structure. Function of foundation, column footing, combined footing and machine foundation. Superstructure and its components typical cross section through load bearing wall, brick and stone masonry used for construction, technical terms related with doors, windows and stairs.
Unit 2	Geographical Measurement Principles of survey, measurement of distance by chain and tape, laser distance meter base line and offset equipments for laying offsets, prismatic compass, measurement of bearing and calculation of inclined angles, study and use of dumpy level, leveling staff, bench mark, determination of reduced levels, modern surveying equipments, remote sensing and GIS, uses of toposheets and contours
Unit 3	Civil Engineering Materials Road construction Study of properties and uses of different engineering materials a) bricks b) stones c) aggregates d) sand e) cement f) concrete g) steel h) paving blocks i) autoclaved aerated concrete blocks j) paints Classification of roads, Rigid and flexible pavements, typical road sections in cutting and embankment, function of camber, super-elevation, intelligent transport systems and road safety, various types of bridges.
Unit 4	Major construction equipments: earth moving equipment, pavers, ready mix concrete plants, automation and robotics in construction, software used in civil engineering.

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Approved Curriculum in XXXth Academic Council Meeting Dated: 5th July 2025

Dated: 27th April 2023

	Environment and Water resources engineering Definition of watershed, necessity of watershed management works, different structures involved in watershed management. Classification of dams, Necessity of irrigation and benefits of irrigation Water treatment units and component parts of water supply system; sewage treatment units and sewerage systems; necessity of solid waste management

Text and Reference books

1. PC Verghese "Building construction" 2nd PHI learning pvt ltd
2. NN Bask "Surveying and leveling" 2nd McGraw hill education
3. Garg SK "Irrigation Engineering and Hydraulics structures" 36th Khanna Publishers Delhi
4. Jai Krishna, Brijesh Chandra "Elements of earthquake engineering" 2nd South asian publishers
5. Shah Kale and Patki "Building Design and Drawing" 5th Tata McGraw Hill

Mapping of course outcomes with program outcomes and program specific outcomes

Outcomes	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	3	2				2			1			
CO2	3	2							1			
CO3	3	2				2			1			
CO4	3	2				2	2		2			
CO5	3	2				2	2		2			

1-low, 2-medium, 3-high

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Head, Civil Engg.

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Approved Curriculum in XXXth Academic Council Meeting
Dated: 5th July 2025

CEESC1002: Lab -Basic of Civil Engineering

Teaching Scheme		Evaluation Scheme	
Theory	2 Hrs/ Week	ISE I	25 Marks
Total Credit	1	ISE II	
		ISE III	
		Practical Examination	25 Marks
		Total	50 Marks

Pre-requisites – Nil

Course Description: Objective of this course is to provide an insight and inculcate the essentials of civil engineering discipline to the students of all branches of Engineering and to provide the students an illustration of the significance of the civil engineering profession in satisfying the societal needs. Civil engineers plan, design, build, supervise and maintain infrastructure projects such as public and private utility buildings, roads, bridges, water supply and sewage treatment schemes, irrigation projects, etc. In this course the students will have to write the information of different civil engineering structures along with sketches wherever necessary. While drawing the sketches, students are expected to see the structures, measure the dimensions and conduct the practical If necessary.

Course Outcomes:

After completing the course, students will able to:

	Course outcomes
CO1	Explain terms related with building construction
CO2	Demonstrate the uses of basic surveying equipments
CO3	Explain the properties of materials and types of roads
CO4	Demonstrate construction equipments and term related with earthquake
CO5	Summarize the water, wastewater treatment units and types of dams.

Detailed syllabus:

The term work shall consist of at least 10 exercises of following nature. Individual subject teacher shall have freedom of including additional exercises.

1	Identify 5 ancient monuments and 5 modern marvels and list the uniqueness of each
2	Draw line plans of residential building/flats
3	Draw the plan and sectional elevation of door and window
4	Draw the plan and sectional elevation of staircase
5	Draw different types of foundations
6	Measure the dimensions of Room/Hall and furniture and write it
7	Find the level different between two stations by using level
8	Find out the latitude, longitude and reduced level of different stations, bearing of line by using software apps
9	Draw typical road sections in cutting and embankment
10	Identify three top new materials and write their potential in construction
11	Visit concrete technology laboratory/ strength of materials laboratory/ Geotechnical engineering laboratory and enlist the equipment and their uses.
12	Explain the terms related with earthquake along with sketch
14	Explain different types of construction equipments
15	Draw the flow chart of water sewage treatment plant
16	Draw the section of earthen and gravity dams
17	Identify three different irrigation projects and write their features

18	Draw different types of roof top rainwater harvesting works
19	Enlist the different types of software used in civil engineering and their uses.

Text and Reference books

1. PC Verghese "Building construction" 2nd PHI learning pvt ltd
2. NN Bask "Surveying and leveling" 2nd McGraw hill education
3. Garg SK "Irrigation Engineering and Hydraulics structures" 36th Khanna Publishers Delhi
4. Jai Krishna, Brijesh Chandra "Elements of earthquake engineering" 2nd South asian publishers
5. Shah Kale and Patki "Building Design and Drawing" 5th Tata McGraw Hill

Mapping of course outcomes with program outcomes and program specific outcomes

Outcomes	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	3			2		2			2			
CO2	3			2					2			
CO3	3			2		2						
CO4	3			2			2					
CO5	3			2			2					

1-low, 2-medium, 3-high

ETVSE1002: Engineering Exploration		
Teaching Scheme	Examination Scheme	
Practicals: 04 Hrs. / Week	ISE II	25 Marks
Credits: 02	ISE III	25 Marks

Course Outcomes:

After completing the course students will able to

Course Outcomes	
CO1	Explain the role of an Engineer as a problem solver
CO2	Identify multi-disciplinary approach required in solving an engineering problem
CO3	Build simple mechanisms using engineering design process
CO4	Interface different peripherals to Arduino.
CO5	Apply basics of engineering project management skills.
CO6	Analyze engineering solutions from ethical & sustainability perspectives

Engineering exploration is a Project-based learning (PBL) based course wherein students will apply their technical knowledge, practical skills to develop a project in a team. A group of 5 students (max) normally will be permitted in a team. A set of need statements will be prepared by team members with the help of course coordinators. These need statements will be converted to Problem Statements. Students will follow Engineering Design process to develop conceptual design and detailed design.

Few of the activities which can be carried out are:

- Catapult design, weight bearing structure using newspapers, bridge making, activity with straws, coloured paper, box of straws, football with papers, paper plane.
- How do you think Engineering design case studies for designing Panipuri/ teal coffee vending/pan making vending machines, grass cutter/mower machine, winding machines, chips making machine, home automation etc (block diagram and components in different blocks), Pugh chart examples.
- Building mechanisms using gears and other components, design mechanisms using linkages, auto inventor for model designing.
- Arduino based experimentation and programming.
- Preparation of time lines for project management.
- Presentation of case studies for ethics, sustainability, and carbon footprint.

Detailed Syllabus:

Module 1	**Introduction to Engineering and Engineering Study**	2 hrs
	Introduction to Engineering and Engineering Study: Difference between science and engineering, scientist and engineer needs and wants, various disciplines of engineering, some misconceptions of engineering, Expectation for the 21st century engineer and Graduate Attributes.	
Module 2	**Engineering Design**	15 hrs
	Engineering Design Process, Multidisciplinary facet of design, Pair wise comparison chart, Introduction to mechatronics system, generation of multiple solution, Pugh Chart, Motor and battery sizing concepts, introduction to PCB design	
Module 3	**Mechanisms**	4 hrs
	Basic Components of a Mechanism, Degrees of Freedom or Mobility of a Mechanism,4 Bar Chain, Crank Rocker Mechanism, Slider Crank Mechanism.	
Module 4	**Platform based-development**	12 hrs
	Introduction to various platform-based development (Arduino) programming and its essentials, Introduction to sensors, transducers and actuators and its interfacing with Arduino, Introduction to Data Acquisition and Analysis	

Module 5	**Project Management** 3 hrs Introduction to Agile practices, Significance of teamwork, Project management tools: Checklist, Timeline, Gantt Chart, Significance of documentation	
Module 6	**Sustainability and Ethics in Engineering** 4 hrs Introduction to sustainability, Sustainability leadership, carbon footprint Identifying Engineering as a Profession, Significance of Professional Ethics, Code of Conduct for Engineers, Identifying Ethical Dilemmas in different tasks of engineering, Plagiarism check for research papers	
Total Contact Hours		40 Hrs
Course Project Reviews Evaluation of group projects		08 hrs

Evaluation Scheme			
Name of the Module	Hours	Marks	Evaluation
1.Introduction to Engineering & Engineering Study	02	3	ISE - II
2. Engineering Design	15	10	
3. Mechanisms	04	2	
4. Platform based development	12	10	
5. Project Management	03	5	ISE - III
6. Sustainability and ethics in Engineering	04	5	
7. Course Project Reviews	08	10	
8.Honor code	-	5	
TOTAL	48	50	

	CO1	**CO2**	**CO3**	**CO4**	**CO5**	**CO6**	**Total**
ISE	03	10	02	10			25
ISE		05		05	05	10	25

Mapping of Course outcomes with Program outcomes:

Course Outcomes	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	2	1				1					1	1
CO2	2	2	2	1	1				3	1		
CO3	2	2	3	2	2	1	1		3	1	2	
CO4	2	2	2	2	2				1	1	2	1
CO5		2	2	2	2	1	1	1	3	1	3	
CO6						1	3	3				

1 – Low, 2 – Medium, 3 – High

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Approved Curriculum in XXXth Academic Council Meeting
Dated: 5th July 2025

INCCC1101: Yoga and Meditation		
Teaching Scheme	Examination Scheme	
Theory : 1 hr/ week Practice : 2 hr/week	ISE I	20 Marks
Credits: 02	ISE II	20 Marks
	ISE III	10 Marks
	Total	50 Marks

Prerequisites: Minimum age of 10 years and positive approach towards health

Course Objectives:

This course aims at enabling students:

1. To get awareness of Physical, Mental, Social and Spiritual health
2. To understand and perform skill of Yog Asanas
3. To gain knowledge and benefits of meditation
4. To learn the skill to manage the stress through art of Yog and Meditation
5. To learn importance of yogic diet, food and nutrition.

	Course Outcomes The students will able to -
CO1	Increase the awareness regarding healthy and peaceful living
CO2	Perform skill of Yog Asanas and Meditation
CO3	Aware of breathing techniques
CO4	Bring peace and harmony in the society at large
CO5	Aware of yogic diet, food and nutrition.

Detailed Syllabus:

Unit 1	Introduction and definition of Yog, Fundamental concept of yog, relationship of yog and health, Physical fitness
Unit 2	Yogic sukshma vyayam, Patanjali Ashtang Yog Sutra, different types and benefits of Asanas (min. three in each pose). Surya Namaskar and its benefits
Unit 3	Different types of Pranayam (Min. five) and their benefits.
Unit 4	Meditation and its importance, types of Meditation, Benefits of Meditation, Meditative Asanas
Unit 5	Importance of diet, food and nutrition, Types of foods
List of Practice Sessions	1. Practice of Yogic Sukshma Vyayam 2. Practice of different Asanas 3. Practice of different Pranayam 4. Practice of Dhyan

Text and Rereference books:

1. B. K. S. Iyengar, Light on Yoga, Harper Collins Publisher, New Delhi, 2005
2. Swami Vivekanand, Patanjali Yog Sutra, Geeta Press, Gorakhpur
3. Swami Satyendra Saraswati, Yoga Publication Trust, 1997
4. Swami Ramdev, Pranayam Rahasya, Divya Prakashan, 2009
5. Kamlesh Patel & Joshua Pollock, The Hearfulness Way

CEIKS1001: Ancient Water Management Practices(IKS)		
Teaching Scheme	Examination Scheme	
Lectures: 02 hrs/ week	ISE I	10 Marks
	ISE II	10 Marks
Credits: 02	ISE III	-
	End Semester Examination	30 Marks

Prerequisites: NIL

Course description: This course will explore various dimensions of knowledge on water resources - local, indigenous, traditional, and scientific and its criticality as a resource for development. The course explores how strategies have been evolved by mankind to create knowledge systems and societies for sustainable development of water resources. Particular emphasis of this course is on traditional knowledge for water management.

Course Outcomes:

After completing the course, students will able to:

	Course Outcomes
CO1	Understand the importance of various dimensions of knowledge and its relevance for water management.
CO2	Appreciate the need to go beyond binaries and articulate the need for greater synergies between two knowledge systems and bridging the science-management divide.
CO3	Be familiar with the concept and need for use of traditional knowledge for adaptive water management.

Detailed Syllabus:

Unit 1	**Introduction to Knowledge for development:** Definition and aspects of knowledge (traditional, social, technical), Understanding of knowledge (static, processesual, past), meaning of traditional knowledge, Utility of various aspects of knowledge for water management. Contributions of Rulers namely Rashtrakut, Satwahan, Yadavas, Chatrapati Shivaji Maharaj, Rani Ahilyadevi Holkar, Chatrapati Shahu Maharaj for water resources development in the public interest.
Unit 2	**Knowledge gap**: Introduction, the science-management divide, Local and global/scientific knowledge, Need for greater synergies. Traditional knowledge and adaptive management :((I) Integration of traditional and western / contemporary knowledge for adaptive management, (II) Traditional knowledge and conflict resolution (III) Knowledge management & Knowledge networks, Hydraulic Societies. Water management technology in ancient India: Traditional Methods of harnessing water and water conservation in India, Concepts, Thumb rules & empirical Hydrological, Hydraulic Design and Construction of various water conservation structures.
Unit 3	**Knowledge for water management** : Human and Water, Ancient Civilizations, Harappan (or Indus Valley) civilization (~3000–1500 BCE), Vedic Period in the Indian subcontinent, Mauryan dynasty and other dynasties. Knowledge of hydrological processes in ancient Indian Vedas, epics and literarture, Measurement of precipitation in ancient India and data storage, Hydraulic interlinkages between the ancient Indian and nearby cultures, Decline of Harappan civilization – role of climate and natural disasters. various (traditional) knowledge systems for water management in different ecological (global, in India and local) Hydraulic Societies, zones – *(Note : discussion not to focus on only simple empirical design of structures but also on untangling the complex socio-political and economic realities that led to demise/or sustenance of these knowledge systems through case studies of different knowledge systems in different ecological zones*).

Text and Reference Books

1.Traditional water management practices of Maharashtra by Dr. D.M. More.
2. Environmental Engineering- Peary, Rowe & Tclobaloglous

3. Agarwal, A., & Narain, S. (1997). Dying Wisdom: Rise, fall and potential of India's traditional water harvesting systems (Vol. 4): Centre for Science and Environment New Delhi. Chapter 2. Pp 25-268.
4. Sengupta, N. (1985). Irrigation: Traditional vs Modern. Economic & Political Weekly, 20(45/47), 19.
5. Koul, D. N., Singh, S., Neelam, G., & Shukla, G. (2012). Traditional water management systems-An overview of Ahar-pyne system in South Bihar plains of India and need for its revival. Indian Journal of Traditional Knowledge, 11(2), 266-272.

Mapping of Course outcome with Program Outcomes and Program Specific Outcomes

Course outcome	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO 10	PO 11	PO 12	PSO 1	PSO 2
CO1	2	2			2			1					3	
CO2	2					2				2			2	
CO3	2							2			2			
CO4	2	3			3		3					2		
CO5	2			3				2		2			3	

3 – High 2 – Medium 1 - Low

Assessment:
ISE I: Based on unit I and unit II
ISEII: Based on unit III and unit IV

MABSC1003: Mathematics – II		
Teaching Scheme	**Examination Scheme**	
Lectures: 03 Hrs. / Week	**ISE I**	**15 Marks**
Tutorial: 01 Hrs. / Week	**ISE II**	**15 Marks**
Credits: 04	**ISE III**	**10 Marks**
	End Semester Examination	**60 Marks**

Course Description: MABSC1003: Engineering Mathematics II is a compulsory course for Civil Engineering, Mechanical Engineering, Computer Science & Engineering and Information Technology students.

Course Outcomes:

After completing the course students will able to

Course Outcomes		Bloom's Taxonomy Level	Unit
CO1	Define first order first degree ordinary differential equations, orthogonal trajectories; partial derivatives, Jacobian, Directional Derivative, Gradients, Curl and divergence; Multiple integrals; Fourier Series.	K1	1,2,3,4,5
CO2	Summaries the First order First degree Linear Differential Equations; Partial, Total Derivatives; methods of solving Multiple Integrals; Fourier Series and Half Range Fourier series Expansion.	K2	1,2,3,4
CO3	Identify Order of Differential Equation and exactness; Homogeneous function, Gradient, Divergence and Curl; Even and odd functions, Euler's coefficients for the Fourier Series.	K2	1,2,4,5
CO4	Solve the First order Linear Differential Equations, Jacobians, Maxima and Minima of functions of two variables; Double and Triple Integrations; vector integration	K2	1,2,3,5
CO5	Apply knowledge of Differential equation to different Engineering Problems, Partial derivative; Multiple Integrals to find area and volume of solids; surface integral and volume integral using Green's theorem and Stoke's theorem, Fourier Series to Harmonic Analysis.	K3	1,2,3,4,5

Detailed Syllabus:

Unit 1	**First order ordinary differential equations and its applications** Exact, linear and Bernoulli's equations, application of first order ordinary differential equations: orthogonal trajectories, simple electrical circuit, D'Alembert's principle, one dimensional conduction of heat.
Unit 2	**Multivariate Calculus [Differentiation]** Limit, continuity, partial derivatives, Euler's theorem on homogeneous functions, implicit functions, composite functions, total derivatives, Jacobians and their applications, error and approximations, maxima and minima of functions of two variables, saddle points, Lagrange's method of undermined multipliers.
Unit 3	**Multiple integrals and its applications** Double and triple integrals (Cartesian and polar), change of order of integration in double integrals, change of variables (Cartesian to polar), applications: to find area and volume.
Unit 4	**Fourier Series** Fourier Series (Dirichlet's conditions), Periodic functions, convergence of the Fourier series, Euler's formula, Fourier series expansion with period 2π, 2L, Fourier series of even and odd functions, Half range sine and cosine series, applications to harmonic analysis.
Unit 5	**Vector Calculus**

	Directional Derivative, Gradients, Curl and divergence. Vector integration: Line integral, Surface integral and volume integral, Green's Theorem, Gauss Divergence Theorem and Stoke's Theorem.

Text and Reference Books

1. Erwin Kreyszing, Advanced Engineering Mathematics,10th Edition, Mumbai: Willey Eastern Ltd. 2015.
2. B. S. Grewal, Higher Engineering Mathematics, 44th Edition, New Delhi: Khanna publication, 2017.
3. Ramana B. V. Higher Engineering Mathematics, 11th Reprint, New Delhi: Tata McGraw Hill, 2010.
4. David Poole, Linear Algebra: A Modern Introduction, 3rd Edition, USA: BROOKS/COLE CENGAGE Learning, 2011.
5. Ravish R. Singh, Mukul Bhatt, Engineering Mathematics- A tutorial approach, 4th Edition, New Delhi: Tata McGraw Hill Education Pvt. Ltd.2018.
6. Dass H.K. Advanced Engineering Mathematics, 22nd Edition, New Delhi: S. Chand publications, 2018.
7. P. N. Wartikar and J. N. Wartikar, A text book of Engineering Mathematics (Vol. 1 & 2), Reprint, Pune: Pune Vidhyarthi Griha Prakashan, 2013.

Assessment: ISEI, II, III (Class Test-1, Class Test-2, TA) & ESE

TA: Students will perform one or more of the following activities

1. Surprise Test
2. Assignment using Mathematical tools like Mathematica/MATLAB or similar.
3. Quiz
4. Any other activity suggested by course coordinator

Assessment Pattern:

Assessment Pattern Level No.	Knowledge Level	ISE I (Class Test-1)	ISE II (Class Test-2)	ISE III (TA + Surprise Test)	End Semester Examination
K1	Remember	5	5		10
K2	Understand	10	10	2	38
K3	Apply			8	12
K4	Analyze				
K5	Evaluate				
K6	Create				
Total Marks 100		15	15	10	60

Mapping of Course outcomes with Program outcomes:

Course Outcomes	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	2	2	1									1
CO2	2	2	1									1
CO3	2	2	1									1
CO4	2	3	1		2							1
CO5	3	3	1		2							1

1 – Low, 2 – Medium, 3 – High

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Approved Curriculum in XXXth Academic Council Meeting
Dated: 5th July 2025

CHBSC1002: Battery Science, Lubricants and Green Chemistry		
Teaching Scheme	Examination Scheme	
Lectures: 03 Hrs. / Week	ISE I	15 Marks
Credits: 03	ISE II	15 Marks
	ISE III	10 Marks
	End Semester Examination	60 Marks

Course description: The course is mandatory course for first year B. Tech. Civil Engineering, Mechanical Engineering and Electrical Engineering programs in first semester. The course objective is to teach fundamental principles in Chemistry and relate the understanding to applications.

Course Outcomes:

After completing the course students will able to

Course Outcomes		Bloom's Taxonomy Level
CO1	To understand fundamental of Chemistry relevant to Engineering field.	K1
CO2	To differentiate between primary and secondary battery as well as battery and fuel cell.	K2
CO3	To equipped with basic knowledge of polymer reinforced composites, applications of semiconductor conducting polymers in energy harnessing.	K2
CO4	To understand Basic Principals of Green chemistry for minimizing waste.	K1
CO5	To apply the principles of water softning to hard water and understand consequence of water quality degradation.	K3

Detailed Syllabus:

	Course Contents	CO
Unit 1	**Battery Science** Introduction – Classification of batteries, Primary and secondary batteries, reserve batteries with examples, battery components and their role-Characteristics of Battery. Batteries and their importance, basic requirements for commercial batteries, construction, working and applications of Ni-Cd, and Lithium ion battery, fuel Cells- Differences between battery and fuel cell, electrical vehicle battery construction, working advantages and disadvantages of EV Car.	CO1, CO2
Unit 2	**Electrochemistry** Single electrode potential, sign convention, reversible and irreversible cells measurements, specific conductance, equivalent conductance, variation of equivalent conductance with dilution, migration of ions Nernst equation and application, determination of EMF of cell, applications of EMF series. **Chromatographic techniques** Basics and applications of chromatographic technique- thin layer chromatography, flame photometry potentiometric titrations, conductometry, PH metry	CO1, CO2
Unit 3	**Lubricants** Introduction, mechanisms of lubrication-fluid film, boundary film & extreme pressure, types of lubricants–solid lubricants–molybdenum disulphide, graphite. Liquid lubricants– vegetable, animal, mineral & synthetic oils, semisolid lubricants, greases, lubricating emulsions– oil in water, Water in oil, properties of lubricants & its significance– physical properties and significances viscosity & viscosity index, flash & fire point, cloud & pour point, acid value, saponification value, steam emulsification number **Conducting Polymers:** Definition- classification- intrinsic and extrinsic, mechanism of	CO1, CO3

	conduction in doped poly acetylene -applications synthesis & mechanism of conduction in poly-acetylene **Composites:** Basics of composites, Composition and Characteristic properties of composites. Types of Composites: Particle, Fiber, Reinforced, Structural, applications. **Nano materials:** Introduction, fullerenes, carbon nano tubes, nano wires, electronic and mechanical properties, synthesis of nano materials, applications of nano materials-Catalysis, Electronics & Telecommunication, Medicines, Energy sciences.	
Unit 4	**Energy sciences & Green Chemistry:** **Green Chemistry:** Introduction- definition of green chemistry, need of green chemistry, basic principles of green 12 principles of green chemistry principles of green chemistry, waste minimization and atom economy, reduction of materials and energy requirement, significance, concept of sustainability, industrial applications of green chemistry **Fuels:** Fuel- classification, characteristics of good fuel, comparison between solid, liquid, gaseous fuel, alternative and non conventional fuels, calorific value, low and high calorific value, units of calorific value, determination of calorific value by Bomb calorimeter, fuel cells, solar cell and polymer cell, hydrogen-oxygen fuel cell, advantages and applications.	CO1, CO4
Unit 5	**Water treatment:** Introduction, sources and impurities in water, portable water; meaning and specifications (WHO standards), hardness of water types, determination of hardness using EDTA titration and numerical, softening of hard water by ion- exchange process. numerical problems on hardness of water, biological oxygen demand (BOD) and chemical oxygen demand (COD), determination of COD of industrial waste water, purification of water for town supply, principal wastage treatment – industrial waste water	CO1, CO5

Text and Reference Books

1. F. W. Billmeyer, Text Book of Polymer Science, John Wiley & Sons, 15th Edition, 2020.
2. B. K. Sharma- A text book of Industrial Chemistry. 15th Edition, 2020. G.A. Ozin & A.C. Arsenault, "Nanotechnology A Chemical Approach to Nanomaterials". RSC Publishing, 5th Edition, 2020.
3. Uppal M.M, Jain and Jain. Engineering Chemistry, Khanna Publishers, 45th Edition, 2020.
4. P.C. Jain and Monica Jain, A test Book of Engineering Chemistry, Dhanpat Rai Publications, New Delhi, 20th Edition, 2020.
5. S. S. Dara -A Text book of Engineering Chemistry, S Chand & Company Ltd., 15th Edition, 2020.

Mapping of Course outcomes with Program outcomes:

Course Outcomes	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	3	2	2	2		1	1					1
CO2	3	1	1	1								1
CO3	3	2	2	2		1	1					1
CO4	3	2	2	2	2	1	1					1
CO5	3	2	2	2		1	1					1

1 – Low, 2 – Medium, 3 – High

CHBSC1003: Lab Chemistry		
Teaching Scheme	Examination Scheme	
Practical: 02 Hrs / Week	ISE III	25 Marks
Credit: 01		

Course Outcomes:

After completing the course students will able to

Course Outcomes	
CO1	Perform qualitative and quantitative determination of physical and chemical properties of lubricants, polymers and water used for domestic and industrial application.
CO2	Explain the objectives of experiments, perform the experiments, appropriately record the data and analyze the results with accuracy and precision.
CO3	Demonstrate laboratory skills by use of relevant instrument or modern analytical methods for analysis of chemical compounds.
CO4	Work effectively and safely in a laboratory environment in teams as well as independently.
CO5	Recognize the issues of safety regulations, ethical, societal, economical and environmental issues in the use of chemicals in their laboratory work.

List of the Experiments:

The student shall perform any eight experiments of the following:

Sr. No.	Title of the Experiments	Skill / Knowledge Level	CO
1	Determination of hardness of water by EDTA method.	S3/K2	CO3, CO4, CO2
2	Determination of BOD and COD of water sample	S3/K2	CO3, CO5, CO2
3	Determination of Cell Constant.	S3/K2	CO3, CO2
4	Determination of Acid Value of lubricant.	S1/K1	CO1, CO5, CO2
5	Determination of chloride content of water by Mohr's method	S1/K1	CO1, CO5, CO2
6	Determination of Viscosity of lubricating oils by Redwood Viscometer.	S3/K2	CO3, CO4, CO2
7	Determination of Flash & Fire point of lubricant oil.	S3/K2	CO3, CO4, CO2
8	To Determination P^H value of solutions by indicator, Paper and by P^H meter	S1/K1	CO3, CO5, CO2
9	Preparation of Phenol Formaldehyde Resin (Bakelite) /Urea formaldehyde resin.	S2/K2	CO2, CO4, CO5
10	Determination of Iron by colorimetric method.	S3/K2	CO3, CO2
11	Separation of chemicals by thin layer chromatography.	S2/K2	CO3, CO2
12	Dermination of strength of acids by Potentiometric titrations	S2/K2	CO1, CO4, CO5, CO2
13	Determination of Cloud & Pour point of lubricant oil.	S3/K2	CO3, CO2
14	To verify Lambert Beer's Law calorimetrically.	S3/K2	CO3, CO2
15	To determine Rf value and identify phenyl alanine & Glycine mixture by ascending paper chromatography.	S3/K2	CO3, CO2
16	Demonstration Of TLC/Paper chromatography	S2/K2	CO3, CO2

17	To determine conduct metrically, the strength of given HCl solution by titrating with standard NaOH solution.	S3/K2	CO3, CO2
18	To determine the empirical formula of ferric-5 sulpho salicylate complex by Jobs method.	S3/K2	CO3, CO2

Mapping of Course outcomes with Program outcomes:

Course Outcomes	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	1											
CO2	1			1	1		1	2			1	
CO3	1	2	2	2	3	2	1		2			2
CO4	2	3	1	3	2	1						2
CO5	1	2	2		3	1				2		2

1 – Low, 2 – Medium, 3 – High

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CEESC1003 : Civil Engineering Drawing

Teaching Scheme		Evaluation Scheme	
Theory	02 hrs/week	ISE I	10 Marks
Tutorial	00	ISE II	10 Marks
Total Credits	02	ISE III	
		End Semester Examination	30 Marks
		Total	50 Marks

Prerequisite: Nil

Course Description: Objective of this course is to provide an insight and inculcate the essentials of building planning and drawing. Civil engineer's plan, design, execute and maintain the infrastructure through drawings. So it is rightly said, "Drawing is the language of civil engineers." This course introduces the elements of building planning and drawing. This course forms the foundation of civil engineering in which students will be able to decide on the requirements of the residential building and its component along with the standard dimensions.

Course Outcomes:

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

1. Understand different conventions, symbols, lines, in civil engineering drawing as per IS 962.
2. Use Orthographic Projection method and Isometric view method for drawing,
3. Identify and draw different building components.
4. Develop line plan, plan, elevation, Section, and schedules for doors and windows and room finishes.

Detailed Syllabus:

Unit - 1:	**Introduction to Drawing:** Different drawing instrument and their use, letters its types, sizes and its use in drawing, convention of different lines, giving dimensions, scales and its uses, study of IS 962(Code of Practice for Architectural and Building drawings)
Unit - 2:	**Orthographic Projection and Isometric View:** Introduction to orthographic projections, first angle projections method, third angle projections method, drawing orthographic projections of simple pictorial view, method of preparing isometric views, isometric view of rectangular objects, isometric view of circular objects , isometric view of building.
Unit - 3:	**Building Drawing:** Details of foundation, different types of door and windows, staircase, brick masonry, lintel, chajja, c/s details of R.C.C chajja, lintel, beam, footing, column, slab. **Development of Line Plan of a Building:** Symbols and notations as per BIS 696 in civil engineering drawing, preparing line plan of building, development of plan of residential building having living room, kitchen room, bed room, bath room and w. c. with slab, draw to scale – plan, elevation sections in 3 directions.

Reference Books:

1. **Malik, R. S. & Meo G. S., Civil Engineering Drawing Delhi: New Asian Publishing**
2. **Shah P. J. Engineering Drawing – 1, Ahmedabad: D. J. Shah Publishing**
3. Bhat N.D. Engineering Drawing: Charotor
4. Gurucharan Singh Civil Engineering Drawing Delhi: Standard Publishers
5. Sane Y.S., Building planning
6. Shaha Kale & Patki, Building Drawing
7. Relevant I. S. codes.

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CEESC1004 : Lab: Civil Engineering Drawing

Teaching Scheme	Examination Scheme	
Practical: 02 hrs/ week	Practical Examination	50 marks
Credits:1	Total Marks	50 Marks

Prerequisite: Nil

Course Description: Objective of this course is to provide an insight and inculcate the essentials of building planning and drawing. Civil engineer's plan, design, execute and maintain the infrastructure through drawings. So it is rightly said, "Drawing is the language of civil engineers." This course introduces the elements of building planning and drawing. This course forms the foundation of civil engineering in which students will be able to decide on the requirements of the residential building and its component along with the standard dimensions.

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

1. Draw different types of foundations
2. Draw different types of doors and windows
3. Draw different types of staircases
4. Draw Isometric view of building
5. Plan of residential building with area statement and schedules.

Detailed Syllabus: List of the Drawings/assignments (Draw min. 10 sheets out of following)

	Details
1	Prepare sheet on lettering, lines
2	Conventional signs and symbols
3	3rd Angle projections
4	Isometric view of rectangular objects
5	Isometric view of circular objects
6	Isometric view of building
7	Drawing of types foundations
8	Drawing types of doors
9	Types of windows
10	Staircases
11	Draw plan for a residential bungalow (load bearing) i.e. minimum 2 bedrooms (one bedroom with attached toilet), 1hall,1kitchen,veranda, staircase, toilet block, and car parking, plan, elevation , section, schedule of doors and windows, site plan, area statement, construction notes.
12	Site Visit

Reference Books:

1. Malik, R. S. & Meo G. S., Civil Engineering Drawing Delhi: New Asian Publishing
2. Shah P. J. Engineering Drawing – 1, Ahmedabad: D. J. Shah Publishing
3. Bhat N.D. Engineering Drawing: Charotor
4. Gurucharan Singh Civil Engineering Drawing Delhi: Standard Publishers
5. Sane Y.S., Building planning

6. Shaha Kale & Patki, Building Drawing
7. Relevant I. S. codes.

Head of the Civil Engineering Department

Dean Academics

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CSESC10050	05: Programming for Problem Solving	
Teaching Scheme	Examination Scheme	
Lectures: 02 hrs./ week	ISE I	10 Marks
Credits:02	ISE II	10 Marks
	ISE III	
	End Semester Examination	30 Marks

Prerequisites: Nil

Course Objectives

- To understand the fundamentalsof computer systems and programming.
- To understand the basic programming paradigms.
- To learn the conditional branching, iteration and recursion.
- To learn methodology which are essential for developing C programs.

Course Outcomes

Students will be able to:

CO1	Understand fundamentals of computer systems and programming.
CO2	Implement the basic programming paradigms.
CO3	Develop the solutions for the range of problems using branching, looping & conditional statements
CO4	Apply advanced data types and use the concept of pointers, array of structures
CO5	Develop C programs for problem solving using different algorithms

Detailed Syllabus:

Unit 1	**Introduction to programming:** Components of a computer system: Memory, processor, I/O Devices, storage, operating system, Concept of assembler, compiler, interpreter, loader and linker. Idea of Algorithm: Representation of Algorithm, Flowchart, Pseudo code with examples, From algorithms to programs, source code. Programming Basics: Structure of C program, writing and executing the first C program, Syntax and logical errors in compilation, object and executable code. Components of C language. Standard I/O in C, and memory locations, Storage classes.
Unit 2	**Introduction to C Language fundamentals:** The C character set, variables and constants, data types, keywords, expressions, statements, precedence, operators- arithmetic operators, sizeof() and ternary operators, relational & logical operators, conditional operators, type conversions , type casting.
Unit 3	**Conditional Branching, Loops and Function:** if, nested if, it else, nested if else switch, goto statement, Loop execution – For loop, while loop, Do while loop, break, and continue statements. Functions - Defining a function, passing arguments to functions, call by value, idea of call by reference, returning values from function, command line arguments, Local & Global, Formal variables concept, Recursion.
Unit 4	**Arrays:** Array's definition (1-D, 2-D), passing array to the function, String Operation-String copy, String length, String concatenation, String compare, Basic Sorting Algorithms (Bubble, Insertion and Selection).

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Unit 5	**Structure and Pointers:** Introduction to structure and union. Array of structure, Passing structure as an object to function. Structure as a return type of function. Pointers- pointer as a variable, pointer to array, pointer as argument to function, notion of linked list.

Text and Reference Books

1. E. Balagurusamy; Programming in C, 3rd ed, Tata McGraw Hill.
2. K. R. Venugopal and S R Prasad, Mastering C, 3rd ed, Tata McGrath Hill.
3. Brian W. Kernighan and Dennis M. Ritchie, The C Programming Language, 2nd ed , Prentice Hall of India.
4. Problem Solving and Program Design in C, by Jeri R. Hanly, Elliot B. Koffman, Pearson Addison-Wesley, 2006.
5. Let Us C By Yashwant P. Kanetkar.

Mapping of Course outcome with Program Outcomes and Program Specific Outcomes

Course outcomes	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	1		1	3						2		
CO2	1		1	3				2	1	2		
CO3	1	3	1	2						2		
CO4	1	3	1	2						2	1	
CO5	1		1	3					1	1		2

Assessment:

ISE I: Class Test-I of Maximum Marks-15

ISE II: Class Test-II of Maximum Marks-15

ISE III: Teacher's Assessment of Maximum Marks-10

Teachers Assessment of 10 marks is based on one of the / or combination of few of following

1) Quiz
2) Question & answer
3) Power point presentation
4) Any other activity suggested by course coordinator

ESE: End Semester Examination of Maximum Marks-60

Assessment table:

Assessment Tool	K2	K3,k4
	CO1, CO2,CO3	CO3,CO4 ,CO5
ISE I (15 Marks)	15	0
ISE II (15Marks)	15	0
ISEIII(10)	00	10
ESE Assessment (60 Marks)	30	30
Total Marks 100		

Special Instructions if any: Nil

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CSESC1006: Lab Programming for Problem Solving		
Teaching Scheme	**Examination Scheme**	
Practical: 2Hrs/Week	**ISE III**	**25 Marks**
Credits:01		

Course Outcomes:

After completion of this course students will be able to:

	Course Outcomes
CO1	Understand the development environment for compiling, debugging, linking and executing a C program.
CO2	Analyzing the complexity of problems, Modularize the problems into small modules and then convert them into programs
CO3	Apply the in-built functions and customized functions for solving the problems.
CO4	Illustrate algorithms, flowcharts, and programs for problem solving
CO5	Demonstrate using of various technologies and tools for developing applications

List of the Experiments:

The student shall perform minimum ten experiments of the following using TURBO C&C++/ CodeBlocks

Sr. No.	Title of the Experiments	Skill / Knowledge Level	CO
1	Developing Flowchart and alorithm.	K2	CO1
2	Creating Pseudo code for C program.	K3	CO1
3	Simple program using scanf() and printf()	K3	CO2
4	Program using Control Statements	K3	CO2
5	Program using Loops	K3	CO2,CO3
6	Program to generate Fibonacci series and/or factorial of a number using recursive function	K3	CO3, CO4
7	Program using Switch-Case statement	K3	CO3,CO4
8	Using arrays for sorting numbers -Write a C program to input elements in array and sort array elements in ascending or descending order.	K3	CO4
9	Program which shows use of call by value and call by reference	K3	CO3 ,CO4
10	Program to accept and display student information using structure.	K3	CO4, CO5
11	Program to pass structure/array as a parameter to a function	K3	CO5

12	Program to prepare monthly telephone bill	K3	CO5
13	Menu driven program for matrix addition and subtraction	K3	CO5
14	Program for matrix multiplication	K3	CO5

Mapping of Course outcome with Program Outcomes and Program Specific Outcomes

Course outcomes	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO 12
CO1	3	2		2						1		
CO2	2		3	2						1		
CO3	2	2		2						3		
CO4	1	2		2		1				3	1	
CO5	1		3	2					3	3	1	1

1-Low, 2-Medium, 3-High

CEVSE1001: Civil Engineering Workshop

Teaching Scheme		Evaluation Scheme	
Theory	4 Hrs/ Week	ISE I	50 Marks
Total Credit	2	ISE II	
		ISE III	
		Practical Examination	
		Total	50 Marks

Pre-requisites – Nil

Course Description: Objective of this course is to provide an insight and inculcate the essentials of workshop to the students of Civil Engineering and to provide the students an illustration of the significance of the workshop practices. In this course the students will have to prepare jobs as mentioned in the curriculum

Course Outcomes:

After completing the course, students will able to:

	Course outcomes
CO1	State and Explain various tools of fitting, carpentry and working
CO2	Demonstrate the various operations about fitting, carpentry, plumbing work

Detailed syllabus:

The term work shall consist of 10 exercises of following nature.

1	Fitting: Preparing one job involving simple fitting, operations like marking, cutting and fitting different shapes using appropriate files, drilling machines, threading machines, etc
2	Carpentry: Preparing three jobs using different carpentry tools and operations
3	Reinforcement bar bending and cutting, taking cores of concrete with the help of core cutting machine
4	Plumbing: preparing three jobs involving use of different cutting tools, threading tools and fitting operations
5	Beam, Column, footing reinforcement detailing, Welding

Text and Reference books

1. Raghuwanshi BS “Workshop Technology Vol I and Vol II” Dhanpart Rai and Sons
2. John KC “Mechanical Workshop Practice” 2nd Prentice Hall of India

Mapping of course outcomes with program outcomes and program specific outcomes

Outcomes	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	1		2	1	2				2			1
CO2	1		2	1	2		1		2			1

1-low, 2-medium, 3-high

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INAEC1001: Communication Skills		
Teaching Scheme	Examination Scheme	
Lectures: 02 Hrs. / Week	ISE I	10 Marks
Credits: 02	ISE II	10 Marks
	End Semester Examination	30 Marks

Course Description: Communication Skills (INAEC1001) is a one semester compulsory course for the first-year students of all disciplines of the institute.
The course is aimed at introducing the basic of the communication skills. The goal of the course is to improve listening, speaking, reading and writing skills. Thus, the stress in the syllabus in primarily on the development of communicative skills and fostering of ideas.

Course Outcomes:
After completing the course students will able to

Course Outcomes	
CO1	Analyze the situation and overcome the barriers in speaking English and get the ability to communicate in professional as well as day to day life.
CO2	Develop personality through corporate etiquettes and take active participation in discussion and other academic activities as well.
CO3	Apply proper words and structure in speaking English language and develop vocabulary and use of correct English.
CO4	Express them through oral as well as written communication.
CO5	Use of social media platforms and AI in day to day as well as professional life.

Detailed Syllabus:

Unit 1	**Communication Skills & Soft Skills** Basic concept, factor's, process and types of communication, principles of effective communication, barriers of communication, and how to overcome these barriers, basic of soft skills.
Unit 2	**Non verbal Communication and Corporate Etiquettes** Body language and its different aspects, voice dynamics & voice modulation, professional appearance, clothing etiquettes and corporate dressing.
Unit 3	**Remedial Grammar and Vocabulary Building** Parts of speech, types of tense, use of articles, synonyms and antonyms, Find out the grammatical errors in the given sentences.
Unit 4	**Writing Skills and Business Correspondence** Letter writing, office documents like circulars, notices, minutes, agenda and memos. Report writings-technical report, academic report, accident report, resume writing
Unit 5	**Social Media, AI and Communication** Introduction to email communication and email etiquettes. Different social media platforms, role of social media in communication. Defining Artificial Intelligence and its role in Communication. ChatGPT and Gemini: Tools for Communication.

Text and Reference Books

1. S. M. Rai and Urmila Rai, *Business Communication,* 1st ed, New York, USA, New royal book Company Publication, 2010
2. Leena Sen, *Communication skills,* 2nd Revised ed, Publisher-PHI Learning, 2007
3. William Sanborn, *Technical communication,* Delhi, Pearson publications ,2014
4. McGraw Hills brief case books, *Presentation Skills for Managers*, United states, John A. Hill, 1888
5. Pravil S.R. Bhatia and S. Bhatia, *Professional Communication Skill*, 8th Revised ed, S. Chand Publications, 2001.
6. Daniel G. Riordan and Steven E. Pauley, *Technical Report Writing Today*, 10th ed, USA, Michael Rosenberg Publisher
7. B. N. Basu, *Technical Writing*, 1st ed, New Delhi, Prentice Hall of India,2008
8. M. A Pink and S. E. Thomas., *English Grammar Composition* & *Effective Business Communication,* 12th ed, S Chand Publication, 1998
9. Sarah Freeman, *Written Communication in English,* 1st ed, Orient Blackswan publication, 1996

Mapping of Course outcomes with Program outcomes:

Course Outcomes	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1						1				3		
CO2						1				3		
CO3						1				3		
CO4									3	3		
CO5					3					3		1

1 – Low, 2 – Medium, 3 – High

INCCC1002: NSS / INCCC1003: Sports / INCCC1004: Club Activities		
Teaching Scheme	Examination Scheme	
Practicals: 04 Hrs. / Week	ISE III	50 Marks
Credits: 02		

Course Description: Co-curricular activities are activities that take place outside of a course's curriculum but are related to academics in some way. Although involvement is not part of classroom instruction, it does supplement and enhance a student's academic experience.

NSS: Aim of NSS activities to Gain skills in mobilizing community participation; To acquire leadership qualities and democratic attitude; To develop the capacity to meet emergencies and national disasters; To practice national integration and social harmony. Types of Activities are not limited to Cleaning, Plantation, Blood Donation Camps, Awareness Rallies, Health Care Camps, Stage shows or a procession creating awareness of such issues as social problems, education and cleanliness but decided by Institute NSS Coordinator. Students will participate in NSS Activities throughout semester.

The evaluation is based on participation in regular NSS activities. NSS Coordinator along with departmental NSS coordinator will certify at the end of semester about participation. Program head will notify the exam section about awarding credits to the students.

Sports activity: Sporting Activities means performing or participating in the Sport in any capacity which includes, but is not limited to, participation in training, competitions, coaching or as an official.
Students will participate in Sports Activities throughout semester. Gymkhana vice president will coordinate along with sports coordinator of department. The coordinators will certify at the end of semester about participation. Program head will notify the examination section about awarding credits to the students. The evaluation is based on participation in regular sports activities.

Club activities: Government Engineering College Aurangabad has various clubs that focus on specific interests such as robotics, coding, literature, environment, etc. These clubs often organize events, workshops, and competitions that provide students with opportunities to learn new skills and showcase their talents. Students will participate in Club Activities throughout semester. Faculty coordinators will coordinate along with students bodies the activities of club.

The faculty coordinators will certify at the end of semester about participation of students. Program head will notify the examination section about awarding credits to the students.

Dean Students affairs and all program heads will formulate additional modalities for smooth conduction of cocurricular activities as and when required.

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CEPCC1001: Engineering Geology

Teaching Scheme		Evaluation Scheme	
Theory	2 Hrs/ Week	ISE I	10 Marks
Tutorial		ISE II	10 Marks
Total Credit	2	ISE III	
		End Semester Examination	30 Marks
		Total	50 Marks

Course Description: This course introduces the elements of Engineering Geology and Earth Science. It also mentions the importance of principles of geology in various stages of civil engineering project. It also describes occurrence and character of common building materials. It explains the structural geology and its importance in the civil engineering. It covers natural hazards like landslide, earthquake and their remedial measures.

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

CO1	Explain the basic principles in engineering geology
CO2	Differentiate between various rocks types and their application in civil engineering
CO3	Identify the favorable conditions for construction of buildings, roads, dams and tunnels
CO4	Understand the geological hazards and the remedial measures to prevent the damage to the civil engineering project

Detailed Syllabus:

Unit - 1:	Geology definition, scope, importance in Civil Engineering, Mineralogy introduction, important rock forming minerals groups. Classification and mineral composition, important igneous rocks
Unit - 2:	Strike, dip, parts and important types of folds, faults, fractures and joints, unconformity, discordant and concordant igneous intrusions, geological works, river rejuvenation, river capture, earthquake, introduction to plate tectonics, principles of stratigraphy, geological time scale, Indian Geology, Physiographic divisions of India, significance of their structural characters in major civil engineering activities.
Unit 3:	Geological investigations in Civil Engineering sites, significance of stratification strike dip fold faults joints fractures, dykes in the study, surface and subsurface surveys, use of pit trenches, exploratory drilling in the subsurface exploration, preparation of the geological maps and sections, Sub surface water types, water table, porosity, permeability zones, perched water table, occurrence of subsurface water, geological conditions favorable for the natural springs and seepages, depression and contact springs, hot springs and geysers and drill holes
Unit - 4:	Building stones, requirement of good building stones and their dependability on the geological characters of rocks, common building stones, Building stones of India, Landslides, angle of repose, causes, stability of hill slopes, relation of dip, amount of slope with stability of hill slopes, preventive measures for landslides. fluctuations in water table levels by geo physical electrical resistivity method

References:

1. Gupte R.B. "Text Book of Engineering Geology", P.V.G. Publications, Pune
2. Parbin Singh "A Text Book of Engineering and General Geology", S.K. Kataria & Sons New Delhi
3. M. S. Krishnan, "Geology of India and Burma" CBS Publishers, New Delhi
4. Arthur Holmes, "Physical Geology", ELBS Publication.
5. M. P. Billings, "Structural Geology", Prentice Hall India Learning Private Limited
6. F G H Blyth and De Frietus, "Engineering Geology" Reed Elsevier India Ltd.
7. Bell FG, "Engineering Geology" Butterworth-Heinemann

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CEPCC1002: Lab-Engineering Geology

Teaching Scheme		Evaluation Scheme	
Theory	2 Hrs/ Week	ISE I	25 Marks
Total Credit	1	ISE II	
		ISE III	
		Practical Examination	25 Marks
		Total	50 Marks

Prerequisite: Not Applicable

Course Description: This course introduces with practical aspects of engineering geology and earth science. It deals with identification and classification of important rock forming minerals and rocks, study of geological maps and geological features. Case study of 'Geophysical Exploration and field visit is also included in the course.

Course Outcomes:

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

CO1	Recognize the sample of rock and explain brief about mineralogy of rock
CO2	Analyze the geological maps
CO3	Select suitable method for geophysical explorations

Detailed Syllabus:

List of the experiments/assignments/ field visits if any

	Details
1	Identification and classification of important rock forming minerals and rocks
2	Study of solutions to engineering geological problems with the help of these maps
3	Geological map reading, construction of section of geological maps consisting of horizontal, and inclined beds, unconformity, faults, folds, dykes etc
4	Case study of 'Geophysical Exploration by electrical resistivity method or seismic refraction method from literature
5	One site visit to study geology and its engineering applications

Term Work:

The term work shall consist of information, exercise based on detailed syllabus above.

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