B.E. Civil Engineering
CURRICULUM AND SYLLABI
I to VI Semesters
Regulation - 2020

Excel

ENGINEERING COLLEGE
(Autonomous)

Approved by AICTE, New Delhi & Affiliated to Anna University, Chennai

Accredited by NBA and NAAC with "A+"and Recognized by UGC (2f&12B)

KOMARAPALAYAM – 637303

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B.E. CIVIL ENGINEERING
REGULATION – 2020
CHOICE BASED CREDIT SYSTEM
I TO VIII SEMESTERS CURRICULUM AND SYLLABI

SEMESTER I									
Sub Code	**Course**	**Category**	**Periods/Week**			**C**	**Maximum Marks**		
			L	**T**	**P**		**CA**	**FE**	**Total**
Theory Course (s)									
20MA102	Mathematics - I for Building Sciences	BS	3	2	0	4	40	60	100
20CE101	Basics of Civil Engineering	ES	3	0	0	3	40	60	100
Theory with Practical Course (s)									
20ENEXX	Language Elective - I*	HSS	2	0	2	3	50	50	100
20CH102	Chemistry for Building Sciences	BS	3	0	2	4	50	50	100
20ME101	Engineering Graphics	ES	1	0	4	3	50	50	100
Practical Course (s)									
20CE102	Civil Engineering Practices Laboratory	ES	0	0	2	1	50	50	100
Mandatory Course (s)									
20MC101	Induction Programme	MC	2 Weeks			0	100	0	100
		Total	**12**	**2**	**10**	**18**	**380**	**320**	**700**
*Language Electives – I									
20ENE01	Communicative English	HSS	2	0	2	3	50	50	100
20ENE02	Advanced Communicative English	HSS	2	0	2	3	50	50	100

SEMESTER II									
Sub Code	**Course**	**Category**	**Periods/Week**			**C**	**Maximum Marks**		
			L	**T**	**P**		**CA**	**FE**	**Total**
Theory Course (s)									

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Sub Code	Course	Category	L	T	P	C	CA	FE	Total
20MA202	Mathematics - II for Building Sciences	BS	3	2	0	4	40	60	100
20ME201	Engineering Mechanics	ES	3	2	0	4	40	60	100
Theory with Practical Course (s)									
20ENEXX	Language Elective - II*	HSS	2	0	2	3	50	50	100
20PH202	Physics for Building Sciences	BS	3	0	2	4	50	50	100
20CS201	Problem Solving using Python	ES	3	0	2	4	50	50	100
Practical Course (s)									
20CE201	Computer Aided Building Drawing Laboratory	PC	0	0	4	2	50	50	100
Mandatory Course (s)									
20MC201	Environmental Sciences	MC	2	0	0	0	100	0	100
		Total	**16**	**4**	**10**	**21**	**380**	**320**	**700**
*Language Electives - II									
20ENE02	Advanced Communicative English	HSS	2	0	2	3	50	50	100
20ENE03	Hindi	HSS	2	0	2	3	50	50	100
20ENE04	French	HSS	2	0	2	3	50	50	100
20ENE05	German	HSS	2	0	2	3	50	50	100

SEMESTER III									
Sub Code	**Course**	**Category**	**L**	**T**	**P**	**C**	**CA**	**FE**	**Total**
			Periods/Week				**Maximum Marks**		
Theory Course (s)									
20MA301	Transforms and Boundary Value Problems	BS	3	2	0	4	40	60	100
20CE301	Mechanics of Solids I	ES	3	2	0	4	40	60	100
20CE302	Fluid Mechanics	ES	3	0	0	3	40	60	100
20CE303	Engineering Geology	PC	3	0	0	3	40	60	100
Theory with Practical Course (s)									
20CE304	Surveying I	PC	3	0	2	4	50	50	100
20CE305	Construction Materials	PC	3	0	2	4	50	50	100
Mandatory Course (s)									

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20MC301	Interpersonnal Skills	MC	0	0	2	0	100	0	100
	Total		18	4	6	22	360	340	700

SEMESTER IV									
Sub Code	**Course**	**Category**	**Periods/Week**			**C**	**Maximum Marks**		
			L	**T**	**P**		**CA**	**FE**	**Total**
Theory Course (s)									
20MA401	Numerical Analysis and Statistics	BS	3	2	0	4	40	60	100
20CE401	Concrete Technology	PC	3	0	0	3	40	60	100
20CE402	Geotechnical Engineering I	PC	3	0	0	3	40	60	100
20CE403	Mechanics of Solids II	PC	3	2	0	4	40	60	100
Theory with Practical Course (s)									
20CE404	Surveying II	PC	3	0	2	4	50	50	100
20CE405	Applied Hydraulic Engineering	ES	3	0	2	4	50	50	100
Practical Course (s)									
20CE406	Strength of Materials Laboratory	PC	0	0	2	1	50	50	100
Mandatory Course (s)									
20MC401	Soft Skills	MC	2	0	0	0	100	0	100
	Total		20	4	6	23	410	390	800

SEMESTER V									
Sub Code	**Course**	**Category**	**Periods/Week**			**C**	**Maximum Marks**		
			L	**T**	**P**		**CA**	**FE**	**Total**
Theory Course (s)									
20CE501	Design of Reinforced Cement Concrete Elements	PC	3	2	0	4	40	60	100
20CE502	Structural Analysis I	PC	3	0	0	3	40	60	100
20CEEXX	Professional Elective-I	PE	3	0	0	3	40	60	100

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20YYOXX	Open Elective-I	OE	3	0	0	3	40	60	100
Theory with Practical Course (s)									
20CE503	Environmental Engineering I	PC	3	0	2	4	50	50	100
20CE504	Geotechnical Engineering II	PC	3	0	2	4	50	50	100
Practical Course (s)									
20CE505	Survey Camp	PC	1 Week			1	100	0	100
		Total	**18**	**2**	**4**	**22**	**360**	**340**	**700**

SEMESTER VI									
Sub Code	**Course**	**Category**	**Periods/Week**			**C**	**Maximum Marks**		
			L	**T**	**P**		**CA**	**FE**	**Total**
Theory Course (s)									
20CE601	Design of Steel Structural Elements	PC	3	2	0	4	40	60	100
20CE602	Structural Analysis II	PC	3	0	0	3	40	60	100
20CE603	Environmental Engineering II	PC	3	0	0	3	40	60	100
20CEEXX	Professional Elective-II	PE	3	0	0	3	40	60	100
20YYOXX	Open Elective-II	OE	3	0	0	3	40	60	100
Theory with Practical Course (s)									
20CE604	Highway Engineering	PC	3	0	2	4	50	50	100
Employment Enhancement Course (s)									
20CE605	Mini Project	EEC	0	0	2	1	50	50	100
20CE606	Internship	EEC	2 weeks			1	100	0	100
		Total	**18**	**2**	**4**	**22**	**400**	**400**	**800**

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SEMESTER VII									
Sub Code	**Course**	**Category**	**Periods/Week**			**C**	**Maximum Marks**		
			L	**T**	**P**		**CA**	**FE**	**Total**
Theory Course (s)									
20CE701	Structural Dynamics and Earthquake Engineering	PC	3	0	0	3	40	60	100
20CE702	Estimation Costing and ValuationEngineering	PC	3	0	0	3	40	60	100
20CE703	Water Resource and Irrigation Engineering	PC	3	0	0	3	40	60	100
20CEEXX	Professional Elective-III	PE	3	0	0	3	40	60	100
20CEEXX	Professional Elective-IV	PE	3	0	0	3	40	60	100
20YYOXX	Open Elective-III	OE	3	0	0	3	40	60	100
Practical Course (s)									
20CE704	Computer Aided Design and Drawing Laboratory (Concrete and Steel)	PC	0	0	4	2	50	50	100
Employment Enhancement Course (s)									
20CE705	Design Project	EEC	0	0	2	1	50	50	100
		Total	**18**	**0**	**6**	**21**	**340**	**460**	**800**

SEMESTER VIII									
Sub Code	**Course**	**Category**	**Periods/Week**			**C**	**Maximum Marks**		
			L	**T**	**P**		**CA**	**FE**	**Total**
Theory Course (s)									
20CEEXX	Professional Elective-V	PE	3	0	0	3	40	60	100
20CEEXX	Professional Elective-VI	PE	3	0	0	3	40	60	100
Employment Enhancement Course (s)									
20CE801	Major Project	EEC	0	0	20	10	50	50	100
		Total	**6**	**0**	**20**	**16**	**130**	**170**	**300**

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	PROFESSIONAL ELECTIVES (PE)								
STREAM-I : ENVIRONMENTAL AND WATER RESOURCE ENGINEERING									
Sub Code	Course	Category	Periods/Week			C	Maximum Marks		
			L	T	P		CA	FE	Total
20CEE01	Hydrology	PE	3	0	0	3	40	60	100
20CEE02	Ground Water Engineering	PE	3	0	0	3	40	60	100
20CEE03	Air Pollution and Control Engineering	PE	3	0	0	3	40	60	100
20CEE04	Water Resources Systems Analysis	PE	3	0	0	3	40	60	100
20CEE05	Integrated Water Resources Management	PE	3	0	0	3	40	60	100
20CEE06	Hospital Waste Management	PE	3	0	0	3	40	60	100
20CEE07	Municipal Solid Waste Management	PE	3	0	0	3	40	60	100
20CEE08	Participatory Water Resources Management	PE	3	0	0	3	40	60	100
20CEE09	Air Pollution Management	PE	3	0	0	3	40	60	100
20CEE10	Industrial Waste Management	PE	3	0	0	3	40	60	100
20CEE11	Environmental and Social Impact Assessment	PE	3	0	0	3	40	60	100
20CEE12	Geo- Environmental Engineering	PE	3	0	0	3	40	60	100

	STREAM-II : STRUCTURAL ENGINEERING								
Sub Code	Course	Category	Periods/Week			C	Maximum Marks		
			L	T	P		CA	FE	Total
20CEE21	Building Services	PE	3	0	0	3	40	60	100
20CEE22	Disaster Management	PE	3	0	0	3	40	60	100
20CEE23	Industrial Structures	PE	3	0	0	3	40	60	100
20CEE24	Maintenance, Repair and Rehabilitation of Structures	PE	3	0	0	3	40	60	100
20CEE25	Design of Prestressed Concrete Structures	PE	3	0	0	3	40	60	100
20CEE26	Experimental Analysis of Stress	PE	3	0	0	3	40	60	100
20CEE27	Bridge Structures	PE	3	0	0	3	40	60	100

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20CEE28	Storage Structures	PE	3	0	0	3	40	60	100
20CEE29	Ground Improvement Techniques	PE	3	0	0	3	40	60	100
20CEE30	Cost Effective Construction and Green Building	PE	3	0	0	3	40	60	100
20CEE31	Tall Buildings	PE	3	0	0	3	40	60	100
20CEE32	Prefabricated Structures	PE	3	0	0	3	40	60	100
20CEE33	Rock Mechanics	PE	3	0	0	3	40	60	100
20CEE34	Reinforced Soil Structure	PE	3	0	0	3	40	60	100
20CEE35	Geotechnical Exploration and Instrumentation	PE	3	0	0	3	40	60	100
20CEE36	Design of Masonry, Timber & Steel Elements	PE	3	0	0	3	40	60	100

STREAM-III : CONSTRUCTION ENGINEERING AND MANAGEMENT

| Sub Code | Course | Category | Periods/Week | | | C | Maximum Marks | | |
			L	T	P		CA	FE	Total
20CEE41	Construction Planning and Scheduling	PE	3	0	0	3	40	60	100
20CEE42	Modern Construction Materials	PE	3	0	0	3	40	60	100
20CEE43	Housing Planning and Management	PE	3	0	0	3	40	60	100
20CEE44	Construction Project Management	PE	3	0	0	3	40	60	100
20CEE45	Economic and Finance Management in Construction	PE	3	0	0	3	40	60	100
20CEE46	System Integration in Construction	PE	3	0	0	3	40	60	100
20CEE47	Contract Laws and Regulation	PE	3	0	0	3	40	60	100
20CEE48	Resource Management and Control in Construction	PE	3	0	0	3	40	60	100
20CEE49	Quality Control and Assurance in Construction	PE	3	0	0	3	40	60	100
20CEE50	Design of Energy Efficient Building	PE	3	0	0	3	40	60	100
20CEE51	Project Formulation and Appraisal	PE	3	0	0	3	40	60	100

| 20CEE52 | Project Safety Management | PE | 3 | 0 | 0 | 3 | 40 | 60 | 100 |
| 20CEE53 | Railway, Airport, Docks and Harbor Engineering | PE | 3 | 0 | 0 | 3 | 40 | 60 | 100 |

OPEN ELECTIVE COURSES (For Other Branches)									
Sub Code	Course	Category	Periods/Week			C	Maximum Marks		
			L	T	P		CA	FE	Total
20CEO01	Energy Conservation and Management	OE	3	0	0	3	40	60	100
20CEO02	Environment and Agriculture	OE	3	0	0	3	40	60	100
20CEO03	Renewable Energy Sources	OE	3	0	0	3	40	60	100
20CEO04	Vibration and Noise Control	OE	3	0	0	3	40	60	100
20CEO05	Climate Change and its Impacts	OE	3	0	0	3	40	60	100
20CEO06	Green Building Design	OE	3	0	0	3	40	60	100
20CEO07	Selection of Materials	OE	3	0	0	3	40	60	100
20CEO08	Testing of Materials	OE	3	0	0	3	40	60	100

ONE CREDIT COURSES									
Sub Code	Course	Category	Periods/Week			C	Maximum Marks		
			L	T	P		CA	FE	Total
20CEA01	Drafting and Documentation of Construction Projects	PC	1	0	0	1	100	0	100
20CEA02	3D Modeling Techniques of BIM	PC	1	0	0	1	100	0	100
20CEA03	3DModelling of Buildings	PC	1	0	0	1	100	0	100
20CEA04	Total Station Survey	PC	1	0	0	1	100	0	100
20CEA05	Tekla	PC	1	0	0	1	100	0	100
20CEA06	Vasthu	PC	1	0	0	1	100	0	100
20CEA07	Pre-Engineered Building	PC	1	0	0	1	100	0	100

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VALUE ADDED COURSES									
Sub Code	Course	Category	Periods/Week			C	Maximum Marks		
			L	T	P		CA	FE	Total
20CEB01	Auto cad	OE	2	0	2	3	100	0	100
20CEB02	Revit Architecture	OE	2	0	2	3	100	0	100
20CEB03	E tabs	OE	2	0	2	3	100	0	100
20CEB04	3 DX Max	OE	2	0	2	3	100	0	100
20CEB05	Stadd Pro.	OE	2	0	2	3	100	0	100
20CEB06	Primavera	OE	2	0	2	3	100	0	100
20CEB07	Drone Survey	OE	2	0	2	3	100	0	100

Sl. No.	Category	Credits per Semester								Total Credits	By AICTE
		I	II	III	IV	V	VI	VII	VIII		
1	HSS	3	3							6	10-14
2	BS	8	8	4	4					24	22-28
3	ES	7	8	7	4					26	24
4	PC		2	11	15	16	14	11		69	48
5	PE					3	3	6	6	18	18
6	OE					3	3	3		9	9
7	EEC						2	1	10	13	12-16
8	MC	0								0	
Total		18	21	22	23	22	22	21	16	165	143-157

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HSS - Humanities and Social Sciences

BS   - Basic Sciences

ES   - Engineering Sciences

PC   - Professional Core

PE   - Professional Electives

OE   - Open Electives

EEC   - Employability Enhancement Courses

MC   - Mandatory Courses (Non-Credit Courses)

CA   - Continuous Assessment

FE   - Final Examination

20MA102	**Mathematics – I for Building Sciences**	L	T	P	C
		3	2	0	4
Nature of Course	Basic sciences				
Pre requisites	Fundamentals of Basic Mathematics				

Course Objectives

The course is intended to
1. Acquire the concepts of matrix algebra techniques.
2. Acquaint the mathematical tools needed in evaluating limits, derivatives and differentiation of one variable.
3. Learn the concept of calculus for solving the problems mathematically and obtaining solutions.
4. Learn the knowledge of definite, indefinite integrals and parts of Integration.
5. Learn the theory and applications of Riemann Integration of a bounded real valued functions defined on a closed and bounded interval.

Course Outcomes

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

CO. No.	Course Outcome	Bloom's Level
CO1	Apply the idea of reducing the complex problems into simple form using matrix technique	Apply
CO2	Use both the limit definition and rules of differentiation to differentiate functions.	Understand
CO3	Identify the circle of curvature, evolutes and envelope of the curves.	Apply
CO4	Explain different method of integration using in Engineering problems	Apply
CO5	Show the relationship between the derivative and the definite integral as expressed in both parts of fundamental theorem of Calculus.	Understand

Course contents:

Unit- I   Matrices   12
Characteristic equation – Eigen values and Eigen vectors of a real matrix – Properties(statement only) – Cayley- Hamilton theorem and its applications – Orthogonal transformation of a symmetric matrix to diagonal form – Reduction of quadratic form to canonical form by orthogonal transformation

Unit- II   Limits and Continuity   12
Representation of functions- Limit of a function – Continuity – Derivatives – Differentiation rules – Maxima and Minima of functions of one variable.

Unit- III   Differential Calculus   12
Curvature – radis of curvature (Cartesian and polar co-ordinates) – Centre of curvature –Circle of curvature – Involutes and evolutes – envelope

Unit- IV   Integral Calculus   12
Definite and Indefinite integrals – Substitution rule – Techniques of integration – Integration by parts, Trigonometric integrals, Trigonometric substitutions, Integration of rational functions by partial fraction – Double integral – Triple integral

Unit- V   Riemann Integration   12
Definition and properties - fundamental theorem of integral calculus - improper integrals - Beta and Gamma functions

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Total: 60 Periods

Text books
1. Grewal B.S., "Higher Engineering Mathematics", Khanna Publishers,44th Edition,2016.
2. Veerajan.T, "Engineering mathematics for semester I and II", Tata McGraw Hill, 3rd Edition,2014

Reference books
1. Anton H. Bivens, and Davis, "Calculus", Wiley, 10th Edition, 2016.
2. Weir M.D. and Joel Hass, "Thomas calculus", Pearson,12th Edition, 2016.

Additional References:
1. nptel.ac.in/course/111/105/111105121
2. nptel.ac.in/course/122/104/122104017

COs	1	2	3	4	5	6	7	8	9	10	11	12	PSO 1	PSO 2
Mapping of Course Outcomes (COs) with Programme Outcomes (POs) Programme Specific Outcomes (PSOs)														
CO1	3	3	2										1	
CO2	3	3	2										2	
CO3	2	3	2										1	
CO4	3	3	1										2	
CO5	3	3	2										1	

3	High	2	Medium	1	Low

Formative assessment			
Bloom's Level	**Assessment Component**	**Marks**	**Total marks**
Remember	Online Quiz	5	
Understand	Tutorial Class/Assignment	5	15
	Attendance	5	

Summative Assessment

Bloom's Category	Internal Assessment Examination			Final Examination (60)
	IAE 1 (7.5)	IAE 2 (7.5)	IAE3 (10)	
Remember	10	10	10	20
Understand	10	10	10	20
Apply	30	30	30	60
Analyse				
Evaluate				
Create				

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20CE101	Basics of Civil Engineering	L	T	P	C
		3	0	0	3

Nature of Course	Engineering sciences
Pre requisites	NIL

Course Objectives
The course is intended to

1. Understand basic concepts of about Civil Engineering
2. Know about the various types of buildings.
3. Gain knowledge about the properties and uses of various materials for constructions
4. Recognize the necessity for composite materials like concrete, RCC
5. Understand the building components

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

CO. No.	Course Outcome	Bloom's Level
CO1	Gain knowledge on scope and importance of civil engineering.	Apply
CO2	Acquire knowledge on the composition, properties and classification of building materials.	Understand
CO3	Analyze the properties of timber, and other building materials used in construction	Apply
CO4	Explain the various building components and their functions.	Apply
CO5	Differentiate the types of masonry and also enumerate the functions of super- structure.	Understand

Course Contents:
Unit- I   Scope of Civil Engineering   9
Scope of Civil Engineering- Functions of a Civil Engineer - Types of Building: Residential- Commercial- Industrial & Institutional buildings- Site selection- Units & Unit conversions- Room dimensions as per NBC.

Unit- II   Primary Building Materials   9
Bricks: Manufacturing of bricks-Types- Characteristics of Bricks. Stone: Characteristics of Stones- Coarse aggregate- Characteristics of good building stone. Concrete: Definition-Cement-Types- Manufacturing of cement. Fine aggregate- M-sand- Manufacturing of M-Sand. Water- Water standards for construction purpose. Steel: Properties- Grade- Cold formed steel- Hot rolled steel- Sections.

Unit - III   Other Building Materials   9
Timber: Types of Timber - Seasoning of Timber- Applications. PVC, UPVC, Aluminium, Glass & Stainless steel types- Applications in construction. Paints: Composition of oil paints- Purpose of paints- Applications. Enamels- Varnishes- Plaster of Paris- Purpose- Applications

Unit- IV   Building Components (Sub-Structure)   9
Components of Building- Sub structures- Foundation and its Types- Construction sequence in Building- Design sequence in Building- Ground level- Basement- Plinth level- Sill level- Lintel level- Roof level- Parapet level

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Unit- V   Building Components (Super-Structure)   9
Super-structure - Walls: Types of Stone masonry and Brick masonry walls- Brick bonds- Slab-
Beam- Column- Roof - Floor- Door- Windows- Lintel- Parapet

Total: 45 Periods

Text Books:
1. S. K. Duggal, "Building Materials", New Age International (P) Ltd.3rd Edition,,2003
2. P. C. Varghese, "Building Materials", PHI Learning Private Limited, New Delhi,2nd Edition,2010
3. S. P. Arora and S. P. Bindra, "Textbook of Building Construction", DhanpatRai Publications(P) Ltd. Revised Edition 2003

Reference Books:
1. Punmia B. C., Jain A. J. and Jain A. J. "Building construction", Laxmi Publications,5th Edition2005
2. Shetty .M.S., " Concrete Technology, Theory and Practice", Revised Edition, S. Chand & company Ltd., New Delhi,2006
3. E. Keith Blankenbaker, "Construction and Building Technology", 1st Edition,2009

Additional References:
1. National Building Code

Mapping of Course Outcomes (COs) with Programme Outcomes (POs) Programme Specific Outcomes (PSOs)														
COs	**POs**												**PSOs**	
	1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**	**1**	**2**
CO1	3				3							3		2
CO2	3				3							3		2
CO3	3				3							3		2
CO4	3				3							3		2
CO5	3				3							3		2
	3	High			2		Medium				1		Low	

Formative assessment			
Bloom's Level	**Assessment Component**	**Marks**	**Total marks**
Remember	Online Quiz	5	
Understand	Class Presentation/Power point presentation	5	15
	Attendance	5	

Summative Assessment				
Bloom's Category	**Internal Assessment Examination**			**Final Examination (60)**
	IAE 1 (7.5)	**IAE 2 (7.5)**	**IAE3 (10)**	
Remember	10	10	10	20
Understand	10	10	10	20
Apply	30	30	30	60
Analyse				
Evaluate				
Create				

20CH102	**Chemistry for Building Sciences (Civil Engineering)**	L	T	P	C
		3	0	2	4
Nature of Course	Basic Science				
Prerequisites	Nil				

Course Objectives

The course is intended to

1. Impart knowledge and understanding about the constituents present in water and the need for purification of water.
2. Understand the fundamentals of batteries.
3. Provide knowledge about materials like metals, refractory and cement.
4. Learn about the nature, types and problems of the soil.
5. Understand the causes and control measures of corrosion.

Course Outcomes

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

CO.No	Course Outcome	Bloom's Level
CO1	Develop innovative and eco-friendly method for water purification to meet the growing industrial demand	Apply
CO2	Discuss the basic principles and mechanism of working of batteries and fuel cells	Understand
CO3	Discuss about various types of alloys and engineering materials	Understand
CO4	Identify the nature and problems of the soil	Understand
CO5	Demonstrate the importance of protection of metals from corrosion	Apply

Course Contents

Unit-I   Water Analysis and Water Treatment   9

Water analysis: Sources of water, Hard water and soft water, Hardness of water, acidity, alkalinity, pH value, amount of free CO_2, fluoride content and chloride content. Biological Oxygen Demand (BOD), Chemical Oxygen Demand (COD). Water treatment: Definition, Zeolite process, Conditioning methods: internal conditioning (Phosphate, Calgon) and external conditioning (Demineralisation), Desalination, Reverse osmosis (RO).

Unit-II   Energy Storage Devices   9

Batteries: Definition, characteristics and classification, Primary battery: Alkaline battery, Secondary battery: lead acid battery, nickel cadmium battery, lithium battery and lithium ion battery, Fuel cells: construction and working of phosphoric acid fuel cell

Unit-III   Alloys and Engineering Materials   9

Alloys: classification and types, Ferrous alloys (Nichrome and stainless steel only), Non- ferrous alloys (brass and bronze), Heat treatment of steel, Refractories: characteristics, classification and manufacture, Cement: manufacture and setting

Unit-IV   Soil Chemistry   9

Types of soil: saline soil, acidic soil and alkaline soil. Formation: acid, acid sulphate, salt affected and calcareous soil. Characteristics and Reclamation. Methods of reclamation: mechanical, chemical and biological methods. Chemistry of submerged soils

Unit-V   Corrosion and its Control   9

Corrosion: Classification, Types: Chemical corrosion and Electrochemical corrosion, mechanism. Corrosion control: Corrosion inhibitors, cathodic protection (sacrificial anodic protection, impressed current cathodic protection), Protective coating, Paint and Electroplating (Au).

Total: 45 Periods

Laboratory Component

S.No	Name of the Experiment	CO Mapping	RBT
1	Determination of hardness of water	CO1	Apply
2	Determination of chloride content in water sample	CO1	Apply
3	Conductometric titration of strong acid versus strong base	CO2	Understand
4	Determination of strength of HCl by pH metry	CO2	Understand
5	Estimation of copper in brass by EDTA method	CO3	Apply
6	Determination of CaO in cement	CO3	Apply
7	Measurement of pH of soil sample using litmus paper and pH strips	CO4	Apply
8	Determination of the nature of sample solution of soil (acidic, alkaline, neutral) using universal indicator	CO5	Apply

Total: 30 Periods

Text Books
1. O.G.Palanna, "Engineering Chemistry" Tata McGraw-Hill Pub.Co.Ltd, 1st Edition, New Delhi, 2017.
2. P.C.Jain and Monicka Jain, "Engineering Chemistry", Dhanapat Rai Publishing Company Pvt. Ltd, 2nd Edition, 2017.

Reference Books
1. B. Sivasankar "Engineering Chemistry", Tata McGraw-Hill Pub.Co.Ltd, 2nd Edition, 2009.
2. S.Tolanur, "Soil Chemistry", CBS Publishers, 2nd Edition, 2015.
3. R. Sivakumar and N. Sivakumar, "Engineering Chemistry", Tata McGraw-Hill Pub.Co.Ltd, 1st Edition, 2009.
4. Dr.Sivanesan and Nandagopal, "Engineering Chemistry-I", V. K. Pub. Pvt. Ltd, 2nd Edition, 2011.

Additional Resources
1. https://nptel.ac.in/downloads/122101001
2. https://nptel.ac.in/courses/103103033/module9/lecture1.pdf
3. https://nptel.ac.in/courses/102103044/3
4. https://www.youtube.com/watch?v=jFQeDef6bug
5. https://www.sciencedirect.com/topics/chemistry/phosphoric-acid-fuel-cells

COs	POs												PSOs		
	1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**	**1**	**2**	**3**
CO1	3	2									1				
CO2	3	2									1				
CO3	3	2									1				
CO4	3	2									1				
CO5	3	1									1				
	3	High			2		Medium			1		Low			

Mapping of Course Outcomes (COs) with Programme Outcomes (POs) and Programme Specific Outcomes (PSOs)

	Summative Assessment					
	Continuous Assessment					**Final Examination (Theory) [50]**
	Theory				**Practicals**	
Bloom's Level	**IAE-I [7.5]**	**IAE-II [7.5]**	**IAE-III [10]**	**Attendance [5]**	**Rubric based CIA [20]**	
Remember	30	20	10		20	40
Understand	10	20	30		20	40
Apply	10	10	10		10	20
Analyze						
Evaluate						
Create						

Passed in Board of studies meeting on 21.10.2020   *Approved in Academic Council meeting on 09.02.2022*

CHAIRMAN - BOARD OF STUDIES

20ME101	**Engineering Graphics** **(Common to Aeronautical ,Agriculture, Civil, Mechanical, Safety and Fire Engineering & Food Technology)**	**L**	**T**	**P**	**C**
		1	0	4	3
Nature of Course	Engineering Sciences				
Pre requisites	Nil				

Course Objectives:

The course is intended to

1. Understand technical drawings in various fields of engineering

2. Imagine and visualize the geometric details of engineering objects.

3. Translate the geometric information of engineering objects into engineering drawings.

4. Develop the graphical skills for communication of concepts, ideas and design of engineering products through technical drawings.

5. Visualize and draw isometric and perspective views

Course Outcomes

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

CO. No.	Course Outcome	Bloom's Level
CO 1	Develop the conic sections, special curves, and draw orthographic views from pictorial views.	Apply
CO 2	Apply the principles of orthographic projections of points in all quadrants, lines and planes in first quadrant.	Apply
CO 3	Construct the projections of simple solids like prisms, pyramids, cylinder and cone.	Apply
CO 4	Build the sectional views of solids like cube, prisms, pyramids, cylinders & cones and development of its lateral surfaces.	Apply
CO 5	Organize and draw isometric and perspective sections of simple solids.	Apply

Course Contents:

Concepts and Conventions (Not for Examination) **1**
Importance of graphics in engineering applications – Use of drafting instruments – BIS conventions and specifications – Size, layout and folding of drawing sheets – Lettering and dimensioning.

Unit - I   Plane Curves and Free Hand Sketching **(3+12)**
Basic Geometrical constructions, Curves used in engineering practices: Conics – Construction of ellipse, parabola and hyperbola by eccentricity method – Construction of cycloid – construction of involutes of square and circle – Drawing of tangents and normal to the above curves. Visualization concepts and Free Hand sketching: Visualization principles –Representation of Three-Dimensional objects – Layout of views- Free hand sketching of multiple views from pictorial views of objects

Unit – II   Projection of Points, Lines and Plane Surfaces **(3+12)**
Orthographic projection- principles-Principal Planes-First angle projection-projection of points
Projection of straight lines (only First angle projections) inclined to both the principal planes - Determination of true lengths and true inclinations by rotating line method. Projection of planes (polygonal and circular surfaces) inclined to both the principal planes by rotating object method.

Unit- III   Projection of Solids **(3+12)**
Projection of simple solids like prisms, pyramids, cylinder and cone when the axis is inclined to one of the principal planes by rotating object method.

Unit- IV   Projection of Sectioned Solids and Development of Surface   (3+12)
Sectioning of above solids in simple vertical position when the cutting plane is inclined to the one of the principal planes and perpendicular to the other – obtaining true shape of section, Development of lateral surfaces of simple and sectioned solids – Prisms, pyramids cylinders and cones. Development of lateral surfaces of solids with cut-outs and holes

Unit -V   Isometric and Perspective Projections   (3+12)
Principles of isometric projection – isometric scale –Isometric projections of simple solids and truncated solids - Prisms, pyramids, cylinders, cones- combination of two solid objects in simple vertical positions and miscellaneous problems. Perspective projection of simple solids-Prisms, pyramids and cylinders by visual ray method.

Total:(15+60) Periods

Text Books:
1. Venugopal K. and Prabhu Raja V., "Engineering Graphics", New Age International (P) Limited,1ˢᵗ Edition 2011
2. Natarajan K.V., "A text book of Engineering Graphics", Dhanalakshmi Publishers, Chennai, 2012.

Reference Books:
1. Bhatt N.D. and Panchal V.M., "Engineering Drawing", Charotar Publishing House, 50ᵗʰ Edition, 2010.
2. Basant Agarwal and Agarwal C.M., "Engineering Drawing", Tata McGraw Hill Publishing Company Limited, New Delhi, 2008.
3. Parthasarathy N S and Vela Murali, "Engineering Graphics", Oxford University, Press, New Delhi, 2015.

Web References:
1. http://nptel.ac.in/courses/112103019/Engineering drawing
2. http://pioneer.netserv.chula.ac.th/~kjirapon/self-practice.html

Publication of Bureau of Indian Standards:
1. IS 10711 – 2001: Technical products Documentation – Size and lay out of drawing sheets.
2. IS 9609 (Parts 0 & 1) – 2001: Technical products Documentation – Lettering.
3. IS 10714 (Part 20) – 2001 & SP 46 – 2003: Lines for technical drawings.
4. IS 11669 – 1986 & SP 46 – 2003: Dimensioning of Technical Drawings.
5. IS 15021 (Parts 1 to 4) – 2001: Technical drawings – Projection Methods.

Special points applicable only to Final Examinations of Engineering Graphics:
1. There will be five questions, each of either-or type covering all units of the syllabus.
2. All questions will carry equal marks of 20 each making a total of 100.
3. The answer paper shall consist of drawing sheets of A3 size only. The students will be permitted to use appropriate scale to fit solution within A3 size.
4. The examination will be conducted in appropriate sessions on the same day

Passed in Board of studies meeting on 21.10.2020   *Approved in Academic Council meeting on 09.02.2022*

CHAIRMAN - BOARD OF STUDIES

Mapping of Course Outcomes (COs) with Programme Outcomes (POs) Programme Specific Outcomes (PSOs)																
COs	**POs**												**PSOs**			
	1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**	**1**	**2**	**3**	
CO1	3	2										1	2			
CO2	3	2										1	2			
CO3	3	2										1	2			
CO4	3	3										1	2			
CO5	3	2										1	2			
	3	High			2	Medium				1	Low					

Summative assessment						
Bloom's Level	**Continuous Assessment**					**Final Examination (Theory) [50 marks]**
	Theory				**Practical**	
	IAE-1 [7.5]	**IAE-2 [7.5]**	**IAE-3 [10]**	**Attendance [5]**	**Rubric based CIA [20 Marks]**	
Remember	10	10	10		20	20
Understand	20	20	20		40	40
Apply	20	20	20		40	40
Analyse						
Evaluate						
Create						

20CE102	Civil Engineering Practices Laboratory	L	T	P	C
		0	0	2	1
Nature of Course	Engineering Sciences				
Pre requisites	Nil				

Course Objectives:

The course is intended to

1. To provide hands on training on plumbing works
2. To impart knowledge on carpentry using power tools
3. To practice Butt joints, Lap joints and T- Joints. by metal arc welding
4. To provide training in basic machining works
5. To fabricate different models using sheet metal

Course Outcomes

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

CO. No.	Course Outcome	Bloom's Level
CO1	Get trained in plumbing works	Apply
CO2	Fabricate joints in carpentry components	Apply
CO3	Experiment with arc welding equipment to make joints.	Apply
CO4	Carry out the basic machining operations for turning and drilling.	Apply
CO5	Make the models using sheet metal	Apply

Course Contents:

S.No	List of Experiment	CO Mapping	RBT
1	**Buildings** Study of plumbing and carpentry components of residential and industry buildings, safety aspects.	CO1	Apply
2	**Plumbing Works** a. Pipeline joints, location and functions: valves, tapes, couplings, unions, reduces, elbows and house a. hold fittings. b. Pipe connection requirements for pumps and turbines. c. Preparation of plumbing line sketches for water supply and sewage works. d. Basic pipe connections, mixed pipe material connections, pipe connections with different	CO1	Apply

	joining components. Plumbing requirements of high rise buildings			
3	**Carpentry using power tools** a. Joints in roofs, doors, windows and furniture. b. Planning and making of various joints	**CO2**	**Apply**
4	**Welding** a. Preparation of welding symbols and edges b. Arc welding – Butt joints, Lap joints and T joints. c. Standard size of bars, rods, section and sheet metal	**CO3**	**Apply**
5	**Basic Machining** a. Facing and plain turning. b. Drilling practice. c. Different types of screw drivers, screws, bolt and nuts.	**CO4**	**Apply**
6	**Sheet metalwork** a. Model making using bending and forming - trays, cone b. Study of thickness gauges, wire gauges.	**CO5**	**Apply**

Total: 30 Periods

Mapping of Course Outcomes (COs) with Programme Outcomes (POs) Programme Specific Outcomes (PSOs)														
	Pos												**PSOs**	
	1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**	**1**	**2**
CO1	3		2	1	3									3
CO2	3		2	1	3									3
CO3	3		2	1	3									3
CO4	3		2	1	3									3
CO5	3		2	1	3									3
	3	High			2	Medium				1				

Summative assessment based on Continuous and End Semester Examination		
Bloom's Level	**Rubric based Continuous Assessment [50 marks]**	**End Semester Examination [50 marks]**
Remember	30	30
Understand	70	70
Apply		
Analyze		
Evaluate		
Create		

CHAIRMAN - BOARD OF STUDIES

20MC101	Induction Programme	L	T	P	C
		2	0	0	0
Nature of Course	Mandatory, Non Credit				
Pre requisites	Completion of Schooling at Higher Secondary Level				

Course Objectives

The course is intended

1. To nurture the character and behavior as a student.
2. To have broad understanding of society and relationships.
3. To impart interpersonal and soft skills.
4. To inspire the students in the field of engineering.
5. To provide exposure to industries.

Course Outcomes

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

CO. No.	Course Outcome	Bloom's Level
CO 1	Perform curricular and co-curricular activities excellently.	Knowledge
CO 2	Do the skill based training with excellence.	Understand
CO 3	Work as team for the given task	Apply
CO 4	Gain character and behavior	Knowledge
CO 5	Demonstrate the acquired skills effectively	Apply

Course Contents
PHYSICAL ACTIVITY
Yoga, Sports
CREATIVE ARTS (students can select any one of their choice)
Painting, sculpture, pottery, music, craft making and so on
UNIVERSAL HUMAN VALUES
Enhancing soft skills
LITERARY AND PROFICIENCY MODULES
Reading, Writing, Speaking- Debate, Role play etc.,
Communication and computer skills
LECTURES BY EMINENT PEOPLE
Guest lecture by subject experts
VISIT TO LOCAL CITIES
Meditation centers / Industry
FAMILARIZATION TO DEPARTMENT / BRANCH INNOVATION
Lectures by Departments Head and senior faculty members

Total: 45 Periods

Mapping of COs with POs and PSOs

<table>
<tr><td colspan="16">Mapping of Course Outcomes (COs) with Programme Outcomes (POs) Programme Specific Outcomes (PSOs)</td></tr>
<tr><td rowspan="2">COs</td><td colspan="12">POs</td><td colspan="3">PSOs</td></tr>
<tr><td>1</td><td>2</td><td>3</td><td>4</td><td>5</td><td>6</td><td>7</td><td>8</td><td>9</td><td>10</td><td>11</td><td>12</td><td>1</td><td>2</td><td>3</td></tr>
<tr><td>CO1</td><td></td><td></td><td></td><td></td><td></td><td>2</td><td>1</td><td>2</td><td></td><td></td><td></td><td>3</td><td>2</td><td></td><td></td></tr>
<tr><td>CO2</td><td></td><td></td><td></td><td></td><td></td><td>2</td><td>1</td><td>2</td><td></td><td></td><td></td><td>3</td><td>2</td><td></td><td></td></tr>
<tr><td>CO3</td><td></td><td></td><td></td><td></td><td></td><td>2</td><td>1</td><td>2</td><td></td><td></td><td></td><td>3</td><td>2</td><td></td><td></td></tr>
<tr><td>CO4</td><td></td><td></td><td></td><td></td><td></td><td>2</td><td>1</td><td>2</td><td></td><td></td><td></td><td>3</td><td>2</td><td></td><td></td></tr>
<tr><td>CO5</td><td></td><td></td><td></td><td></td><td></td><td>2</td><td>1</td><td>2</td><td></td><td></td><td></td><td>3</td><td>2</td><td></td><td></td></tr>
<tr><td></td><td>3</td><td colspan="4">High</td><td>2</td><td colspan="4">Medium</td><td>1</td><td>Low</td><td></td><td></td></tr>
</table>

Bloom's Level	Continuous Assessment (Non-Credit, Mandatory)				
	Test -I [20]	Test -II [20]	Test - III [20]	Assignment/ Activity [20]	Attendance [20]
Remember	10	10	10		
Understand	20	20	20	10	
Apply	20	20	20	10	
Analyse					
Evaluate					
Create					

CHAIRMAN - BOARD OF STUDIES

20ENE01	COMMUNICATIVE ENGLISH (Common to all B.E/ B.Tech Programmes)	L	T	P	C
		2	0	2	3
Nature of Course	Humanities and Social Science				
Pre requisites	Nil				

Course Objectives

The course is intended to
1. Improve lexical, grammatical and semantic competence.
2. Enhance communicative skills in real life situations.
3. Augment thinking in all forms of communication.
4. Equip with oral and written communication skills.
5. Gain employability skills.

Course Outcomes

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

CO. No.	Course Outcome	Bloom's Level
CO1	Use effectively the lexical, grammatical and semantic knowledge	Remember
CO2	Communicate with clarity using intentional vocabulary in English	Apply
CO3	Articulate perfectly and express their opinions confidently using communicative strategies	Remember
CO4	Accomplish listening and reading skills for lifelong learning	Understand
CO5	Comprehend, interpret and present data	Understand

Course Contents:

Unit – I   Basic structure and Usage   6

Parts of Speech –- Articles –Tenses - Subject-Verb Agreement – Different Grammatical forms of the same word - Listening to Speeches and Conversations from Globareana software – Listening to Announcements – Listening and Gap Filling.

Unit – II   Vocabulary and Language Development   6

Intentional vocabulary used in and around Airport, Hospital, Hotel, Court – Abbreviations and acronyms - One Word Substitution - Compound words – Homophones and Homonyms – Types of sentences - Ordering Jumbled Sentences Letter writing – informal.

Unit – III   Oral Communication Skills   6

Improving fluency – Articulation with pronunciation – Voice modulation in Speaking – One minute talk -Self Introduction and introducing ones friend – Telephonic conversations – Group Discussion – Modal Auxiliaries – Discourse markers

Unit – IV   Comprehensive Listening and Reading   6

Effective listening Strategies –– Listening to Interviews from Globareana software – Phrasal verbs – Reading Comprehension – "An Astrologer's Day" by R.K.Narayan and "Building a New State" by Dr. A.P.J. Abdul Kalam

Unit – V   Effective Writing   6

Interpretation and presentation of data – Developing Hints – General essays and paragraph writing – Report Writing – survey report and accident report - Instructions and Recommendations

Total: 30 Periods

Laboratory Components

S.No	List of Exercises	CO Mapping	RBT
1	Role-play – One minute talk	3	Understand
2	Role-play – Telephonic conversations	3	Understand
3	Listening to speeches and lectures and gap filling	4	Understand
4	Group Discussion.	4	Understand
5	Articulation with pronunciation practice	3	Apply
6	Listening to Announcements – Listening and Gap Filling	4	Understand
7	Listening to Interviews & Native speakers' Conversations	4	Understand
8	Reading practice with articles in magazine and news papers.	4	Understand
9	Model – Job Interviews	4	Understand
10	Introspective report – Personal analysis	5	Understand
11	Telephone etiquette	3	Remember
12	Reading – Shorter texts and News Articles	4	Understand
13	Role Play – Getting and Giving Permission	3	Remember
14	Self Introduction(Formal)	3	Understand
15	Recommendations/Suggestions	3	Apply

Total: 30 Periods

Text Books
1. Rizvi, Ashraf M., "Effective Technical Communication", Tata McGraw Hill Publishing Company Limited, New Delhi, 5th Edition, 2007.
2. Board of Editers, "Using English – A Coursebook for Undergraduate Engineers and Technologists", Orient BlackSwan Private Limited, Hyderabad, 2nd Edition, 2017.

Reference Books:
1. Meenakshi Raman and Sangeetha Sharma, "Technical Communication", Oxford University Press, USA, 10th Edition, 2007.
2. John Cunnison Catford, "A Practical Introduction to Phonetics", Clarendon Press, Jamaica, 2nd Edition, 2001.
3. Hewings. M, "Advanced English Grammar", Cambridge University Press, Chennai, 3rd Edition, 2000.
4. S P Dhanavel "English and Soft Skills", Orient BlackSwan Private Limited, Hyderabad, 1st Edition, 2010.

Web reference:
https://www.googleadservices.com/pagead/aclk?sa=L&ai=DChcSEwij4dCTucfsAhXE1pYKHch4AB
MYABABGgJ0bA&ohost=www.google.com&cid=CAASEuRo76H-
Vx9BpazOOBfXeJSKVQ&sig=AOD64_3O-HNEnUO4A5sc31MsUfaTBGG-
dQ&q&adurl&ved=2ahUKEwjC3ceTucfsAhXBeisKHatlBewQ0Qx6BAgfEAE

Mapping of Course Outcomes (COs) with Programme Outcomes (POs) Programme Specific Outcomes (PSOs)															
COs	**POs**												**PSOs**		
	1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**	**1**	**2**	**3**
CO1							1			3	2	2			
CO2							1			3	2	2			
CO3							1			3	2	2			
CO4							1			3	2	2			
CO5							1			3	2	2			
	3	**High**				**2**	**Medium**				**1**	**Low**			

Summative assessment						
Bloom's Level	**Continuous Assessment**					**Final Examination (Theory) [50 marks]**
	Theory Marks				**Practical**	
	IAE 1 [7.5]	**IAE 2 [7.5]**	**IAE 3 [10]**	**Attendance [5]**	**Rubric based CIA [20 Marks]**	
Remember	20	20	20		40	40
Understand	20	20	20		40	40
Apply	10	10	10		20	20
Analyse						
Evaluate						
Create						

Passed in Board of studies meeting on 21.10.2020   *Approved in Academic Council meeting on 09.02.2022*

CHAIRMAN - BOARD OF STUDIES

20ENE02		Advanced Communicative English (Common to all B.E/ B.Tech Programmes)	L	T	P	C
			2	0	2	3
Nature of Course		Humanities and Social Sciences				
Pre requisites		Basics of Communicative English				

Course Objectives
The course is intended to
1. Demonstrate satisfactory control over complex structures and mechanics in English.
2. Develop fluency and accuracy in oral communication.
3. Communicate effectively and actively in social interactions.
4. Read English at inspectional level.
5. Face interviews with confidence.

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

CO. No.	Course Outcome	Bloom's Level
CO1	Apply knowledge of English grammar for effective communication	Remember
CO2	Make use of common English phrases and vocabulary strength.	Understand
CO3	Build self confidence and enhance professionalism	Apply
CO4	Implement listening, reading and writing skills in real - life situations	Apply
CO5	Speak fluently in English with proper pronunciation, intonation, tone and accent.	Understand

Course Contents:
Unit - I   Grammar and usage   **6**
Active voice and passive voice – Prefixes and suffixes – Compound words – Clauses - If Conditionals –   Idioms & Phrases - Right forms of verbs – Modal Auxiliaries - Spotting errors

Unit - II   Lexical competence   **6**
Technical Vocabulary - Expressions – Frequency – Cause and effect - Words often Miss-spelled – Syntax and structure - Homophones and Homonyms- Verbal analogy - idioms and phrases

Unit - III   Conversational etiquette   **6**
Processes description – Tone and accent in speech – Role-play (Job-Interview) – Presentation skills – Mechanics of presentation - Telephone etiquette – Group Discussion strategy - Formal & Informal, subjective and objective introduction – Body Language – Mock Interview

Unit – IV   Listening reading and writing   **6**
Listen to Scientific / Technical talks and gap filling – Listening to TED/INK Talks – Reading – "Water: The Elixir of Life" by C.V.Raman. "Progress" by St. John Ervine - Instructions and Recommendations – Letter writing formal – Job application- Report writing – Introspective report – Creative writing – Essays and Paragraph

Unit – V   Phonetics   **6**
Production and classification of speech sound – International Phonetic Alphabet and transcriptions – Phonological rules – way and Place of articulation – Vowels, consonants and diphthongs. Specific characteristics feature of vowel sounds.

Passed in Board of studies meeting on 21.10.2020   *Approved in Academic Council meeting on 09.02.2022*

Laboratory Components

S.No	List of Exercises	CO Mapping	RBT
1	Role-play – Processes Description	2	Remember
2	Listening to TED/INK Talks and gap filling	4	Understand
3	Group Discussion	3	Understand
4	Articulation with pronunciation practice	3	Apply
5	Reading – Longer texts and Technical Articles (Skimming & Scanning).	4	Apply
6	Presentation skills – Mechanics of presentation	5	Understand
7	Individual presentation on given topics	5	Remember
8	Telephone etiquette	5	Understand
9	Instructions and Recommendations	5	Remember
10	Writing – General Essays.	4	Apply
11	Report writing technique- write up	4	Remember
12	Introspective report – Personal analysis	4	Understand
13	Model Job Interviews	3	Understand
14	Job Interviews(Role play)	3	Apply
15	Body Language	3	Understand

Total: 30 Periods

Text Books

1. Rizvi, Ashraf.M, "Effective Technical Communication", Tata McGraw Hill Publishing Company Limited, New Delhi, 5th Edition, 2007.
2. Hewings. M, "Advanced English Grammar", Cambridge University Press, Chennai, 3rd Edition, 2000.
3. Board of Editers, "Using English – A Coursebook for Undergraduate Engineers and Technologists", Orient BlackSwan Private Limited, Hyderabad, 2nd Edition, 2017.

Reference Books:

1. Raman M & Sangeetha Sharma, "Technical Communication", Oxford University Press, USA, 10th Edition, 2007.
2. John Cunnison Catford, "A Practical Introduction to Phonetics",Clarendon Press, Jamaica, 2nd Edition, 2001.
3. Norman Whitby, Business Benchmark – "Pre-Intermediate to Intermediate, Students Book", Cambridge University Press, 1st Edition, 2006.
4. Dhanavel S. P., "English and Soft Skills", Orient BlackSwan Private Limited, Hyderabad, 1st Edition, 2010.

Web reference:

1. https://www.coursera.org/lecture/tesol-speaking/video-2-listening-strategies-for-learners-3AeBL?utm_source=mobile&utm_medium=page_share&utm_content=vlp&utm_campaign=top_button

2. blob:https://www.youtube.com/73f7256d-d302-4563-bed5-9e84c94a26ac

Passed in Board of studies meeting on 21.10.2020   *Approved in Academic Council meeting on 09.02.2022*

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Mapping of Course Outcomes (COs) with Programme Outcomes (POs) Programme Specific Outcomes (PSOs)															
COs	**PO's**												**PSOs**		
	1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**	**1**	**2**	**3**
CO1										3	1	2			
CO2										3	1	2			
CO3										3	1	2			
CO4										3	1	2			
CO5										3	1	2			
	3	High			2	Medium				1	Low				

Summative assessment						
Bloom's Level	**Continuous Assessment**					**Final Examination (Theory) [50 marks]**
	Theory Marks				**Practical**	
	IAE1 [7.5]	**IAE 2 [7.5]**	**IAE 3 [10]**	**Attendance [5]**	**Rubric based CIA [20 Marks]**	
Remember	20	20	20		40	40
Understand	20	20	20		40	40
Apply	10	10	10		20	20
Analyse						
Evaluate						
Create						

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20MA202	**Mathematics – II for Building Sciences**	L	T	P	C
		3	2	0	4
Nature of Course	Basic sciences				
Pre requisites	Fundamentals of basic mathematics				

Course Objectives

The course is intended to

1. Study the basics of vector calculus comprising of gradient, divergence ,curl, line, surface and volume integrals and the classical theorems.
2. Learn the mathematical analysis to understand the sequences.
3. Classify and explain the functions of singularities and its corresponding residue theorem.
4. Understand the concepts of mathematical skills to solve the first order differential equations.
5. Explain the method of finding Laplace transform of different functions.

Course Outcomes

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

CO. No.	Course Outcome	Bloom's Level
CO1	Apply the concepts of differentiation and integration to vectors.	Apply
CO2	Observe how the terms of a sequence are represented graphically.	Understand
CO3	Identify the Singularities and its corresponding Residues for the given function.	Apply
CO4	Construct the first order differential equations from real time phenomena and solve it by suitable method.	Understand
CO5	Compare Laplace transform, Inverse Laplace transform and solve the linear differential equations by Laplace transform techniques.	Apply

Course contents

Unit I   Vector Analysis   12

Gradient, Divergence and Curl –Directional derivative – Irrotational and Solenoid vector fields – Vector integration – Green's, Gauss divergence and Stokes' theorem – Statement, Verification and Simple applications

Unit II   Sequence and Series   12

Sequences and series – Convergence and divergence of series – Absolute convergence – Conditional convergence – Test for convergence and divergence. Power series for functions – interval of convergence –Taylor and Maclaurin series – Taylor's theorem with reminder.

Unit III   Complex Analysis   12

Analytic function – Construction of analytic function – Conformal mapping: w=kz, 1/z - Cauchy's Integral theorem (statement only) – Cauchy's integral formula – Taylor's and Laurent's series – Classification of singularities – Cauchy's residue theorem – Contour integration.

Unit IV   First Order Differential Equation   12

Separable differential equations – Homogeneous differential equations – Exact differential equations – Integrating factor – Bernoulli's equation – Applications

Unit V   Laplace Transforms   12

Introduction to Laplace and inverse Laplace Transform – Laplace Transform of elementary functions – Basic Properties –Transforms of derivatives and integrals of functions - Transform of periodic functions. Inverse Laplace transform of elementary functions – Statement and applications of Convolution theorem –Initial and Final value theorems –Solution of linear ODE of second order with constant coefficients by Laplace Transforms

Total: 60 Periods

Passed in Board of studies meeting on 21.10.2020   *Approved in Academic Council meeting on 09.02.2022*

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Text books
1. Grewal B.S., ''Higher Engineering Mathematics'', Khanna Publishers,44th Edition, 2016.
2. Veerajan T, ''Engineering Mathematics I and II'', Tata MC Graw-Hilli, 3rd Edition, 2014.
3. Ramana B.V, "Higher Engineering Mathematics", MC Graw-Hill companies, 5th reprint, 2008.

Reference books
1. Bali N.P and Manish Goyal, ''A text book Engineering Mathematics Semester II'', Laxmi Publications,8thEdition Reprint2015.
2. Erwin Kreyszig, ''Advanced Engineering Mathematics'', John Wiley and sons, 10thEdition, 2018.

Additional References:
1. nptel.ac.in/courses/111/111106142
2. nptel.ac.in/courses/122/104/122104017
3. nptel.ac.in/courses/111/105/111105134

<table>
<tr><th colspan="16">Mapping of Course Outcomes(COs) with Programme Outcomes(POs) Programme Specific Outcomes (PSOs)</th></tr>
<tr><th rowspan="2">COs</th><th colspan="12">POs</th><th colspan="2">PSOs</th></tr>
<tr><th>1</th><th>2</th><th>3</th><th>4</th><th>5</th><th>6</th><th>7</th><th>8</th><th>9</th><th>10</th><th>11</th><th>12</th><th>1</th><th>2</th></tr>
<tr><td>CO1</td><td>3</td><td>3</td><td>3</td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td>1</td><td></td></tr>
<tr><td>CO2</td><td>3</td><td>3</td><td>3</td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td>1</td><td></td></tr>
<tr><td>CO3</td><td>3</td><td>3</td><td>2</td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td>2</td><td></td></tr>
<tr><td>CO4</td><td>3</td><td>2</td><td>2</td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td>1</td><td></td></tr>
<tr><td>CO5</td><td>2</td><td>3</td><td>2</td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td>2</td><td></td></tr>
<tr><td></td><td>3</td><td colspan="2">High</td><td></td><td>2</td><td colspan="3">Medium</td><td></td><td></td><td>1</td><td colspan="2">Low</td></tr>
</table>

Formative assessment			
Bloom's Level	**Assessment Component**	**Marks**	**Total marks**
Remember	Online Quiz	5	
Understand	Tutorial Class/Assignment	5	15
	Attendance	5	

Summative Assessment				
Bloom's Category	**Internal Assessment Examination**			**Final Examination (60)**
	IAE 1 (7.5)	**IAE 2 (7.5)**	**IAE 3 (10)**	
Remember	10	10	10	20
Understand	10	10	10	20
Apply	30	30	30	60
Analyse				
Evaluate				
Create				

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20ME201	Engineering Mechanics (Common to Aeronautical ,Agriculture, Civil, Mechanical, Safety and Fire Engineering)	L	T	P	C
		3	2	0	4
Nature of Course	Engineering Sciences				
Pre requisites	Fundamentals of Basic Mathematics and Physics				

Course Objectives

The course is intended to

1. Develop capacity to predict the effect of force and motion in the course of carrying out the design functions of engineering.
2. Make the students understand the vector and scalar representation of forces and Moments and the static equilibrium of particles and rigid bodies.
3. Understand the effect of friction on equilibrium, laws of motion, kinematics of motion and the interrelationship.
4. Make the students understand the properties of surfaces and solids, prediction of behavior of particles and rigid bodies under motion.
5. Make the students familiar with frictional laws and its application

Course Outcomes

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

CO. No.	Course Outcome	Bloom's Level
CO 1	Illustrate the vectorial and scalar representation of forces and moments	Apply
CO 2	Find the rigid body in equilibrium.	Apply
CO 3	Determine the properties of surfaces and solids.	Apply
CO 4	Calculate dynamic forces exerted in rigid body	Apply
CO 5	Determine the friction and the effects by the laws of friction	Apply

Course Contents

Unit - I   Statics of Particles   12
Introduction – Units and Dimensions – Laws of Mechanics – Lami's theorem, Parallelogram and triangular Law of forces — Vectorial representation of forces – Vector operations of forces - additions, subtraction, dot product, cross product – Coplanar Forces – rectangular components – Equilibrium of a particle – Forces in space – Equilibrium of a particle in space – Equivalent systems of forces –Principle of transmissibility .

Unit - II   Equilibrium of Rigid Bodies   12
Free body diagram – Types of supports –Action and reaction forces – stable equilibrium – Moments and Couples – Moment of a force about a point and about an axis – Vectorial representation of moments and couples – Scalar components of a moment – Varignon's theorem – Single equivalent force -Equilibrium of Rigid bodies in two dimensions – Equilibrium of Rigid bodies in three dimensions.

Unit- III   Properties of Surfaces and Solids   12
Centroids and centre of mass– Centroids of lines and areas - Rectangular, circular, triangular areas by integration – T section, I section, - Angle section, Hollow section by using standard formula –

Theorems of Pappus - Area moments of inertia of plane areas – Rectangular, circular, triangular areas by integration – T section, I section, Angle section, Hollow section by using standard formula – Parallel axis theorem and perpendicular axis theorem –Principal moments of inertia of plane areas – Principal axes of inertia-Mass moment of inertia –mass moment of inertia for prismatic, cylindrical and spherical solids from first principle – Relation to area moments of inertia.

Unit -IV   Dynamics of Particles   12
Displacements, Velocity and acceleration, their relationship – Relative motion – Curvilinear motion - Newton's laws of motion – Work Energy Equation– Impulse and Momentum – Impact of elastic bodies.

Unit - V   Friction and Elements of Rigid Body Dynamics   12
Friction force – Laws of sliding friction – Equilibrium analysis of simple systems with sliding friction – wedge friction-. Rolling resistance -Translation and Rotation of Rigid Bodies – Velocity and acceleration – General Plane motion of simple rigid bodies such as cylinder and fly wheel

Total: 60 Periods

Text Books:
1. Rajasekaran, S. and Sankarasubramanian. G, "Fundamentals of Engineering 17 Mechanics", Vikas Publishing House Pvt. Ltd., New Delhi, 2009
2. Kumar, K.L., "Engineering Mechanics", Tata McGraw-Hill Publishing Company, New Delhi, 3rd revised Edition, 2008

References:
1. Beer, F.P and Johnston Jr. E.R., "Vector Mechanics for Engineers (In SI Units): Statics and Dynamics", Tata McGraw-Hill Publishing Company, New Delhi, 8th Edition 2004
2. Hibbeller, R.C and Ashok Gupta, "Engineering Mechanics: Statics and Dynamics", Pearson Education ,11th Edition, 2010

Web References:
1. http://nptel.ac.in/courses/122104015/
2. http://nptel.ac.in/courses/112103109/

Online Resources:
1. https://ocw.mit.edu/courses

COs	POs												PSOs		
Mapping of Course Outcomes (COs) with Programme Outcomes (POs) Programme Specific Outcomes (PSOs)															
	1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**	**1**	**2**	**3**
CO1	3	2		1									3		
CO2	3	2		1									3		
CO3	3	2		1									3		
CO4	3	2		1									3		
CO5	3	2		1									3		
	3	High			2	Medium				1	Low				

Formative assessment			
Bloom's Level	**Assessment Component**	**Marks**	**Total marks**
Remember	Online Quiz or Tutorial Class	5	
Understand	Assignment	5	15
	Attendance	5	

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Summative Assessment			
Bloom's Category	**Internal Assessment Examinations**		**Final Examination**
	IAE 1 (7.5)	IAE 2 (7.5)	IAE 3 (10)
			(60)
Remember	10	10	10	20
Understand	10	10	10	20
Apply	20	20	20	40
Analyse	0	0	0	0
Evaluate	10	10	10	20
Create	0	0	0	0

20PH202	Physics for Building Sciences (Civil Engineering)	L	T	P	C
		3	0	2	4
Nature of Course	Basic Science				
Pre requisites	Nil				

Course Objectives:
The course is intended to
1. Impart knowledge of optics, especially laser and their applications in fiber optics.
2. Provide knowledge of the thermal properties of materials and their applications.
3. Impart knowledge on properties of matter like elasticity and its applications
4. Learn the acoustic properties of materials and their applications in buildings.
5. Deliver knowledge on basic concept of seismic and flood hazard.

Course Outcomes

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

CO. No.	Course Outcome	Bloom's Level
CO1	Compare the working of lasers and propagation of light through Optical fibers and its applications	Understand
CO2	Demonstrate the thermal conductivity of good and bad conductors	Understand
CO3	Explain the knowledge about elastic modulus	Understand
CO4	Interpret the knowledge about the acoustics of buildings.	Understand
CO5	Classify the natural calamities like seismic hazards, flood hazards in detail	Understand

Course Content:
Unit- I   Laser And Fiber Optics   9
Lasers: population of energy levels, Einstein's A and B coefficients derivation – resonant cavity, optical amplification (qualitative) – Semiconductor lasers: homo junction and hetero junction – Fiber optics: principle, numerical aperture and acceptance angle - types of optical fibers (material, refractive index, mode) – optical fiber communication system- fiber optic endoscope.

Unit- II   Thermal Physics   9
Transfer of heat energy – thermal expansion of solids and liquids – expansion joints - bimetallic strips - thermal conductivity - Forbe's and Lee's disc method: theory and experiment - conduction through compound media (series and parallel) – thermal insulation – applications : heat exchangers in refrigerators, ovens and solar water heaters.

Unit- III   Properties of Matter   9
Elasticity – Stress-strain diagram and its uses - factors affecting elastic modulus and tensile strength – torsional stress and deformations – twisting couple - torsion pendulum: theory and experiment - bending of beams - bending moment – cantilever – uniform and non-uniform bending - I-shaped girders - stress due to bending in beams.

Unit- IV   Acoustics   9
Classification of sound - decibel - Weber–Fechner law – Reverberation - Sabine's formula-derivation using growth and decay method – Absorption Coefficient and its determination – factors affecting acoustics of buildings and their remedies - sound insulation and its measurements.

Unit- V   Hazards   9
Seismology and Seismic waves - Earth quake ground motion - Basic concepts and estimation techniques - site effects - Probabilistic and deterministic Seismic hazard analysis - Cyclone and flood hazards - Fire hazards and fire protection, fire-proofing of materials, fire safety regulations and firefighting equipment - Prevention and safety measures.

Total : 45 Periods

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Laboratory Components

S.No	List of Experiments	CO Mapping	RBT
1	Determination of rigidity modulus – Torsion pendulum	CO3	Apply
2	Determination of Young's modulus by non-uniform bending Method.	CO3	Apply
3	Determination of wavelength, and particle size using Laser	CO1	Apply
4	Determination of acceptance angle in an optical fiber	CO1	Apply
5	Determination of thermal conductivity of a bad conductor by Lee's Disc method.	CO2	Apply
6	Determination of velocity of sound and compressibility of Liquid by Ultrasonic interferometer	CO4	Apply
7	Determination of Coefficient of viscosity of liquid	CO3	Apply

Total:30 Periods

Text Books:
1. Bhattacharya D.K. and Poonam T., "Engineering Physics", Oxford University Press, 2nd Edition, 2015.
2. Avadhanulu M.N. and Kshirsagar P.G., "A Text book of Engineering Physics", S.Chand and company., New Delhi, 10th Edition, 2014.
3. Ulrich Ranke., "Natural Disaster Risk management", Springer International Publishing, 1st Edition, 2016.

References:
1. David Halliday. Robert Resnick. and Jearl Walker., "Principles of Physics", Wiley, 10th Edition, 2014
2. Raymond A Serway. and John W Jewett., "Physics for Scientists and Engineers", Cengage Learning, 9th Edition, 20191. David Halliday. Robert Resnick. and Jearl Walker., "Principles of Physics", Wiley, 10th Edition, 2014
2. Raymond A Serway. and John W Jewett., "Physics for Scientists and Engineers", Cengage Learning, 9th Edition, 2019.

Web References:
1. https://nptel.ac.in/courses/115/107/115107095/
2. https://spaceplace.nasa.gov/laser/en/
3. https://www.coursera.org/lecture/fe-exam/stresses-in-beams-strains-in-pure-and-nonuniform-ending-6aMRx
4. http://www.ce.memphis.edu/7119/PDFs/FEAM_Notes/Topic05a- Seismic Hazard Analysis Notes.pdf

Mapping of Course Outcomes (COs) with Programme Outcomes (POs) Programme Specific Outcomes (PSOs)															
COs	POs												PSOs		
	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3
CO1	3	1													
CO2	3	1													
CO3	3	2	2												
CO4	3	2	2												
CO5	3														
	3	High			2	Medium				1	Low				

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Summative assessment						
Bloom's Level	**Internal Assessment**					**Final Examination (Theory) [50 marks]**
	Theory Marks				**Practical**	
	IAE1 [7.5]	**IAE2 [7.5]**	**IAE3 [10]**	**Attendance [5]**	**Rubric based CIA [20 Marks]**	
Remember	10	10	10			20
Understand	35	35	35		40	60
Apply	5	5	5		60	10
Analyze						
Evaluate						
Create						

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20CS201	Problem Solving Using Python (Common to all Branches)	L	T	P	C
		3	0	2	4
Nature of Course	Engineering Sciences				
Pre requisites	Mathematical and Logical Knowledge				

Course Objectives

The course is intended
1. To think logically and write algorithm and draw flow charts for problems.
2. To read and write simple Python programs.
3. To develop Python programs with conditionals and loops.
4. To define Python functions and call them.
5. To use Python data structures –- lists, tuples, dictionaries and files.

Course Outcomes

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

CO. No.	Course Outcome	Bloom's Level
CO1	Develop algorithmic solutions to simple computational problems and read, write, execute by simple python programs.	Apply
CO2	Structure simple python programs for solving problems.	Understand
CO3	Administer the role of control statements and functions involving the idea of modularity.	Apply
CO4	Represent compound data using python strings and lists.	Apply
CO5	Read and write data from/to files in python Programs.	Understand

Course Contents:

Unit- I   Basics of Computers & Problem Solving   9
Computer Basics – Components-Computer organization - Computer Software- Types of software - Software Development steps -Need for logical analysis and thinking- Algorithms – Flowchart - Number system.

Unit- II   Introduction of Python Programming   9
Introduction-Python Interpreter-Interactive and script mode -Values and types, variables, operators, expressions, statements, precedence of operators, Multiple assignments, comments, Input and Output Statements.

Unit - III   Control statements and Functions   9
Conditional (if), alternative (if-else), chained conditional (if-elif-else)-Iteration-while, for, break, continue, pass – Functions - Introduction, inbuilt functions, user defined functions, passing parameters, return values, recursion, Lambda functions.

Unit IV   Strings and Lists   9
Strings-String slices, immutability, string methods and operations -Lists-creating lists, list operations, list methods, mutability, aliasing, cloning lists, list and strings, list and functions-list processing-list comprehension, searching and sorting.

Unit -V   Tuples, Dictionaries and Files   9
Tuples- Tuple assignment, lists and tuples, Tuple as return value- Dictionaries-operations and methods, Files and Exception-Text files, reading and writing files, format Operator, Exception handling.

Total: 45 Periods

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Laboratory Components

S.No	List of Experiments	CO Mapping	RBT
1	Write a algorithm & draw flowchart for simple computational problems	CO1	Understand
2	Write a program to perform different arithmetic operations on numbers in python.	CO2	Understand
3	Write a python program to implement the various control structures	CO3	Apply
4	Write a python program for computational problems using recursive function.	CO3	Apply
5	Demonstrate use of list for data validation.	CO4	Apply
6	Develop a python program to explore string functions	CO4	Analyze
7	Implement linear search and binary search.	CO4	Apply
8	Develop a python program to implement sorting methods	CO4	Analyze
9	Develop python programs to perform operations on dictionaries.	CO5	Analyze
10	Write a python program to read and write into a file	CO5	Apply

Total: 30 Periods

Text Books
1. Reema Thareja, "Problem Solving and Programming with Python", Oxford University Press, 2018
2. Dr. R. Nageswara Rao, "Core Python Programming", Dreamtech Press, 2017 Edition

Reference Books:
1. Kenneth A. Lambert, "Fundamentals of Python: First Programs", CENGAGE Learning, 2012
2. Ashok Namdev Kamthane, Amit Ashok Kamthane, "Programming and Problem Solving with Python" , Mc-Graw Hill Education, 2018.
3. Charles Dierbach, "Introduction to Computer Science using Python: A Computational Problem Solving Focus", Wiley India Edition, 2013
4. Timothy A. Budd," Exploring Python", Mc-Graw Hill Education (India) Private Ltd., 2015

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Mapping of Course Outcomes (COs) with Programme Outcomes (POs)
Programme Specific Outcomes (PSOs)

COs	POs												PSOs		
	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3
CO1	3	2	1										3	1	
CO2	3	2	1										3	1	
CO3	3	2	2										3	1	
CO4	3	2	2										3	1	
CO5	3	2	2										3	1	
	3	High			2	Medium					1	Low			

Summative assessment						
Bloom's Level	**Continuous Assessment**					**End Semester Examination (Theory) [50 marks]**
	Theory Marks				**Practical**	
	IAE1 [7.5]	IAE 2 [7.5]	IAE3 [10]	Attendance [5]	Rubric based CIA [20 Marks]	
Remember	10	10	10			20
Understand	20	20	20		30	50
Apply	20	20	20		50	30
Analyse	-	-	-		20	-
Evaluate	-	-	-		-	-
Create	-	-	-		-	-

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20CE201	Computer Aided Building Drawing Laboratory	L	T	P	C
		0	0	4	2

Nature of Course	Professional Core
Pre requisites	NA

Course Objectives
The course is intended to
1. Understand the techniques of building drawing
2. Develop plan, elevation and technical uses of building
3. Follow the development and control rules
4. Satisfy orientation and functional requirements as per National Building Code
5. Visualize and draw 2D and 3D models of Engineering Components

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

CO. No.	Course Outcome	Bloom's Level
CO1	Gain the various basic commands used for drafting and known the type of coordinate system.	Apply
CO2	Utilize the software packages for drafting and modeling.	Apply
CO3	Prepare the plan of building components o satisfy the functional and orientation aspects.	Apply
C04	Draw the plan, elevation and sectional views of load bearing structures and framed structures.	Apply
CO5	Visualize and draw 2D and 3D models of Engineering Components	Apply

Course Content:

S.No	List of Experiment	CO Mapping	RBT
1	**Principles of planning, orientation and complete joinery details** **(Paneled and Glazed Doors and Windows)** a. Introduce to draw the plan, elevation and sectional views of buildings as per National Building Regulations b. Making the students to get practice in various AUTOCAD Commands for preparing building plan, elevation and sections. c. Specify the Principles of Planning, Orientation and Complete Joinery Details (Paneled and Glazed Doors and Windows).	**CO1**	**Apply**
2	**Buildings with Load Bearing Walls**	**CO2**	**Apply**

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	a. Draw the Plan, Elevation and Section of the Residential Building with Load Bearing walls and RCC Flat Roof. b. Draw the Plan, Elevation and Section of the Primary Health Centre. c. Draw the Plan, Elevation and Section of the School Building.		
3	**Buildings with Sloping Roof** a. Draw the Plan, Elevation and Section of the Fully Tiled Gabled House b. Draw the Plan, Elevation and Section of the Residential Building with Load Bearing walls and Pitched Roof.	**CO3**	**Apply**
4	**R.C.C. framed structures.** a. Draw the Plan, Elevation and Section of the A Reading Room with RCC Flat Roof. b. Draw the Plan, Elevation and Section of the Library Building with RCC Flat Roof. c. Draw the Plan, Elevation and Section of the RCC Framed Building with RCC Roof. d. Draw the Plan, Elevation and Section of the A Single Bed Room Residential Building with RCC Roof	**CO4**	**Apply**
5	**Industrial buildings – North light roof structure** a. Draw the Plan, Elevation and Section of the workshop building	**CO5**	**Apply**

Total: 45 Periods

Textbooks:
1. Sikka V.B., A Course in Civil Engineering Drawing, , S.K.Kataria and Sons,4th Edition,2015.
2. George Omura, "Mastering in Autocad 2005 and Autocad LT 2005"– BPB Publications,2nd edition,2009

References:
1. Chuck Eastman, Paul Teicholz, Rafael Sacks, Kathleen Liston, BIM Handbook:A Guide to building information modeling for Owners, Managers, Designers, Engineers, and Contractors, John Wiley and Sons.Inc.,2011.
2. Marimuthu V.M., Murugesan R. and Padmini S., Civil Engineering Drawing-I, Pratheeba Publishers,2008.

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3. Shah.M.G., Kale. C.M. and Patki.S.Y., Building Drawing with an Integrated
   Approach to Built Environment, Tata McGraw Hill Publishers Limited,2007.
4. Verma.B.P., Civil Engineering Drawing and House Planning, Khanna Publishers,2010.

Mapping of Course Outcomes (COs) with Programme Outcomes (POs) Programme Specific Outcomes (PSOs)														
COs	**POs**												**PSOs**	
	1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**	**1**	**2**
CO1	3		3		3								3	
CO2	3		3		3								3	
CO3	3		3		3								3	
CO4	3		3		3								3	
CO5	3		3		3								3	
	3	High			2	Medium				1	Low			

Summative assessment based on Continuous and End Semester Examination		
Bloom's Level	**Rubric based Continuous Assessment [50 marks]**	**End Semester Examination [50 marks]**
Remember		
Understand	30	30
Apply	70	70
Analyze		
Evaluate		
Create		

20MC201	**Environmental Science**	**L**	**T**	**P**	**C**
	(Common to Agriculture, Food Technology, Aero, Civil, Mechanical and Fire and Safety Engineering)	**2**	**0**	**0**	**0**

Nature of Course	Mandatory
Prerequisites	Nil

Course Objectives
The course is intended to
1. Understand the concept of eco system and environment.
2. Become conversant with ecological balance and values of bio diversity.
3. Know the role of human in prevention of pollution and making a clean environment.
4. Get knowledge about conservation of non conventional energy resources.
5. Study about the nature and management of e-waste and solid waste.

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

CO. No.	Course Outcome	Bloom's Level
CO1	Describe the ecosystem and environment	Understand
CO2	Understand the ecological balance and preservation of bio diversity	Understand
CO3	Demonstrate various types of pollution in order tocontrol pollution	Apply
CO4	Classify the energy sources for the conservation of non conventional energy sources	Understand
CO5	Identify the nature and management of e-waste and solid waste	Apply

Course Contents
Unit-I   Ecosystem   6
Eco system-Food chains, Food webs and Ecological pyramids. Ecosystem-(a) Forest eco system,(b) Aquatic eco system(pond ecosystem and marine ecosystem).

Unit-II   Biodiversity   6
Introduction to Bio diversity, Values of Bio diversity, Threads to Bio diversity, Endangered and Endemic species of India, Hotspots of biodiversity. Conservation of Bio diversity: In-Situ and Ex-Situ conservation of bio diversity.

Unit-III   Environmental Pollution   6
Definition Causes, Effects and Control of (a) Air pollution (b) Water pollution (c) Soil pollution. Electrostatic Precipitator for controlling air pollution.

Unit-IV   Non Conventional Energy Resources   6
Introduction, Types: Solar Energy, Wind Energy and Geo Thermal Energy.

Unit-V   Environmental Management   6
Sustainable Development, Role of Information technology in Environment and Human.HIV and AIDS: causes and control measures. Green chemistry: Definition and Principles

Activity Component

S.No	Name of the Experiment	CO Mapping	RBT
1	Field study of simple eco system: pond, river and hill slopes	CO1	Understand
2	Case study regarding environmental management	CO5	Apply

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Total: 30 periods

Textbooks
1. AnubhaKaushik and C.P. Kaushik, "Environmental Science and Engineering, New Age International Publishers, New Delhi, 2nd Edition, 2015.
2. V. Kumar, "An Introduction to Green Chemistry" Vishal publishing Co. Reprint Edition,2010.

Reference Books
1. Masters, Gilbert M, "Introduction to Environmental Engineering and Science", Pearson Education, New Delhi, 2nd Edition, 2012.
2. Santosh Kumar Garg andRajeshwariGarg"Ecological and Environmental Studies",Khanna Publishers, NaiSarak, Delhi, 2nd Edition, 2014.

Additional Resources
1. https://nptel.ac.in/courses/122103039/38
2. https://bch.cbd.int/cms/ui/collaboration/download/download.aspx?id=909
3. https://nptel.ac.in/courses/105102089/air%20pollution%20(Civil)/Module-3/3a.htm
4. www.vssut.ac.in/lecture_notes/lecture1428910296.pdf
5. nptel.ac.in/courses/120108004/module7/lecture8.pdf

Mapping of Course Outcomes (COs) with Programme Outcomes (POs) Programme Specific Outcomes (PSOs)

COs	POs												PSOs		
	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3
CO1							3					3			
CO2							3					3			
CO3							3					3			
CO4							3					3			
CO5							3					3			
	3	High		2	Medium		1	Low							

Bloom's Level	Continuous Assessment				
	IAE1 [20]	IAE 2 [20]	IAE 3 [20]	Attendance [10]	Activity [30]
Remember	30	20	20		
Understand	10	20	20		
Apply	10	10	10		
Analyze					
Evaluate					
Create					

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20ENE02	Advanced Communicative English (Common to all B.E/ B.Tech Programmes)	L	T	P	C
		2	0	2	3
Nature of Course	Humanities and Social Sciences				
Pre requisites	Basics of Communicative English				

Course Objectives
The course is intended to
6. Demonstrate satisfactory control over complex structures and mechanics in English.
7. Develop fluency and accuracy in oral communication.
8. Communicate effectively and actively in social interactions.
9. Read English at inspectional level.
10. Face interviews with confidence.

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

CO. No.	Course Outcome	Bloom's Level
CO1	Apply knowledge of English grammar for effective communication	Remember
CO2	Make use of common English phrases and vocabulary strength.	Understand
CO3	Build self confidence and enhance professionalism	Apply
CO4	Implement listening, reading and writing skills in real - life situations	Apply
CO5	Speak fluently in English with proper pronunciation, intonation, tone and accent.	Understand

Course Contents:
Unit - I   Grammar and usage   6
Active voice and passive voice – Prefixes and suffixes – Compound words – Clauses - If Conditionals –   Idioms & Phrases - Right forms of verbs – Modal Auxiliaries - Spotting errors

Unit - II   Lexical competence   6
Technical Vocabulary - Expressions – Frequency – Cause and effect - Words often Miss-spelled – Syntax and structure - Homophones and Homonyms- Verbal analogy - idioms and phrases

Unit - III   Conversational etiquette   6
Processes description – Tone and accent in speech – Role-play (Job-Interview) – Presentation skills – Mechanics of presentation - Telephone etiquette – Group Discussion strategy - Formal & Informal, subjective and objective introduction – Body Language – Mock Interview

Unit – IV   Listening reading and writing   6
Listen to Scientific / Technical talks and gap filling – Listening to TED/INK Talks – Reading – "Water: The Elixir of Life" by C.V.Raman. "Progress" by St. John Ervine - Instructions and Recommendations – Letter writing formal – Job application- Report writing – Introspective report – Creative writing – Essays and Paragraph

Unit – V   Phonetics   6
Production and classification of speech sound – International Phonetic Alphabet and transcriptions – Phonological rules – way and Place of articulation – Vowels, consonants and diphthongs. Specific characteristics feature of vowel sounds.

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Laboratory Components

S.No	List of Exercises	CO Mapping	RBT
1	Role-play – Processes Description	2	Remember
2	Listening to TED/INK Talks and gap filling	4	Understand
3	Group Discussion	3	Understand
4	Articulation with pronunciation practice	3	Apply
5	Reading – Longer texts and Technical Articles (Skimming & Scanning).	4	Apply
6	Presentation skills – Mechanics of presentation	5	Understand
7	Individual presentation on given topics	5	Remember
8	Telephone etiquette	5	Understand
9	Instructions and Recommendations	5	Remember
10	Writing – General Essays.	4	Apply
11	Report writing technique- write up	4	Remember
12	Introspective report – Personal analysis	4	Understand
13	Model Job Interviews	3	Understand
14	Job Interviews(Role play)	3	Apply
15	Body Language	3	Understand

Total: 30 Periods

Text Books
4. Rizvi, Ashraf.M, "Effective Technical Communication", Tata McGraw Hill Publishing Company Limited, New Delhi, 5th Edition, 2007.
5. Hewings. M, "Advanced English Grammar", Cambridge University Press, Chennai, 3rd Edition, 2000.
6. Board of Editers, "Using English – A Coursebook for Undergraduate Engineers and Technologists", Orient BlackSwan Private Limited, Hyderabad, 2nd Edition, 2017.

Reference Books:

5. Raman M & Sangeetha Sharma, "Technical Communication", Oxford University Press, USA, 10th Edition, 2007.
6. John Cunnison Catford, "A Practical Introduction to Phonetics",Clarendon Press, Jamaica, 2nd Edition, 2001.
7. Norman Whitby, Business Benchmark – "Pre-Intermediate to Intermediate, Students Book", Cambridge University Press, 1st Edition, 2006.
8. Dhanavel S. P., "English and Soft Skills", Orient BlackSwan Private Limited, Hyderabad, 1st Edition, 2010.

Web reference:

3. https://www.coursera.org/lecture/tesol-speaking/video-2-listening-strategies-for-learners-3AeBL?utm_source=mobile&utm_medium=page_share&utm_content=vlp&utm_campaign=top_button

4. blob:https://www.youtube.com/73f7256d-d302-4563-bed5-9e84c94a26ac

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COs	PO's												PSOs		
	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3
CO1										3	1	2			
CO2										3	1	2			
CO3										3	1	2			
CO4										3	1	2			
CO5										3	1	2			

Mapping of Course Outcomes (COs) with Programme Outcomes (POs) Programme Specific Outcomes (PSOs)

3	High	2	Medium	1	Low

Summative assessment

Bloom's Level	Continuous Assessment					Final Examination (Theory) [50 marks]
	Theory Marks				Practical	
	IAE1 [7.5]	IAE 2 [7.5]	IAE 3 [10]	Attendance [5]	Rubric based CIA [20 Marks]	
Remember	20	20	20		40	40
Understand	20	20	20		40	40
Apply	10	10	10		20	20
Analyse						
Evaluate						
Create						

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