MOTHER TERESA INSTITUTE OF SCIENCE AND TECHNOLOGY
AUTONOMOUS
B.Tech. in CIVIL ENGINEERING COURSE STRUCTURE & SYLLABUS
(M24 Regulations)
Applicable from AY 2024-25 Batch

I YEAR I SEMESTER

S. No.	Course Code	Course Title	L	T	P	Credits
1.	M241ACE101	Matrices and Calculus	3	1	0	4
2.	M241ACE102	Applied Physics	3	1	0	4
3.	M241ACE103	C Programming and Data Structures	3	0	0	3
4.	M241ACE104	Engineering Workshop	0	1	3	2.5
5.	M241ACE105	English for Skill Enhancement	2	0	0	2
6.	M241ACE106	Elements of Civil Engineering	0	0	2	1
7.	M241ACE107	Applied Physics Laboratory	0	0	3	1.5
8.	M241ACE108	C Programming and Data Structures Laboratory	0	0	2	1
9.	M241ACE109	English Language and Communication Skills Laboratory	0	0	2	1
10.	M241ACE110	Environmental Science	3	0	0	0
		Induction Programme				
		Total	**14**	**3**	**12**	**20**

I YEAR II SEMESTER

S. No.	Course Code	Course Title	L	T	P	Credits
1.	M241ACE201	Ordinary Differential Equations and Vector Calculus	3	1	0	4
2.	M241ACE202	Engineering Chemistry	3	1	0	4
3.	M241ACE203	Computer Aided Engineering Graphics	1	0	4	3
4.	M241ACE204	Applied Mechanics	3	0	0	3
5.	M241ACE205	Surveying	2	0	0	2
6.	M241ACE206	Python Programming Laboratory	0	1	2	2
7.	M241ACE207	Engineering Chemistry Laboratory	0	0	2	1
8.	M241ACE208	Surveying Laboratory - I	0	0	2	1
		Total	**12**	**3**	**10**	**20**

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II Year I SemesterM24

S.No.	Course Code	CourseTitle	L	T	P	Credits
1.	M241ACE301	Probability and Statistics	3	1	0	4
2.	M241ACE302	Building Materials, Construction and Planning	3	0	0	3
3.	M241ACE303	Engineering Geology	3	0	0	3
4.	M241ACE304	Strength of Materials–I	3	0	0	3
5.	M241ACE305	Fluid Mechanics	3	0	0	3
6.	M241ACE306	Surveying Laboratory-II	0	1	2	2
7.	M241ACE307	Strength of Materials Laboratory	0	0	2	1
8.	M241ACE308	Computer Aided Drafting Laboratory	0	0	2	1
9.	M241ACE309	Skill Course-I (AUTO CAD)	0	0	3	0
10	M241ACE310	Design Thinking	2	0	0	0
		TotalCredits	17	2	9	20

II Year II SemesterM24

S.No.	CourseCode	CourseTitle	L	T	P	Credits
1.	M241ACE401	Basic Electrical and Electronics Engineering	3	0	0	3
2.	M241ACE402	Concrete Technology	3	0	0	3
3.	M241ACE403	Strength of Materials–II	3	0	0	3
4.	M241ACE404	Hydraulics and Hydraulics Machinery	3	0	0	3
5.	M241ACE405	Structural Analysis-I	3	0	0	3
6.	M241ACE406	Fluid Mechanics and Hydraulics Machinery Laboratory	0	0	2	1
7.	M241ACE407	Basic Electrical and Electronics Engineering Laboratory	0	0	2	1
8.	M241ACE408	Concrete Technology Laboratory	0	0	2	1
9.	M241ACE409	Real-time Research Project/Field- Based Project	0	0	4	2
10.	M241ACE410	Skill Course-II JAVA Programming	0	0	2	0
		TotalCredits	15	0	12	20

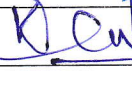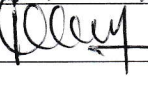L–Lecture   T-Tutorial   P–Practical   D–Drawing   CH–ContactHours/WeekC–Credits
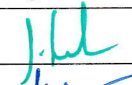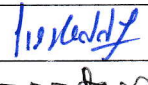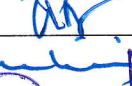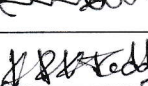
BOARD OF STUDIES MEMBERS

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4	Er BOLLEPOGU RAM BABU		8	Mr T MAHESWARARAO	

III YEAR I SEMESTER

S.No.	Course Code	CourseTitle	L	T	P	Credits
1.	M241ACE501	Structural Analysis-II	3	0	0	3
2.	M241ACE502	Geotechnical Engineering	3	0	0	3
3.	M241ACE503	Structural Engineering-I(RCC)	3	0	0	3
4.	M241ACE504	Business Economics & Financial Analysis	3	0	0	3
5.	M241ACE505	Transportation Engineering	3	0	0	3
6.	M241ACE506	Hydrology and Water Resources Engineering	3	0	0	3
7.	M241ACE507	Transportation Engineering Laboratory	0	0	2	1
8.	M241ACE508	Geotechnical Engineering Laboratory	0	0	2	1
9.	M241ACE509	Personality development	3	0	0	0
		TotalCredits	21	0	4	20

III YEAR II SEMESTER

S.No	Course Code	CourseTitle	L	T	P	Credits
1.	M241ACE601	Environmental Engineering	3	0	0	3
2.	M241ACE602	Foundation Engineering	3	0	0	3
3.	M241ACE603	Structural Engineering-II (SteelStructures)	3	0	0	3
4.		Professional Elective–I	3	0	0	3
5.	M241ACE605	Open Elective-I	3	0	0	3
6.	M241ACE606	Environmental Engineering Laboratory	0	0	2	1
7.	M241ACE607	Computer Aided Design laboratory	0	0	2	1
8.	M241ACE608	Advanced English Communication Skills Laboratory	0	0	2	1
9.	M241ACE609	Industry Oriented MiniProject/Internship	0	0	4	2
10.	M241ACE610	Intellectual property rights	3	0	0	0
11	M241ACE611	Skill course – III(Building Modeling & Analysis)	0	0	3	0
		TotalCredits	18	0	10	20

L–Lecture   T–Tutorial   P–Practical   D–Drawing   CH–ContactHours/WeekC–Credits
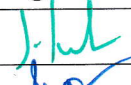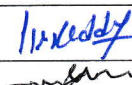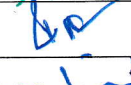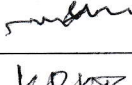
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IV YEAR I SEMESTER
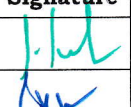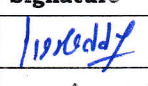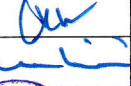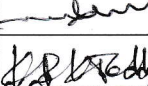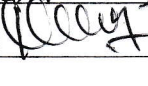
S.No.	Course Code	CourseTitle	L	T	P	Credits
1.	M241ACE701	Quantity Survey & Valuation	2	0	0	2
2.	M241ACE702	Project Management	2	0	0	2
3.		Professional Elective–II	3	0	0	3
4.		Professional Elective–III	3	0	0	3
5.		Professional Elective-IV	3	0	0	3
6.		Open Elective-II	3	0	0	3
7.	M241ACE707	Civil Engineering Software Laboratory	0	0	2	1
8.	M241ACE708	Project Stage-I	0	0	6	3
		Total Credits	**16**	**0**	**8**	**20**

IVYEARIISEMESTER

S.No.	Course Code	CourseTitle	L	T	P	Credits
1.		Professional Elective–V	3	0	0	3
2.		Professional Elective-VI	3	0	0	3
3.		Open Elective-III	3	0	0	3
4.	M241ACE804	Project Stage–II including seminar	0	0	22	11
		TotalCredits	**9**	**0**	**22**	**20**

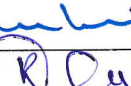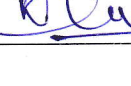L–Lecture   T–Tutorial   P–Practical   D–Drawing   CH–ContactHours/WeekC–Credits

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LIST OF PROFESSIONAL ELECTIVES SUBJECTS

Professional Elective – I

M241ACE604A	Green Building Technologies
M241ACE604B	Geomatic Applications in Civil Engineering
M241ACE604C	Smart Cities Planning and Management

ProfessionalElective–II

M241ACE703A	Prestressed Concrete
M241ACE703B	Elements of Earthquake Engineering
M241ACE703C	Advanced Structural Analysis

ProfessionalElective-III

M241ACE704A	Earth Retaining Structures
M241ACE704B	Ground Improvement Techniques
M241ACE704C	Stability Analysis of Slopes

ProfessionalElective-IV

M241ACE705A	Design of Hydraulic Structures
M241ACE705B	Advanced Water Resources Engineering
M241ACE705C	Ground Water Hydrology
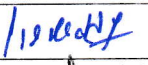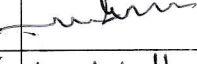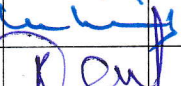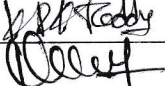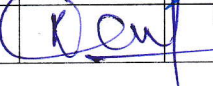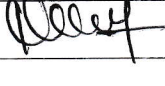
ProfessionalElective–V

M241ACE801A	Solid Waste Management
M241ACE801B	Environmental Impact Assessment
M241ACE801C	Air pollution

ProfessionalElective-VI

M241ACE802A	Airports, Railways and Waterways
M241ACE802B	Pavement Asset Management
M241ACE802C	Pavement Analysis & Design

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LIST OF OPEN ELECTIVES OFFERED FOR
M-24 REGULATION
B.TECH., Civil ENGINEERING PROGRAMME
III Yr II Sem Open Elective (OE–I)

DEPARTMENT OF ECE ENGINEERING SUBJECTS
1. M241AEC605- Fundamentals of Internet of Things
DEPARTMENT OF CSE SUBJECTS
1. M241ACS605A- Entrepreneurship 2. M241ACS605B- Fundamentals of Management for Engineers 3. M241ACS605C- Cyber Law & Ethics
DEPARTMENT OF EEE SUBJECTS
1. M241AEE605A- Reliability Engineering 2. M241AEE605B- Renewable Energy Sources
DEPARTMENT OF MECHANICAL ENGINEERING SUBJECTS
1. M241AME605- Quantitative Analysis for Business Decisions
DEPARTMENT OF MINING ENGINEERING SUBJECTS
1. M241AMNG605A- Introduction to Mining Technology 2. M241AMNG605B- Coal Gasification, CBM & Shale Gas

*Note: Students should take Open Electives from the List of Open Electives Offered by Other Departments/Branches Only

IV Yr I Sem Open Elective (OE–II)

DEPARTMENT OF ECE ENGINEERING SUBJECTS
1. M241AEC704- Electronic Sensors
DEPARTMENT OF CSE SUBJECTS
1. M241ACS704A- Data Structures 2. M241ACS704B- Artificial Intelligence 3. M241ACS704C- Python Programming 4. M241ACS704D- Java Programming
DEPARTMENT OF EEE SUBJECTS
1. M241AEE704A- Utilization of Electrical Energy 2. M241AEE704B- Electric Drives and Control
DEPARTMENT OF MECHANICAL ENGINEERING SUBJECTS
1. M241AME704A- Basic Mechanical Engineering
DEPARTMENT OF MINING ENGINEERING SUBJECTS
1. M241AMNG704A - Health & Safety in Mines 2. M241AMNG704B - Material Handling in Mines
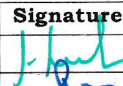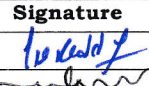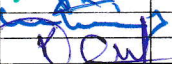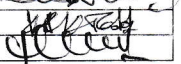
*Note: Students should take Open Electives from the List of Open Electives Offered by Other Departments/Branches Only.

IV Yr II Sem Open Elective (OE–III)

DEPARTMENT OF ECE ENGINEERING SUBJECTS
1. M241AEC803- Measuring Instruments
DEPARTMENT OF CSE SUBJECTS
1. M241ACS803A- Machine Learning 2. M241ACS803B- Mobile Application Development 3. M241ACS803C- Scripting Languages 4. M241ACS803D- Database Management Systems
DEPARTMENT OF EEE SUBJECTS
1. M241AEE803A- Basics of Power Plant Engineering 2. M241AEE803B- Energy Sources and Applications
DEPARTMENT OF MECHANICAL ENGINEERING SUBJECTS
1. M241AME803A- Non-Conventional Sources of energy
DEPARTMENT OF MINING ENGINEERING SUBJECTS
1. M241AMNG803A - Solid Fuel Technology 2. M241AMNG803B - Remote Sensing and GIS in Mining

*Note: Students should take Open Electives from the List of Open Electives Offered by Other Departments/Branches Only.

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2.	M241ACE102	Applied Physics	3	1	0	4
3.	M241ACE103	C Programming and Data Structures	3	0	0	3
4.	M241ACE104	Engineering Workshop	0	1	3	2.5
5.	M241ACE105	English for Skill Enhancement	2	0	0	2
6.	M241ACE106	Elements of Civil Engineering	0	0	2	1
7.	M241ACE107	Applied Physics Laboratory	0	0	3	1.5
8.	M241ACE108	C Programming and Data Structures Laboratory	0	0	2	1
9.	M241ACE109	English Language and Communication Skills Laboratory	0	0	2	1
10.	*M241ACE110	Environmental Science	3	0	0	0
		Induction Programme				
		Total	**14**	**3**	**12**	**20**

I YEAR II SEMESTER

S. No.	Course Code	Course Title	L	T	P	Credits
1.	M241ACE201	Ordinary Differential Equations and Vector Calculus	3	1	0	4
2.	M241ACE202	Engineering Chemistry	3	1	0	4
3.	M241ACE203	Computer Aided Engineering Graphics	1	0	4	3
4.	M241ACE204	Applied Mechanics	3	0	0	3
5.	M241ACE205	Surveying	2	0	0	2
6.	M241ACE206	Python Programming Laboratory	0	1	2	2
7.	M241ACH207	Engineering Chemistry Laboratory	0	0	2	1
8.	M241ACE208	Surveying Laboratory - I	0	0	2	1
		Total	**12**	**3**	**10**	**20**

M241ACE101: MATRICES AND CALCULUS

B.Tech. I Year I Sem.   L T P C
                                                                                                         3 1 0 4

Pre-requisites: Mathematical Knowledge at pre-university level

Course Objectives: To learn
- Types of matrices and their properties.
- Concept of a rank of the matrix and applying this concept to know the consistency and solvingthe system of linear equations.
- Concept of eigenvalues and eigenvectors and to reduce the quadratic form to canonical form
- Geometrical approach to the mean value theorems and their application to the mathematical problems
- Evaluation of surface areas and volumes of revolutions of curves.
- Evaluation of improper integrals using Beta and Gamma functions.
- Partial differentiation, concept of total derivative
- Finding maxima and minima of function of two and three variables.
- Evaluation of multiple integrals and their applications

Course outcomes: After learning the contents of this paper the student must be able to
- Write the matrix representation of a set of linear equations and to analyse the solution of thesystem of equations
- Find the Eigenvalues and Eigen vectors
- Reduce the quadratic form to canonical form using orthogonal transformations.
- Solve the applications on the mean value theorems.
- Evaluate the improper integrals using Beta and Gamma functions
- Find the extreme values of functions of two variables with/ without constraints.
- Evaluate the multiple integrals and apply the concept to find areas, volumes

UNIT-I: Matrices   10 L
Rank of a matrix by Echelon form and Normal form, Inverse of Non-singular matrices by Gauss-Jordanmethod, System of linear equations: Solving system of Homogeneous and Non-Homogeneous equations by Gauss elimination method, Gauss Seidel Iteration Method.

UNIT-II: Eigen values and Eigen vectors   10 L
Linear Transformation and Orthogonal Transformation: Eigenvalues, Eigenvectors and their properties, Diagonalization of a matrix, Cayley-Hamilton Theorem (without proof), finding inverse and power of a matrix by Cayley-Hamilton Theorem, Quadratic forms and Nature of the Quadratic Forms, Reduction ofQuadratic form to canonical forms by Orthogonal Transformation.

UNIT-III: Calculus   10 L
Mean value theorems: Rolle's theorem, Lagrange's Mean value theorem with their Geometrical Interpretation and applications, Cauchy's Mean value Theorem, Taylor's Series.
Applications of definite integrals to evaluate surface areas and volumes of revolutions of curves (Only in Cartesian coordinates), Definition of Improper Integral: Beta and Gamma functions and their applications.

UNIT-IV: Multivariable Calculus (Partial Differentiation and applications)   10 L
Definitions of Limit and continuity.
Partial Differentiation: Euler's Theorem, Total derivative, Jacobian, Functional dependence & independence. Applications: Maxima and minima of functions of two variables and three variables using method of Lagrange multipliers.

UNIT-V: Multivariable Calculus (Integration)   **8 L**

Evaluation of Double Integrals (Cartesian and polar coordinates), change of order of integration (only Cartesian form), Evaluation of Triple Integrals: Change of variables (Cartesian to polar) for double and(Cartesian to Spherical and Cylindrical polar coordinates) for triple integrals.

Applications: Areas (by double integrals) and volumes (by double integrals and triple integrals).

TEXT BOOKS:

1. B.S. Grewal, Higher Engineering Mathematics, Khanna Publishers, 36th Edition, 2010.
2. R.K. Jain and S.R.K. Iyengar, Advanced Engineering Mathematics, Narosa Publications, 5th Editon, 2016.

REFERENCE BOOKS:

1. Erwin kreyszig, Advanced Engineering Mathematics, 9th Edition, John Wiley & Sons, 2006.
2. G.B. Thomas and R.L. Finney, Calculus and Analytic geometry, 9thEdition,Pearson, Reprint,2002.
3. N.P. Bali and Manish Goyal, A text book of Engineering Mathematics, Laxmi Publications,Reprint, 2008.
4. H. K. Dass and Er. Rajnish Verma, Higher Engineering Mathematics, S Chand and CompanyLimited, New Delhi.

M241ACE102: APPLIED PHYSICS

B.Tech. I Year I Sem.   **L T P C**
                                                                    3 1 0 4

Pre-requisites: 10 + 2 Physics

Course Objectives: The objectives of this course for the student are to:
1. Understand the basic principles of quantum physics and band theory of solids.
2. Understand the underlying mechanism involved in construction and working principles of various semiconductor devices.
3. Study the fundamental concepts related to the dielectric, magnetic and energy materials.
4. Identify the importance of nanoscale, quantum confinement and various fabrications techniques.
5. Study the characteristics of lasers and optical fibres.

Course Outcomes: At the end of the course the student will be able to:
1. Understand physical world from fundamental point of view by the concepts of Quantum mechanics and visualize the difference between conductor, semiconductor, and an insulator by classification of solids.
2. Identify the role of semiconductor devices in science and engineering Applications.
3. Explore the fundamental properties of dielectric, magnetic materials and energy for their applications.
4. Appreciate the features and applications of Nanomaterials.
5. Understand various aspects of Lasers and Optical fiber and their applications in diverse fields.

UNIT - I: QUANTUM PHYSICS AND SOLIDS

Quantum Mechanics: Introduction to quantum physics, blackbody radiation – Stefan-Boltzmann's law, Wein's and Rayleigh-Jean's law, Planck's radiation law - photoelectric effect - Davisson and Germer experiment –Heisenberg uncertainty principle - Born interpretation of the wave function – timeindependent Schrodinger wave equation - particle in one dimensional potential box.

Solids: Symmetry in solids, free electron theory (Drude & Lorentz, Sommerfeld) - Fermi-Dirac distribution - Bloch's theorem -Kronig-Penney model – E-K diagram- effective mass of electron-origin of energy bands- classification of solids.

UNIT - II: SEMICONDUCTORS AND DEVICES

Intrinsic and extrinsic semiconductors – Hall effect - direct and indirect band gap semiconductors - construction, principle of operation and characteristics of P-N Junction diode, Zener diode and bipolarjunction transistor (BJT)–LED, PIN diode, avalanche photo diode (APD) and solar cells, their structure,materials, working principle and characteristics.

UNIT - III: DIELECTRIC, MAGNETIC AND ENERGY MATERIALS

Dielectric Materials: Basic definitions- types of polarizations (qualitative) - ferroelectric, piezoelectric,and pyroelectric materials – applications – liquid crystal displays (LCD) and crystal oscillators.

Magnetic Materials: Hysteresis - soft and hard magnetic materials - magnetostriction, magnetoresistance - applications - bubble memory devices, magnetic field sensors and multiferroics.

Energy Materials: Conductivity of liquid and solid electrolytes- superionic conductors - materials andelectrolytes for super capacitors - rechargeable ion batteries, solid fuel cells.

UNIT - IV: NANOTECHNOLOGY

Nanoscale, quantum confinement, surface to volume ratio, bottom-up fabrication: sol-gel, precipitation,combustion methods – top-down fabrication: ball milling - physical vapor deposition (PVD) - chemical vapor deposition (CVD) - characterization techniques - XRD, SEM &TEM - applications of nanomaterials.

UNIT - V: LASER AND FIBER OPTICS

Lasers: Laser beam characteristics-three quantum processes-Einstein coefficients and their relations-lasing action - pumping methods- ruby laser, He-Ne laser, CO2 laser, Argon ion Laser, Nd:YAG laser-semiconductor laser-applications of laser.

Fiber Optics: Introduction to optical fiber- advantages of optical Fibers - total internal reflection-construction of optical fiber - acceptance angle - numerical aperture- classification of optical fibers-losses in optical fiber - optical fiber for communication system - applications.

TEXT BOOKS:

1. M. N. Avadhanulu, P.G. Kshirsagar & TVS Arun Murthy" A Text book of Engineering Physics"- S. Chand Publications, 11th Edition 2019.
2. Engineering Physics by Shatendra Sharma and Jyotsna Sharma, Pearson Publication,2019
3. Semiconductor Physics and Devices- Basic Principle – Donald A, Neamen, Mc Graw Hill,4thEdition,2021.
4. B.K. Pandey and S. Chaturvedi, Engineering Physics, Cengage Learning, 2ndEdition,2022.
5. Essentials of Nanoscience & Nanotechnology by Narasimha Reddy Katta, Typical CreativesNANO DIGEST, 1st Edition, 2021.

REFERENCE BOOKS:

1. Quantum Physics, H.C. Verma, TBS Publication, 2nd Edition 2012.
2. Fundamentals of Physics – Halliday, Resnick and Walker, John Wiley &Sons,11th Edition, 2018.
3. Introduction to Solid State Physics, Charles Kittel, Wiley Eastern, 2019.
4. Elementary Solid State Physics, S.L. Gupta and V. Kumar, Pragathi Prakashan, 2019.
5. A.K. Bhandhopadhya - Nano Materials, New Age International, 1stEdition, 2007.
6. Energy Materials a Short Introduction to Functional Materials for Energy Conversion and Storage Aliaksandr S. Bandarenka, CRC Press Taylor & Francis Group Energy Materials Taylor & Francis Group, 1st Edition, 2022.

M241ACE103: C PROGRAMMING AND DATA STRUCTURES

B.Tech. I Year I Sem.   **L   T   P   C**
                                                                                  3   0   0   3

Course Objectives: Introduce the importance of programming, C language constructs, program development, data structures, searching and sorting.

Course Outcomes:
1. Understand the various steps in Program development.
2. Explore the basic concepts in C Programming Language.
3. Develop modular and readable C Programs
4. Understand the basic concepts such as Abstract Data Types, Linear and Non-Linear Data structures.
5. Apply data structures such as stacks, queues in problem solving
6. To understand and analyze various searching and sorting algorithms.

UNIT - I

Introduction to Computers – Computer Systems, Computing Environments, Computer Languages,Creating and running programs, Software Development

Introduction to C Language – Background, Simple C programs, Identifiers, Basic data types, Variables, Constants, Input / Output

Structure of a C Program – Operators, Bit-wise operators, Expressions, Precedence and Associatively, Expression Evaluation, Type conversions, Statements.

UNIT - II

Statements – if and switch statements, Repetition statements – while, for, do-while statements, Loop examples, other statements related to looping – break, continue, go to, Recursion.

Designing Structured Programs- Functions, basics, user defined functions, inter function communication, standard functions.

Arrays – Concepts, using arrays in C, inter function communication, array applications, two – dimensional arrays, multidimensional arrays.

UNIT - III

Pointers – Introduction, Pointers for inter function communication, pointers to pointers, compatibility, **Pointer Applications** – Passing an array to a function, Memory allocation functions, array of pointers**Strings** – Concepts, C Strings, String Input / Output functions, arrays of strings, string manipulationfunctions, string / data conversion.

UNIT - IV

Derived types – The Typedef, enumerated types, Structures – Declaration, definition and initialization of structures, accessing structures, operations on structures, complex structures. Unions – Referencing unions, initializers, unions and structures.

Input and Output – Text vs Binary streams, standard library functions for files, converting file types, File programs – copy, merge files.

UNIT – V

Sorting- selection sort, bubble sort, insertion sort,

Searching-linear and binary search methods.

Data Structures – Introduction to Data Structures, abstract data types, Linear list – singly linked list implementation, insertion, deletion and searching operations on linear list, Stacks-Operations, array and linked representations of stacks, stack applications, Queues-operations, array and linked representations.

TEXT BOOKS:
1. C Programming & Data Structures, B.A.Forouzan and R.F. Gilberg, Third Edition, CengageLearning.
2. Problem Solving and Program Design in C, J.R. Hanly and E.B. Koffman, Fifth Edition, Pearson Education.
3. The C Programming Language, B.W. Kernighan and Dennis M.Ritchie, PHI/Pearson Education

REFERENCE BOOKS:
1. C & Data structures – P. Padmanabham, 3rd Edition, B.S. Publications.
2. C Programming with problem solving, J.A. Jones & K. Harrow, Dreamtech Press
3. Programming in C – Stephen G. Kochan, III Edition, Pearson Education.
4. C for Engineers and Scientists, H. Cheng, McGraw-Hill International Edition
5. Data Structures using C – A. M. Tanenbaum, Y. Langsam, and M.J. Augenstein, Pearson Education / PHI
6. C Programming & Data Structures, E. Balagurusamy, TMH.
7. C Programming & Data Structures, P. Dey, M Ghosh R Thereja, Oxford University Press
8. C & Data structures – E V Prasad and N B Venkateswarlu, S. Chand & Co.

M241ACE104: ENGINEERING WORKSHOP

B.Tech. I Year I Sem.   **L T P C**
                                                            0 1 3 2.5

Pre-requisites: Practical skill

Course Objectives:
- To Study of different hand operated power tools, uses and their demonstration.
- To gain a good basic working knowledge required for the production of various engineeringproducts.
- To provide hands on experience about use of different engineering materials, tools, equipments and processes those are common in the engineering field.
- To develop a right attitude, team working, precision and safety at work place.
- It explains the construction, function, use and application of different working tools, equipmentand machines.
- To study commonly used carpentry joints.
- To have practical exposure to various welding and joining processes.
- Identify and use marking out tools, hand tools, measuring equipment and to work to prescribedtolerances.

Course Outcomes: At the end of the course, the student will be able to:
- CO 1: Study and practice on machine tools and their operations
- CO 2: Practice on manufacturing of components using workshop trades including pluming,fitting, carpentry, foundry, house wiring and welding.
- CO 3: Identify and apply suitable tools for different trades of Engineering processes includingdrilling, material removing, measuring, chiseling.
- CO 4: Apply basic electrical engineering knowledge for house wiring practice.

1. TRADES FOR EXERCISES:
At least two exercises from each trade:
  I.   Carpentry – (T-Lap Joint, Dovetail Joint, Mortise & Tenon Joint)
  II.   Fitting – (V-Fit, Dovetail Fit & Semi-circular fit)
  III. Tin-Smithy – (Square Tin, Rectangular Tray & Conical Funnel)
  IV.   Foundry – (Preparation of Green Sand Mould using Single Piece and Split Pattern)
  V.   Welding Practice – (Arc Welding & Gas Welding)
  VI.   House-wiring – (Parallel & Series, Two-way Switch and Tube Light)
  VII. Black Smithy – (Round to Square, Fan Hook and S-Hook)

2. TRADES FOR DEMONSTRATION & EXPOSURE:
Plumbing, Machine Shop, Metal Cutting (Water Plasma), Power tools in construction and WoodWorking

TEXT BOOKS:
  1. Workshop Practice /B. L. Juneja / Cengage
  2. Workshop Manual / K. Venugopal / Anuradha.

REFERENCE BOOKS:
  1. Work shop Manual - P. Kannaiah/ K.L. Narayana/ Scitech
  2. Workshop Manual / Venkat Reddy/ BSP

M241ACE105: ENGLISH FOR SKILL ENHANCEMENT

B.Tech. I Year I Sem.   **L   T   P   C**
                                                          2   0   0   2

Course Objectives: This course will enable the students to:
1. Improve the language proficiency of students in English with an emphasis on Vocabulary, Grammar, Reading and Writing skills.
2. Develop study skills and communication skills in various professional situations.
3. Equip students to study engineering subjects more effectively and critically using the theoretical and practical components of the syllabus.

Course Outcomes: Students will be able to:
1. Understand the importance of vocabulary and sentence structures.
2. Choose appropriate vocabulary and sentence structures for their oral and writtencommunication.
3. Demonstrate their understanding of the rules of functional grammar.
4. Develop comprehension skills from the known and unknown passages.
5. Take an active part in drafting paragraphs, letters, essays, abstracts, précis and reports invarious contexts.
6. Acquire basic proficiency in reading and writing modules of English.

UNIT - I

Chapter entitled '***Toasted English*' by R.K.Narayan** from *"English: Language, Context andCulture"* published by Orient BlackSwan, Hyderabad.

Vocabulary: The Concept of Word Formation -The Use of Prefixes and Suffixes - Acquaintance with Prefixes and Suffixes from Foreign Languages to form Derivatives - Synonyms and Antonyms

Grammar: Identifying Common Errors in Writing with Reference to Articles and Prepositions.

Reading: Reading and Its Importance- Techniques for Effective Reading.

Writing: Sentence Structures -Use of Phrases and Clauses in Sentences- Importance of Proper Punctuation- Techniques for Writing precisely – Paragraph Writing – Types, Structures and Features of a Paragraph - Creating Coherence-Organizing Principles of Paragraphs in Documents.

UNIT - II

Chapter entitled **'Appro JRD' by Sudha Murthy** from *"English: Language, Context and Culture"* *published* by Orient BlackSwan, Hyderabad.

Vocabulary: Words Often Misspelt - Homophones, Homonyms and Homographs

Grammar: Identifying Common Errors in Writing with Reference to Noun-pronoun Agreement and Subject-verb Agreement.

Reading: Sub-Skills of Reading – Skimming and Scanning – Exercises for Practice

Writing: Nature and Style of Writing- Defining /Describing People, Objects, Places and Events – Classifying- Providing Examples or Evidence.

UNIT - III

Chapter entitled **'Lessons from Online Learning' by F.Haider Alvi, Deborah Hurst et al** from *"English: Language, Context and Culture"* published by Orient BlackSwan, Hyderabad. **Vocabulary**: Words Often Confused - Words from Foreign Languages and their Use in English.

Grammar: Identifying Common Errors in Writing with Reference to Misplaced Modifiers and Tenses.

Reading: Sub-Skills of Reading – Intensive Reading and Extensive Reading – Exercises forPractice.

Writing: Format of a Formal Letter-Writing Formal Letters E.g.., Letter of Complaint, Letter ofRequisition, Email Etiquette, Job Application with CV/Resume.

UNIT - IV
Chapter entitled **'Art and Literature' by Abdul Kalam** from **_"English: Language, Context and Culture"_** published by Orient BlackSwan, Hyderabad.

Vocabulary: Standard Abbreviations in English
Grammar: Redundancies and Clichés in Oral and Written Communication.
Reading: Survey, Question, Read, Recite and Review (SQ3R Method) - Exercises for Practice
Writing: Writing Practices- Essay Writing-Writing Introduction and Conclusion -Précis Writing.

UNIT - V
Chapter entitled **'Go, Kiss the World' by Subroto Bagchi** from **_"English: Language, Context and Culture"_** published by Orient BlackSwan, Hyderabad.

Vocabulary: Technical Vocabulary and their Usage
Grammar: Common Errors in English (*Covering all the other aspects of grammar which were notcovered in the previous units*)
Reading: Reading Comprehension-Exercises for Practice
Writing: Technical Reports- Introduction – Characteristics of a Report – Categories of Reports Formats- Structure of Reports (Manuscript Format) -Types of Reports - Writing a Report.

Note: *Listening and Speaking Skills which are given under Unit-6 in AICTE Model Curriculum are covered in the syllabus of ELCS Lab Course.*

 - ➢ **Note: 1**. As the syllabus of English given in AICTE *Model Curriculum-2018 for B.Tech First Year is **Open-ended**,* besides following the prescribed textbook, it is required to prepare teaching/learning materials **by the teachers collectively** in the form of handouts based on theneeds of the students in their respective colleges for effective teaching/learning in the class.

 - ➢ **Note**: **2**.Based on the recommendations of NEP2020, teachers are requested to be flexible to adopt Blended Learning in dealing with the course contents .They are advised to teach 40 percent of each topic from the syllabus in blended mode.

TEXT BOOK:
 1. "English: Language, Context and Culture" by Orient BlackSwan Pvt. Ltd, Hyderabad. 2022. Print.

REFERENCE BOOKS:
 1. Effective Academic Writing by Liss and Davis (OUP)
 2. Richards, Jack C. (2022) Interchange Series. Introduction, 1,2,3. Cambridge University Press
 3. Wood, F.T. (2007). Remedial English Grammar. Macmillan.
 4. Chaudhuri, Santanu Sinha. (2018). Learn English: A Fun Book of Functional Language,Grammar and Vocabulary. (2nd ed.,). Sage Publications India Pvt. Ltd.
 5. (2019). Technical Communication. Wiley India Pvt. Ltd.
 6. Vishwamohan, Aysha. (2013). English for Technical Communication for Engineering Students.Mc Graw-Hill Education India Pvt. Ltd.
 7. Swan, Michael. (2016). Practical English Usage. Oxford University Press. Fourth Edition.

M241ACE106: ELEMENTS OF CIVIL ENGINEERING

B.Tech. I Year I Sem.   **L   T   P   C**
                                                                   0   0   2   1

Pre-requisites: Nil

Course objectives:
- To provide practical knowledge about physical properties of minerals and rocks.
- To determine the characteristics of cement**,** Coarse & Fine aggregates.

Course Outcomes: At the end of the course, the student will be able to:
- Understands the method and ways of investigations required for Civil Engineering projects
- Identify the various rocks, minerals depending on geological classifications
- Evaluate the properties of cement, fine and coarse aggregates and determine its suitability for construction.

List of Experiments:
1. **Identification of Minerals** – Silica Group, Feldspar Group, Crystalline Group, CarbonateGroup, Pyroxene Group, Mica Group, Amphibole Group.
2. **Identification of Rocks –** Igneous Petrology, Sedimentary Petrology, MetamorphicPetrology.
3. 1. Study of topographical features from Geological maps. Identification of symbols in maps.
   2. Simple structural Geology Problems (Folds, Faults & Unconformities)
4. **Tests on Cement**
   a. Fineness test & Normal Consistency test.
   b. Specific gravity test, Initial and Final setting time of cement.
5. **Tests on Fine Aggregates**
   a. Specific Gravity test.
   b. Bulking of sand & Fineness modulus of Fine aggregate.
6. **Tests on Coarse Aggregate**
   a. Specific Gravity test.
   b. Fineness modulus of Coarse aggregate.

TEXT BOOK:
1. IS 383 :1993 "Specification for Coarse and Fine Aggregates from Natural Sources for Concrete".

M241ACE107: APPLIED PHYSICS LABORATORY

B.Tech. I Year I Sem.	**L**	**T**	**P**	**C**
	0	**0**	**3**	**1.5**

Course Objectives: The objectives of this course for the student to
1. Capable of handling instruments related to the Hall effect and photoelectric effect experimentsand their measurements.
2. Understand the characteristics of various devices such as PN junction diode, Zener diode, BJT, LED, solar cell, lasers and optical fiber and measurement of energy gap and resistivity of semiconductor materials.
3. Able to measure the characteristics of dielectric constant of a given material.
4. Study the behavior of B-H curve of ferromagnetic materials.
5. Understanding the method of least squares fitting.

Course Outcomes: The students will be able to:
1. Know the determination of the Planck's constant using Photo electric effect and identify thematerial whether it is n-type or p-type by Hall experiment.
2. Appreciate quantum physics in semiconductor devices and optoelectronics.
3. Gain the knowledge of applications of dielectric constant.
4. Understand the variation of magnetic field and behavior of hysteresis curve.
5. Carried out data analysis.

LIST OF EXPERIMENTS:
1. Determination of work function and Planck's constant using photoelectric effect.
2. Determination of Hall co-efficient and carrier concentration of a given semiconductor.
3. Characteristics of series and parallel LCR circuits.
4. V-I characteristics of a p-n junction diode and Zener diode
5. Input and output characteristics of BJT (CE, CB & CC configurations)
6. a) V-I and L-I characteristics of light emitting diode (LED)
   b) V-I Characteristics of solar cell
7. Determination of Energy gap of a semiconductor.
8. Determination of the resistivity of semiconductor by two probe method.
9. Study B-H curve of a magnetic material.
10. Determination of dielectric constant of a given material
11. a) Determination of the beam divergence of the given LASER beam
    b) Determination of Acceptance Angle and Numerical Apertureof an optical fiber.
12. Understanding the method of least squares – torsional pendulum as an example.

Note: Any 8 experiments are to be performed.

REFERENCE BOOK:
1. S. Balasubramanian, M.N. Srinivasan "A Text book of Practical Physics"- S Chand Publishers, 2017.

M241ACE108: C PROGRAMMING AND DATA STRUCTURES LABORATORY

B.Tech. I Year I Sem.   **L T P C**
                                                                   0 0 2 1

Course Objectives: Introduce the importance of programming, C language constructs, program development, data structures, searching and sorting.

Course Outcomes:
1. Develop modular and readable C Programs
2. Solve problems using strings, functions
3. Handle data in files
4. Implement stacks, queues using arrays, linked lists.
5. To understand and analyze various searching and sorting algorithms.

List of Experiments:
1. Write a C program to find the sum of individual digits of a positive integer.
2. Fibonacci sequence is defined as follows: the first and second terms in the sequence are 0 and 1. Subsequent terms are found by adding the preceding two terms in the sequence. Writea C program to generate the first n terms of the sequence.
3. Write a C program to generate all the prime numbers between 1 and n, where n is a valuesupplied by the user.
4. Write a C program to find the roots of a quadratic equation.
5. Write a C program to find the factorial of a given integer.
6. Write a C program to find the GCD (greatest common divisor) of two given integers.
7. Write a C program to solve Towers of Hanoi problem.
8. Write a C program, which takes two integer operands and one operator from the user, performs the operation and then prints the result. (Consider the operators +,-,*, /, % and useSwitch Statement)
9. Write a C program to find both the largest and smallest number in a list of integers.
10. Write a C program that uses functions to perform the following:
    i)   Addition of Two Matrices
    ii) Multiplication of Two Matrices
11. Write a C program that uses functions to perform the following operations:
    i)   To insert a sub-string in to a given main string from a given position.
    ii) To delete n Characters from a given position in a given string.
12. Write a C program to determine if the given string is a palindrome or not
13. Write a C program that displays the position or index in the string S where the string T begins,or – 1 if S doesn't contain T.
14. Write a C program to count the lines, words and characters in a given text.
15. Write a C program to generate Pascal's triangle.
16. Write a C program to construct a pyramid of numbers.
17. Write a C program that uses functions to perform the following operations:
    i)   Reading a complex number
    ii)   Writing a complex number
    iii) Addition of two complex numbers
    iv)   Multiplication of two complex numbers
          (Note: represent complex number using a structure.)
18.
    i.   Write a C program which copies one file to another.
    ii.   Write a C program to reverse the first n characters in a file.(Note: The file name and n are specified on the command line.)

19.
   i.   Write a C program to display the contents of a file.
   ii.   Write a C program to merge two files into a third file (i.e., the contents of the first filefollowed by those of the second are put in the third file)

20. Write a C program that uses functions to perform the following operations on singly linkedlist.:
   i) Creation   ii) Insertion   iii) Deletion   iv) Traversal

21. Write C programs that implement stack (its operations) using
   i) Arrays   ii) Pointers

22. Write C programs that implement Queue (its operations) using
   i) Arrays   ii) Pointers

23. Write a C program that implements the following sorting methods to sort a given list ofintegers in ascending order   i) Bubble sort   ii) Selection sortiii)Insertion sort

24. Write C programs that use both recursive and non recursive functions to perform the followingsearching operations for a Key value in a given list of integers:
   i) Linear search   ii) Binary search

TEXT BOOKS:
   1. C Programming & Data Structures, B.A. Forouzan and R. F. Gilberg, Third Edition, CengageLearning.
   2. Let us C, Yeswanth Kanitkar
   3. C Programming, Balaguruswamy.

M241ACE109: ENGLISH LANGUAGE AND COMMUNICATION SKILLS LABORATORY

B.Tech. I Year I Sem.   **L T P C**
                                                                       0 0 2 1

The **English Language and Communication Skills (ELCS) Lab** focuses on the production and practice of sounds of language and familiarizes the students with the use of English in everyday situations both in formal and informal contexts.

Course Objectives:
- ✓ To facilitate computer-assisted multi-media instruction enabling individualized andindependent language learning
- ✓ To sensitize the students to the nuances of English speech sounds, word accent, intonation and rhythm
- ✓ To bring about a consistent accent and intelligibility in students' pronunciation ofEnglish by providing an opportunity for practice in speaking
- ✓ To improve the fluency of students in spoken English and neutralize the impact ofdialects.
- ✓ To train students to use language appropriately for public speaking, group discussions and interviews

Course Outcomes: Students will be able to:
- ✓ Understand the nuances of English language through audio- visual experience and group activities
- ✓ Neutralise their accent for intelligibility
- ✓ Speak with clarity and confidence which in turn enhances their employability skills

Syllabus: English Language and Communication Skills Lab (ELCS) shall have two parts:
a. **Computer Assisted Language Learning (CALL) Lab**
b. **Interactive Communication Skills (ICS) Lab**

Listening Skills:
Objectives
1. To enable students develop their listening skills so that they may appreciate the role in the LSRWskills approach to language and improve their pronunciation
2. To equip students with necessary training in listening, so that they can comprehend the speech of people of different backgrounds and regions

Students should be given practice in listening to the sounds of the language, to be able to recognize them and find the distinction between different sounds, to be able to mark stress and recognize and use the right intonation in sentences.
- Listening for general content
- Listening to fill up information
- Intensive listening
- Listening for specific information

Speaking Skills:
Objectives
1. To involve students in speaking activities in various contexts
2. To enable students express themselves fluently and appropriately in social and professional contexts
- Oral practice
- Describing objects/situations/people
- Role play – Individual/Group activities

• Just A Minute (JAM) Sessions

The following course content is prescribed for the **English Language and Communication Skills Lab**. **Exercise – I**

CALL Lab:

Understand: Listening Skill- Its importance – Purpose- Process- Types- Barriers- Effective Listening. *Practice*: Introduction to Phonetics – Speech Sounds – Vowels and Consonants – Minimal Pairs-Consonant Clusters- Past Tense Marker and Plural Marker- *Testing Exercises*

ICS Lab:

Understand: Spoken vs. Written language- Formal and Informal English.

Practice: Ice-Breaking Activity and JAM Session- Situational Dialogues – Greetings – Taking Leave – Introducing Oneself and Others.

Exercise –
IICALL
Lab:

Understand: Structure of Syllables – Word Stress– Weak Forms and Strong Forms – Stress pattern in sentences – Intonation.

Practice: Basic Rules of Word Accent - Stress Shift - Weak Forms and Strong Forms- Stress pattern in sentences – Intonation - *Testing Exercises*

ICS Lab:

Understand: Features of Good Conversation – Strategies for Effective Communication.

Practice: Situational Dialogues – Role Play- Expressions in Various Situations –Making Requests andSeeking Permissions - Telephone Etiquette.

Exercise -
IIICALL
Lab:

Understand: Errors in Pronunciation-Neutralising Mother Tongue Interference (MTI).

Practice: Common Indian Variants in Pronunciation – Differences between British and American Pronunciation -*Testing Exercises*

ICS Lab:

Understand: Descriptions- Narrations- Giving Directions and Guidelines – Blog Writing

Practice: Giving Instructions – Seeking Clarifications – Asking for and Giving Directions – Thanking and Responding – Agreeing and Disagreeing – Seeking and Giving Advice – Making Suggestions.

Exercise –
IVCALL
Lab:

Understand: Listening for General Details.

Practice: Listening Comprehension Tests - *Testing Exercises*

ICS Lab:

Understand: Public Speaking – Exposure to Structured Talks - Non-verbal Communication- Presentation Skills.

Practice: Making a Short Speech – Extempore- Making a Presentation.

Exercise – V
CALL Lab:

Understand: Listening for Specific Details.

Practice: Listening Comprehension Tests -*Testing Exercises*

ICS Lab:

Understand: Group Discussion

Practice: Group Discussion

Minimum Requirement of infrastructural facilities for ELCS Lab:

1. **Computer Assisted Language Learning (CALL) Lab:**
The Computer Assisted Language Learning Lab has to accommodate 40 students with 40 systems, with one Master Console, LAN facility and English language learning software for self- study by students.
System Requirement (Hardware component):
Computer network with LAN facility (minimum 40 systems with multimedia) with the following specifications:
    i)   Computers with Suitable Configuration
    ii)   High Fidelity Headphones

2. **Interactive Communication Skills (ICS) Lab :**
The Interactive Communication Skills Lab: A Spacious room with movable chairs and audio-visual aids with a Public Address System, a T. V. or LCD, a digital stereo –audio & video system and camcorder etc.
 Source of Material (Master Copy):
    *   *Exercises in Spoken English. Part 1,2,3.* CIEFL and Oxford University Press

Note: Teachers are requested to make use of the master copy and get it tailor-made to suit the contents of the syllabus.

Suggested Software:
*   Cambridge Advanced Learners' English Dictionary with CD.
*   Grammar Made Easy by Darling Kindersley.
*   Punctuation Made Easy by Darling Kindersley.
*   Oxford Advanced Learner's Compass, 10th Edition.
*   English in Mind (Series 1-4), Herbert Puchta and Jeff Stranks with Meredith Levy, Cambridge.
*   English Pronunciation in Use (Elementary, Intermediate, Advanced) Cambridge UniversityPress.
*   English Vocabulary in Use (Elementary, Intermediate, Advanced) Cambridge University Press.
*   TOEFL & GRE (KAPLAN, AARCO & BARRONS, USA, Cracking GRE by CLIFFS).
*   Digital All
*   Orell Digital Language Lab (Licensed Version)

REFERENCE BOOKS:
1. (2022). *English Language Communication Skills – Lab Manual cum Workbook.* Cengage Learning India Pvt. Ltd.
2. Shobha, KN & Rayen, J. Lourdes. (2019). *Communicative English – A workbook.* CambridgeUniversity Press
3. Kumar, Sanjay & Lata, Pushp. (2019). *Communication Skills: A Workbook.* Oxford UniversityPress
4. Board of Editors. (2016). *ELCS Lab Manual: A Workbook for CALL and ICS Lab Activities.* Orient Black Swan Pvt. Ltd.
5. Mishra, Veerendra et al. (2020). *English Language Skills: A Practical Approach.* CambridgeUniversity Press

*M241ACE110: ENVIRONMENTAL SCIENCE

B.Tech. I Year I Sem.   **L T P C**
                                                                  3 0 0 0

Course Objectives:
- Understanding the importance of ecological balance for sustainable development.
- Understanding the impacts of developmental activities and mitigation measures.
- Understanding the environmental policies and regulations

Course Outcomes:
- Based on this course, the Engineering graduate will understand /evaluate / develop technologies on the basis of ecological principles and environmental regulations which in turnhelps in sustainable development

UNIT - I
Ecosystems: Definition, Scope, and Importance of ecosystem. Classification, structure, and function of an ecosystem, Food chains, food webs, and ecological pyramids. Flow of energy, Biogeochemical cycles, Bioaccumulation, Biomagnification, ecosystem value, services and carrying capacity, Field visits.

UNIT - II
Natural Resources: Classification of Resources: Living and Non-Living resources, **water resources:** use and over utilization of surface and ground water, floods and droughts, Dams: benefits and problems. **Mineral resources:** use and exploitation, environmental effects of extracting and using mineral resources, **Land resources:** Forest resources, **Energy resources:** growing energy needs, renewable and non-renewable energy sources, use of alternate energy source, case studies.

UNIT - III
Biodiversity and Biotic Resources: Introduction, Definition, genetic, species and ecosystem diversity. Value of biodiversity; consumptive use, productive use, social, ethical, aesthetic and optional values. India as a mega diversity nation, Hot spots of biodiversity. Field visit. Threats to biodiversity: habitat loss, poaching of wildlife, man-wildlife conflicts; conservation of biodiversity: In-Situ and Ex-situ conservation. National Biodiversity act.

UNIT - IV
Environmental Pollution and Control Technologies: Environmental Pollution: Classification of pollution, **Air Pollution:** Primary and secondary pollutants, Automobile and Industrial pollution, Ambient air quality standards. **Water pollution:** Sources and types of pollution, drinking water quality standards. **Soil Pollution:** Sources and types, Impacts of modern agriculture, degradation of soil. **Noise Pollution:** Sources and Health hazards, standards, **Solid waste:** Municipal Solid Waste management, composition and characteristics of e-Waste and its management. **Pollution control technologies:** Wastewater Treatment methods: Primary, secondary and Tertiary.
Overview of air pollution control technologies, Concepts of bioremediation. **Global Environmental Issues and Global Efforts: C**limate change and impacts on human environment. Ozone depletion and Ozone depleting substances (ODS). Deforestation and desertification. International conventions / Protocols: Earth summit, Kyoto protocol, and Montréal Protocol. NAPCC-GoI Initiatives.

UNIT - V
Environmental Policy, Legislation & EIA: Environmental Protection act, Legal aspects Air Act-1981, Water Act, Forest Act, Wild life Act, Municipal solid waste management and handling rules, biomedical waste management and handling rules, hazardous waste management and handling rules. EIA: EIA structure, methods of baseline data acquisition. Overview on Impacts of air, water, biological and Socio- economical aspects. Strategies for risk assessment, Concepts of Environmental Management Plan

(EMP). **Towards Sustainable Future:** Concept of Sustainable Development Goals, Population and its explosion, Crazy Consumerism, Environmental Education, Urban Sprawl, Human health, Environmental Ethics, Concept of Green Building, Ecological Foot Print, Life Cycle assessment (LCA),Low carbon life style.

TEXT BOOKS:
1   Textbook of Environmental Studies for Undergraduate Courses by Erach Bharucha for University Grants Commission.
2   Environmental Studies by R. Rajagopalan, Oxford University Press.

REFERENCE BOOKS:
1. Environmental Science: towards a sustainable future by Richard T. Wright. 2008 PHL LearningPrivate Ltd. New Delhi.
2. Environmental Engineering and science by Gilbert M. Masters and Wendell P. Ela. 2008 PHILearning Pvt. Ltd.
3. Environmental Science by Daniel B. Botkin & Edward A. Keller, Wiley INDIA edition.
4. Environmental Studies by Anubha Kaushik, 4th Edition, New age international publishers.
5. Text book of Environmental Science and Technology - Dr. M. Anji Reddy 2007, BS Publications.
6. Introduction to Environmental Science by Y. Anjaneyulu, BS. Publications.

MOTHER TERESA INSTITUTE OF SCIENCE & TECHNOLOGY
AUTONOMOUS
B. Tech. in CIVIL ENGINEERING COURSE STRUCTURE & SYLLABUS
(M24 Regulations)
Applicable from A.Y 2024-25 Batch

II YEAR I SEMESTER

S.No.	Course Code	Course Title	L	T	P	Credits
1.	M241ACE301	Probability and Statistics	3	1	0	4
2.	M241ACE302	Building Materials, Construction and Planning	3	0	0	3
3.	M241ACE303	Engineering Geology	3	0	0	3
4.	M241ACE304	Strength of Materials-I	3	0	0	3
5.	M241ACE305	Fluid Mechanics	3	0	0	3
6.	M241ACE306	Surveying Laboratory-II	0	1	2	2
7.	M241ACE307	Strength of Materials Laboratory	0	0	2	1
8.	M241ACE308	Computer Aided Drafting Laboratory	0	0	2	1
9.	M241ACE309	Skill Course-I (AUTO CAD)	0	0	3	0
10	M241ACE310	Design Thinking	2	0	0	0
		Total Credits	**17**	**2**	**9**	**20**

II YEARIISEMESTER

S.No.	Course Code	Course Title	L	T	P	Credits
1.	M241ACE401	Basic Electrical and Electronics Engineering	3	0	0	3
2.	M241ACE402	Concrete Technology	3	0	0	3
3.	M241ACE403	Strength of Materials-II	3	0	0	3
4.	M241ACE404	Hydraulics and Hydraulics Machinery	3	0	0	3
5.	M241ACE405	Structural Analysis-I	3	0	0	3
6.	M241ACE406	Fluid Mechanics and Hydraulics Machinery Laboratory	0	0	2	1
7.	M241ACE407	Basic Electrical and Electronics Engineering Laboratory	0	0	2	1
8.	M241ACE408	Concrete Technology Laboratory	0	0	2	1
9.	M241ACE409	Real-time Research Project/Field-Based Project	0	0	4	2
10.	M241ACE410	Skill Course-II JAVA Programming	0	0	2	0
		Total Credits	**15**	**0**	**12**	**20**

M241CE301: PROBABILITY AND STATISTICS

B.Tech.IIYearISem.   **L T P C**
                                                                                               3 1 0 4

Pre-requisites: Mathematicscoursesoffirstyearofstudy.

CourseObjectives: Tolearn
- ThetheoryofProbability,andprobabilitydistributionsofsingleandmultiplerandom   variables
- Thesamplingtheoryandtestingofhypothesisandmakingstatisticalinferences

Courseoutcomes: Afterlearningthecontentsofthispaperthestudentmustbeableto
- Applytheconceptsofprobabilityanddistributionstosomecasestudies.
- Correlatetheconceptsofoneunittotheconceptsinotherunits.

UNIT-I:Probability   **8L**
Sample Space, Events, Counting Sample Points, Probability of an Event, Additive Rules, Conditional Probability, Independence, and the Product Rule, Baye's Rule.
RandomVariablesandProbabilityDistributions: ConceptofaRandomVariable,DiscreteProbability Distributions, Continuous Probability Distributions.

UNIT-II:Expectationanddiscretedistributions   **10L**
MeanofaRandomVariable,VarianceandCovarianceofRandomVariables,MeansandVariancesof Linear Combinations of Random Variables, Chebyshev's Theorem.
DiscreteProbabilityDistributions: BinomialDistribution,Poissondistribution.

UNIT - III: Continuous Distributions and sampling   **10 L**
Uniform Distribution, Normal Distribution, Areas under the Normal Curve, Applications of the Normal Distribution, Normal Approximation to the Binomial Distributions.
Fundamental Sampling Distributions: Random Sampling, Some Important Statistics, Sampling Distributions, Sampling Distribution of Means and the Central Limit Theorem, t -Distribution, F-Distribution.

UNIT - IV: Estimation & Tests of Hypotheses   **10 L**
Introduction,StatisticalInference,ClassicalMethodsofEstimation,SingleSample:Estimatingthe mean, standard error of a point estimate, prediction interval. Two sample: Estimating the difference between two means, Single sample: Estimating a proportion, Two samples: Estimating the difference between two proportions, Two samples: Estimating the ratio of two variances.
Statistical Hypotheses: General Concepts, Testing a Statistical Hypothesis, Single sample: Tests concerningasinglemean,Twosamples:testsontwomeans,Onesam   ple:testonasingleproportion.   Two samples: tests on two proportions, Two- sample tests concerning variances.

UNIT-V:AppliedStatistics   **10L**
Curvefittingbythemethodofleastsquares,fittingofstraightlines,seconddegreeparabolasandmore   general curves, Correlation and regression, Rank correlation.

TEXTBOOKS:
1. Ronald E. Walpole, Raymond H. Myers, Sharon L. Myers, Keying Ye, Probability & Statistics for Engineers & Scientists, 9thEd. Pearson Publishers.
2. SCGuptaandVKKapoor,FundamentalsofMathematicalstatistics,Khannapublications.

REFERENCEBOOKS:
1. T.T.Soong,FundamentalsofProbabilityandStatisticsforEngineers,JohnWiley&Sons,Ltd,   2004.
2. SheldonMRoss,ProbabilityandstatisticsforEngineersandscientists,academicpress.

M241ACE302: BUILDING MATERIALS,CONSTRUCTION AND PLANNING

B.Tech.IIYearISem.   **L T P C**
                                                                                                                            3 0 0 3

CourseObjectives: Theobjectivesofthecourseisto
- Listtheconstructionmaterial.
- Explaindifferentconstructiontechniques
- Understandthebuildingbye-laws
- Highlightthesmartbuildingmaterials

CourseOutcomes: Afterthecompletionofthecoursestudentshouldbeable   to
- Understandthedifferentconstructionmaterial.
- Understandthedifferentcomponentpartsofbuildingandtheirconstruction practices and techniques
- Understandthefunctionalrequirementstobeconsideredfordesignand construction of building
- Identifythefactorstobeconsideredinplanningandconstructionofbuildings
- Planabuildingbasedonthefactorsandprinciplesofplanning

UNIT-I
Stonesand Bricks, Tiles: Building stones –classifications and quarrying- properties -structural requirements-dressing.
Bricks-CompositionofBrickearth-manufactureandstructuralrequirements,Flyash,Ceramics.
Timber,Aluminum,Glass,PaintsandPlastics: Wood-structure-typesandproperties-seasoning-defects;alternatematerialsforTimber-GI/fiber-reinforcedglassbricks,steel&aluminum,Plastics.

UNIT- II
Cement&Admixtures: Ingredientsofcement-manufacture–Chemicalcomposition-Hydration-   field & lab tests. Admixtures-
mineral&chemicaladmixtures-uses.

UNIT- III BuildingComponents:Lintels,Arches,walls,vaults-staircases-
typesoffloors,typesofroofs-
flat,curved,trussed;foundations- types;DampProofCourse;Joinery-doors-windows-materials   -types.
Building Services: Plumbing Services: Water Distribution, Sanitary - Lines & Fittings; Ventilations: Functional requirements systems of ventilations. Air-conditioning - Essentials and Types; Acoustics - characteristic - absorption - Acoustic design; Fire protection - Fire Hazards - Classification of fire-resistantmaterialsandconstructions

UNIT-IV
Mortars,MasonryandFinishing'sMortars: CementMortar,Brickmasonry-types-bonds;Stonemasonry-types;Compositemasonry-Brick-stonecomposite;Concrete,Reinforcedbrick.
Finishers: Plastering,Pointing,Painting,Claddings-Types-Tiles-ACP. **Formwork:Types**:Requirements-Standards-Scaffolding-Design;Shoring,Underpinning.

UNIT–V
Building Planning: Classification of buildings ,functional Planning of buildings: Sustainability and concept of Green building, General aspects to consider for planning, bye-laws and regulations, Selectionofsiteforbuildingconstruction,Principlesofplanning,Orientationofbuildinganditsrelation   to outside environment

TEXTBOOKS:
1. BuildingMaterialsandConstruction-Arora&Bindra,DhanpatRoyPublications.
2. BuildingMaterialsandConstructionbyGCSahu,JoygopalJenaMcGrawhillPvtLtd2015.
3. BuildingConstructionbyB.C.Punmia,AshokKumarJainandArunKumarJain- Laxmi   Publications
    (P) ltd., New Delhi.

REFERENCEBOOKS:
1. BuildingMaterialsbyDuggal,NewAgeInternational.
2. BuildingMaterialsbyP.C.Varghese,PHI.
3. BuildingConstructionbyPCVarghesePHI.
4. ConstructionTechnology-Vol-I&IIbyR.Chubby,LongmanUK.
5. AlternateBuildingMaterialsandTechnology,Jagadish,VenkataramaReddyandothers;New Age
    Publications.

M241ACE303: ENGINEERING GEOLOGY

B.Tech. II Year I Sem.   **L T P C**
                                                                                                                3 0 0 3

Course Objectives: The objective of this Courses
- To give the basics knowledge of Geology that is required for constructing various Civil Engineering Structures, basic Geology, Geological Hazardous and Environmental Geology.
- Tofocusonthecoreactivitiesofengineeringgeologists- sitecharacterizationandgeologic hazard identification and mitigation. Planning and construction of major Civil Engineering projects.

Course Outcomes: At the end of the course, the student will be able to:
- Sitecharacterizationandhowtocollect,analyze,andreportgeologicdatausingstandardsin engineering practice.
- ThefundamentalsoftheengineeringpropertiesofEarthmaterialsandfluids.
- Rockmasscharacterizationandthemechanicsofplanarrockslidesandtopples.

UNIT-I
Introduction: ImportanceofgeologyfromCivilEngineeringpointofview.Briefstudyofcasehistories offailureofsomeCivilEngineeringconstructionsduetogeologicaldrawbacks.ImportanceofPhysical geology, Petrology and Structural geology.
WeatheringofRocks: Its effectoverthe properties of rocks importanceof weathering withreference to dams, reservoirs and tunnels weathering of common rock like "Granite"

UNIT- II
Mineralogy: Definition of mineral, Importance of study of minerals, Different methods of study of minerals. Advantages of study of minerals by physical properties. Role of study of physical properties of minerals in the identification of minerals. Study of physical properties of following common rock forming minerals: Feldspar, Quartz, Flint, Jasper, Olivine, Augite, Hornblende, Muscovite, Biotite, Asbestos,Chlorite,Kyanite,Garnet,Talc,Calcite.Studyofothercommoneconomicsmineralssuchas Pyrite, Hematite, Magnetite, Chlorite, Galena, Pyrolusite, Graphite, Magnesite, and Bauxite.
Petrology: Definition of rock: Geological classification of rocks into igneous, Sedimentary and metamorphic rocks. Dykes and sills, common structures and textures of igneous. Sedimentary and metamorphicrocks.Theirdistinguishingfeatures,Megascopicandmicroscopicandmicroscopicstudy ofGranite,Dolerite,Basalt,Pegmatite,Laterite,Conglomerate,SandStone,Shale,Limestone,Gneiss, Schist, Quartzite, Marble and Slate.

UNIT- III
StructuralGeology: Out crop, strike and dip study of common geological structures associating with therockssuchasfolds,faultsunconformities,andjoints-theirimportanttypesandcasestudies.Their importance Insitu and drift soils, common typesof soils,their origin and occurrence in India, Stabilizationof soils. Ground water, Water table, common types of ground water, springs, cone of depressio n, geological controls of ground water movement, ground water exploration.

UNIT-IV
Earth Quakes: Causes and effects, shield areas and seismic belts. Seismic waves, Richter scale, precautionstobetakenforbuildingconstructioninseismic   areas.Landslides,theirc ausesandeffect; measures to be taken to prevent their occurrence.
Importance of Geophysical Studies: Principles of geophysical study by Gravity methods. Magnetic methods,Electrical methods. Seismic methods, Radio metric methods and geothermal method. Special importanceofElectricalresistivitymethods,andseismicrefractionmethods.Improvement of

competence of sites by grouting etc. Fundamental aspects of Rock mechanics and Environmental Geology.

UNIT-V

Geologyof Dams, Reservoirs, andTunnels: Types of dams and bearing of Geology of site in their selection,GeologicalConsiderationsintheselectionofadamsite.Analysisofdamfailuresofthepast.   Factors contributing to the success of a reservoir. Geological factors influencing water Lightness and life of reservoirs - Purposes of tunneling, Effects of Tunneling on the ground Role of Geological Considerations (i.e. Tithological, structural and ground water) in tunneling over break and lining in tunnels.

TEXTBOOKS:
   1. EngineeringGeologybyN.Chennakesavulu,McMillan,IndiaLtd.2005
   2. EngineeringMethodsbyD.VenkatReddy;VikasPublishers2015.
   3. EngineeringGeologybySKDuggal,HKPandeyMcGrawHillEducationPvtLtd2014
   4. PrinciplesofEngineeringGeologybyK.V.G.K.Gokhale-B.Spublications

REFERENCEBOOKS:
   1. F.G.Bell,FundamentalofEngineeringB.S.Publications,2005.
   2. Krynine&Judd,PrinciplesofEngineeringGeology&Geotechnics,CBSPublishers&Distribution
   3. EngineeringGeologybySubinoyGangopadhyay,Oxforduniversitypress.
   4. EngineeringGeologyforCivilEngineers-P.C.VarghesePHI

M241ACE304:STRENGTHOFMATERIALS–I

B.Tech.IIYearISem.   **L T P C**
                                                                                                                          3 0 0 3

Pre-Requisites:EngineeringMechanics

CourseObjectives: TheobjectiveofthisCourseis
- Tounderstandthenatureofstressesdevelopedinsimplegeometriessuchasbars,cantilevers and beams for various types of simple loads.
- Tocalculatetheelasticdeformationoccurringinsimplemembersfordifferent types of loading.
- Toshowtheplanestresstransformationwithaparticularcoordinatesystemfordifferent   orientation of the plane.
- Toknowdifferentfailuretheoriesadoptedindesigningofstructuralmembers.

CourseOutcome:Oncompletionofthecourse,thestudentwillbeableto:
- Describe the concepts and principles, understand the theory of elasticity including strain/displacement and Hooke's law relationships; and perform calculations, related to the strength of structured and mechanical components.
- Recognizevarioustypesloadsappliedonstructuralcomponentsofsimpleframinggeometries   and understand the nature of internal stresses that will develop within the components.
- To evaluate the strains and deformation that will result due to the elastic stresses developed within the materials for simple types of loading.
- Analyzevarioussituationsinvolvingstructuralmemberssubjectedtoplanestressesby application of Mohr's circle of stress.

UNIT–I
Simple Stresses and Strains: Concept of stress and strain- St. Venant's Principle-Stress and Strain Diagram-Elasticityandplasticity-Typesofstressesandstrains-Hooke'slaw-stress-straindiagram formildsteel-Workingstress-Factorofsafety-Lateralstrain,   Poisson'sratioandvolumetricstrain   -PureshearandComplementaryshear-Elasticmodulii,Elasticconstantsandtherelationship betweenthem-Barsofvaryingsection-compositebars-Temperaturestresses.
StrainEnergy-Resilience-Gradual,sudden,andimpactloadings-simpleapplications.

UNIT–II
ShearForceandBendingMoment: Typesofbeams-Conceptofshearforceandbendingmoment   -S.FandB.M diagramsforcantilever,simply   supportedincludingoverhanging   beams   subjectedto   point   loads, uniformly distributed load, uniformly varying load, couple and combination of these loads -Pointofcontraflexure-RelationbetweenS.F.,B.Mandrateofloadingatasectionofabeam.

UNIT–III
Flexural Stresses: Theory of simple bending - Assumptions - Derivation of bending equation- Section ModulusDeterminationofflexural/bendingstressesofrectangularandcircularsections(Solidand Hollow),I,T,AngleandChannelsections-Designofsimplebeamsections.
Shear Stresses: Derivation of formula for shear stress distribution - Shear stress distribution across variousbeamsectionslikerectangular,circular,triangular,I,Tangleandchannelsections.

UNIT–IV
DeflectionofBeams: Slope,deflectionandradiusofcurvature-Differentialequationfortheelastic lineofabeam-DoubleintegrationandMacaulay'smethods-Determinationofslopeanddeflection   for   cantilever   and simply supported beamssubjected to point loads,U.D.L, Uniformly varying load and couple-Mohr'stheorems -Moment area method -Applicationto simple cases.

ConjugateBeamMethod: Introduction-Conceptofconjugatebeammethod-Differencebetweena real beam and a conjugate beam - Deflections of determinate beams with constant and different moments of inertia.

UNIT–V PrincipalStresses: Introduction-Stressesonanobliqueplaneofabarunderaxialloading- compoundstresses-Normalandtangentialstressesonaninclinedplaneforbiaxialstresses-Two perpendicularnormalstressesaccompaniedbyastateofsimpleshear-Principalstresses-Mohr's circleofstresses-ellipseofstress-Analyticalandgraphicalsolutions.

TheoriesofFailure:Introduction-Varioustheoriesoffailure-MaximumPrincipalStressTheory, MaximumPrincipalStrainTheory,Maximumshearstresstheory-StrainEnergyandShearStrain EnergyTheory(VonMises Theory).

TEXTBOOKS:
1. StrengthofMaterialsbyR.KRajput,S.Chand&CompanyLtd.
2. MechanicsofMaterialsbyDr.B.CPunmia,Dr.AshokKumarJainandDr.ArunKumar   Jain
3. StrengthofMaterialsbyR.Subramanian,OxfordUniversityPress

REFERENCEBOOKS:
1. MechanicsofmaterialbyR.C.Hibbeler,PrenticeHallpublications
2. EngineeringMechanicsofSolidsbyEgorP.Popov,PrenticeHallpublications
3. StrengthofMaterialsbyT.D.GunneswaraRaoandM.Andal,CambridgePublishers
4. StrengthofMaterialsbyR.K.Bansal,LakshmiPublicationsHousePvt.Ltd.
5. StrengthofMaterialsbyB.S.BasavarajaiahandP.Mahadevappa,3rdEdition,Universities   Presss

M241ACE305:FLUIDMECHANICS

B.Tech.IIYearISem.   **L T P C**
                                                                                                3 0 0 3

CourseObjectives: The objectivesof thecourseareto
- IntroducetheconceptsoffluidmechanicsusefulinCivilEngineeringapplications.
- Provideafirstlevelexposuretothestudentstofluidstatics,kinematicsanddynamics.
- Learnabouttheapplicationofmass,energyandmomentumconservationlawsforfluidflows.
- Trainandanalyses engineeringproblems involvingfluidswithamechanisticperspective is essential for the civil engineering students
- Toobtainthevelocityandpressurevariationsinvarioustypesofsimpleflows.
- To prepare a student to build a good fundamental background useful in the application-intensive courses covering hydraulics, hydraulic machinery and hydrology.

CourseOutcomes: Uponcompletionof thiscourse,studentsshouldbeableto:
- Understandthebroadprinciplesoffluidstatics,kinematicsanddynamics.
- Understanddefinitions ofthebasic terms usedinfluid mechanics andcharacteristics offluids and its flow.
- Understandclassificationsoffluidflow.
- Beabletoapplythecontinuity,momentumandenergyprinciples.

UNIT–I
PropertiesofFluid
Distinction between a fluid and a solid; Properties of fluids - Viscosity, Newton law of viscosity; vapour pressure, boiling point, cavitation; surface tension, capillarity, Bulk modulus of elasticity, compressibility.
Fluid Statics
Fluid Pressure: Pressure at a point, Pascals law, Hydrostatic law, Piezometer, U-Tube Manometer, Single Column Manometer, U-Tube Differential Manometer, Micromanometers. Pressure gauges, Hydrostatic pressure and force: horizontal, vertical and inclined surfaces.

UNIT- II
FluidKinematics
Classification of fluid flow: steady and unsteady flow; uniform and non-uniform flow; laminar and turbulentflow;rotationalandirrotationalflow;compressibleandincompressibleflow;idealandreal fluid flow; One, two-andthree-dimensionalflows; Streamline, path line, streak line and stream tube; stream function, velocity potential function , flow net , One, two- and three-dimensional continuityequationsinCartesiancoordinatesapplications.
FluidDynamics
Surface and Body forces -Euler's andBernoulli'sequation; Momentum equation. correction factors. Bernoulli's equation to real fluid flows.

UNIT- III
FlowMeasurementinPipes
Practical applications of Bernoulli's equation:venturi meter, orifice meter and pitot tube, applications of Momentum equations; Forces exerted by fluid flow on pipe bend, sudden enlargement in pipes.
FlowOverNotches&Weirs
Flow through rectangular; triangular and trapezoidal notches and weirs; End contractions; Velocity of approach. Broad crested weir.
UNIT–IV
FlowthroughPipes
Reynolds experiment, Reynolds number**,** Loss of head through pipes, Darcy-Wiesbatch equation, minorlosses,totalenergyline,hydraulicgradeline,Pipesinseries,equivalentpipes,pipesinparallel,

siphon,branchingofpipes,threereservoirproblem,powertransmissionthroughpipes.Analysisof pipenetworks:HardyCrossmethodandEPANET,waterhammerinpipesandcontrolmeasures.

UNIT-V
Laminar&TurbulentFlow
Laminarflowthroughcircularpipes,andfixedparallelplates.
BoundaryLayerConcepts
Prandtl contribution, Assumption and concept of boundary layer theory. Boundary-layer thickness, displacement,momentum &energy thicknessconceptsoflaminarandturbulentboundarylayersona flat plate; Laminar sub-layer, smooth and rough boundaries. Local and average friction coefficients. Separation and Control. Drag and Lift and types of drag, magnus effect.
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TEXTBOOKS:
1. FluidMechanicsbyModiandSeth,StandardBookHouse.
2. Fluid Mechanics and Hydraulic machines by Manish Kumar Goyal, PHI learning Private Limited, 2015.
3. FluidMechanicsbyR.C.Hibbeler,PearsonIndiaEducationServicesPvt. Ltd.

REFERENCEBOOKS:
1. FluidMechanics-FrankM.White-8th Edition-McGrawHillEducation.
2. *TheoryandApplicationsofFluidMechanics,K.Subramanya,TataMcGrawHill
3. IntroductiontoFluidMechanicsandFluidMachinesbySKSom,GautamBiswas,Suman Chakraborthy, Mc Graw Hill Education (India) Private Limited
4. Fluid Mechanics and Machinery,C.S.P.Ojha, R. Berndtsson and P. N. Chadramouli, Oxford University Press, 2010
5. Fluidmechanics&HydraulicMachines,Domkundwar&DomkundwarDhanpatRai&Co
6. FluidMechanicsandHydraulicMachines,R.K.Bansal,LaxmiPublicationPvt Ltd.

M241ACE306:SURVEYING LABORATORY–II

B. Tech. II Year I Sem.   **L T P C**
                                                                                                0 1 2 2

Course Objectives:
1. Studentwillbeabletolearnandunderstandthevariousbasicconceptandprinciplesusedin surveying like Chain Surveying, Compass Surveying, Plane Table Surveying, and Levelling Surveying.
2. Studentwillbeabletolearnandunderstandabouttheodoliteandtotalstationinsurveying.
3. Student will earn and understand how to calculate Area of plotandGround.
4. StudentwilllearnandunderstandaboutHorizontalAngle,VerticalAngle,Horizontaldistance and Vertical distance to study the ground profile using total station.

CourseOutcomes: Attheendofthecoursestudentwillbeableto:
1. PrepareMapandPlanforrequiredsitewithsuitablescale.
2. PreparecontourMapandEstimatetheQuantityofearthworkrequiredforformationlevelfor Road and Railway Alignment.
3. JudgewhichtypeofinstrumenttobeusedforcarryingoutsurveyforaParticularAreaand estimate the area.
4. Judgetheprofileofgroundbyobservingtheavailableexistingcontourmap.

CYCLE-I
Theodolitesurveying:
1. Measurementofhorizontalanglesandverticalangles.
2. Distancebetweentwoinaccessiblepoints.
3. Measurementofareabytheodolitetraversing(Galestraversetable).
4. Determinationoftachometerconstants.
5. Distancebetweentwoinaccessiblepointsusingtheprinciplesoftachometersurveying.
6. Distancebetweentwoinaccessiblepointsusingtheprinciplesoftrigonometricsurveying

CYCLE-II
TotalStation:
7. AreaMeasurement8.StakeOut
9. RemoteElevationMeasurement
10. MissingLineMeasurement
11. Longitudinal&CrossSectionProfile
12. Contouring
13. ProvidingaSimpleCircularCurve
14. DemonstrationusingDGPS

M241ACE307:STRENGTHOFMATERIALSLABORATORY

B.Tech.IIYearISem.   **L T P C**
                                                                          0 0 2 1

CourseObjectives:
- ToconducttheTensiontest,Compressiontestonvariousmaterials
- ToconducttheSheartest,Bendingtestondeterminatebeams
- ToconducttheCompressiontestonspringandHardnesstestusingvariousmachines
- ToconducttheTorsiontest,Impacttestonvariousmaterials

CourseOutcomes: Afterthecompletionofthecourse,studentsshouldbeableto
- Determinetheyieldstress,ultimatetensilestress,percentageelongationofsteel, compressive strength of brick and concrete
- Determinetheultimateshearstress,modulusofelasticityofsteel
- Determinethestiffnessoftheclosecoiledhelicalspringandhardnessnumberofmildsteel, brass, copper and aluminium.
- Determinethemodulusofrigidityandimpactstrengthofsteel**.**

ListofExperiments:
1. Tensiontest
2. Bendingteston(Steel/Wood)Cantileverbeam.
3. Bendingtestonsimplesupportbeam.
4. Torsiontest
5. Hardnesstest
6. Springtest
7. Compressiontestonconcrete.
8. Impacttest
9. Sheartest
10. VerificationofMaxwell'sReciprocaltheoremonbeams.
11. Useofelectricalresistancestraingauges.
12. Continuousbeam-deflectiontest.

M241ACE308:COMPUTERAIDEDDRAFTINGLABORATORY

B.Tech.IIYearISem.   **L T P C**

0 0 2 1

CourseObjectives:

- TobeabletoplanbuildingsasperNBC**.**
- Tounderstandvarioustypesofconventionalsignsandbrickbonds.
- Todrawtheplansectionandelevationfordoors,trussesandstaircases.
- TouseAutoCADtoolstodrawbuildingplans,sectionsandelevationsfromagivenlinediagram and specifications.
- Todevelopworkingdrawingsofresidentialbuildings.

CourseOutcomes: Aftercompletionofthecourse,thestudentshouldbeable   to

- PlanbuildingsasperNBC.
- Use different Commands of selected drafting software to draw Conventional signs and brick bonds, Plan, Section and Elevation of buildings.
- Drawsectionandelevationofpanelleddoorsandtrusses.
- DrawanddetailthedifferentcomponentsofStaircases.
- Developanddrawsingle/twostoreyresidentialbuildingandpublicbuildingasperthebuilding by-laws.
- DrawElectricallayout,Plumbinglayoutforresidentialbuildings.

ListofExperiments:

1. PlanningAspectsofBuildingsystemsasperNationalBuildingCode(NBC).
2. Brickbonds:Englishbond&Flemishbond-OddandEvencourses.
3. Developingplanandsectionofdog-leggedstaircase.
4. Developingplanofsinglestoriedresidentialbuilding.
5. Developingsectionandelevationofsinglestoriedresidentialbuilding.
6. Developingplanofsingle/twostoriedResidentialbuildingasperBuildingby-laws.
7. Developingplanofpublicbuildingasperbuildingby-laws.
8. Developingsectionandelevationofpublicbuilding.
9. Development ofworkingdrawingofbuilding-ElectricalLayout.
10. Developmentofworkingdrawingofbuilding-PlumbingLayout.

TEXTBOOKS:

1. ComputerAidedDesignLaboratorybyM.N.SeshaPraksh&Dr.G.S.Servesh- Laxmi   Publications.
2. EngineeringGraphicsbyP.J.Sha-S.Chand&Co.
3. CivilEngineeringDrawing-IbyN.Sreenivasulu,S.RamaRao-RadiantPublishingHouse.
4. CivilEngineeringDrawing-IIbyN.Sreenivasulu-RadiantPublishingHouse.

REFERENCEBOOKS:

1. EngineeringGraphicsbyP.J.Sha-S.Chand&Co
2. CivilEngineeringDrawing-IbyS.MahaboobBasha-FalconPublishers
3. BuildingdrawingbyM.G.Shah-TataMcGraw-HillEducation
4. StructuralEngineeringDrawingbyS.MahaboobBasha-FalconPublishers

M241ACE310:DESIGN THINKING

B.Tech.IIYearISem.   **L T P C**
                                                                                          2 0 0 0

CourseObjectives: Studentswillbeableto:
- To instill a sense of significance towards applying creativity to product and service design
- To teach a systematic approach to identifying and defining a problem before brainstorming for a solution
- To inculcate core design principles and applied creativity to develop innovative strategies that better connect engineers and technologies with their end users
- To build a mindset leading to flow of creative ideas, validating those ideas and prioritizing the best ones among them
- To motivate students to apply design thinking while implementing projects focusing on local, regional or global societal problems .

CourseOutcomes: Studentswillbeableto:
- Demonstrate the understanding of design principles from a technology perspective
- Validate problem statements through user empathisation with societal, cultural, global and environmental consciousness
- Use specific and relevant ideation and brainstorming techniques to find innovative solutions
- Prototype a solution to address user challenges
- Investigate the cultural, emotional, environmental, technological and business factors relevant to developing new product or service design concept Know how to think critical in problem solving

UNIT-I

Design Overview and Doing Design: Various perspectives of design; Good and Bad Design; Introduction to the Design Double Diamond: Discover-Define-Develop Deliver; Discover Phase- Looking for problems; Identifying Stakeholders and Defining User Personas; User Empathization; Data collection, creating and conducting surveys and Empathy Tools - What/How/Why, Five Why method, Empathy Maps, AEIOU method, Story Share and Capture.

UNIT-II

Need Analysis: Types of Users, Types of Needs; Market Size; Value Proposition to the Users; Identifying Addressable Needs and Touch points; Structuring Need Statements; Customer Experience (CX) Design; Service Design and Development Process; Customer Journey Map (CJM), Service Experience Cycle.

UNIT-III

Ideation Process: Introduction to creativity and closed-world solutions, Idea generation techniques: Brainstorming, Mind Maps, SCAMPER, Systematic Inventive Thinking methods (Subtraction, Multiplication, Division, Task Unification and Attribute Dependency);

Strategic Innovation for Competition in Future: Linear Innovation vs. Non-linear innovation, Understanding and identifying weak signals, 3-box thinking, 3-Box framework and Box-3 ideation, Four-Action Framework (Eliminate-Reduce-Raise Create, or ERRC Matrix).

UNIT-IV

Building Prototypes: Building Conceptual model of product/service using various prototype methods, test a business model or business case to support the viability of the solution using MVP. Design for Sustainability: Concern for Environment and Sustainability in Design, Case Studies to understand good Design for Environment (DFE) Decisions;

Sustainable Design Approaches in the five stages of the Product Life Cycle**.**

UNIT-V

Capstone Project (Interdisciplinary): Applying design thinking principles and methods for problem definition, ideation, prototyping, testing, refining and taking the solution to the users, using visual representation tools to indicate problem,

User persona, needs, empathisation, ideas and prototype that leads to chosen solution, creating presentation**.**

TEXTBOOKS:
1. Change by Design, Tim Brown, Harper Business, 2012.
2. The Design of Everyday Things, Donald A. Norman, MIT Press, 2013

REFERENCEBOOKS:
1. The Art of Innovation, Tom Kelly, Jonathan Littman, Harper Collins Business, 2002
2. Design Thinking: Integrating Innovation, Customer Experience, and Brand Value, Thomas Lockwood, Allworth Press, 2009
3. Design Thinking for Start-ups: A Handbook for Readers and Workbook for Practitioners, Jimmy Jain, Notion Press,2018

M241ACE401:BASICELECTRICALANDELECTRONICSENGINEERING

B.Tech.IIYearIISem.   L T P C
                                                                                                3 0 0 3

CourseObjectives:
- Tointroducetheconceptsofelectricalcircuitsandits components
- Tounderstandmagneticcircuits,DCcircuitsandACsinglephase&threephasecircuits
- TostudyandunderstandthedifferenttypesofDC/ACmachinesandTransformers.
- Toimporttheknowledgeofvariouselectricalinstallations.
- Tointroducetheconceptofpower,powerfactoranditsimprovement.
- Tointroducetheconceptsofdiodes&transistors,and
- Toimparttheknowledgeofvariousconfigurations,characteristicsandapplications.

CourseOutcomes:
- Toanalyzeandsolveelectricalcircuitsusingnetworklawsandtheorems.
- TounderstandandanalyzebasicElectricandMagneticcircuits
- TostudytheworkingprinciplesofElectricalMachines
- TointroducecomponentsofLowVoltageElectricalInstallations
- Toidentifyandcharacterizediodesandvarioustypesoftransistors.

UNIT- I:
D.C.Circuits: Electricalcircuitelements(R,LandC),voltageandcurrentsources,KVL&KCL,analysis   of
simple circuits with dc excitation.
A.C.Circuits: Representation of sinusoidal waveforms,peak and rms values,phasor representation,
realpower,reactivepower,apparentpower,powerfactor,Analysisofsingle-phaseaccircuits,Three-   phase
balanced circuits, voltage and current relations in star and delta connections.

UNIT- II:
ElectricalInstallations: ComponentsofLTSwitchgear:SwitchFuseUnit(SFU),MCB,ELCB,MCCB,

Types of Wires and Cables, Earthing. Types of Batteries, Important Characteristics for Batteries.
Elementary calculations for energy consumption, power factor improvement and battery backup.

UNIT-III:
Electrical Machines: Working principle of Single-phase transformer, equivalent circuit, losses in
transformers, efficiency, Three-phase transformer connections. Construction and working principle of
DCgenerators,EMFequation,workingprincipleofDCmotors,TorqueequationsandSpeedcontrolof
DCmotors,ConstructionandworkingprincipleofThree-phaseInductionmotor,Torquesequationsand
Speed control of Three-phase induction motor. Construction and working principle of synchronous
generators.

UNIT- IV:
P-NJunction andZener Diode: Principle of Operation Diode equation, Volt-Ampere characteristics,
Temperature dependence, Ideal versus practical, Static and dynamic resistances, Equivalent circuit,
Zener diode characteristics and applications.
Rectifiers and Filters: P-N junction as a rectifier - Half Wave Rectifier, Ripple Factor - Full Wave
Rectifier, Bridge Rectifier, Harmonic components in Rectifier Circuits, Filters - Inductor Filters,
Capacitor Filters, L- section Filters, п- section Filters.
UNIT- V:
BipolarJunctionTransistor(BJT): Construction,PrincipleofOperation,AmplifyingAction,Common

Emitter, Common Base and Common Collector configurations, Comparison of CE, CB and CC
configurations.

FieldEffectTransistor (FET): Construction,PrincipleofOperation,ComparisonofBJTandFET, Biasing FET.

TEXTBOOKS:
1. BasicElectricalandelectronicsEngineering-MSSukijaTKNagasarkarOxfordUniversity
2. BasicElectricalandelectronicsEngineering-DPKothari.IJNagarath,McGrawHillEducation

REFERENCEBOOKS:
1. ElectronicDevicesandCircuits-R.L.BoylestadandLouisNashelsky,PEI/PHI,9_{th}Ed,2006.
2. Millman'sElectronicDevicesandCircuits-J.MillmanandC.C.Halkias,SatyabrataJit,TMH, 2/e, 1998.
3. Engineering circuit analysis- by William Hayt and Jack E. Kemmerly, McGraw Hill Company, 6_{th}edition.
4. Linear circuit analysis (time domain phasor and Laplace transform approaches) - 2_{nd}edition by Raymond A. De Carlo and Pen-Min-Lin, Oxford University Press-2004.
5. NetworkTheorybyN.C.Jagan&C.Lakshminarayana,B.S.Publications.
6. NetworkTheorybySudhakar,ShyamMohanPalli,TMH.
7. L.S.Bobrow,"FundamentalsofElectricalEngineering",OxfordUniversityPress,2011.
8. E.Hughes,"ElectricalandElectronicsTechnology",Pearson,   2010.
9. V.D.Toro,"ElectricalEngineeringFundamentals",PrenticeHallIndia,1989.

M241ACE402:CONCRETETECHNOLOGY

B.Tech.IIYearIISem.   **LTPC**

                                                                                                         300   3

Pre-Requisites:BuildingMaterials

CourseObjectives: Theobjectivesofthecourseareto
- **Know**differenttypesofcementaspertheirpropertiesfordifferentfieldapplications.
- **UnderstandDesign**economicconcretemixproportionfordifferentexposureconditionsand intended purposes.
- **Know**fieldandlaboratory**tests**onconcreteinplasticandhardenedstage.

CourseOutcomes: Afterthecompletionofthecoursestudentshouldbeableto
- **Determine** the properties of concrete ingredients i.e., cement, sand, coarse aggregate by conducting different tests. Recognize the effects of the rheology and early age properties of concrete on its long-term behavior.
- **Apply** the use of various chemical admixtures and mineral additives to design cement-based materials with tailor-made properties
- **Use**advancedlaboratorytechniquestocharacterizecement-basedmaterials.
- **Perform**mixdesignandengineeringpropertiesofspecialconcretessuchashigh-performance concrete, self-compacting concrete, and fiber reinforced concrete.

UNITI
Aggregate: Deleterioussubstanceinaggregate-Soundnessofaggregate-Alkaliaggregatereaction   - Thermalproperties-Sieveanalysis-Finenessmodulus-Gradingcurves-Gradingoffine,
Manufactured sand and coarse Aggregates - Gap graded aggregate - Maximum aggregate size-Properties Recycled aggregate.

UNIT- II
Fresh Concrete: Workability - Factors affecting workability- Measurement of workabilityby different tests-Settingtimesofconcrete-Effectoftimeandtemperatureonworkability-Segregation&bleeding   - Mixing, vibration and revibration of concrete - Steps in manufacture of concrete - Quality of mixing water.

UNIT–III
Hardened Concrete: Water / Cement ratio - Abram's Law - Gel/space ratio - Gain of strength of concrete-Maturity   concept-Strengthintension   andcompression-Factorsaffectingstrength-Relationbetweencompressionandtensilestrength-Curing.
Testing of Hardened Concrete: Compression tests- Tension tests - Factors affecting strength - Flexuretests-Splittingtests-Pull-outtest,Non-destructivetestingmethods-codalprovisionsfor   NDT.

UNIT-IV
Elasticity,Creep&Shrinkage-Modulusofelasticity-Dynamicmodulusofelasticity-Poisson's   ratio-Creepofconcrete-Factorsinfluencingcreep-Relationbetweencreep&time-Natureofcreep   -Effectsofcreep-Shrinkage-typesofshrinkage.

UNIT–V
Admixtures: Typesofadmixtures-mineralandchemicaladmixtures.
Mix Design: Factors in the choice of mix proportions - Durability of concrete - Quality Control of concrete - Statistical methods - Acceptance criteria - Proportioning of concrete mixes by various methods-BISmethodofmixdesign.

SpecialConcretes: IntroductiontoLightweightconcrete-Cellularconcrete-No-finesconcrete-   Highdensityconcrete-Fibrereinforcedconcrete-Polymerconcrete-Highperformanceconcrete-Selfcompactingconcrete,NanosilicaandNanoAluminaconcrete.

TEXTBOOKS:
1. ConcreteTechnologybyM.S.Shetty.-S.Chand&Co.;2004
2. ConcreteTechnologybyA.R.Santhakumar,2ndEdition,OxforduniversityPress,NewDelhi
3. ConcreteTechnologybyM.L.Gambhir.-TataMc.GrawHillPublishers,5THEdition,NewDelhi

REFERENCEBOOKS:
1. PropertiesofConcretebyA.M.Neville-LowpricedEdition-4thedition
2. Concrete:Microstructure,PropertiesandMaterials-P.K.MehtaandJ.M.Monteiro,Mc- Graw Hill Publishers

ISCodes:
IS383:2016
IS516:2018(Part-1-4)
IS10262-2019

M241ACE403:STRENGTHOFMATERIALS–II

B.Tech.IIYearIISem.   **L T P C**
                                                                             3 0 0 3

Pre-Requisites:StrengthofMaterials-I

CourseObjectives: TheobjectiveofthisCourseis
- Tounderstandthenatureofstressesdevelopedinsimplegeometriesshafts,springs,columns &cylindrical and spherical shells for various types of simple loads.
- To calculate the stability and elastic deformation occurring in various simple geometries for different types of loading.
- Tounderstandtheunsymmetricalbendingandshearcenterimportanceforequilibrium   conditions in a structural member of having different axis of symmetry.

CourseOutcome: Oncompletionofthecourse,thestudentwillbeableto:
- Describe the concepts and principles, understand the theory of elasticity, and perform calculations, relative to the strength of structures and mechanical components in particular to torsion and direct compression.
- To evaluate the strains and deformation that will result due to the elastic stresses developed within the materials for simple types of loading.
- Analyze strength and stability of structural members subjected to Direct, and Direct and Bending stresses.
- Understandandevaluatetheshearcenterandunsymmetricalbending.

UNIT–I
TorsionofCircularShafts: Theoryofpuretorsion-DerivationofTorsionequation-Assumptions   made in the theory of pure torsion - Polar section modulus - Power transmitted by shafts - Combined bendingandtorsion-Designofshaftsaccordingtotheoriesoffailure. **Springs:**Introduction-Typesofsprings-deflectionofcloseandopencoiledhelicalspringsunderaxialpullandaxialcouple-springsinseriesandparallel.

UNIT–II
ColumnsandStruts: Introduction-Typesofcolumns-Short,mediumandlongcolumns-Axially   loaded compression members - Crushing load - Euler's theorem for long columns- assumptions-derivation of Euler's critical load formulae for various end conditions - Equivalent length of a column - slendernessratio-Euler'scriticalstress-LimitationsofEuler'stheory-Longcolumnssubjectedto eccentric loading - Secant formula-Empirical formulae – Rankine- Gordonformula- Straight line formula-Prof.Perry'sformula. **BEAMCOLUMNS:**Laterallyloadedstruts-subjectedtouniformlydistributedandconcentratedloads.

UNIT- III
DirectandBendingStresses: Stressesunderthecombinedactionofdirectloadingandbending moment,coreofasection-determinationofstressesinthecaseofretainingwalls,chimneysand   dams-conditionsforstability-Overturningandsliding-stressesduetodirectloadingandbending   moment about both axis.

UNIT–IV
Thin Cylinders: Thin seamless cylindrical shells -Derivation of formula for longitudinal and circumferentialstresses-hoop,longitudinalandVolumetricstrains-changesindiameter,andvolume   of   thin cylinders - Thin spherical shells. **ThickCylinders:**Introduction-Lame'stheoryforthickcylinders-DerivationofLame'sformulae-distributionofhoopandradialstressesacrossthickness-designof   thickcylinders-compound cylinders-Necessarydifferenceofradiiforshrinkage.

UNIT–V
UnsymmetricalBending:

Introduction - Centroidal principal axes of section -Moments of inertia referred to any set of rectangular axes - Stresses in beams subjected to unsymmetrical bending - Principal axes - Resolution of bending momentintotworectangularaxesthroughthecentroid-Locationofneutralaxis.

Shear Centre: Introduction - Shear center for symmetrical and unsymmetrical (channel, I, T and L) sections.

TEXTBOOKS:

1. StrengthofMaterialsbyR.KRajput,S.Chand&CompanyLtd.
2. MechanicsofMaterialsbyDr.B.CPunmia,Dr.AshokKumarJainandDr.ArunKumar   Jain
3. StrengthofMaterialsbyR.Subramanian,OxfordUniversityPress.

REFERENCEBOOKS:

1. MechanicsofMaterialsbyR.C.Hibbeler,PearsonEducation
2. EngineeringMechanicsofSolidsbyPopovE.P.Prentice-HallLtd
3. StrengthofMaterialsbyT.D.GunneswaraRaoandM.Andal,CambridgePublishers
4. StrengthofMaterialsbyR.K.Bansal,LakshmiPublicationsHousePvt.Ltd.
5. FundamentalsofSolidMechanicsbyM.L.Gambhir,PHILearningPvt.Ltd

M241ACE404: HYDRAULICS AND HYDRAULICS MACHINERY

B.Tech.IIYearIISem.   **L T P C**
                                                                                        3 0 0 3

CourseObjectives: Theobjectiveofthecourseis
- ToDefinethefundamentalprinciplesofwaterconveyanceinopenchannels.
- ToDiscussandanalyzetheopenchannelsinuniformandNon-uniformflowconditions.
- ToStudythecharacteristicsofhydroelectricpowerplantanditscomponents.
- Toanalyzeanddesignofhydraulicmachineryanditsmodeling.

CourseOutcomes: Attheendofthecoursethestudentwillable   to
- Applytheirknowledgeoffluidmechanicsinaddressingproblemsinopenchannelsand hydraulic machinery.
- Understandandsolveproblemsinuniform,graduallyandrapidlyvariedflowsinopenchannel in steady state conditions.
- Applydimensional analysis andtodifferentiate themodel, prototypeandsimilitudeconditions for practical problems.
- Gettheknowledgeondifferenthydraulicmachinerydevicesanditsprinciplesthatwillbe utilized in hydropower development and for other practical usages.

UNIT-I OpenChannelFlow–I: IntroductiontoOpenchannelflow-
Comparisonbetweenopenchannelflow
andpipeflow,Classificationofopenchannelflows,Velocitydistribution.Uniformflow- Characteristics of uniform flow, Chezy's, Manning's and Bazin formulae for uniform flow - Factors affecting Manning's RoughnessCoefficient.Mosteconomicalsections.ComputationofUniformflow,Normaldepth.
Critical Flow: Specific energy - critical depth - computation of critical depth - critical, sub critical andsupercriticalflows-Channeltransitions.

UNIT- II OpenChannelFlow–II: Non-uniformflow-GraduallyVariedFlow-
DynamicequationforG.V.F;
Classification of channel bottom slopes –Classification and characteristics of Surface profiles - Computation of water surface profiles by Numerical and Analytical approaches. Direct step method.
Rapidly varied flow: Elements and characteristics (Length and Height) of Hydraulic jump in rectangular channel- Types, applications and location of hydraulic jump, Energy dissipation and other uses - PositiveandNegativeSurges(Theoryonly).

UNIT- III
Dimensional Analysis and Hydraulic Similitude: Dimensional homogeneity - Rayleigh's method and Buckingham's π methods -Dimensionless groups. Similitude, Model studies, Types of models. Applicationofdimensionalanalysisandmodelstudiestofluidflowproblems.Distortedmodels.
Basics of Turbo Machinery: Hydrodynamic force of jets on stationary and moving flat, inclined and curvedvanes,Jetstrikingcentrallyandattip,Velocitytrianglesatinletandoutlet,expressionsforwork   done and efficiency - Angular.

UNIT-IV
Hydraulic Turbines – I: Elements of a typical Hydropower installation - Heads and efficiencies - Classificationofturbines-Peltonwheel-Francisturbine-Kaplanturbine-working,working
proportions, velocity diagram, work done and efficiency, hydraulic design. Draft tube - Classification, functionsandefficiency. **HydraulicTurbines–II:**Governingofturbines-Surgetanks-Unitandspecificturbines-
Unitspeed - Unit quantity - Unit power - Specific speed - Performance characteristics - Geometric   similarity - Cavitation.Selection of turbines.

UNIT-V

CentrifugalPumps: Pumpinstallation details -classification -work done-Manometrichead -minimumstartingspeed-lossesandefficiencies-specificspeed.Multistagepumps   -pumpsin parallel - performance ofpumps - characteristic curves - NPSH - Cavitation. Reciprocatingpumps-Working,discharge,slipindicatordiagrams.

TEXTBOOKS:

1. FluidMechanicsbyModiandSeth,StandardBookHouse.
2. Fluid Mechanics and Hydraulic machines by Manish Kumar Goyal, PHI learning Private Limited, 2015
3. OpenchannelflowbyV.T.Chow(McGrawHillBookCompany).

REFERENCEBOOKS:

1. FluidMechanicsbyR.C.Hibbeler,PearsonIndiaEducationServicesPvt.   Ltd
2. Fluid Mechanic & Fluid Power Engineering by D. S. Kumar (Kataria & Sons Publications Pvt. Ltd.).
3. Introduction to Fluid Mechanics and Fluid Machines by SK Som, Gautam Biswas, Suman Chakraborthy, Mc Graw Hill Education (India) Private Limited
4. HydraulicMachinesbyBanga&Sharma(KhannaPublishers).

M241ACE405:STRUCTURALANALYSIS–I

B.Tech.IIYearIISem.   **L T P C**
                                                                                                                          3 0 0 3

Pre-Requisites:StrengthofMaterials-I

CourseObjectives: Theobjectiveofthecourseisto
- Differentiatethestaticallydeterminateandindeterminatestructures.
- Tounderstandthenatureofstressesdevelopedinperfectframesandthreehingedarchesfor various types of simple loads
- Analyse the statically indeterminate members such as fixed bars, continuous beams and for various types of loading.
- Understandtheenergymethodsusedtoderivetheequationstosolveengineeringproblems
- EvaluatetheInfluenceonabeamfordifferentstatic&movingloadingpositions

CourseOutcomes: Attheendofthecoursethestudentwillable   to
- Anabilitytoapplyknowledgeofmathematics,science,andengineering
- Analysethestaticallyindeterminatebarsandcontinuousbeams
- Drawstrengthbehaviourofmembersforstaticanddynamicloading.
- Calculatethestiffnessparametersinbeamsandpinjointedtrusses.
- Understandtheindeterminacyaspectstoconsiderforatotalstructuralsystem.
- Identify,formulate,andsolveengineeringproblemswithrealtimeloading

UNIT–I
Analysis of Perfect Frames: Types of frames- Perfect, Imperfect and Redundant pin jointed plane frames - Analysis of determinate pin jointed plane frames using method of joints, method of sections and tension coefficient method for vertical loads, horizontal loads and inclined loads.

UNIT–II EnergyTheorems:Introduction-
Strainenergyinlinearelasticsystem,expressionofstrainenergydue
toaxialload,bendingmomentandshearforces-Castigliano'stheorem-UnitLoadMethod-Deflections   of simple beams and pin- jointed plane frames - Deflections of statically determinate bent frames.
Three Hinged Arches – Introduction – Types of Arches - Comparison between Three hinged and Two hinged Arches - Linear Arch - Eddy's theorem - Analysis of Three hinged arches - Normal Thrust and radialshearandbendingmoment-Geometricalpropertiesofparabolicandcirculararches-Three hingedparaboliccirculararcheshavingsupportsatdifferentlevels.

UNIT- III
Propped Cantilever and Fixed Beams: Determination of static and kinematic indeterminacies for beams- Analysis of Propped cantilever and fixed beams, including the beams with different moments of inertia - subjected to uniformly distributed load - point loads -uniformly varying load, couple and combinationofloads-Shearforce,BendingmomentdiagramsandelasticcurveforProppedCantilever andFixedBeams-DeflectionofProppedcantileverandfixedbeams-effectofsinkingofsupport,effect   of rotation of a support.

UNIT–IV
Continuous Beams: Introduction-Continuous beams - Clapeyron's theorem of three moments- Analysis of continuous beams with constant and variable moments of inertia with one or both ends fixed-continuous beams with overhang - eeffect of sinking of supports.
Slope Deflection Method: Derivation of slope-deflection equation, application to continuous beams withandwithoutsinkingof supports-Determinationofstaticandkinematicindeterminaciesfor frames
- AnalysisofSingleBay,SinglestoreyPortalFramesbySlopeDeflectionMethodincludingSide   Sway
- ShearforceandbendingmomentdiagramsandElasticcurve.

UNIT–V

Moving Loads and Influence Lines: Introduction maximum SF and BM at a given section and absolute maximumshearforceandbendingmomentduetosingleconcentratedload,uniformlydistributedload   longer than the span, uniformly distributed loadshorter than the span, two point loads with fixed distance between them and several point loads-Equivalent uniformly distributed load-Focal length - Definitionofinfluencelineforshearforceandbendingmoment-loadpositionformaximumshearforce   and maximum bending Moment at a section - Point loads, uniformly distributed loadlonger than the span, uniformly distributed load shorter than the span.

TEXTBOOKS:

1. StructuralAnalysisVol-I&IIbyV.N.VaziraniandM.M.Ratwani,KhannaPublishers.
2. StructuralAnalysisVolI&IIbyG.S.Pandit andS.P. Gupta, TataMcGrawHillEducation Pvt. Ltd.
3. StructuralanalysisT.SThandavamoorthy,OxforduniversityPress

REFERENCEBOOKS:

1. StructuralAnalysisbyR.C.Hibbeler,PearsonEducation
2. BasicStructuralAnalysisbyK.U.Muthu*etal.,*I.K.InternationalPublishingHousePvt.Ltd
3. MechanicsofStructuresVol-IandIIbyH.J.ShahandS.B.Junnarkar,CharotarPublishing House Pvt. Ltd.
4. BasicStructuralAnalysisbyC.S.Reddy,TataMcGrawHillEducationPvt.   Ltd.
5. FundamentalsofStructuralAnalysisbyM.L.Gamhir,PHILearningPvt.   Ltd.

M241ACE406: FLUID MECHANICS AND HYDRAULICS MACHINERY LABORATORY

B.Tech.IIYearIISem.   **L T P C**
                                                                                                  0 0 2 1

CourseObjectives
- To**identify**thebehaviorofanalyticalmodelsintroducedinlecturetotheactualbehaviorofreal fluid flows.
- To**explain**thestandardmeasurementtechniquesoffluidmechanicsandtheirapplications.
- To**illustrate**thestudentswiththecomponentsandworkingprinciplesoftheHydraulic machines-differenttypes ofTurbines,Pumps, andother miscellaneous hydraulics machines.
- To**analyze**thelaboratorymeasurementsandtodocumenttheresultsinanappropriateformat.

CourseOutcomes: Studentswhosuccessfullycompletethiscoursewillhavedemonstratedabilityto:
- **Describe**thebasicmeasurementtechniquesoffluidmechanicsanditsappropriateapplication.
- **Interpret**theresultsobtainedinthelaboratoryforvariousexperiments.
- **Discover**thepracticalworkingofHydraulicmachines-differenttypesofTurbines,Pumps,and other miscellaneous hydraulics machines.
- **Compare**theresultsofanalyticalmodelsintroducedinlecturetotheactualbehaviorofreal fluid flows and draw correct and sustainable conclusions.
- Writeatechnicallaboratoryreport

ListofExperiments
1. VerificationofBernoulli'sequation
2. DeterminationofCoefficientofdischargeforasmallorificebyaconstantheadmethod
3. CalibrationofVenturimeter/OrificeMeter
4. CalibrationofTriangular/Rectangular/TrapezoidalNotch
5. DeterminationofMinorlossesinpipeflow
6. DeterminationofFrictionfactorofapipeline
7. DeterminationofEnergylossinHydraulicjump
8. DeterminationofManning'sandChezy'sconstantsforOpenchannelflow.
9. Impact ofjetonvanes
10. PerformanceCharacteristicsofPeltonwheelturbine
11. PerformanceCharacteristicsofFrancisturbine
12. PerformancecharacteristicsofKeplanTurbine
13. PerformanceCharacteristicsofasinglestage/multistageCentrifugal   Pump

M241ACE407:BASICELECTRICALANDELECTRONICSENGINEERINGLABORATORY

B.Tech.IIYearIISem.   **L T P C**
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Pre-requisites: BasicElectricalandElectronicsEngineering

CourseObjectives:
- Tointroducetheconceptsofelectricalcircuitsanditscomponents
- Tounderstandmagneticcircuits,DCcircuitsandACsinglephase&threephasecircuits
- TostudyandunderstandthedifferenttypesofDC/ACmachinesandTransformers.
- Toimporttheknowledgeofvariouselectricalinstallations.
- Tointroducetheconceptofpower,powerfactoranditsimprovement.
- Tointroducetheconceptsofdiodes&transistors,and
- Toimparttheknowledgeofvariousconfigurations,characteristicsandapplications.

CourseOutcomes:
- Toanalyzeandsolveelectricalcircuitsusingnetworklawsandtheorems.
- TounderstandandanalyzebasicElectricandMagneticcircuits
- TostudytheworkingprinciplesofElectricalMachines
- TointroducecomponentsofLowVoltageElectricalInstallations
- Toidentifyandcharacterizediodesandvarioustypesoftransistors.

Listofexperiments/demonstrations:

PARTA:ELECTRICAL
1. VerificationofKVLandKCL
2. (i)MeasurementofVoltage,CurrentandRealPowerinprimaryandSecondaryCircuitsofa Single-Phase Transformer
   (ii)VerificationofRelationshipbetweenVoltagesandCurrents(Star- Delta,Delta-Delta,Delta- star, Star-Star) in a Three Phase Transformer
3. MeasurementofActiveandReactivePowerinabalancedThree-phasecircuit
4. PerformanceCharacteristicsofaSeparatelyExcitedDCShuntMotor
5. PerformanceCharacteristicsofaThree-phaseInductionMotor
6. No-LoadCharacteristicsofaThree-phaseAlternator

PARTB:ELECTRONICS
1. Studyandoperationof
   (i)Multi-meters(ii)FunctionGenerator(iii)RegulatedPowerSupplies(iv)CRO.
2. PNJunctiondiodecharacteristics
3. ZenerdiodecharacteristicsandZenerasvoltageRegulator
4. Input&OutputcharacteristicsofTransistorinCB/CEconfiguration
5. FullWaveRectifierwith&withoutfilters
6. InputandOutputcharacteristicsofFETinCSconfiguration

TEXTBOOKS:
1. BasicElectricalandelectronicsEngineering-MSSukijaTKNagasarkarOxfordUniversity
2. BasicElectricalandelectronicsEngineering-DPKothari.IJNagarath,McGrawHillEducation

REFERENCEBOOKS:
1. ElectronicDevicesandCircuits-R.L.BoylesteadandLouisNashelsky,PEI/PHI,9thEd,2006.
2. Millman'sElectronicDevicesandCircuits-J.MillmanandC.C.Halkias,SatyabrataJit,TMH, 2/e, 1998.
3. Engineering circuit analysis- by William Hayt and Jack E. Kemmerly, McGraw Hill Company, 6thedition.

4. Linear circuit analysis (time domain phasor and Laplace transform approaches) - 2nd edition by
    Raymond A. De Carlo and Pen-Min-Lin, Oxford University Press-2004.
5. NetworkTheorybyN.C.Jagan&C.Lakshminarayana,B.S.Publications.
6. NetworkTheorybySudhakar,ShyamMohanPalli,TMH.
7. L.S.Bobrow,"FundamentalsofElectricalEngineering",OxfordUniversityPress,2011.
8. E.Hughes,"ElectricalandElectronicsTechnology",Pearson,2010.
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M241ACE408:CONCRETETECHNOLOGYLABORATORY

B.Tech.IIYearIISem.   **L T P C**
                                                                          0 0 2 1

CourseObjectives:
1. Toknowthevariousprocedurestodeterminethecharacteristicsofcement
2. Tounderstandthetestprocedurestoevaluatethecharacteristicsofaggregates
3. Toknowthetestprocedurestofindthepropertiesoffreshconcrete
4. Tounderstandthetestprocedurestofindmechanicalpropertiesofhardenedconcrete

CourseOutcomes:Aftercompletionofthecourse,thestudentshouldbeable   to
1. Performvarioustestsrequiredtoassessthecharacteristicsofcement
2. Testandevaluatethepropertiesoffineandcoarseaggregatesanddetermineitssuitability for construction
3. Evaluatethefreshandhardenedpropertiesofconcrete
4. Designtheconcretemixforrequiredstrengthandtestitsperformancecharacteristics

LISTOFEXERCISES:
1. TestsonCement:
a) Soundness.
f)Compressivestrength.

2. TestsonAggregates:
a) Specificgravityoffineaggregate.
b) Specificgravityofcoarseaggregate.
c) Bulkingoffineaggregate.
d) Gradingoffineaggregate

3. ISmethodofmixdesignofnormalconcreteasperIS:10262

4. TestsonFreshConcrete:
a) Slumpconetest.
 b) Compactingfactortest.
c) Vee-Beeconsistometertest.

5. TestsonHardenedConcrete:
 a) Compressive&Tensilestrengthtests.
 b) Modulusofelasticityofconcrete.
c) Non-destructivetestingofconcrete.

M241ACE410:JAVA PROGRAMMING

B.Tech.IIYearIISem.   **L T P C**
                                                                                          0 0 2 0.

Course Objectives:
- To write programs using abstract classes.
- To write programs for solving real world problems using java collection frame work.
- To write multithreaded programs.
- To write GUI programs using swing controls in Java.
- To introduce java compiler and eclipse platform.
- To impart hands on experience with java programming.

Course Outcomes:
- Able to write programs for solving real world problems using java collection frame work.
- Able to write programs using abstract classes.
- Able to write multithreaded programs.
- Able to write GUI programs using swing controls in Java.

- perform CRUD operations on the student table in a database using JDBC**.**

Note:
1. Use LINUX and MySQL for the Laboratory Experiments. Though not mandatory, encourage the use of Eclipse platform.
 2. The list suggests the minimum program set. Hence, the concerned staff is requested to add more problems to the list as needed.

List of experiments:
1. Use eclipse or Netbean platform and acquaint with the various menus, create a test project, add a test class and run it see how you can use auto suggestions, auto fill. Try code formatter and code refactoring like renaming variables, methods and classes. Try debug step by step with a small program of about 10 to 15 lines which contains at least one if else condition and a for loop.
2. Write a Java program to demonstrate the OOP principles. [i.e., Encapsulation, Inheritance, Polymorphism and Abstraction].
3. Write a Java program to handle checked and unchecked exceptions. Also, demonstrate the usage of custom exceptions in real time scenario.
4. Write a Java program on Random Access File class to perform different read and write operations.
5. Write a Java program to demonstrate the working of different collection classes. [Use package structure to store multiple classes].
6. Write a program to synchronize the threads acting on the same object. [Consider the example of any reservations like railway, bus, movie ticket booking, etc.]
7. Write a program to perform CRUD operations on the student table in a database using JDBC.
8. Write a Java program that works as a simple calculator. Use a grid layout to arrange buttons for the digits and for the +, -,*, % operations. Add a text field to display the result. Handle any possible exceptions like divided by zero.
9. Write a Java program that handles all mouse events and shows the event name at the center of the window when a mouse event is fired. [Use Adapter classes]
10. . Write a Java program to list all the files in a directory including the files present in all its subdirectories.

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 3. Java Programming, D. S. Malik and P. S. Nair, Cengage Learning.
 4. Core Java, Volume 1, 9th edition, Cay S. Horstmann and G Cornell, Pearson