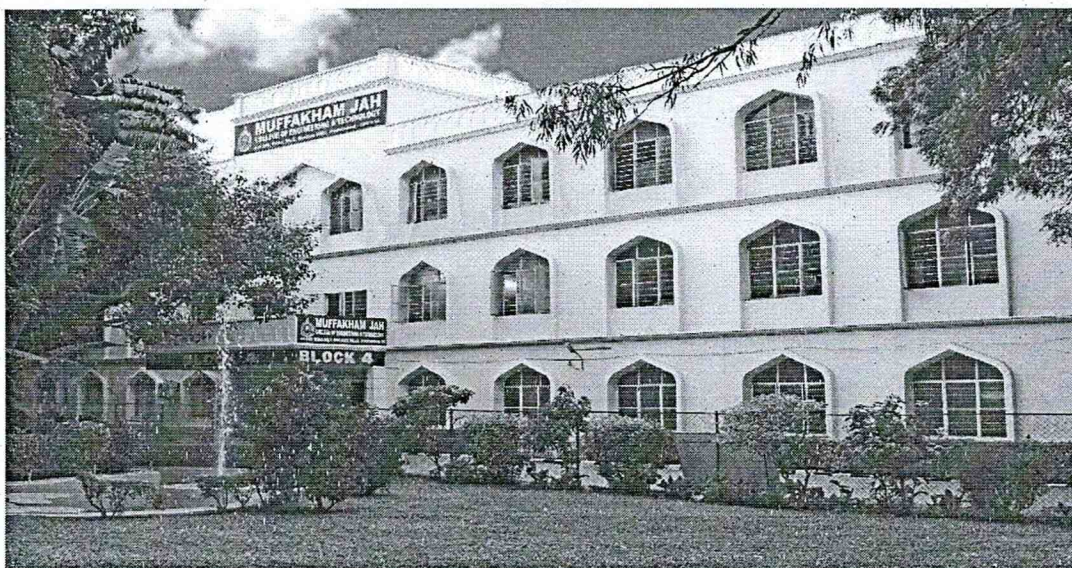


Scheme of Instruction & Syllabi

(In line with AICTE Model Curriculum with effect from AY 2025-26)

BACHELOR OF ENGINEERING I & II SEMESTERS of FOUR YEAR DEGREE PROGRAMME IN Civil Engineering Department (CIVIL) (R-25 Regulation)



MUFFAKHAM JAH COLLEGE OF ENGINEERING & TECHNOLOGY

An Autonomous Institution

Affiliated to Osmania University, Approved by AICTE

Accredited by NBA & NAAC (A+)

Mount Pleasant, 8-2-249 to 267, Road No.3, Banjara Hills,

Hyderabad- 500 034, Telangana, India

Website: www.mjcollege.ac.in, E-Mail: principal@mjcollege.ac.in,

Phone Nos.: 040-22280301 / 305

Scheme of Instruction & Syllabi

(In line with AICTE Model Curriculum with effect from AY 2025-26)

BACHELOR OF ENGINEERING I & II SEMESTERS OF FOUR YEAR DEGREE PROGRAMME

IN

Civil Engineering Department (CIVIL)

(R-25 Regulation)



MUFFAKHAM JAH COLLEGE OF ENGINEERING & TECHNOLOGY

An Autonomous Institution

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Phone Nos.: 040-22280301 / 305





MUFFAKHAM JAH COLLEGE OF ENGINEERING & TECHNOLOGY (A)

Institute Vision

To empower the faculty and students in the area of Research & Development by providing seed funds for implementing their innovative research and product development ideas.

Institute Mission

- To attain excellence in imparting technical education from the undergraduate to through doctoral levels by adopting coherent and judiciously coordinated curricular and co-curricular programs.
- To foster a partnership with industry and Governmental agencies through collaborative research and consultancy.
- To nurture and strengthen auxiliary soft skills for overall development and improved employability in a multicultural workspace.
- To develop scientific temper and spirit of enquiry in order to harness the innovative talents.
- To develop a constructive attitude in the students towards the task of nation-building and empower them to become future leaders.
- To nourish the entrepreneurial instincts of the students and hone their business acumen.
- To involve the student and faculty in solving local community problems through economical and sustainable solutions.

Department Vision

To produce technically competent and socially responsible civil engineers to propel infrastructural development.

Department Mission

To impart quality education and inculcate professional skills to function as proficient planners, designers and constructors capable of ensuring sustainability and safety.



Program Education Objectives (PEO's)

1. Graduates will demonstrate technical competence and leadership by analyzing, designing and executing Civil Engineering Structures using current techniques and tools.
2. Graduates will communicate effectively as individuals or team members and be successful in the local and global cross cultural working environment.
3. Graduates will demonstrate lifelong learning through continuing education and professional development.
4. Graduates will be successful in providing viable and sustainable solutions within societal, professional, environmental and ethical contexts.

Program Outcomes (PO's)

Engineering Graduates will be able to:

1. **PO1: Engineering Knowledge**
Apply concepts of engineering fundamentals, mathematics and basic sciences to solve Civil Engineering problems.
2. **PO2: Problem Analysis**
Identify, formulate and analyze complex problems in the area of Civil Engineering materials and structures.
3. **PO3: Design/Development Of Solutions**
Design concrete structures, steel structures, irrigation structures, water supply and waste water treatment systems, various types of sub- structures, pavements and efficient transport systems.
4. **PO4: Conduct Investigation Of Complex Problems**
Design and conduct experiments, analyze and interpret the data to draw the valid conclusions.
5. **PO5: Modern Tool Usage**
Use modern engineering software for drafting, analysis and design of Civil Engineering structures and use available tools for report presentation, data representation and presentations.
6. **PO6: The Engineer And Society**
Evaluate the impact of Civil Engineering solutions in safety, health and legal context.
7. **PO7: Environment And Sustainability**
Recognize the need for sustainable development in the societal and environmental context.

8. PO8: Ethics

Demonstrate social responsibility and professional ethics in dealing with multi disciplinary projects.

9. PO9: Individual And Team Work

Function effectively as an individual and as a member of multi disciplinary teams.

10. PO10: Communication

Produce engineering report using written, oral and graphical method of communication and communicate effectively with superiors, colleagues and construction workers.

11. PO11: Project Management And Finance

Apply best management and accounting practices for construction and maintenance of Civil Engineering projects.

12. PO12: Life-Long Learning

Engage in research and lifelong learning to adopt the changes and update themselves in the procedure of analysis, design and soft skills.

Program Specific Outcomes (PSO's)

Civil Engineering Graduates will be able to:

1. Function in construction industry for planning and execution of civil engineering Projects like multistoried buildings, Bridges and water retaining structures.
2. Function as design consultants for the Design of Infrastructural Projects.

MUFFAKHAM JAH COLLEGE OF ENGINEERING & TECHNOLOGY (A)

In line with AICTE Model Curriculum with effect from AY 2025-26

B.E. Civil Engineering Department (Civil)

SEMESTER-1			Scheme of Instruction				Scheme of Examination			Credits
S. No	Course Code	Name of the Course	Lecture	Tutorial	Practical	Contact Hrs/Wk	CIE	SEE	Duration in Hrs	
1	*25 MC101PO	Indian Constitution	2	-	-	2	40	-	-	0
2	25BS101MT	Matrices & Differential Calculus	3	1	-	4	40	60	3	4
3	25BS102PH	Engineering Physics	3	1	-	4	40	60	3	4
4	25ES101CS	Programming for Problem Solving	3	-	-	3	40	60	3	3
5	25ES102EE	Basic Electrical Engineering	3	1	-	4	40	60	3	4
6	25BS151PH	Engineering Physics Lab	-	-	2	2	25	50	3	1
7	25ES151CS	Programming for Problem Solving Lab	-	-	2	2	25	50	3	1
8	25ES152CE	Engineering Graphics	-	-	2x2	4	25	50	3	2
9	25ES153EE	Basic Electrical Engineering Lab	-	-	2	2	25	50	3	1
Total			14	3	10	27	300	440	24	20

SEMESTER-2			Scheme of Instruction				Scheme of Examination			Credits
S. No	Course Code	Name of the Course	Lecture	Tutorial	Practical /Drawin	Contact Hrs/Wk	CIE	SEE	Duration in Hrs	
1	*25MC102CE	Environmental Sciences	2	-	-	2	40	-	-	0
2	*25MC103PY	Essence of Indian Traditional Knowledge	2	-	-	2	40	-	-	0
3	25HS101EG	English	2	-	-	2	40	60	3	2
4	25BS103MT	Differential Equations & Numerical Methods	3	1	-	4	40	60	3	4
5	25BS104CH	Engineering Chemistry	3	1	-	4	40	60	3	4
6	25ES105CE	Engineering Mechanics	3	1	-	4	40	60	3	4
7	25HS151EG	English Lab	-	-	2	2	25	50	3	1
8	25BS152CH	Engineering Chemistry Lab	-	-	2	2	25	50	3	1
9	25ES154ME	Engineering Workshop Practice	-	-	2x2	4	25	50	3	2
10	25PC154CE	Basics of Building Drawing Lab	-	-	2	2	-	-	-	1
Total			15	3	10	28	315	390	21	19

MC: Mandatory Course BS: Basic Science ES: Engineering Science

CIE: Continuous Internal Evaluation SEE: Semester End Evaluation

*GRADE: Satisfactory/Unsatisfactory (Non-credit Mandatory Course)

MUFFAKHAM JAH COLLEGE OF ENGINEERING & TECHNOLOGY**(An Autonomous Institution)**

Course Code	Course Title					Core/Elective
*25MC101PO	Indian Constitution (Common to all branches)					Core
Pre-requisites	Contact hours per week			CIE	SEE	Credits
	L	T	P			
-	2	-	-	40	0	0

Course objectives: To learn

1. To create awareness among students about the Indian Constitution.
2. To acquaint the working conditions of union, state, local levels, their powers and functions
3. To create consciousness in the students on democratic values and principles articulated in the constitution.
4. To expose the students on the relations between federal and provincial units.
5. To divulge the students about the statutory institutions.

Course Outcomes: After learning the contents of this course, the student must be able to

1. Know the background of the present constitution of India
2. Understand the working of the union, state and local levels
3. Gain consciousness on the fundamental rights and duties
4. Be able to understand the functioning and distribution of financial resources between the centre and states
5. Be exposed to the reality of hierarchical Indian social structure and the ways the grievances of the deprived sections can be addressed to raise human dignity in a democratic way

UNIT-I:

Evolution of the Indian Constitution: 1909 Act, 1919 Act and 1935 Act. Constituent Assembly: Composition and Functions; Fundamental features of the Indian Constitution

UNIT-II:

- **Union Government:** Executive-President, Prime Minister, Council of Minister
- **State Government:** Executive: Governor, Chief Minister, Council of Minister
- **Local Government:** Panchayat Raj Institutions, Urban Government

UNIT-III:

Rights and Duties: Fundamental Rights, Directive principles, Fundamental Duties.



 (Subject Expert)

UNIT-IV:

Relation between Federal and Provincial units: Union-State relations, Administrative, legislative and Financial, Inter State council, NITI Ayog, Finance Commission of India.

UNIT-V: Constitutional and Statutory Bodies

Statutory Institutions: Elections-Election Commission of India, National Human Rights Commission, National Commission for Women.

Suggested Readings

1. Durga Das Basu, *"Introduction to the Constitution of India"*, Lexis Nexis Butterworths Wadhwa Nagpur, 2008
2. Subhash Kashyap, *"Our Parliament"*, National Book Trust, India, 2004.
3. M. V. Pylee, *"An introduction to the Constitution of India"*, Vikas Publishing House, 2007

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Abdul Kadir

MUFFAKHAM JAH COLLEGE OF ENGINEERING & TECHNOLOGY
(An Autonomous Institution)

Course Code	Course Title				Core/Elective	
25BS101MT	MATRICES & DIFFERENTIAL CALCULUS (Common to CSE, CSE(AI), CSE(DS), CSE(AIML), ECE, CE, ME)				Core	
Pre-requisites	Contact hours per week			CIE	SEE	Credits
	L	T	P			
Basics in Matrices, differentiation and integration	3	1	0	40	60	4

Course objectives: To learn

1. Concept of a rank of the matrix and applying this concept to know the consistency and solving the system of linear equations.
2. Concept of eigen values and eigen vectors and to reduce the quadratic form to canonical form.
3. Geometrical approach to the mean value theorems and their applications to the mathematical problems.
4. Finding maxima and minima of functions of two and three variables.
5. Concept of double, and triple integrals.

Course Outcomes: After learning the contents of this course, the student must be able to

1. Find a rank of matrix and to analyze the solution of the system of linear equations.
2. Find the eigen values and eigen vectors, and to reduce the quadratic form to canonical form.
3. Apply Mean value theorems.
4. Find the extreme values of functions of two and three variables.
5. Evaluate double, and triple integrals.

UNIT-I: Matrices:

Rank of a matrix by Echelon form, Solving System of homogeneous and non-homogeneous linear equations, Linearly dependence and independence of vectors, Gauss elimination method, Gauss-Jordan method.

UNIT-II: Eigen values and Eigen vectors:

Linear transformation, Orthogonal transformation, Eigen values, Eigen vectors, Properties of Eigen values, Cayley-Hamilton theorem(without proof), Finding inverse of a matrix by Cayley-Hamilton theorem, Quadratic forms and Nature of quadratic forms, Reduction of quadratic form to canonical form.

K. Phaneendra
28/10/25
Dr. K. PHANEENDRA
Professor
Department of Mathematics
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Hyderabad-500 007.

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S. A. H.
A. S. S.
P. S. S.
K. S. S.

UNIT-III

Calculus of one Variable: Rolle's theorem, Lagrange's Mean-value theorem, Cauchy's mean value theorem, Taylor's series (All theorems without proof), Curvature, Radius of Curvature, Centre of Curvature, Circle of Curvature(Cartesian form only).

UNIT-IV

Multivariable Calculus (Differentiation): Functions of two variables, Limits and Continuity, First order Partial derivatives, Total derivative, Derivatives of composite and implicit functions (Chain rule), Change of variables, Jacobians, Maximum and minimum of values of functions of two variables, Lagrange's method of undetermined multipliers.

UNIT-V

Multivariable Calculus(Integration): Double integrals, Change of variables from Cartesian to plane polar coordinates, Triple integrals.

Suggested Reading:

1. R.K.Jain & S.R.K.Iyengar, Advanced Engineering Mathematics, Narosa Publications, 2014.
2. B.S.Grewal, Higher Engineering Mathematics, Khanna Publications, 43rd Edition, 2014.
3. N.P.Bali & Dr.Manish Goyal, A textbook of Engineering Mathematics(Volume I), 10th Edition, Laxmi Publications, 2022.
4. H.K.Dass and Er.Rajnish Verma, Higher Engineering Mathematics, S.Chand and Company Limited, New Delhi.

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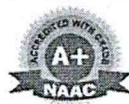


Muffakham Jah College of Engineering and Technology

(Sultan-ul-Uloom Education Society)

Approved by AICTE, Affiliated to Osmania University

(Osmania University Approved Research Centres in Civil, CSE, ECE & Mech)



(An Autonomous Institution)

DEPARTMENT OF PHYSICS

B.E (SEM-I&II) Syllabus for CSE, CSE (AIML), CSE(AI), CSE(DS), ECE, CIVIL & MECH
(w.e.f 2025-2026)

Engineering Physics (Course Code: 25BS102PH)

L	T	P	Credits	CIE		SEE	
4	0	0	04	Marks: 40	Exam Duration: 1 Hr	Marks: 60	Exam Duration: 3 Hrs

Course objective	Course outcome
To understand the fundamental principles of lasers and optical fibers in communication.	Students will be able to explain the working and demonstrate applications of laser and fiber-based communication systems.
To introduce quantum mechanics and quantum computing concepts.	Students will be able to apply quantum principles to analyze qubits, quantum gates, and entanglement.
To study the structure and properties of magnetic, superconducting, and semiconductor materials.	Students will be able to analyze the behavior of advanced materials in devices like superconductors, QLEDs, and solar cells
To comprehend electromagnetic theory and ultrasonic wave principles.	Students will be able to apply Maxwell's equations and evaluate ultrasonic testing methods for engineering problems
To explore synthesis and applications of nanomaterials and thin films.	Students will be able to evaluate the role of nanomaterials and thin films in modern technologies like foldable electronics

UNIT-1 Laser & Optical Fiber

Characteristics of Laser, Stimulated Emission, Population Inversion, Einstein's Coefficients, Construction and working of CO₂ Laser & Semiconductor Laser, Advantages of Laser-Based Optical Communication in Space, Engineering Applications of Laser.

Construction of Optical Fiber, Types of Optical Fibers (Refractive Index Profiles), Fiber Drawing Process (Double Crucible Method), Basic principle of Optical fiber Sensors & its types, Block diagram of Optical fiber communication system, Applications of optical fibers

UNIT-2 Quantum Physics & Quantum Computing

Physical Significance of Wave Function, Schrodinger Time-Independent Wave Equation, Energy of Particle in 1-D Potential Box, Kronig-Penney Model (Qualitative).

Introduction to Quantum Computing, Types of Qubits & Quantum Gates, Quantum Entanglement & its properties, Applications of Quantum Computing.

Sri Ram Gopal

W. S. S.

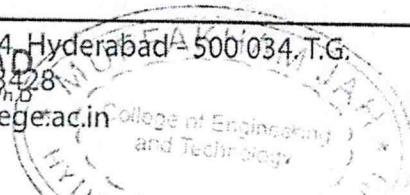
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University College of Science
Osmania University



UNIT-3 Advanced Materials

Types of Magnetic Materials, Weiss Molecular Field Theory, Hysteresis Curve, Soft and Hard Magnetic Materials, Applications of Magnetic Materials.

Superconductors, Meissner Effect, Type I and Type II Superconductors, BCS Theory (Qualitative), High- T_c Superconductors, Applications of Superconductors.

Direct and Indirect Bandgap Semiconductors, Hall Effect, Construction and Working of Quantum Light Emitting Diodes (QLEDs) & Solar Cell, Classification of Fabrication Techniques for Semiconductor Chips, Applications of Semiconductor Devices

UNIT-4 Electromagnetic Waves and Ultrasonic Waves

Displacement current, Maxwell's equations, Expression for Maxwell's Integral to Differential Equations, Poynting Theorem, Electromagnetic spectrum (brief) and Practical applications (microwave, terahertz, optical)

Properties of ultrasonic waves, Generation of ultrasonic waves (piezoelectric), Ultrasonic Pulse-Echo Testing Method, Types of computer methods for Ultrasonic Testing, Engineering applications of ultrasonic waves

UNIT-5 Nanomaterials and Thin Film Technology

Introduction to nano materials, Surface-to-Volume Ratio at Nano Scale, Bottom-Up Method (Sol-Gel), Top-Down Method (Ball Milling), Properties of nanomaterials in nanoelectronics & 2D Materials, Applications of Nano materials

Introduction to Thin Films, Thermal Evaporation Method, Electron Beam Evaporation Method, Properties of Foldable Electronic devices, Applications of thin films

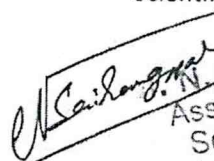
Characterization Techniques (working) - Scanning Electron Microscope, Raman spectrometer

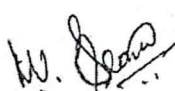
PRESCRIBED BOOKS

1. Modern Engineering Physics – I & II : S. Chandralingam, K. Vijayakumar, S. Chand & Co.
2. Engineering Physics: P.K. Palanisamy, Scitech Publishers.
3. Engineering Physics: S.O. Pillai, New Age International.
4. Nielsen M.A., I.L. Chuang, Quantum Computation & Quantum Information, Cambridge Univ. Press.
5. Thin Film Fundamentals, A. Goswami, New Age International, New Delhi.
6. Nano Materials, A.K. Bandyopadhyay, New Age Publishers.

REFERENCE BOOKS

1. Solid State Physics – Charles Kittel, Wiley & Sons (Asia) Pvt. Ltd.
2. Fundamentals of Physics – Halliday, Resnick, Walker.
3. Engineering Physics – V. Rajendran, McGraw Hill Education.
4. Solar Photovoltaics – Fundamentals, Technologies and Applications, 3rd Edition, PHI.
5. Principles of Quantum Computation and Information – G. Benenti, G. Casati, G. Strini, World Scientific.


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Muffakham Jah College of Engineering & Technology
(An Autonomous Institution)
Computer Science and Engineering Department
(wef: academic year 2025-2026)
PROGRAMMING FOR PROBLEM SOLVING
(Common to All branches)

B.E, I-Semester (CSE, CSE(AI), CSE(DS), CSE(AIML), ECE, MECH, CIVIL)

Course Code	Course Title				Core/Elective	
25ESI01CS	PROGRAMMING FOR PROBLEM SOLVING				Core	
Pre-requisites	Contact hours per week			CIE	SEE	Credits
	L	T	P			
	3	0	0	40	60	3

Course Objectives:

1. To interpret the various steps in problem solving and program development.
2. To recall and reuse the fundamentals, syntax and semantics of C programming language.
3. To illustrate problem solving using arrays, strings, structures and pointers.
4. To demonstrate structured and modular programming approach in solving problems.
5. To interpret code and debug the given problems using files.

Course Outcomes:

1. Recognize functional components in computing environment and develop simple programs.
2. Implement control structures and modular programming for problem solving.
3. Demonstrate arrays and strings concepts to store and manipulate data.
4. Apply pointers and memory management techniques.
5. Create user defined data-types and manage File I/O.

UNIT-I

Introduction to Computers: Computer Systems, Computing Environments, Computer Languages, Creating and Running Programs, Software Development, Flow Charts.

Number Systems: Binary, Octal, Decimal and Hexadecimal

Introduction to C Language: Background, C Programs, Identifiers, Data Types, Variables, Constants, Input/Output Statements.

Arithmetic Operators and Expressions: Evaluating Expressions, Precedence and Associativity of Operators, Type Conversion.

UNIT-II

Conditional Control Statements: Bitwise Operators, Relational and Logical Operators, if, if-else, switch Statement and examples.

Loop Control Statements: for, while, do-while and examples, continue, break and goto statements

Functions: Function Basics, User-Defined functions, Inter Function Communication, Standard Functions, Methods of Parameter Passing, Recursive Functions.

Storage Classes: Auto, Register, Static, Extern, Scope Rules and Type Qualifiers

UNIT-III

Preprocessors: Preprocessor Commands

Arrays: Concepts, Using Arrays in C, Inter-Function Communication, Array Applications, Two-Dimensional Arrays, Multidimensional Arrays, Linear and Binary Search, Selection and Bubble Sort.

UNIT-IV

Pointers: Introduction, Pointers for Inter-Function Communication, Pointers to Pointers,

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Compatibility, L-value and R-value, Arrays and Pointers, Pointer Arithmetic and Arrays, Passing Arrays to a Function, Memory Allocation Functions, Array of Pointers, Programming Applications, Pointers to void, Pointers to Functions, Command-line Arguments.

Strings: Concepts, C Strings, String Input/Output Functions, Arrays of Strings, String Manipulation Functions.

UNIT V

Structures: Definition and Initialization of Structures, Accessing Structures, Nested Structures, Arrays of Structures, Structures and Functions, Pointers to Structures, Self Referential Structures, Unions, Type Definition (typedef), Enumerated Types.

Input and Output: Introduction to Files, Modes of Files, Streams, Standard Library Input/Output Functions, Character Input/Output Functions.

Suggested Textbook:

1. B.A. Forouzan and R.F. Gilberg, "A Structured Programming Approach in C", Cengage Learning, 2007

Reference Books:

1. Brian W. Kernighan and Dennis M. Ritchie, The C Programming Language, Prentice Hall of India
2. Byron Gottfried, Schaum's Outline of Programming with C, McGraw-Hill
3. Rajaraman Y, "The Fundamentals of Computer", 4th Edition, Prentice-Hall of India, 2006
4. Programming in C, Stephen G. Kochan, Fourth Edition, Pearson Education
5. Herbert Schildt, C: The Complete Reference, Mc Graw Hill, 4th Edition

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Muffakham Jah College of Engineering & Technology
An Autonomous Institution
(wef: academic year 2025-2026)
BASIC ELECTRICAL ENGINEERING
(Common to All branches)

Course Code	Course Title				Core/Elective	
25ES102EE	BASIC ELECTRICAL ENGINEERING				Core	
Pre-requisites	Contact hours per week .			CIE	SEE	Credits
	L	T	P			
-	3	1	--	40	60	4

Course objectives: To learn

1. To provide an understanding of basics in Electrical circuits.
2. To explain the working principles of Electrical Machines and single phase transformers.

Course Outcomes: After learning the contents of this course, the student must be able to

1. Simplify complex circuit by network reduction technique & theorems
2. Analyze Electrical circuits with AC excitation.
3. Comprehend the working principles of DC Machines and single phase transformers.
4. Comprehend the working principles of Induction Motor
5. Identify Electrical Installation and switchgear for Safety measures.

UNIT-I: DC Circuits:

Network elements (R, L, C), energy stored in inductor & capacitor. Voltage and current sources, Ohm's Law, KVL, KCL, network reduction technique (series, parallel and series parallel combination), Superposition theorem, Thevenin's theorem and Norton's theorem (simple problems)

UNIT-II: AC Circuits:

Representation of sinusoidal waveforms, peak and RMS values, Form Factor, Peak Factor phasor representation, real power, reactive power, apparent power, power factor, Analysis of single phase AC circuits consisting of R, L, C and RL, RC, RLC combinations (series only). Three phase balanced circuits, voltage and current relations in star and delta connections.

UNIT-III: DC Machines and Transformers:

DC Generators: Construction and principle of operation of DC generator, EMF equation, Types of DC Generators, OCC characteristics, applications. **DC Motors:** Principle of operation of DC motor, Types of DC motors, applications.

Transformers: Construction and principle of operation of ideal and practical transformer, EMF equation of transformer, Types of losses and efficiency (simple problems)

UNIT-IV: Induction Motor:

Three Phase Induction motor: Generation of rotating magnetic fields, Construction and working of a three-phase induction motor, squirrel cage IM, slip-ring IM, Applications.

Single-Phase Induction motor: Construction and principle of operation, Capacitor start & capacitor run motor.

UNIT-V: Electrical Installation:

Components of LT Switchgear, Switch Fuse Unit (SFU), MCB, ELCB, MCCB, Earthing, Elementary calculations for energy consumption, power factor improvement.

Suggested Reading:

1. N.K. De, —Basic Electrical Engineering, Universities Press, 2015
2. J.B. Gupta, —Fundamentals of Electrical Engineering and Electronics, S.K. Kataria & Sons Publications, 2016.
3. J.B. Gupta, —Utilization of Electric Power and Electric Traction, S.K. Kataria & Sons Publications, 2010.
4. Abhijit Chakrabarti, Sudipta Nath, Chandan Kumar Chanda, —Basic Electrical Engineering, Tata McGraw Hill, Publications, 2009.
5. Hughes, —Electrical Technology, VII Edition, International Student -on, Addison Wesley Longman Inc., 1995.





Muffakham Jah College of Engineering and Technology

(Sultan-ul-Uloom Education Society)

Approved by AICTE, Affiliated to Osmania University

(Osmania University Approved Research Centres in Civil, CSE, ECE & Mech)



INSTITUTION'S
INNOVATION
COUNCIL
(Ministry of Education Initiative)



(An Autonomous Institution)

DEPARTMENT OF PHYSICS

B.E (SEM-1&II) Syllabus for CSE, CSE(AIML), CSE(AI), CSE(DS), ECE, CIVIL & MECH
(w.e.f 2025-2026)

Engineering Physics Lab (Course Code: 25BS151PH)

L	T	P	Credits	CIE		SEE	
0	0	2	1	Marks: 25	Exam Duration: 2 Hrs	Marks: 50	Exam Duration: 3 Hrs

Course objective	Course outcome
To understand fundamental concepts of semiconductors, optics, magnetism, and modern materials.	Apply physics principles to study electrical, optical, and magnetic properties of materials.
To perform experiments for measuring electrical, optical, and mechanical properties.	Analyze semiconductor, solar cell, and optical fiber characteristics for device applications.
To analyze and interpret experimental data scientifically.	Demonstrate computational skills for solving problems in quantum mechanics and electromagnetics.
To develop computational and simulation skills using Python/MATLAB.	Evaluate mechanical and elastic properties of materials using experiments and simulations.
To integrate experimental and computational methods for applications in advanced technologies.	Integrate theoretical and experimental results to understand lasers, nanomaterials, NDT, and quantum devices.

1. Study of I-V Characteristics of a P-N Junction Diode – Determination of Resistance & Cut-in Voltage.
2. Measurement of Energy Band Gap of a Semiconductor
3. Study of Hall Effect in Semiconductors – Determination of Hall Coefficient, Carrier Concentration, and Mobility.
4. Study of Thermistor Characteristics – Determination of Temperature Coefficient of Resistance and Constants A & B.
5. Plotting of B-H Curve for a Ferromagnetic Material and Determination of energy Loss.
6. Study of V-I Characteristics of a Solar Cell – Determination of Fill Factor and Series Resistance.

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W. B. Deem

Dr. N. Venkata Prasad

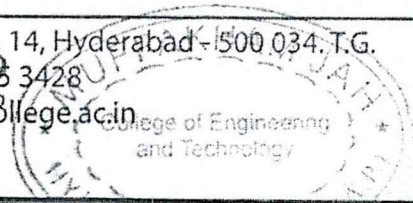
M. S. S.

8-2-249 to 267, "Mount Pleasant", Road No. 3, Banjara Hills, Post Box No. 14, Hyderabad - 500 034, T.G.

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7. Determination of Planck's Constant using Photoelectric Effect (Work Function of Photometal).
8. Determination of Numerical Aperture (NA) and Acceptance Angle of an Optical Fiber.
9. Measurement of Wavelength of a Laser Source using a Diffraction Grating.
10. Determination of Rigidity Modulus of a Wire using Torsional Pendulum.
11. Determination of Wavelength of Light using Newton's Rings.
12. Visualization of Electromagnetic Wave Propagation – Python Simulation of Maxwell's Equations.
13. Ultrasonic NDT Using Python Simulation – Signal Analysis for Flaw Detection.
14. Visualization of Energy Bands in Kronig–Penney Model & Particle in a 1-D Potential Box using Python Simulation.
15. Prediction of Density and Elastic Properties of Oxide Glasses/Polymers using Machine Learning.

Note: Minimum eight experiments should be conducted in the Semester

Members, Board of Studies

Dr. Shaik Kareem Ahmmad, Professor Department of Physics, MJCET

Prof. N. V. Prasad, Professor, Department of Physics, OU.

Dr. D. Mallikarjuna Rao, Scientist, DRDO, Hyderabad

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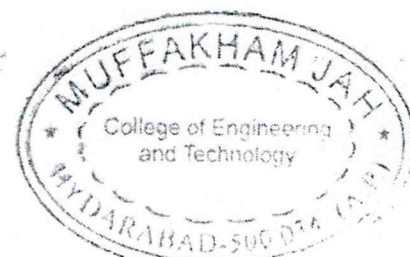
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Mr. Muzammil Ahmed, AI Engineer

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Professor M.Sc
Department of Physics
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Muffakham Jah College of Engineering & Technology
(An Autonomous Institution)
Computer Science and Engineering Department
(wef: academic year 2025-2026)
PROGRAMMING FOR PROBLEM SOLVING LAB
(Common to All branches)

B.E, I-Semester (CSE, CSE(AI), CSE(DS), CSE(AIML), ECE, MECH, CIVIL)						
Course Code	Course Title					Core/Elective
25ESI51CS	PROGRAMMING FOR PROBLEM SOLVING LAB					Core
Pre-requisites	Contact hours per week			CIE	SEE	Credits
	L	T	P			
	0	0	2	25	50	1

Course Objectives:

1. To use tools available under Linux for C programming
2. To gain hands on experience on basic constructs of C programming
3. To formulate problems and implement algorithmic solutions in C
4. To write modular programs in C using structure programming techniques and data files

Course Outcomes:

1. Implement, run and debug basic C programs on Linus
2. Build programs with modular design using I/O operations, decisions and loops.
3. Demonstrate search and sort algorithms using structured type of Data.
4. Apply the concept of strings to manipulate data.
5. Design and Implement programs to store data using user defined data types and files.

List of Experiments:

1. Introducing to Programming Environment (Linux commands, Editing tools such as vi editor, sample program entry, Compilation and Execution)
2. Write programs using Arithmetic, Logical, Bitwise and Ternary operators.
3. Write programs for simple control statements: Roots of a Quadratic Equations, Extracting Digits of Integers, Reversing Digits, Finding Sum of Digits, Printing Multiplication Tables, Armstrong Numbers, Checking for Prime, Magic number.
4. Sin x and Cos x values using series expansion.
5. Conversion of Binary to Decimal, Octal, Hexadecimal and vice versa.
6. Generating Pascal Triangle, Pyramid of Numbers.
7. Recursion: Factorial, Fibonacci, GCD.
8. Finding the Maximum, Minimum, Average, and Standard Deviation of a given set of numbers using Arrays.
9. Reversing an Array, Removal of Duplicates from Array
10. Matrix Addition, Multiplication and Transpose of a Square Matrix using functions
11. Bubble Sort and Selection Sort.
12. Programs on Linear Search and Binary Search using iteration and recursion
13. Functions of String Manipulation: Inputting and Outputting String, using String Functions such as strlen(), strcat(), strcpy(), etc.
14. Write simple programs for strings without using string functions.
15. Finding the number of Characters, Words and Lines of a given text file.
16. File handling programs: Students Memo Printing

PROFESSOR

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CIVIL ENGG. DEPT.

With effect from 2025-26

Course Code	Course Title					Core/Elective
25ES152CE	ENGINEERING GRAPHICS (Common to all branches)					Core
Pre-requisites	Contact hours per week			CIE	SEE	Credits
	L	T	P			
	-	-	2x2	25	50	2

Course Objectives: To learn

1. Design a system, component, or process to meet desired needs within realistic constraints such as economic, environmental, social, political, ethical, health and safety, manufacturability, and sustainability.
2. Communicate effectively using graphical methods.
3. Understand the techniques, skills, and modern engineering tools necessary for engineering practice.

Course Outcomes: After learning the contents of this course, the student must be able to

1. Introduction to engineering design and its place in society.
2. Exposure to the visual aspects of engineering design.
3. Exposure to engineering graphics standards and solid modelling.
4. Exposure to computer-aided geometric design.
5. Exposure to creating working drawings.

Sheet No	Description of the Topic	Contact Hours Drawing
1	Principles of Engineering Graphics and their significance.	2
	Introduction to AutoCAD	
	Basic commands	2
	Simple drawings	4
2	Conic Sections – I	
	Construction of ellipse, parabola and hyperbola given focus and eccentricity.	2
	Conic Sections – II	
3	Construction of ellipse (given major and minor axis), parabola (given base and height), rectangular hyperbola.	2
4	Cycloids (cycloid & epicycloids)	2
5	Involutes (involute of triangle, square & circle)	2
6	Scales (plain & diagonal scales)	4
7	Orthographic Projection	
	Projections of points situated in different quadrants.	4
8	Projections of straight lines	
	Line parallel to both the reference planes, line perpendicular or inclined to one reference plane.	2
	Line inclined to both the reference planes.	4

9	Projections of planes Perpendicular planes and Inclined to one plane.	4
10	Projections of solids Polyhedra and solids of revolution, Projections of solids in simple position and Inclined to one plane.	4
11	Section of solids When the sectional plane is parallel or perpendicular to one reference plane.	4
12	Isometric projection – I Planes and simple solids	4
13	Isometric projection – II Combination of two or three solids	4
14	Conversion of Isometric Views to Orthographic Views	6

Note: Sheet numbers 1 to 14 (CAD Drawings)

Suggested Readings:

1. Bhatt N.D., Panchal V.M. & Ingle P.R., *Engineering Drawing*, Charotar Publishing House, 2014.
2. Shah, M.B. & Rana B.C., *Engineering Drawing and Computer Graphics*, Pearson Education, 2008.
3. S.N Lal, *Engineering Drawing with Introduction to Auto CAD*, Cengage Learning India Pvt Lid, New Delhi, 2018.
4. Agrawal B. & Agrawal C. M., *Engineering Graphics*, TMH Publication, 2012.
5. Narayana, K.L. & P Kannaiah, *Text book on Engineering Drawing*, SciTech Publishers, 2008.
6. Corresponding set of CAD Software Theory and User Manuals.

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Muffakham Jah College of Engineering & Technology
An Autonomous Institution
(wef: academic year 2025-2026)

BASIC ELECTRICAL ENGINEERING LAB
(Common to All Branches)

Course Code	Course Title						Core/ Elective
25ES153EE	Basic Electrical Engineering Lab (Common to All Branches)						Core
Prerequisite	Contact Hours per Week				CIE	SEE	Credits
	L	T	D	P			
-	-	-	-	2	25	50	1

Course Objectives: To Learn

- To impart the practical knowledge on testing of DC and AC Machines.
- To learn the usage of common electrical measuring instruments.

Course Outcomes:

After completing this course, the student will be able to:

1. Get an exposure to common electrical components and their ratings.
2. Analyze the performance of DC and AC Machines.
3. Comprehend the usage of common electrical measuring instruments.
4. Test the basic characteristics of transformers and electrical machines

Suggested List of Laboratory Experiments/Demonstrations:

Demo 1: Basic safety precautions, Introduction and use of measuring instruments—voltmeter, ammeter, multi-meter, wattmeter, tachometer, resistors, capacitors and inductors.

1. Verification of KVL and KCL, superposition theorem (with DC excitation)
2. Verification of Thevenin's and Norton's theorems (with DC excitation)
3. Sinusoidal steady state response of R-L, and R-C circuits – impedance calculation and verification of phase differences between current and voltage and Power factor calculation.
4. Measurement of phase voltage/current, line voltage/current and power in a balanced three-phase circuit connected in star and delta.
5. Predetermination of efficiency by OC and SC test on Single phase transformer.

Demo 2: Cut-out sections of machines: dc machine, induction machine (squirrel cage rotor), and single-phase induction machine.

6. Loading of a transformer: measurement of primary and secondary voltages and currents, and power.
7. Power factor improvement of Induction Motor using static capacitors
8. Synchronous speed of two and four-pole, three-phase induction motors. Direction reversal by change of phase-sequence of connections.
9. OCC characteristics of DC Generator
10. Load Test of DC Motor.

Note: Minimum eight experiments should be conducted in the semester

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MUFFAKHAM JAH COLLEGE OF ENGINEERING & TECHNOLOGY (A)
In line with AICTE Model Curriculum with effect from AY 2025-26

B.E. Civil Engineering Department (Civil)

SEMESTER-2			Scheme of Instruction				Scheme of Examination			Credits
S. No	Course Code	Name of the Course	Lecture	Tutorial	Practical	Contact Hrs/Wk	CIE	SEE	Duration in Hrs	
1	*25MC102CE	Environmental Sciences	2	-	-	2	40	-	-	0
2	*25MC103PY	Essence of Indian Traditional Knowledge	2	-	-	2	40	-	-	0
3	25HS101EG	English	2	-	-	2	40	60	3	2
4	25BS103MT	Differential Equations & Numerical Methods	3	1	-	4	40	60	3	4
5	25BS104CH	Engineering Chemistry	3	1	-	4	40	60	3	4
6	25ES105CE	Engineering Mechanics	3	1	-	4	40	60	3	4
7	25HS151EG	English Lab	-	-	2	2	25	50	3	1
8	25BS152CH	Engineering Chemistry Lab	-	-	2	2	25	50	3	1
9	25ES154ME	Engineering Workshop Practice	-	-	2x2	4	25	50	3	2
10	25PC154CE	Basics of Building Drawing Lab	-	-	2	2	-	-	-	1
Total			15	3	10	28	315	390	21	19

MC: Mandatory Course BS: Basic Science ES: Engineering Science

CIE: Continuous Internal Evaluation SEE: Semester End Evaluation

*GRADE: Satisfactory/Unsatisfactory (Non-credit Mandatory Course)

Course Code	Course Title					Core/Elective
*25MC102CE	Environmental Sciences (Common to all branches)					Core
Pre-requisites	Contact hours per week			CIE	SEE	Credits
	L	T	P			
-	2	-	-	40	-	0

Course Objectives: To learn

1. To create awareness and impart basic knowledge about the environment and its allied problems.
2. To know the functions of ecosystems, social and environment related issues and their preventive measures.
3. To understand importance of biological diversity different pollution and their impact on environment

Course Outcomes: After learning the contents of this course, the student must be able to

1. Adopt environment ethics to attain sustainable development
2. Develop an attitude of concern for the environment
3. Conservation of natural resources and biological diversity
4. Creating awareness of Green technologies formation's security
5. Imparts awareness for environmental laws and regulations.

UNIT-I

The Multidisciplinary Nature of Environmental Studies: Definition, scope and importance, need for public awareness.

Natural Resources: Water Resources – Use and over utilization of surface and ground water, flood, drought, conflicts over water, Dams: Benefits and Problems. Food Resources–World Food Problems, effects of modern agriculture, fertilizer-pesticides problems, water logging, salinity, Forest Resources – Use and over exploitation, deforestation & its effect on tribal people. Land Resources–Land Degradation, environmental effect of mining, man induced landslides, soil erosion and desertification. Energy Resources –Growing energy needs, Renewable and Non-renewable energy resources.

UNIT-II

Ecosystems: Concept of an ecosystem, Structure and function of an ecosystem, Producers, consumers and decomposers, Energy flow in ecosystem, food chains, ecological pyramids, ecological succession, types of ecosystems(marine, pond, river, forest, grassland, desert)

UNIT-III

Biodiversity: Levels of Biodiversity, Bio-geographical classification of India. Value of biodiversity, Threats to biodiversity, endangered and endemic species of India. Conservation of biodiversity, global and national efforts.

UNIT-IV

Environmental Pollution: Definition, Causes, effects and control measures of air pollution, water pollution, soil pollution, noise pollution, thermal pollution, solid waste management.

Environment Protection Act: Air, water, forest and wild life Acts, issues in the enforcement of environmental legislation.

UNIT-V

Social Issues and the Environment: Watershed management and environmental ethics. Climate change, global warming, acid rain, ozone layer depletion.

Environmental Disaster Management: Types of disasters, impact of disasters on environment, infrastructure, and development. Basic principles of disaster mitigation, disaster management, and methodology. Disaster management cycle and disaster management in India.

Field Work: Visit to a local area to document environmental issues-agricultural area/pond/lake/terrestrial ecosystem. Visit to a local polluted area-market/slum area/Industrial area/traffic area.

Suggested Readings:

1. Anil Kumar, D. (2016). *Environmental Chemistry*. New Age International Publishers Pvt. Ltd. New Delhi.
2. Odum, E. P. (1971). *Fundamentals of Ecology*. W.B. Saunders Co., USA.
3. Rao, M. N., & Datta, A. K. (2009). *Waste Water Treatment*. Oxford and IBH Publications, New Delhi.
4. Joseph, B. (2009). *Environmental Studies*. Tata McGraw Hill, New Delhi.
5. Sharma, V. K. (1999). *Disaster Management*. National Centre for Disaster Management, IIT New Delhi.

For the Academic year 2025-2026

MUFFAKHAM JAH COLLEGE OF ENGINEERING & TECHNOLOGY
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Course Code	Course Title					Core/MC
*25MC103PY	ESSENCE OF INDIAN TRADITIONAL KNOWLEDGE (Common to all branches)					Mandatory course
Pre-requisites	Contact hours per week			CIE	SEE	Credits
	L	T	P			
-	2	0	0	40	-	0

Course Objectives: To learn

1. Basics of Indian philosophy, culture, civilization, and heritage.
2. Significance of scriptures, Sanskrit, Dravidian and regional literatures.
3. Role of religion, philosophy, and reform movements in Indian society.
4. Philosophy of Indian fine arts, architecture, science, and technology.
5. Indian education system across ages and applied philosophy in modern contexts.

Course Outcomes: After learning the contents of this course, the student must be able to

1. Explain the foundations of Indian philosophy, culture, and heritage.
2. Appreciate the role of scriptures, Sanskrit, Dravidian and regional literatures.
3. Analyze the impact of religion, philosophy, and reform movements on Indian society.
4. Recognize the philosophical basis of Indian fine arts, architecture, science, and technology.
5. Evaluate the Indian education system across different periods and apply philosophical insights to contemporary issues.

UNIT – I: Introduction to Indian Philosophy & Culture

Introduction to Philosophy and its branches; Understanding Culture, Civilization, and Heritage, Ancient Indian Culture, Medieval Indian Culture, Modern Indian Culture

UNIT – II: Indian Language, Literature & Scriptures

Significance of scriptures to current society, Role of Sanskrit and other Northern Indian Languages and Literature, Dravidian and other Southern Indian Languages and Literature

UNIT – III: Religion, Philosophy & Reform Movements

Religion and Philosophy in Ancient India, Religion and Philosophy in Medieval India, Religious, Political, and Social Reform Movements in Modern India

UNIT – IV: Indian Fine Arts, Science & Technology

Fine Arts: Indian Painting, Handicrafts, and Sculptures, Performance Arts: Music, Dance, Drama, and Puppetry (ancient & modern), Applied Fine Arts: Indian Architecture (ancient, medieval & modern), Science and Technology in India: Developments in Ancient, Medieval & Modern Periods

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UNIT – V: Education & Applied Philosophy

Education in: Ancient, Medieval, Modern India, Applied Philosophy: Indian philosophical ideas in AI and consciousness studies, Indian perspectives towards neuroscience: Digital detox and mindfulness, Philosophical perspectives on globalization: Vasudhaiva Kutumbakam vs. Neoliberalism

Suggested Books:

1. Jha, A. (2023). Traditional knowledge system in India. Atlantic Publishers & Distributors. Atlantic Books
2. Mishra, O. P. (2021). Essence of Indian traditions (2nd ed.). Khanna Publishers.

Reference books:

1. Nitonde, R. (2024). Introduction to Indian knowledge system: A textbook for UG students as per NEP. Barnes & Noble Publications.
2. Dwivedi, D., & Mohan, S. (2024). Indian philosophy, Indian revolution: On caste and politics. Hurst / Westland.
3. Kapoor, S., & Danino, M. (2017). *Knowledge traditions and practices of India*. National Council of Educational Research and Training (NCERT).
4. Radhakrishnan, S. (2018). *Indian philosophy* (Vols. 1–2). Oxford University Press. (Original work published 1923)
5. Menon, S., Todariya, S., & Agerwala, T.. (2024). *AI, consciousness and the new humanism: Fundamental reflections on minds and machines*. Springer Nature.
6. Birch, J. (2024). *The edge of sentience: Risk and precaution in humans, other animals, and AI*. Oxford University Press.
7. Sebo, J. (2025). *The moral circle: Who matters, what matters, and why*. W. W. Norton & Company.
8. Summerfield, C. (2025). *These strange new minds: How AI learned to talk and what it means*. Oxford University Press.
9. Hendrycks, D. (2024). *Introduction to AI safety, ethics, and society* [Preprint]. arXiv. <https://arxiv.org/abs/2411.01042>
10. Pandikattu, K. (Ed.). (2025). *Applied ethics and rationality: Contemporary Indian perspectives* (Studies in Applied Philosophy, Epistemology and Rational Ethics, Vol. 74). Springer.

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Muffakham Jah College of Engineering & Technology
(An Autonomous Institution)

Course Code	Course Title				Core/Elective	
25HS101EG	ENGLISH (Common to CSE, CSE(AI), CSE(DS), CSE(AIML), ECE, CE, ME)				Core	
Prerequisites	Contact hours per week			CIE	SEE	Credits
	L	T	P			
Knowledge of grammar and vocabulary, along with tertiary-level skills in reading, writing, listening, and speaking	2	0	0	40	60	2

Course Objectives:

The objectives of this course are to enhance the English language abilities of students by

1. developing appreciation to a variety of context-rich contents and encouraging them to think critically;
2. enhancing word knowledge and usage in varied contexts;
3. strengthening grammar knowledge for effective expression;
4. fostering originality and creativity while improving writing style and coherence;
5. developing skills in writing clear, formal, and effective professional letters.

Course Outcomes:

After learning the contents of this course, the student will be able to

1. interpret and understand a variety of texts for language learning at literal, evaluative and appreciative levels;
2. demonstrate the use of rich and contextually appropriate vocabulary;
3. construct grammatically accurate sentences;
4. develop academic writing skills and construct cohesive and persuasive paragraphs;
5. compose a variety of letters for professional requirements with appropriate format and tone.

Unit I

Reading : "If" by Rudyard Kipling

Vocabulary : Words often confused, Compounding and Blending

Grammar : Sentence Structures and Types; Prepositions

Writing : Note-Taking, Note-Making: Importance and Strategies

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Department of English
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Unit II

- Reading** : "Anukul" by Satyajit Ray
Vocabulary : Collocations, Synonyms and Antonyms
Grammar : Connectives and Concord
Writing : Guided writing and Paragraph Writing

Unit-III

- Reading** : "Leisure" by W. H. Davies
Vocabulary : Phrasal Verbs, One word substitutes
Grammar : Tenses and Voice
Writing : Formal letters: Inquiry letters, Complaint letters and Response letters

Unit -IV

- Reading** : "Of Studies" by Francis Bacon
Vocabulary : Homonyms, Homophones and Homographs
Grammar : Reported Speech
Writing : Describing a process/events/ experiences

Unit-V

- Reading** : "The Danger of a Single Story" by Chimamanda Ngozi Adichie
Vocabulary : Inclusive language and euphemism
Grammar : Degrees of Comparison, Common Errors
Writing : Summarizing and paraphrasing

Suggested Books:

- Board of Editors, **Language and Life: A Skills Approach**. Orient BlackSwan, 2018
- Bhatnagar, Nitin, and Mamta Bhatnagar. **Communicative English for Engineers and Professionals**. 1st ed., Pearson Education India, 2010.
- Kumar, Sanjay and Pushpa Lata. **English Language and Communication Skills for Engineers**, Oxford University Press, 2018.
- Sudarshana, NP and C. Savitha, **English for Engineers**, Cambridge University Press, 2018.
- Wood, F. T. A **Remedial English Grammar for Foreign Students**, Trinity Press, 2022

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MUFFAKHAM JAH COLLEGE OF ENGINEERING & TECHNOLOGY

(An Autonomous Institution)

Course Code	Course Title				Core/Elective	
25BS103MT	DIFFERENTIAL EQUATIONS & NUMERICAL METHODS (Common to CSE, CSE(AI), CSE(DS), CSE(AIML), ECE, CE, ME)				Core	
Pre-requisites	Contact hours per week			CIE	SEE	Credits
	L	T	P			
MDC	3	1	0	40	60	4

Course Objectives: To learn

1. Methods of solving the ordinary differential equations of first order.
2. Methods of solving the ordinary differential equations of second and higher order.
3. The physical quantities involved in engineering field related to vector valued functions.
4. Various numerical methods to find roots of polynomial and transcendental equations.
5. Evaluation of integrals using numerical techniques

Course Outcomes: After learning the contents of this course, the student must be able to

1. Identify whether the given differential equation of first order is exact or not.
2. Solve the second and higher order ordinary differential equations.
3. Find the Gradient, Divergence, Curl and directional derivatives.
4. Find the root of a given polynomial and transcendental equations.
5. Estimate the value for the given data using interpolation

UNIT-I: Ordinary Differential Equations of First Order:

Exact differential equations, Equations reducible to exact differential equations, Integrating factors, Linear differential equations, Leibnitz's linear equation, Bernoulli's equation, and Clairaut's differential equations, Orthogonal trajectories of a given family of curves(Cartesian coordinates only).

UNIT-II: Ordinary Differential Equations of Higher Order: Solution of second and higher order linear homogeneous equations with constant coefficients, Solutions of non-homogeneous linear differential equations of the type e^{ax} , $\sin ax$, $\cos ax$, polynomials in x , $e^{ax}V(x)$, and $xV(x)$, Method of variation of parameters.

UNIT-III: Vector Differentiation:

Vector point functions and scalar point functions, Normal vector, Unit normal vector, Gradient, Divergence, Curl, Directional derivatives, Solenoidal and irrotational vectors.

UNIT-IV: Numerical Methods-I: Solution of polynomial and transcendental equations- Bisection method, Regula-Falsi method, and Newton-Raphson Method. Finite differences-forward differences-backward differences, Interpolation using Newton's forward and backward formulae: Lagrange's method of interpolation.

UNIT-V: Numerical Methods-II: Numerical Integration: Trapezoidal rule and Simpson's $1/3^{\text{rd}}$ rules. Ordinary differential equations: Taylor's series method; Euler's method; Modified Euler's method; Runge-Kutta method of fourth order.

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28/10/25

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Suggested Reading:

1. R.K.Jain & S.R.K.Iyengar, Advanced Engineering Mathematics, Narosa Publications, 2014.
2. B.S.Grewal, Higher Engineering Mathematics, Khanna Publications, 43rd Edition, 2014.
3. N.P.Bali & Dr.Manish Goyal, A textbook of Engineering Mathematics(Volume I), 10th Edition, Laxmi Publications, 2022.
4. H.K.Dass and Er.Rajnish Verma, Higher Engineering Mathematics, S.Chand and Company Limited, New Delhi.

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Course Code	Course Title				Core/Elective	
25BS104CH	ENGINEERING CHEMISTRY Common to (CSE ,CSE(AI) ,CSE(DS), CSE(AIML), ECE,CE,ME)				Core	
Pre-requisites	Contact hours per week			CIE	SEE	Credits
	L	T	P			
Chemistry	3	1	0	40	60	4

Course Objectives: To learn

1. Explain the principles of electrochemical processes and study analyze working principles and applications of Various batteries.
2. Gain knowledge about the causes of corrosion and its prevention. Attain Knowledge about the hard water and treatment of water for drinking purpose.
3. Appraise Engineering materials their classifications, structure-property Relationship
4. Expose to qualitative and quantitative parameters of chemical fuels and awareness of eco-friendly materials, fuels and processes.
5. Understand the concepts and applications of spectroscopy.

Course Outcomes: After learning the contents of this course, the student must be able to

1. Apply concept of electrode potential in identifying feasibility of electrochemical reaction; develop a more in-depth perception on working of various types of batteries and their applications especially in electric vehicles.
2. Identify the mechanism of corrosion of materials on the basis of electrochemical approach and devise corrosion control methods; Estimate the physical and chemical parameters of quality of water and explain the process of water treatment.
3. Explain the influence of chemical structure on properties of materials and their choice in engineering applications.
4. Classify chemical fuels and grade them through qualitative analysis and Acquire knowledge on environment friendly bio-diesel.
5. Relate the concept of green chemistry to modify engineering processes and materials; understand the concepts and applications of spectroscopy

UNIT-1: Electrochemistry: Electrolytic conductance, its types, factors affecting electrolytic conductance. Electrochemical cells: Electrolytic and Galvanic cells. Cell notation, cell reaction and cell potentials. Electrochemical series & its significance. Nernst equation and its derivation. Applications of Nernst equation to electrode potential and EMF of cells. Numerical problems. Types of electrodes, Calomel, Quinhydrone and Glass electrodes. Determination of pH of a solution by using Quinhydrone electrode.

Battery Chemistry: Types of batteries-Primary and secondary batteries, Construction and Applications of Secondary batteries: Pb-Acid storage battery and Li-ion battery, Fuel cells: Methanol-Oxygen fuel cells and Hydrogen-oxygen fuel cells.

UNIT-2: Corrosion: Causes and its effects. Types of Corrosion-Dry or Chemical Corrosion and Wet or Electrochemical corrosion and their mechanism. Electrochemical corrosion — Galvanic and Waterline Corrosion. Factors influencing rate of corrosion.

Corrosion control methods: Cathodic protection methods - Sacrificial anodic and Impressed current Cathodic protection methods.

Surface coating methods: Hot Dipping-Galvanizing.

Water Chemistry : Hardness of Water-Types and units of hardness of water, estimation of hardness of water by EDTA method - Numerical problems. Alkalinity of water and its sources. Water softening by Ion exchange and Reverse Osmosis methods. Specifications of potable water. Sterilization by Chlorination. Break Point of Chlorination.

UNIT-3: Engineering Materials: Polymers: Monomer and its functionality, Polymers and degree of polymerization. Types of Polymerization - Addition, Condensation and Co-Polymerization with one example each. Classification of polymers—Plastics: (Thermoplastics & Thermosetting Resins - PVC and Bakelite), Fiber's: (Nylon-6:6)

Elastomers: (Buna-S and Buna—N rubber).

Conducting polymers: Introduction, classification, properties and applications of conducting polymers.

Biomaterials : Introduction, Definition of Biomaterials, Preparation, properties and applications of Poly lactic acid (PLA).

UNIT— 4: Chemical Fuels : Introduction, definition and classification of chemical fuels. - primary and secondary -- solid, liquid and gaseous fuels Requirements of a good fuel. **Calorific Value** — HCV and LCV. Theoretical Calculations of calorific value by Dulong's formula — Numerical problems.

Solid Fuels: Coal and its Ranking. Analysis of coal-Proximate and Ultimate analysis.

Liquid Fuels: Composition and uses of Gasoline, Diesel and kerosene. Knocking, Fuel-rating— Octane and Cetane numbers.

Gaseous Fuels : LPG, CNG-Composition and Uses.

Biodiesel : Sources , Concept of Trans esterification , properties and applications of biodiesel . Carbon neutrality and its significance .

Unit-5: Spectroscopy- Description of Electromagnetic spectrum.

Principles of UV-Visible Spectroscopy: Statement of Beer-Lambert law Absorbance and intensity shifts: Bathochromic, Hypsochromic, Hyperchromic and Hypochromic shifts , Types of Electronic transitions .

Applications of UV — Visible Spectroscopy.

IR Spectroscopy : Principle and applications of IR spectroscopy

NMR Spectroscopy: Principle of H-1 NMR Spectroscopy, Multiplicity, Chemical Shift, Applications of NMR. Principle & Applications of MRI.

Green Chemistry : Concept, Mention – Principles of Green Chemistry – example Diels-Alder reaction.

Suggested Books:

1. Principles of Physical Chemistry I, S.N. Chand & Co. New Delhi, 1987
2. PC Jain and M Jain ,—Engineering Chemistry I, Dhanpat Rai&Sons, 15th Edition, New Delhi, 2004
3. JCKuriacoseandJRajaram,—ChemistryinEngineeringandTechnology—,TataMcGrawHill, a. New Delhi,2010
4. OG Palanna, —Engineering Chemistry I,TataMcGrawHill, New Delhi, 2009
5. S S Daraand SSU mare, —Engineering Chemistry I, S.N. Chand & Co. New Delhi, 2004
6. Sashi Chawla,—Engineering Chemistry I, DhanpatRai&Sons, New Delhi, 2017
7. Prasanta Rath,—Engineering Chemistry I,Cengage Learning India Pvt. Ltd, 2015
8. Dr. Kishore Palle, Dr. V. Shanthi , Dr. A. Kishore Kumar and K. Ramesh -Engineering Chemistry.
9. Dr.Shanthi Vunguturi ,Dr.Geetha Swarupa Pamidimalla – Fundamentals of Engineering Chemistry ,Applications in Modern Engineering and Technology

Course Code	Course Title				Core/Elective	
25ES105CE	ENGINEERING MECHANICS				Core	
Pre-requisites	Contact hours per week			CIE	SEE	Credits
	L	T	P			
	3	1	-	40	60	4

Course Objectives: To learn

1. Resultant and equilibrium of force system, concept of friction, analyze the Perfect trusses.
2. Obtaining centroids and moments of inertia for various sections.
3. Basic concepts of dynamics, Kinematics and Kinetics and their applications to problem solving

Course Outcomes: After learning the contents of this course, the student must be able to

1. Apply the fundamental concepts of forces, Resultant and Equilibrium conditions for static loads.
2. Analyse forces in members of a Perfect truss using method of joints and method of sections, analyze friction for single and connected bodies.
3. Determine the centroid and moment of inertia for various sections.
4. Apply the basic concepts of dynamics for rectilinear and curvilinear motion and kinetics Using D' Alembert's Principle.
5. Solve problems involving work energy principles and impulse momentum theory.

UNIT – I

Introduction to Engineering Mechanics: Basic Concepts

System of Forces: Coplanar Concurrent Forces, Components in Space – Resultant of coplanar and spatial systems, Moment of Force and Couple and its Application to coplanar system

Equilibrium of Systems of Forces: Free Body Diagrams, Equations of Equilibrium and applications to Coplanar System.

UNIT – II

Analysis of Trusses: Types of Trusses, Assumptions for forces in members of trusses, Method of joints and Method of sections for Cantilever Trusses, Simply supported Trusses.

UNIT – III

Centroid: Centroid of simple areas (from basic principles), Centroid of Composite areas.

Centre of Gravity: Centre of gravity of simple bodies (from basic principles).

Area Moment of Inertia: Definition, Moment of inertia of simple areas (from basic principles), Polar Moment of Inertia, Transfer formula, Moment of Inertia of Composite areas.

UNIT – IV

Kinematics: Introduction, Types of Rigid bodies, Motion of particle, Rectilinear and Curvilinear motions, Velocity and Acceleration.

Kinetics: Introduction, fundamental equation of kinetics for a particle, D'Alembert's principle for particle motion and connected system.

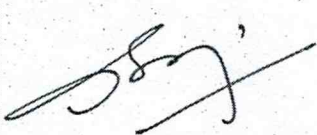
UNIT – V

Work - Energy Method: Introduction, Equations for Translation, Work-Energy Applications to Particle Motion, Connected System.

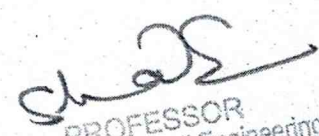
Impulse Momentum Method: Linear impulse momentum, law of conservation of momentum, coefficient of restitution, Elastic impact.

Suggested Reading:

- Ferdinand L. Singer, Engineering Mechanics Statics and Dynamics, Harper Collins publishers inc, New York, 1994.
- Ferdinand L. Singer, K. Vijaya Kumar Reddy, J. Suresh Kumar, Singer's Engineering Mechanics, BS Publications, Hyderabad, 2011.
- S.S Bhavakatti, K. G. Rajashekarappa Engineering Mechanics, New age international publishers, Delhi, 1994.
- Rajeshakharan, S. and Sankara Subrahmanyam, G., Engineering Mechanics Statics and Dynamics, Vikas Publications, Delhi, 2005.
- Junarkar, S.B. and H.J. Shah., Applied Mechanics, Charotar Publishing House Pvt. Ltd, Anand, 2015






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Muffakham Jah College of Engineering & Technology
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Course Code	Course Title				Core/Elective	
25HS151EG	ENGLISH LAB (Common to CSE, CSE(AI), CSE(DS), CSE(AIML), ECE, CE, ME)				Core	
Prerequisites	Contact hours per week			CIE	SEE	Credit
	L	T	P			
Tertiary-level competence in listening to spoken English and comprehending written texts	0	0	2	25	50	1

Course Objectives: This course seeks to develop learners' language abilities by

1. Giving them adequate practice in listening with comprehension
2. Providing them ample opportunities to improve their public speaking skills
3. Training them in the use of correct pronunciation, stress, and intonation
4. Sensitizing them to the use of verbal and non-verbal communication appropriate to the context
5. Encouraging them to learn the art of conversation to suit formal and informal situations
6. Preparing them to make formal presentations and face interviews

Course Outcomes: On successful completion of this course, the learners will be able to

1. Comprehend audio or audio-visual contents to improve listening competence;
2. Demonstrate intelligible pronunciation and distinguish RP from other varieties of English;
3. Improve speaking skills through interactive activities;
4. Demonstrate appropriate body language in various oral communication settings;
5. Demonstrate writing skills.

Activities in English Language Lab:

Experiments and Practice Sessions to Enhance Listening and Speaking Skills

1. Introduction to English Phonetics
2. Sound System of English; Varieties of English: Indian, British, American
3. Word Stress, Sentence Stress and Intonation
4. Listening Skills, Barriers to Listening, Listening for Comprehension
5. Conversation Skills: Introducing oneself to another, making requests and responding appropriately, agreeing and disagreeing
6. JAM

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7. Poster designing and presenting
8. Role Play
9. Group Discussions
10. Debate
11. Public Speaking Skills and aspects of Body Language
12. Interview Skills
13. Formal Presentations with PowerPoint Slides

Suggested Reading

- Balasubramanian, T. **A Textbook of English Phonetics for Indian Students**. Macmillan, 1981.
- Board of Editors. **Language and Life: A Skills Approach**. Orient Black Swan, 2018.
- CIEFL. **Exercises in Spoken English**. Parts. I-III. Oxford University Press.
- Pillai, Radhakrishna G. **Spoken English for You - Level II**. 8th Edition. Emerald Publishers, 2014.
- Sethi, J, PV Dhamija. **A Course in Phonetics and Spoken English**. 2nd Edition, Prentice Hall, 1999.
- Shinde, Maithry et al. **Life Skills and Personality Development**. Cambridge University Press, 2022.

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Course Code	Course Title					Core/ Elective
MJ25BS152C H	Engineering Chemistry Lab Common to (CSE ,CSE(AI) ,CSE(DS), CSE(AIML), ECE,CE,ME)					Core
Pre requisite	Contact Hours per Week			CIE	SEE	Credits
	L	T	P			
-	-	-	2	25	50	1

Course Objectives: To learn

1. Conduct experiments, take measurements and analyze the data through hands-on experience in order to demonstrate understanding of the theoretical concepts of quantitative analysis while working in small group.
2. Interpret the electro analytical principles with experimental results graphically
3. Demonstrate writing skills through clear laboratory reports

Course Outcomes: After learning the contents of this course, the student must be able to

1. Apply the Electro analytical techniques in quantitative analysis.
2. Estimate the amount of Iron (II), hardness and alkalinity present in the given test solution.
3. Synthesize small drug molecules

List of Experiments:

- Introduction to Chemical Analysis.

Volumetric Analysis:

- Preparation of Standard Mohr's salt solution, Standardization of KMnO_4 and estimation of ferrous ion by Permanganometry
- Estimation Iron(II) by Dichrometry.

Water Analysis:

- Preparation of Standard Magnesium sulphate solution, standardization of EDTA and Estimation of Total Hardness.
- Preparation of Standard Sodium Carbonate Solution, Standardization of HCl and Estimation of Carbonate and Bicarbonate Alkalinity.

Conductometry:

- Estimation of HCl
- Estimation of CH_3COOH
- Estimation of mixture of acids

Potentiometry

- Estimation of HCl
- Estimation of Iron

pH metry:

- Estimation of HCl

Colorimetry:

- Verification of Beer-Lambert's law and estimation of Manganese

Drug Synthesis

- Preparation of Aspirin

Polymer Synthesis

- Preparation of Urea-Formaldehyde resin.

Note: Minimum ten experiments should be conducted in the semester.

Suggested Books:

- Senior Practical Physical Chemistry ,B.D.Khosla , A .Gulati and V.Garg (R.Chand&Co.,Delhi).
- An Introduction to Practical Chemistry , K.K.Sharma and D.S.Sharma (Vikas publishing , N.Delhi)

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Course Code	Course Title					Core/Elective	
25ES154ME	ENGINEERING WORKSHOP PRACTICE (Common to All Branches)					Core	
Prerequisite	Contact Hours per Week				CIE	SEE	Credits
	L	T	D	P			
-			-	2x2	25	50	2

Course Objectives:

1. To gain hands-on experience in using various engineering materials, tools, equipment, and processes commonly applied in the engineering field.
2. To have a study and hands-on exercise on Plumbing, Carpentry and House-wiring components.
3. To have a practice on Fitting, Sheet metal operations, Arc welding, Brazing and Soldering.
4. To study and demonstrate the operation and applications of various hand-operated power tools and computer hardware components.
5. To adopt and follow safety practices while working with tools, machines, and equipment in the workshop environment.

Course Outcomes:

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

- CO1: Demonstrate **hands-on proficiency** in using various engineering materials, tools, and equipment applied in common engineering practices.
- CO2: **Perform basic operations in Plumbing, Carpentry, and House Wiring**, applying suitable techniques and materials.
- CO3: **Execute practical tasks** involving Fitting, Sheet Metal Work, Arc Welding, and Soldering with proper procedure and accuracy.
- CO4: Demonstrate the operation and application of various hand-held power tools, along with computer hardware assembly and disassembly.
- CO5: **Apply and follow safety norms** while handling tools, machines, and equipment to ensure a safe working environment in the workshop.

COURSE CONTENT**Module I: Introduction to Manufacturing Methods:**

Casting, forming, joining, machining and advanced manufacturing methods.

Module II: Plumbing:

Study of plumbing materials, fittings, and practices involved in the installation and maintenance of water supply systems.

Module III: Carpentry:

Study and practice of techniques for measuring, cutting, joining, and finishing wood to form structural joints.

Module IV: House Wiring:

Study and practice of electrical circuits involving wiring, switches, sockets, and their applications in household systems.

Module V: Fitting Operations:

Study and practice of shaping metal components using cutting, filing, and drilling tools.

Module VI: Sheet Metal Operations:

Study and practice of cutting, bending, and joining sheet metals to fabricate simple components.

Module VII: Welding, Brazing & Soldering Operations:

Study and practice of joining metals using filler materials, and fusion techniques.

Module VIII: Smithy:

Study and practice of forging and shaping metal objects through controlled heating and deformation processes.

Module IX: Plastic Moulding:

Study and practice of shaping and forming plastics using the injection moulding process.

Module X: Foundry:

Study of making moulds and casting metals to produce shaped components.

Module XI: Glass Cutting:

Study and practice of cutting and shaping glass into desired forms using appropriate tools, proper handling techniques, and safety precautions.

Module XII: Power Tools:

Hands-on study of hand held power-driven tools, focusing on their applications, operational techniques, and safe handling practices.

Module XIII: I.T. Workshop:

Study and practice of computer hardware, including identification of components, and assembly and disassembly to achieve a fully working system.

Module XIV: Additive Manufacturing (3D Printing):

Study and demonstration of creating three-dimensional objects using additive manufacturing techniques.

- Note:**
1. Minimum eight modules should be covered in the semester.
 2. Examinations could involve the actual fabrication of simple components, utilizing one or more of the techniques covered above.

Suggested Readings:

1. Venugopal, K, "Workshop Manual", Anuradha Publications, Kumbakonam, TN, 2012.
2. K.C. John, "Mechanical Workshop" 2nd Edn., PHI, 2010.
3. Hajra Choudhury, S. K. (2021). *Elements of Workshop Technology, Volume 1: Manufacturing Processes* (16th Edition). Media Promoters & Publishers Pvt. Ltd., Mumbai.
4. Kalpakjian, S., & Schmid, S. R. (2023). *Manufacturing Engineering and Technology* (8th Edition). Pearson India.
5. Rao, P. N. (2018). "Manufacturing Technology: Foundry, Forming and Welding" (5th Edition). McGraw Hill Education (India) Pvt. Ltd., New Delhi.

Course Code	Course Title					Core/Elective	
25PC 154 CE	BASICS OF BUILDING DRAWING LABORATORY					Core	
Prerequisite	Contact Hours per Week				CIE	SEE	Credits
	L	T	D	P			
-	-	-	2	-	-	-	1

Course Objectives

The objectives of this course is to impart knowledge of:

Skill sets to prepare computer aided basic of building drawings

Details of sign conventions used in Civil Engineering

Visualizing the Plan, Elevation and Isometric view of basic components of building.

Course Outcomes

After completing this course, the student will be able to:

1. Illustrate the basic principles of building planning and drawings as per codal provisions
2. Apply the tools of AUTOCAD software to draw basic components of a building.
3. Draw plan, elevation and Isometric view of wall in English and Flemish Bond.
4. Draw plan, section and elevation of doors and windows – framed paneled and glazed
5. Draw Structural drawings of Beams, Columns and Isolated Footings

Sheet No	Description of the Topic
1	Introduction to 2D, co-ordinate systems, reference planes, Commands - Initial settings, Line commands, Edit Commands, Copy commands, Move Commands, Modify commands, Layers, Text and Dimensioning, Blocks.
2	Using tools of AUTOCAD, draw the sign convention used for different materials in Civil Engineering.
3	Brick Masonry Bonds Detailed drawing (section and elevation) of Brick wall English Bond Bond in odd and even courses - One brick wall and one and half brick wall,
4	Detailed drawing (section and elevation) of Brick wall Flemish Bond in odd and even courses - One brick wall and one and half brick wall,
5	Doors & Windows Detailed drawing(plan, section and elevation) of doors – Framed Door
6	Detailed drawing(plan, section and elevation) of doors paneled Door
7	Detailed drawing(plan, section and elevation) of glazed Door and Windows.
8	Introduction to Structural Drawing Detailed structural Drawing of an Singly Reinforced R.C.C. Beam
9	Detailed structural Drawing of an R.C.C Column.
10	Detailed structural Drawing of an R.C.C Footing.

Note:

- All drawings must be through commercially available software like AutoCAD, etc.

Suggested Readings:

GurucharanSinghandJagdishSingh, *Building planning, designing and scheduling*, Standard Publishers-Delhi, 2005

S.N Lal, "*Engineering Drawing with Introduction to Auto CAD*", Cengage Learning India Pvt Ltd, New Delhi, 2018.

Malik R.S., Meo, G.S. (2009) "*Civil Engineering Drawing*", Computech Publication Ltd New Asian

Sikka, V.B. (2013), "*A Course in Civil Engineering Drawing*", S.K. Kataria & Sons.

National Building Code,

Bureau of Indian Standards, New Delhi, 2005.

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