



Vision and Mission of the Institute

VISION:

To carve technically competent, Confident and socially responsible engineers.

MISSION:

- * To impart fundamental knowledge of science and technology.
- * To create a conducive ambience for better learning and to bring out creativity in the Students.
- * To instill managerial, entrepreneurial and soft skills.
- * To evolve as trusted destination for quality technical education.
- * To provide positive contribution to meet societal needs.
- * To inculcate a spirit of enquiry, make learning perceptive and rational.

Program Outcomes:

PO1: Engineering Knowledge: Apply knowledge of mathematics, natural science computing, engineering fundamentals and an engineering specialization as specified in WK1 to WK4 respectively to develop to the solution of complex engineering problems.

PO2: Problem Analysis: Identify, formulate, review research literature and analyze complex engineering problems reaching substantiated conclusions with consideration for sustainable development. (WK1 to WK4)

PO3: Design/Development of Solutions: Design creative solutions for complex engineering problems and design/develop systems/components/processes to meet identified needs with consideration for the public health and safety, whole-life cost, net zero carbon, culture, society and environment as required. (WK5)

PO4: Conduct Investigations of Complex Problems: Conduct investigations of complex engineering problems using research-based knowledge including design of experiments, modelling, analysis & interpretation of data to provide valid conclusions. (WK8).

PO5: Engineering Tool Usage: Create, select and apply appropriate techniques, resources and modern engineering & IT tools, including prediction and modelling recognizing their limitations to solve complex engineering problems. (WK2 and WK6)

PO6: The Engineer and The World: Analyze and evaluate societal and environmental aspects while solving complex engineering problems for its impact on sustainability with reference to economy, health, safety, legal framework, culture and environment. (WK1, WK5 and WK7).



PO7: Ethics: Apply ethical principles and commit to professional ethics, human values, diversity and inclusion; adhere to national & international laws. (WK9)

PO8: Individual and Collaborative Team work: Function effectively as an individual, and as a member or leader in diverse/multi-disciplinary teams.

PO9: Communication: Communicate effectively and inclusively within the engineering community and society at large, such as being able to comprehend and write effective reports and design documentation, make effective presentations considering cultural, language, and learning differences

PO10: Project Management and Finance: Apply knowledge and understanding of engineering management principles and economic decision-making and apply these to one's own work, as a member and leader in a team, and to manage projects and in multidisciplinary environments.

PO11: Life-Long Learning: Recognize the need for, and have the preparation and ability for i) independent and life-long learning ii) adaptability to new and emerging technologies and iii) critical thinking in the broadest context of technological change. (WK8)

Knowledge and Attitude Profile (WK)

WK1: A systematic, theory-based understanding of the natural sciences applicable to the discipline and awareness of relevant social sciences.

WK2: Conceptually-based mathematics, numerical analysis, data analysis, statistics and formal aspects of computer and information science to support detailed analysis and modelling applicable to the discipline.

WK3: A systematic, theory-based formulation of engineering fundamentals required in the engineering discipline.

WK4: Engineering specialist knowledge that provides theoretical frameworks and bodies of knowledge for the accepted practice areas in the engineering discipline; much is at the forefront of the discipline.

WK5: Knowledge, including efficient resource use, environmental impacts, whole-life cost, reuse of resources, net zero carbon, and similar concepts, that supports engineering design and operations in a practice area.

WK6: Knowledge of engineering practice (technology) in the practice areas in the engineering discipline.

WK7: Knowledge of the role of engineering in society and identified issues in engineering practice in the discipline, such as the professional responsibility of an engineer to public safety and sustainable development.

WK8: Engagement with selected knowledge in the current research literature of the discipline, awareness of the power of critical thinking and creative approaches to evaluate emerging issues.

WK9: Ethics, inclusive behavior and conduct. Knowledge of professional ethics, responsibilities and norms of engineering practice.



SRI SIDDHARTHA ACADEMY OF HIGHER EDUCATION (SSAHE)

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SRI SIDDHARTHA INSTITUTE OF TECHNOLOGY, TUMAKURU-572105

(A Constituent College of SSAHE, Accredited by NBA)



Scheme of Teaching and Examination for NEP 160 Credits (2025 Scheme)

FIRST YEAR B.E., COMMON TO ALL BRANCHES

1ST SEMESTER - PHYSICS GROUP

ACADEMIC YEAR: 2025-26

Sl. No.	Course Code		Course Title	Teaching Dept.	Teaching Hrs.					Credits	Examination			
					L	T	P	S	Total		CIE Marks	SEE Marks	Total Marks	Exam Hrs.
1	BS	25MA101	Calculus and Linear Algebra	MA	28	14	0	48	90	3	50	50	100	3
2	BS	25PH102	Engineering Physics	PH	42	0	28	50	120	4	50	50	100	3
3	ES	25EC103	Basic Electronics Engineering	EC	42	0	28	50	120	4	50	50	100	3
4	ES	25CS104	Programming with C	CS	42	0	0	48	90	3	50	50	100	3
5	ES	25CV105	Basic Civil Engineering	CV	42	0	0	48	90	3	50	50	100	3
6	ES	25CS106	C- Programming Lab	CS	0	0	28	2	30	1	50	50	100	3
7	ES	25MD107	Computer Aided Engineering Drawing	ME	14	0	28	18	60	2	50	50	100	3
8	HS	25HV108	Universal Human Values	HS	14	0	0	16	30	1	50	-	50	-
Total					224	14	112	280	630	21	400	350	750	

L: Lecture, T-Tutorial, P-Practical/Drawing, CIE: Continuous Internal Evaluation, SEE: Semester End Examination, S: Self Learning.

Credit Distribution: BS: Basic Science-07, ES: Engineering Science-13, HS: Humanity & Social Sciences-01, **Total=21 Credits.**



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Scheme of Teaching and Examination for NEP 160 Credits (2025 Scheme)

FIRST YEAR B.E., COMMON TO ALL BRANCHES

1ST SEMESTER - CHEMISTRY GROUP

ACADEMIC YEAR: 2025-26

Sl. No.	Course Code		Course Title	Teaching Dept.	Teaching Hrs.					Credits	Examination			
					L	T	P	S	Total		CIE Marks	SEE Marks	Total Marks	Exam Hrs.
1	BS	25MA101	Calculus and Linear Algebra	MA	28	14	0	48	90	3	50	50	100	3
2	BS	25CH102	Engineering Chemistry	CH	42	0	28	50	120	4	50	50	100	3
3	ES	25EE103	Basic Electrical Engineering	EE	42	0	28	50	120	4	50	50	100	3
4	ES	25CS104	Programming with C	CS	42	0	0	48	90	3	50	50	100	3
5	ES	25ME105	Basic Mechanical Engineering	ME	42	0	0	48	90	3	50	50	100	3
6	ES	25CS106	C- Programming Lab	CS	0	0	28	2	30	1	50	50	100	3
7	ES	25XX107	Department Skill Lab-1 25CS107-CS, IS, AI, DS, CY, RA 25EC107-EC, 25ET107-ET, 25BM107-BM, 25CV107-CV, 25EE107-EEE, 25ME107-ME	Dept. Specific	0	0	28	2	30	1	50	50	100	3
8	HS	25HS108	Communicative English	HS	14	0	0	16	30	1	50	-	50	-
9	HS	25EN109	Environment Studies	HS	14	0	0	16	30	1	50	-	50	
Total					224	14	112	280	630	21	450	350	800	

L: Lecture, T-Tutorial, P-Practical/Drawing, CIE: Continuous Internal Evaluation, SEE: Semester End Examination, S: Self Learning

Credit Distribution : BS: Basic Science-07, ES: Engineering Science-12, HS: Humanity & Social Sciences-02, Total=21Credits



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Scheme of Teaching and Examination for NEP 160 Credits (2025 Scheme)

FIRST YEAR B.E., COMMON TO ALL BRANCHES

2ND SEMESTER - PHYSICS GROUP

ACADEMIC YEAR: 2025-26

Sl. No.	Course Code		Course Title	Teaching Dept.	Teaching Hrs.					Credits	Examination			
					L	T	P	S	Total		CIE Marks	SEE Marks	Total Marks	Exam Hrs.
1	BS	25MA201	Advanced Calculus and Numerical Methods	MA	28	14	0	48	90	3	50	50	100	3
2	BS	25PH202	Engineering Physics	PH	42	0	28	50	120	4	50	50	100	3
3	ES	25EC203	Basic Electronics Engineering	EC	42	0	28	50	120	4	50	50	100	3
4	ES	25CS204	Programming With Python	CS	42	0	0	48	90	3	50	50	100	3
5	ES	25CV205	Basic Civil Engineering	CV	42	0	0	48	90	3	50	50	100	3
6	ES	25CS206	Python Programming Lab	CS	0	0	28	2	30	1	50	50	100	3
7	ES	25MD207	Computer Aided Engineering Drawing	ME	14	0	28	18	60	2	50	50	100	3
8	HS	25HV208	Universal Human Values	HS	14	0	0	16	30	1	50	-	50	-
				Total	224	14	112	280	630	21	400	350	750	

L: Lecture, T-Tutorial, P-Practical/Drawing, CIE: Continuous Internal Evaluation, SEE: Semester End Examination, S: Self Learning.

Credit Distribution: BS: Basic Science-07, ES: Engineering Science-13, HS: Humanity & Social Sciences-01, **Total=21Credits.**



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FIRST YEAR B.E., COMMON TO ALL BRANCHES

2ND SEMESTER - CHEMISTRY GROUP

ACADEMIC YEAR: 2025-26

Sl.No.	Course Code		Course Title	Teaching Dept.	Teaching Hrs.					Credits	Examination			
					L	T	P	S	Total		CIE Marks	SEE Marks	Total Marks	Exam Hrs
1	BS	25MA201	Advanced Calculus and Numerical Methods	MA	28	14	0	48	90	3	50	50	100	3
2	BS	25CH202	Engineering Chemistry	CH	42	0	28	50	120	4	50	50	100	3
3	ES	25EE203	Basic Electrical Engineering	EE	42	0	28	50	120	4	50	50	100	3
4	ES	25CS204	Programming With Python	CS	42	0	0	48	90	3	50	50	100	3
5	ES	25ME205	Basic Mechanical Engineering	ME	42	0	0	48	90	3	50	50	100	3
6	ES	25CS206	Python Programming Lab	CS	0	0	28	2	30	1	50	50	100	3
7	ES	25XX207	Department Skill Lab-1 25CS207-CS, IS, AI, DS, CY, RA 25EC207-EC, 25ET107-ET, 25BM207-BM, 25CV207-CV, 25EE207-EEE, 25ME207-ME	Dept. Specific	0	0	28	2	30	1	50	50	100	3
8	HS	25HS208	Communicative English	HS	14	0	0	16	30	1	50	-	50	-
9	HS	25EN209	Environmental Studies	HS	14	0	0	16	30	1	50	-	50	-
				Total	224	14	112	280	630	21	450	350	800	

L: Lecture, T-Tutorial, P-Practical/Drawing, CIE: Continuous Internal Evaluation, SEE: Semester End Examination, S: Self Learning.

Credit Distribution : BS: Basic Science-07, ES: Engineering Science-12, HS: Humanity Science-02, Total=21Credits.



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Syllabus for the Academic Year 2025-26



Department: Mathematics			Semester: I
Subject: Calculus and Linear Algebra			
Subject Code:	25MA101	L – T – P - S:	42-0-0-48 (In Hrs)
		Credits:	3

Sl. No	Course Objectives
This course will enable the students to :	
1	Master the basic tools of differential and integral calculus.
2	Study the concept of partial differentiation and series expansion.
3	Study the differential equations and its applications.
4	Develop the knowledge of linear algebra and differential equations applicable for Engineering problems.
Pre –Requisites	
Fundamentals and concepts of calculus, Matrices and ODE's.	

Note: Suggested Software: Matlab/Scilab/Python

Module	Description	Hrs
I	Differential Calculus: Review of elementary calculus, polar curves-angle between the radius vector and tangent, angle between two curves, Pedal equations. Curvature and radius of curvature-Cartesian, parametric and polar forms (without proof)-problems. Using Modern tool, find the angle between polar curves, curvature. (Text I: 4.7 to 4.11, Text III: 1.1 to 1.3, 5.1, 6.1)	9
II	Linear Algebra: Elementary row transformation of a matrix, Echelon form. Solution of system of linear equations- Gauss-Elimination method and Gauss-Seidel method. Eigen values and Eigen vectors, Rayleigh's Power method. Using Modern tool, find the solution of system of linear equations, find the Eigen values and Eigen vectors. (Text I: 2.7, 2.9, 2.10, 2.13 , Text II: 6.3 to 6.5, 7.1 , Text III: 6.5)	9
III	Partial differentiation-I: Definition of Partial differentiation, Total derivatives - differentiation of composite functions. Using Modern tool, find Partial derivatives, and total derivatives.	8



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	(Text I: 5.2, 5.5, Text II: 11.3)	
IV	Partial differentiation-II: Jacobians, Maxima and Minima for a function of two variables. Taylor's and Maclaurin's series expansions for one variable (Statement only)-problems. Using Modern tool, find Jacobian and Maxima and Minima for a function of two variables. (Text I: 5.7, 5.11, 5.12)	8
V	Ordinary Differential Equations (ODE): Review of Differential equation, Bernoulli's differential equation. Exact differential equation and reducible to Exact differential equation of the Types: (i) $\frac{M_y - N_x}{N} = g(x)$ (ii) $\frac{N_x - M_y}{M} = h(y)$. Orthogonal trajectories. Using Modern tool, find solution of first order differential equation and plotting the graphs. (Text I: 11.4, 11.10 to 11.12, 12.3, Text II: 1.5, 1.6, 1.8)	8

Text Books:

Sl No	Text Book title	Author	Volume and Year of Edition
1	Higher Engineering Mathematics	B.S. Grewal	44 th Edition Khanna Publications, 2021.ISBN:9788193328491
2	Advanced Engineering Mathematics	E. Kreyszig, John Wiley & Sons	10 th Edition JonWiley & Sons, 2018. ISBN: 9781119446842
3	MATLAB Programming for Engineers	Stephen J Chapman	7 th Edition, Cengage, 2024. ISBN: 9798214001531

Reference Books:

Sl No	Text Book title	Author	Volume and Year of Edition
1	Advanced Engineering Mathematics	C. Ray Wylie, Louis C. Barrett, McGraw-Hill Book Co	6 th Edition. 2017, ISBN:9780070722064
2	A Text Book of Engineering Mathematics	N.P.Bali and Manish Goyal	10 th Edition Lakshmi Publishers, 2022, ISBN:



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			9788131808320.
3	Higher Engineering Mathematics	B.V.Ramana, Tata McGraw-Hill	11 th Edition, Tata McGraw-Hill, 2017, ISBN:9780070634190

Course Outcomes:

Course outcome: After the successful completion of the course, the student will be able to	
CO1	Explain the basic concepts of Calculus, Ordinary Differential Equations, series expansion and Linear Algebra.
CO2	Apply the techniques of Calculus and Linear Algebra to solve Engineering problems.
CO3	Analyze the variations associated with voltage, resistance power, oscillations, errors, accuracy, Maxima and Minima using Calculus.
CO4	Use modern tool to solve/visualize Engineering problems by applying principles of Calculus, Differential Equations and Linear Algebra.
CO5	Apply the concept of partial differentiation and ordinary differential equation in the engineering field.

Course Articulation Matrix:

PO/PSO CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PSO1	PSO2
CO1	3	2											
CO2	3	1											
CO3	3	2	1								1		
CO4	1				2						1		
CO5		2	1								1		



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Syllabus for the Academic Year 2025-26



Department: Physics	Semester:	I/II
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Subject: Engineering Physics				
Subject Code:	25PH102/202	L – T – P - S:	42-0-28-50 (In Hrs)	
			Credits	4

Sl. No	Course Objectives
1	To understand fundamental principles of elasticity, vibrations, and material properties.
2	To apply concepts of nanomaterials and superconductivity in engineering fields.
3	To analyze quantum mechanics and wave-related phenomena.
4	To evaluate the applications of lasers, fiber optics, and black-body radiation.

Module	Description	Hrs
I	Elasticity: Introduction, Stress and Strain, Hooke's law, Expression for Young's modulus (Y), Bulk modulus (k) and Rigidity modulus (n), Poisson's ratio (σ) and relation between the Elastic constants (Y, k, n & σ). Bending of beams, Single cantilever (derivation). Text 2: Chapter 3, Text 3: 7.1-7.8, 7.13-7.15, 7.18-7.20 Vibrations: Introduction, Free vibrations, Damped vibrations (theory) and Forced vibrations (theory), Resonance- amplitude and sharpness of resonance. Numerical problems. Text 2: Chapter 1, Text 3: 33.9-33.13	9
II	Nano Materials: Introduction, Principles, Composite materials, Nano scale systems, Smart materials, MEMS and Carbon Nanotubes. Text 1: Chapter 10 Superconductivity: Introduction, Temperature dependence of resistivity in superconducting metals. Effect of magnetic field (Meissner effect). Type I & Type II superconductors, Temperature dependence of critical field, BCS theory, High temperature superconductors and applications of superconductors. Text 1: Chapter 8, Text 3: 60.10-60.13	8
III	Shock Waves: Introduction, Mach number. Distinctions between	9



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	acoustic, ultrasonic, subsonic, transonic, supersonic and hypersonic waves. Description of a shock wave & its applications. Text 2: Chapter 2 Wave Mechanics: Introduction, wave-particle dualism, de-Broglie wavelength, phase and group velocity, Expression for de-Broglie wavelength by the concept of group velocity. Quantum Mechanics: Heisenberg's Uncertainty principle (no derivation), Applications-Non-existence of electrons in the nucleus, Wave function, Physical significance of wave function, Schrodinger wave equation in one dimension (derivation), Eigen values and Eigen function Applications: For a free particle and particle in one dimensional potential well of infinite height. Numerical problems. Text 1: Chapter 1, Text 2: Chapter 6, Text 3: 57.1-57.3, 57.6, 57.10-57.13, 57.15-57.17	
IV	Fiber Optics: Introduction, Principle, Propagation mechanism, numerical aperture and expression, V-number, Types of optical fibers and mode of propagation, attenuation and mechanism - radiation loss (micro and macroscopic bends). Applications-Point to point communication system with block diagram. Advantages and disadvantages of optical communication system. numerical problems. Text 1: Chapter 7, Text 2: Chapter 5, Text 3: 32.1, 32.5-32.12 Lasers: Introduction, Review of principles-three types of interaction with matter, Einstein's coefficients (Expression for energy density at thermal equilibrium). Semiconductor Laser (Construction, Working and Energy level diagram). Holography, applications of laser in Science, Engineering and Medicine. numerical problems. Text 1: Chapter 6, Text 2: Chapter 7, Text 3: 31.1-31.3, 31.6, 31.8	8
V	Black-body Radiation: Introduction, Laws of blackbody radiations - Wien's law, Rayleigh Jean's law, Stefan's law and Planck's law, Numerical problems. Text 1: Chapter 1 Material Science: Introduction, band theory of solids - Distinguish between conductors, semiconductors and insulators based on band-gap, Fermi energy, LCR series (acceptor) and parallel (rejector) resonance circuits, Numerical problems.	8



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	Text 3: 49.14,60.1-60.3	
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LAB CONTENT

Sl. No	Experiment Description
1	Determination of young's modulus of the material by Single Cantilever.
2	Determination of Moment of inertia of Irregular body and Rigidity modulus of the wire by Torsional Pendulum.
3	Determination of Frequency of AC source by Sonometer.
4	Determination of Band gap of semiconductor.
5	Determination of Fermi energy of copper wire.
6	Determination of Wavelength of Semiconductor Laser.
7	Verification of Stefan's law.
8	Determination of Planck's constant using LED's of known wavelengths.

Text Books:

Sl No	Text Book title	Author	Volume and Year of Edition
1	Engineering Physics	S. P. Basavaraju	Edition 2010
2	Engineering Physics	S. P. Basavaraju	Edition 2018
3	Engineering Physics	R. K. Gaur & S. L. Gupta	Danpath Rai Publications, 2012

Reference Books:

Sl No	Text Book title	Author	Volume and Year of Edition
1	Nanosystems – Molecular machinery, manufacturing and computation.	K. Eric Drexler	Wiley ISBN-13:978-0471575184, 1992
2	Shock waves made simple	Chintoo S. Kumar, K Takayama and K.P.J. Reddy	Wiley, 2014
3	Lasers – Theory and applications	K. Thyagarajan and A. K. Ghatak	Plenum Press, New York, 1981



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Syllabus for the Academic Year 2025-26



Course Outcomes:

Course outcome	Descriptions
CO1	Explain the behaviour of elastic and vibrating systems.
CO2	Apply knowledge of nanomaterials and superconductors in real-world scenarios.
CO3	Analyze shock waves, wave mechanics, and quantum mechanics concepts.
CO4	Evaluate the working principles of fiber optics and lasers.
CO5	Demonstrate experimental skills by conducting basic physics lab experiments

Course Articulation Matrix:

PO/PSO CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PSO1	PSO2
CO1	3	2	1	2									
CO2	3	2	1	1									
CO3	3	1											
CO4	3												
CO5	3												



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Syllabus for the Academic Year 2025-26



Department: Chemistry	Semester: I & II
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Subject: Engineering Chemistry				
Subject Code:	25CH102 / 202	L – T – P - S:	42-0-28-50 (In Hrs)	
			Credits	4

Sl. No	Course Objectives
1	Realize the social issues such as water contamination and use of chemical fuels and also the analysis of certain chemical constituents to find their composition by volumetry
2	Identify the Use of different electrodes, electrochemical energy systems and their applications.
3	Promote the students to learn construction, applications of different electrochemical energy storage/conversion devices, and Mechanism of corrosion, behaviour of metals under different environment.
4	Enable the students to understand the role of materials used for engineering applications and analysis of certain solutions to find their composition by instrumentation methods.
5	Facilitate the student about the role of chemistry in display devices and sensor materials used in various field

Module	Description	Hrs
I	NATURAL RESOURCES Chemical Fuels - Introduction, fuels - definition, classification with examples. Calorific value – definition, Gross & Net calorific value, units (SI). Experimental determination of calorific value of Solid fuel by Bomb Calorimeter, Numerical problems. Knocking - definition, mechanism, ill effects. Prevention of knocking - antiknocking agents, unleaded petrol, power alcohol. Water Chemistry – Introduction, sources and impurities in water - Water analysis - determination of different constituents in water – hardness by EDTA method, Definition of BOD and COD, determination of Chemical Oxygen Demand, Numerical problems on COD. Purification of water - Sewage treatment, Reverse osmosis. Estimation of Metal ion Concentration: Estimation of Calcium	08



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	Oxide in Cement, Copper in Brass alloy and Iron in Hematite ore solution.	
II	ELECTRODE SYSTEMS AND CELL POTENTIAL Cell potential – Definition, single electrode potential, standard electrode potential, Free Energy and EMF. Derivation of Nernst equation for single electrode potential and Nernst equation for a cell. Concentration cell – definition and derivation of equation for concentration cell. Numerical problems on E , E^0 , EMF^0 & concentration cell. Electrodes - Types of electrodes. Reference electrode - Calomel electrode – construction, working and applications. Ion selective electrode - Glass electrode - construction and principle, determination of pH using Glass electrode.	08
III	ENERGY SYSTEMS AND CORROSION STUDIES Energy Storage System – Battery - definition, principle components of battery, Classification - primary, secondary and reserve batteries with examples. Characteristics of a battery. Ni-MH and Li-MnO ₂ , Zn-Air batteries - construction, working & applications. Fuel Cells – Introduction, definition, advantages of fuel cells, working of Methanol-Oxygen fuel cell, differences between battery and fuel cell. Metallic Corrosion -Definition, electrochemical theory of corrosion.	08
IV	INSTRUMENTAL METHODS OF ANALYSIS Instrumental methods of analysis - Introduction, advantages of instrumental methods over conventional methods. Colorimetry - derivation of Beer-Lambert's law. Principle, instrumentations and applications of Colorimetry, Potentiometry and Conductometry. Determination of pK _a value of the given soft drink using pH meter. Determination of Viscosity Coefficient of given lubricant oil using Ostwald's Viscometer.	08
V	CHEMISTRY OF DISPLAY SYSTEMS AND SENSORS Display Systems: Photoactive, electroactive materials, nanomaterials and organic molecules used in display devices. Liquid crystals (LC's)- Introduction, classification, properties and applications. Organic light emitting Diodes (OLED's) - Introduction, properties and applications, Quantum Dot Light Emitting Diodes (QDLED's) - Introduction, properties and applications, Light emitting electrochemical cells.	10



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	Sensors: Introduction- Components, working principle of Sensors, construction, working and applications of Conductometric sensors, Electrochemical sensors, Optical sensors and Gas sensors.	
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LAB CONTENT

Sl. No	Experiment Description
PART-A	
1	Determination of total hardness of a sample of water using disodium salt of EDTA.
2	Determination of Calcium Oxide in the given sample of cement solution (Rapid EDTA method).
3	Determination of percentage of copper in Brass alloy using standard Sodium Thiosulphate solution.
4	Determination of Iron in the given sample of Hematite ore solution (External Indicator method) using $K_2Cr_2O_7$ solution.
5	Determination of Chemical Oxygen Demand of the given Industrial waste water sample.
PART-B	
1	Determination of pKa value of the given soft drink using pH meter.
2	Potentiometric estimation of Iron present in stainless steel solution using standard $K_2Cr_2O_7$ solution.
3	Colorimetric estimation of copper in a conducting wire solution.
4	Determination of Viscosity Coefficient of given lubricant oil using Ostwald's Viscometer.
5	Conductometric estimation of acid mixture against strong base.

Text Books:

Sl No	Text Book title	Author	Volume and Year of Edition
1	Engineering Chemistry	Putti R. Vijayasathy	New Edition, by Prentice Hall of India
2	Chemistry for Engineering Students	Dr. B.S. Jai Prakash Prof. R. Venugopal Dr. Shivakumaraiah Dr. Pushpa Iyengar	1 st Edition, 2018



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Reference Books:

Sl No	Text Book title	Author	Volume and Year of Edition
1	Engineering Chemistry: Concepts In Chemistry For Engineering	Satya Prakash & Manisha Agrawal	1 st Edition, 2012
2	Engineering Chemistry - 2024	Bhaskar Chaurasia, Rajiv Kumar Chaurasia, Jitendra Chaurasia	1 st Edition, 2024
3	Principles Of Physical Chemistry	Puri, Sharma, Pathania	49 th Edition, 2024
4	Principles of Instrumental Analysis	Douglas A. Skoog/F. James Holler/Stanley R. Crouch	7 th Edition, 2018
5	Vogel's Text Book of Quantitative Inorganic Analysis.	J.Basset, R.C.Denny, G.H.Jaffery	4th Edition

Course Outcomes:

Course outcome	Descriptions
CO1	Identify solutions for the social issues such as water contamination and use of chemical fuels and they can analyze some certain solution composition.
CO2	Acquire the knowledge on the concept of cell potential, electrodes and their applications.
CO3	Remember the different electrochemical energy storage-Conversion devices, and gain the knowledge of mechanism, effect of various environmental factors on metallic corrosion.
CO4	Account for the applications of instrumental techniques and they can analyze some certain solution composition.
CO5	Be made aware of the different types of sensors and display devices as industry applicants .



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Course Articulation Matrix:

PO/PSO CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PSO1	PSO2
CO1	3	3		3		2	2	2		1			
CO2	3	3				2	2	2		1			
CO3	3	3		3	3	2	2	2		1			
CO4	3	3	3			2	2	2		1			
CO5	3	3	3			2	2	2		1			



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Department: Electronics and Communication Engineering	Semester:	I/II
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Subject: Basic Electronics Engineering			
Subject Code:	25EC103 / 25EC203	L – T – P - S:	42 - 0 - 28 - 50
		Credits	4

Sl. No	Course Objectives
1	Study the basic characteristics and operation of electronic devices & digital electronics.
2	Acquire the knowledge and to understand the importance of transistor configuration and biasing techniques.
3	Understand the working principle of amplifier, oscillators, application of op-amp and fundamentals of digital electronics.
4	Conduct an experiment to understand the characteristics of diode, transistor, logic gates and applications of op-amp.

Module	Description	Hrs
I	Semiconductor Diode and its applications: Introduction to P-N junction diode, VI Characteristics, Parameters, Diode current equation, Applications: Half-Wave Rectifier, Center tapped full-wave rectifier and Bridge Rectifier (no derivations), Capacitor filter circuit, Zener diode as a voltage regulator. (TEXT 1: 1.1, 1.2, 1.6, 1.15, 2.7, 2.8)	9
II	Bipolar Junction Transistors: Introduction to BJT: Characteristics of common emitter configuration and Common base configuration, DC load line and operating point, Biasing techniques: Fixed bias, Voltage divider bias, Construction and working of N- channel JFET, N – channel Enhancement MOSFET (TEXT 1: 3.1, 3.2, 3.4, 3.6, 4.1, 4.2, 4.3, 4.5, 5.2, 5.8)	9
III	Amplifier and Oscillators: Introduction to types of feedback Single stage RC coupled amplifier and its frequency response, Introduction to Oscillator:, Barkhausen criteria for oscillations, Hartley oscillator, Colpitt's oscillator and Crystal Oscillator. (TEXT 1: 17.1, 17.2, 17.5, 17.8, 17.9)	8



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IV	Operational Amplifier: Introduction to Op-amp, Basic block diagram of an Operational amplifier, Ideal characteristics, Operational amplifier as a Voltage follower, Inverting and Non-inverting amplifier, Summing Circuit, Integrator and Differentiator. (TEXT 1: 13.1, 13.2, 13.3, 13.4)	8
V	Digital Electronics: Introduction, De-Morgan's theorem, Boolean laws, Logic gates, Half adder & Full adder (Using Basic gates), Generation of switching equation from truth table, Canonical forms (2 & 3 variables), K-map (without don't care terms). (TEXT 2: 3.1,3.2,3.5,4.4,3.9,5.1)	8

LAB CONTENT:

Sl. No	Experiment Description
1	Plot the V-I characteristic of P N junction diode.
2	Determine the efficiency and ripple factor of Half Wave Rectifier with and Without C-filter.
3	Determine the efficiency and ripple factor of Bridge Rectifier with and Without C-filter.
4	Study the Characteristics of NPN transistor in CE Configuration.
5	Determine the gain of Inverting and Non-inverting amplifier.
6	Verify the truth table of logic gates.
7	Verify the truth table of Half adder using basic gates.
8	Verify the truth table of Full adder using basic gates.



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Text Books:

Sl No	Text Book title	Author	Volume and Year of Edition
1	Electronic Devices and Circuit Theory	Robert L Boylestad, Louis Nashelsky	Pearson Publication- 2005 ISBN: 81-203-2064-6
2	Digital Principles and Design	Donald D. Givone	Tata McGraw- Hill-2002 ISBN: 0070529006-X

Reference Books:

Sl No	Text Book title	Author	Volume and Year of Edition
1	Basic Electronics	D P Kothari, I J Nagrath	McGraw Hill Education- 2014
2	Op-Amp and Linear Integrated Circuits	Ramakant A. Gayakwad	Prentice Hall India-2011
3	Electronics Devices and Circuits	David A. Bell	Prentice Hall India-2008

Course Outcomes:

CO's	Descriptions
CO1	Outline the characteristics of basic electronic devices- Diode, Transistor, JFET, MOSFET.(L2)
CO2	Illustrate the biasing techniques, configurations of a transistor and application of diode.(L2)
CO3	Demonstrate the various basic analog electronics circuits, digital circuits experimentally & acquire the role of operational amplifiers in linear analog applications.(L2)
CO4	Explain the importance and working of various oscillator and amplifier circuits. (L2)



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CO5	Recall the rules and laws of Boolean algebra to simplify logic circuit and formulate the K-map simplification technique to design digital circuits. (L1)
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Course Articulation Matrix:

PO/PSO CO	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PSO 1	PSO 2
CO1	2												
CO2	1	2											
CO3		1	1										
CO4	1		2										
CO5	1		1										



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Department: Electrical & Electronics Engineering	Semester: I / II
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Course: Basic Electrical Engineering		
Course Code: 25EE103/203	Credits: 4	L – T – P - S: 42-0-28-50 (in Hrs.)

Sl. No	Course Objectives
1	To acquire the knowledge on energy sources, domestic wiring and special electrical motors.
2	To understand the construction and principle of operation of DC and AC Machines.
3	To evaluate the performance of Electrical Machines.
4	To Analyze the Construction and Principle of Operation of Single Phase Transformers.
5	To demonstrate and conduct suitable experiment on electrical machines for their performance evaluation.

Module	Description	Hrs.
I	Energy Sources: Classification of Energy Sources, Energy Sectors, Energy scenario in India. Conventional Energy Sources (block diagram approach) - Thermal Energy, Nuclear Energy. Non-Conventional Energy Sources (block diagram approach) - Solar, Wind Energy. Text Book 2 : 1.1,1.3,1.4,1.5,1.6	09
II	DC Machines: Construction and types. DC Generator: Principle of operation, EMF equation, types (series and shunt), Illustrative examples. DC Motor: Principle of operation, back EMF, torque equation, types (series and shunt), Illustrative examples. Text Book 1 : 2.1,2.2,2.3,2.4,2.7,2.9,2.10,2.11,2.12, 2.13, 2.14	08
III	Single Phase Transformers: Construction, types, working principle, EMF equation, transformation ratio, losses, efficiency by direct loading method, illustrative examples. Text Book 1: 5.1,5.2,5.3,5.4,5.7,5.12	08



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IV	AC Machines: Alternators: Construction and working principle, EMF equation, Illustrative Examples. Three Phase Induction motors: Construction and principle of operation, Illustrative examples on Slip Calculation. Text Book 1 : 4.13,4.15,4.18,4.19,5.16, 5.18	08
V	Domestic wiring: Two way and three way control of lamp, elementary discussion on fuse, MCB, Electric shock, precautions against shock, need for Earthing, types of Earthing. Special Electrical Motors: Construction and working principle of Stepper motor, BLDC motor, applications. Text Book 1: 3.27,3.28,3.29,3.30,3.31,3.32 Text Book 3: 21.12,21.15	09

LAB CONTENT

Sl. No.	Experiment Description
1	Determination of Power factor for different lighting systems.
2	Battery charging using solar energy.
3	Determination of Back EMF in DC shunt motor.
4	Speed Control of DC shunt Motor.
5	Determination of the Efficiency of transformer by direct loading method.
6	Verification of truth table for two way and three way control of lamp
7	Demonstration of Stepper motor.
8	Demonstration of BLDC motor.

Text Books:

Sl. No.	Text Book title	Author	Volume and Year of Edition
1	Basic Electrical Engineering,	Kulshreshtha D C	Revised first edition 2017, TMH Publications, New Delhi.
2	A Course in Electrical Power	Soni, Gupta & Bhatnagar	Dhanpat Rai and Sons (New Delhi), 2013
3	Theory and Performance of Electrical Machines	J B Gupta	First Audition, S K kataria & Sons –New Delhi,



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Reference Books:

Sl. No.	Text Book title	Author	Volume and Year of Edition
1	Basic Electrical Engineering	M V Rao	Subhash Publications, Bangalore, 2023.
2	Fundamentals of Electrical Engineering	B L Theraja	Volume 1, S Chand Publications, New Delhi, 2006.

Course Outcomes:

Course outcome	Descriptions
CO1	Acquire the knowledge on energy sources, domestic wiring and special electrical motors.
CO2	Understand the construction and principle of operation of DC and AC Machines.
CO3	Evaluate the performance of Electrical Machines.
CO4	Analyze the Construction and Principle of Operation of Single Phase Transformers.
CO5	Demonstrate and conduct suitable experiment on electrical machines for their performance evaluation.

Course Articulation Matrix

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



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Department: Computer Science and Engineering		Semester:	I
Subject: Programming With C			
Subject Code:	25CS104	L – T – P - S:	42-0-0-48 (In Hrs)
		Credits:	3

Sl. No	Course Objectives
1	To impart adequate knowledge on the need of programming languages and problem solving techniques.
2	To develop programming skills using the fundamentals and basics of C Language.
3	To understand the effective usage of data types, operators, decision making and looping statements.
4	To enable effective usage of arrays, strings, functions, pointers, structures and unions.

Module	Description	Hrs
I	Overview of problem solving techniques (pseudocodes, algorithms and flowcharts). Text 2: 1.1, 1.2 Overview of C: Basic structure of C program, C-Tokens, Keywords and Identifiers, Constants, Variables, Data Types, Declaration of Variables, Defining Symbolic Constants. Operators and Expressions: Arithmetic Operators, Relational Operators, Logical Operators, Assignment Operators, Increment and Decrement Operators, Conditional Operators, Bitwise Operators, Special Operators, Arithmetic Expressions, Evaluation of Expressions, Precedence of Arithmetic Operators. Type Conversion in Expressions, Operator Precedence and Associativity. Managing Input and Output Operations: formatted and unformatted Input and Output statements, Example programs. Text 1: 1.8, 2.3-2.8, 2.11, 3.2-3.15, 4.2- 4.5	9
II	Decision Making and Branching: Decision Making with Simple if Statement, if...else Statement, Nesting of if...else statements, else...if Ladder, switch Statement, goto statement. Example programs. Decision Making and Looping: The While statement, the do statement and for statement, unconditional branching: break, goto, continue,	9



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	return, Example programs. Text 1: 5.1-5.7, 5.9, 6.2-6.5	
III	Arrays: One dimensional array- declaration and initialization of one dimensional arrays, Two dimensional arrays - declaration and initialization of two dimensional arrays, Example programs. Strings: Declaring and Initializing String Variables, Reading and Writing strings, String-Handling Functions, Example programs. Text 1: 7.1-7.6, 8.2, 8.3,8.8	8
IV	Pointers: Declaring Pointer Variables, Initialization of pointer variables, Accessing a variable through its pointer. Functions: Need for User-Defined Functions, Elements of User Defined Functions, Category of Functions, Recursion. Example programs. Text 1: 11.4-11.6, 9.2,9.4,9.9,9.16	8
V	Structures and Unions: Defining a Structure, Declaring Structure Variables, Accessing Structure Members, Structure Initialization, Example programs. Unions: Defining union, declaring union variable, union initialization, Example programs. Text 1: 10.2-10.5, 10.12	8

Text Books:

Sl No	Text Book title	Author	Volume and Year of Edition
1	Programming in ANSI C	E. Balagurusamy	9th Edition, Tata McGraw-Hill Publication, 2024. ISBN-10: 9355326726 ISBN-13: 978-9355326720
2	Programming Techniques through C: A Beginners Companion	M.G. Venkateshmurthy	Pearson Education; 1st edition (1 January 2002); ISBN-10 : 9788131705087 ISBN-13 : 978-8131705087



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Reference Books:

Sl No	Text Book title	Author	Volume and Year of Edition
1	Schaum's outlines, Programming with C	Byron Gottfried	3rd Edition, Tata McGraw-Hill Publication, 2017. ISBN-10: 0070145903 ISBN-13: 978-0070145900
2	C: How to Program	Paul Deffell and Harvey Deitel	8th Edition, Pearson, 2015. ISBN- 10: 9780133976892 ISBN-13: 978-0133976892
3	Let us C	Yashwant Kanetkar	15th Edition, BPB Publication, 2016. ISBN-10: 8183331637 ISBN-13: 978-8183331630

Course Outcomes:

Course outcome	Descriptions
CO1	Describe the basic elements of C Programming.
CO2	Solve mathematical problems using operators and expressions.
CO3	Apply programming constructs of C language to solve problems.
CO4	Implement solutions to problems using derived data types.
CO5	Explore modular programming and user-defined data types.

Course Articulation Matrix:

PO/PSO CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PSO1	PSO2
CO1	3												
CO2	3	3	2			2	2	2	1		3		
CO3	3	3	3			2	2	2	1		3		
CO4	3	3	3			2	2	2	1		3		
CO5	3	3	3			2	2	2	1		3		



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Department: Civil Engineering		Semester:	I/II
Subject: Basic Civil Engineering			
Subject Code:	25CV105/25CV205	L – T – P -S:	42-0-0-48 (Hrs)
		Credits:	3

Course Objectives:

Sl. No.	This Course will enable the students to
1	Understand the scope of various fields of Civil Engineering and the concept of surveying.
2	Analyze the system of forces and to compute their resultant for different direction of forces.
3	Compute the reactions using equilibrium conditions of coplanar concurrent forces.
4	Compute the reactions for different types of loading applied on different kinds of supports using equilibrium conditions of coplanar non concurrent forces.
5	Understand the concept of friction, laws and its types.

Module	Description	Hrs.
I	Introduction to Civil Engineering: Scope of major fields of civil Engineering- Surveying, Geotechnical Engineering, Structural Engineering, Hydraulics & Water Resources, Transportation Engineering, Environmental Engineering. Building materials: ▪ Stones: Classification of rocks, requirements of good building stones and uses of stones. ▪ Bricks : Composition of good brick, requirements of good quality of brick, classification of bricks, difference between bricks and blocks. ▪ Cement : Composition of cement, Grades of cement and	9



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	applications. ▪ Steel: Grades of steel and properties. Introduction to chain surveying: Definition of Surveying, Basic Principles of Surveying, calculation of revenue areas by graphical methods (acres, gunters and cents).	
II	Force and force system: Basic idealizations-Particle, Continuum and Rigid body. Force-Definition and characteristics, classification of force systems, composition and resolution of forces. Principle of transmissibility. Simple Numerical problems on above. Moment of a force, couple and their characteristics, Varignon's theorem of moments, Numerical problems.	9
III	Equilibrium of coplanar concurrent forces: Definition of Equilibrant, Equilibrium, free body diagram, conditions of equilibrium. Lami's theorem and its problems.	8
IV	Equilibrium of coplanar non-concurrent forces: Types of supports, Types of beams-simply supported, cantilever and overhanging, types of loads-concentrated, uniformly distributed and uniformly varying. Problems on above.	8
V	Friction: Definition of Friction and its applications, angle of friction, angle of repose, coefficient of friction. Types of Friction, laws of friction, application of friction on blocks on horizontal and inclined planes. Ladder friction and problems.	8

Course Outcomes:

Course Outcomes	At the end of the course students will be able to
CO1	Familiar with the various fields of Civil Engineering and role of Civil Engineer in infrastructural development.
CO2	Compute the resultant for different direction of forces for coplanar concurrent force system.
CO3	Determine the reactions using equilibrium conditions of coplanar concurrent forces.
CO4	Determine the reactions at different types of supports for loadings.
CO5	Analyze and solve the friction applications in engineering field.



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Course Articulation Matrix:

PO/PSO CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PSO1	PSO2
CO1	3	2	2	2	1	3	2	2	3	1	2		
CO2	3	2	3	2	1	3	2	2	3	1	2		
CO3	3	3	2	2	3	2		2	1	1	1		
CO4	3	3	3	2	3	3	2	3	2	2	2		
CO5	3	3	3	2	3	3	2	3	2	2	2		

Text Books:

Sl. No.	Text Book Title	Author	Volume & Year of Edition
1	Elements of civil Engineering and mechanics	B K Kolhapure	3 rd edition, Jan 2018
2	Elements of Civil Engineering and Engineering Mechanics	M N SheshaPrakash and Ganesh B Mogaveer	3 rd edition, 2014

Reference Books:

Sl. No.	Text Book Title	Author	Volume & Year of Edition
1	Surveying (Volume I)	B C Punmia	13 th Edition, 2017
2	Strength of Materials	R K Bansal	6 th Edition, 2018



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Department: Mechanical Engineering		Semester:	I/II
Subject: Basic Mechanical Engineering			
Subject Code:	25ME105/205	L – T – P - S:	42-0-0-48 (In Hrs.)
Credits:			3

Sl. No	Course Objectives
This course will enable the students to:	
1	Acquiring a basic understanding about scope of mechanical engineering, fundamentals about steam and non-conventional energy resources.
2	Acquire a basic knowledge of various manufacturing techniques, Industrial automation and advanced manufacturing processes.
3	Understand the basics and working principle of IC engines, EV's, Hybrid electric vehicles and refrigeration.
4	Acquiring a basic insight into future mobility such as Mechatronics, robotics, CNC and Additive Manufacturing.

Module	Description	Hrs
I	INTRODUCTION TO MECHANICAL ENGINEERING Role of Mechanical Engineering in Industries and Society: Emerging trends and technologies in different sectors such as Energy, Manufacturing, Automotive and Aerospace. SUSTAINABLE ENGINEERING Introduction, sustainability- definition, need & concept of sustainable engineering. Introduction to Refrigeration: Principle of refrigeration, working principle of vapour compression refrigeration, List of commonly used refrigerants and its properties.	9
II	INTRODUCTION TO MECHATRONICS AND ROBOTICS Introduction to Mechatronics: Systems of mechatronics, advantages and disadvantages, measurement systems and control systems, open loop control systems and close loop control systems (with simple block diagrams), applications. Introduction to Robotics: classification of robots, parts of robots,	9



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	applications.	
III	Introduction to IC Engines working principles of 4-strokes petrol and diesel engines, comparison of 4-stroke petrol and diesel engines, use of MPFI in engine. Introduction to brakes, types of braking system-internal expanding shoe brake, hydraulic braking (Disc brake), Anti-lock Braking system (ABS), Electronic Brakeforce Distribution (EBD), Importance of airbags system (simple line diagram) Alternative fuels for future mobility: Introduction to biofuels, examples of various biofuels used in engineering applications. Hydrogen driven vehicles, advantages, limitations. Insight into Future Mobility Electric and hybrid vehicles- schematic diagram, components, advantages and limitations of Ev's and hybrid vehicles.	8
IV	MANUFACTURING USING MACHINE TOOLS Lathe: Principle of Working, Lathe operations; Turning, Facing, Knurling. Drilling: Principle of working, Working of Bench drilling machine. Drilling operations - Drilling, Boring, Reaming, Tapping. Introduction to Computer Numerical Control Machine (CNC): components of CNC, CNC system configuration, advantages, limitations of CNC & application of CNC.	8
V	JOINING PROCESS, DIGITAL MANUFACTURING, ADDITIVE MANUFACTURING & AUTOMATION: Joining Processes: soldering, brazing and welding definitions only, working of gas welding and arc welding. Introduction to digital manufacturing- machine learning (ML) applications, Industrial Internet of Things (IIoT), Human Machine Interface. Introduction to Additive Manufacturing: classification and any one concept of Additive Manufacturing (Fused deposition modelling). Applications of 3D printing in consumer electronics and IT industries. Automation in industry: Definition, types – fixed, programmable and flexible automation, basic elements with block diagrams, introduction to Programmable Logic Controller (PLC), advantages and limitations of automation.	8



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Textbooks:

Sl No	Textbook title	Author	Volume and Year of Edition
1	Basic Mechanical Engineering	Pravin Kumar	Second edition (2018), Pearson Education;
2	Basic Mechanical Engineering	M.P. Poonia & S.C. Sharma	First Edition (2018), Khanna Book Publishing Company

Reference Books:

Sl No	Textbook title	Author	Volume and Year of Edition
1	Basics of Mechanical Engineering	Vinkel Kumar Arora, Gurjeet Singh, Krishan Verma & Lalit Batra	First Edition (2023), New India Publishing Agency
2	Basic Mechanical Engineering	Basant Agrawal	First Edition (2008), Wiley India
3	Fundamentals of Mechanical Engineering and Mechatronics	Avinash Malladi, N. Ashok, S. Balu Mahandiran & Sambhrant Srivastava	First Edition (2021), Quill Tech Publications

Course Outcomes:

Course outcome: After the successful completion of the course, the student will be able to	
CO1	Identify the scope of Mechanical Engineering, sustainable practices, and basic refrigeration systems.
CO2	Explain the fundamentals of Mechatronics and Robotics and their industrial applications.
CO3	Illustrate principles of IC engines, braking systems, alternative fuels, and electric/hybrid vehicles.
CO4	Demonstrate basic operations of machine tools and analyze CNC system applications.
CO5	Evaluate manufacturing and automation processes, including additive manufacturing and PLCs.



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Course Articulation Matrix:

PO/PSO CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PSO1	PSO2
CO1	3	1	–	–	–	2	–	–	–	2	1	–	1
CO2	2	2	–	–	2	2	1	–	–	2	2	1	–
CO3	3	2	–	–	1	2	–	–	–	2	2	–	1
CO4	3	2	2	–	3	–	–	–	2	2	2	3	–
CO5	2	2	–	1	3	2	2	1	2	3	3	3	3



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Department: Computer Science and Engineering	Semester:	I
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Subject: C Programming Lab				
Subject Code:	25CS106		L – T – P - S:	0-0-28-2
			Credit	1

Sl. No	Course Objectives
1	To introduce programming using C language.
2	To enhance analyzing and Problem solving skills and use the same for writing programs in C.
3	To enable effective use of branching and looping concepts in developing programs.
4	To empower skill to develop programs using derived and user defined data types.

LAB CONTENT: Cycle 1

Sl. No	Experiment Description
1	a) Develop a C program to find the area of a circle. b) Develop a C program to find the simple and compound interest.
2	a) Develop a C program to find the area of triangle for given three sides. b) Develop a C program to check whether a number is positive or negative.
3	a) Develop a C program to find a number is odd or even. b) Develop a C program to check whether a given year is leap year or not.
4	a) Develop a C program to find the biggest of given three integer numbers. b) Develop a C program to check whether a person is eligible to vote or not.
5	a) Develop a C program to find and output all the roots of a given quadratic equation for non-zero coefficients. In case of errors, your program should display suitable error messages. b) Develop a C program to perform the operations like addition, subtraction, multiplication and division only on integers. Use switch statement.



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Cycle 2

Sl. No	Experiment Description
1	a) Develop a C program to display the grade of a student based on the marks. b) Develop a C program to demonstrate goto statement.
2	a) Develop a C program to check for a PERFECT number. b) Develop a C program to reverse a given integer number and check whether it is PALINDROME or not. Output the given number with suitable message.
3	a) Develop a C program to generate and display the first 'N' FIBONACCI numbers. b) Develop a C program to find the GCD and LCM of two integer numbers using Euclid's method.
4	a) Develop a C program to check a number is PRIME or not. b) Develop a C program to display and count the number of PRIME numbers in the range N1 and N2.
5	a) Develop a C program to read N integers number (zero, positive or negative) into an array and find the sum of all positive, negative and average of all input numbers. b) Develop a C program to sort N integer number in ASCENDING/DESCENDING using BUBBLE sort. Display both input array and sorted array with suitable headings.

Cycle 3

Sl. No	Experiment Description
1	a) Develop a C program to read N integer numbers into an array. Conduct a LINEAR search for a given KEY number and display success or failure in the form of a suitable messages. b) Develop a C program to read N integer numbers (in ASCENDING order) into an array. Conduct a BINARY search for a given KEY number and



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	display success or failure in the form of a suitable messages.
2	a) Develop a C program to read two matrices A(M*N) and B(P*Q) and perform ADDITION or SUBTRACTION of A and B. Find the TRACE of the resultant matrix. b) Develop a C program to find and display the TRANSPOSE of a matrix.
3	a) Develop a C program to read two strings and CONCATENATE them (without using library functions). Output the given strings along with the concatenated string. b) Develop a C program to check a given string is PALINDROME or not.
4	a) Develop a C program to read N names and sort them in alphabetical order. b) Develop a C program to multiply to matrices using functions.
5	a) Develop a C program to demonstrate the concept of CALL BY VALUE and CALL BY REFERENCE. b) Develop a C program to demonstrate the usage of structures.

Course Outcomes:

Course outcome	Descriptions
CO1	Design solutions for basic mathematical problems using fundamentals of C language.
CO2	Choose appropriate conditional control statements to solve problems.
CO3	Implement solutions using looping statements.
CO4	Develop solutions to problems using arrays, pointers, modular programming constructs and recursion.
CO5	Explore user-defined data types like structures and unions and use them in implementing solutions.



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Course Articulation Matrix:

PO/PSO CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PSO1	PSO2
CO1	3												
CO2	3	3	2			2	2	2	1		3		
CO3	3	3	3			2	2	2	1		3		
CO4	3	3	3			2	2	2	1		3		
CO5	3	3	3			2	2	2	1		3		



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Department: Mechanical Engineering		Semester:	I/II
Subject: Computer Aided Engineering Drawing			
Subject Code:	25MD107/25MD207	L – T – P - S:	14-0-28-18 (In Hrs)
		Credits:	2

Sl. No	Course Objectives
	This course will enable the students to:
1	Familiarize with the free hand sketching of basic geometrical constructions in Engineering Drawing for visualization of three-dimensional objects.
2	Apply the principles of scales, orthographic projections to draw elevation, plan and profile views of lines, planes and solids.
3	Apply the principles of projection of lines to find solutions to practical problems involving distances and inclinations.
4	Apply the fundamentals of solid geometry and develop lateral surfaces of solids.

Module	Description	Hrs
I	Introduction to Computer Aided Sketching: Introduction to Drawing instruments and their uses, BIS Conventions, Lettering, Dimensioning, geometrical constructions and freehand practicing. Introduction to software, commands used for engineering drawing. Orthographic Projections of Points, Lines and planes: Introduction to Orthographic projections, Orthographic projections of points and Orthographic projections of lines. (Placed in First quadrant only). Introduction, Projections of plane surfaces triangle, square, rectangle, pentagon, hexagon and circle planes in different positions by change of position method only (First Angle Projection Only).	3L+10P
II	Orthographic Projection of solids Introduction to projection of Solids, Orthographic projection of right regular solids (Solids Resting on HP only), tetrahedron, hexahedron (cube), Prisms, Pyramids of square, pentagon and Hexagon,	5L+10P



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	cylinders and cones in different positions (First angle Projection only).	
III	Isometric Projection Isometric scale, Isometric projection of plane surfaces, Isometric projection of hexahedron (cube), right regular prisms, pyramids, cylinders, cones, spheres, Isometric projection of combination of two simple solids.	2L
IV	Development of Lateral Surfaces Development of lateral surfaces of right regular prisms, cylinders, pyramids and cones resting with base on HP only. Development of lateral surfaces of their frustums and truncations.	2L
V	Engineering Applications Conversion of pictorial views of a simple machine part into orthographic projections. Sketching and Drawing Simple Mechanisms, Wiring and lighting diagrams using CAD software, basic Building Drawing, Electronic Drawing- PCB Drawings. Introduction to development of computer graphical packages.	2L+8P

Publications of Bureau of Indian Standards

1. IS 10714 (Part 20) – 2001 & SP 46 – 2003: Lines for technical drawings.
2. IS 11669 – 1986 & SP 46 – 2003: Dimensioning of Technical Drawings.
3. IS 15021 (Parts 1 to 4) – 2001: Technical drawings – Projection Methods.

NPTEL/SWAYAM/MOOC:

<https://nptel.ac.in/courses/112/103/112103019/>

Question paper Pattern:

1. A maximum of six questions must be set as per the following pattern			
Q. No	Question paper pattern	Marks Allotted	
1	Both questions are from projection of planes only with choice	15	
2	Both questions are from projection of Solids only with choice	25	



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3	Isometric projection or Development of Lateral Surfaces with choice	10
Total		50

Evaluation for Continuous Internal Evaluation (50 Marks):

1. 30 Marks for Class work (Sketching & Computer Aided Engineering drawing printouts in A4 size sheets).
2. At least one Test covering all the modules is to be conducted for 50 marks and evaluation to be based SEE pattern, and the same is to be scaled down to 20Marks.

Semester End Examination:

Q. No.	Solutions and sketching in the sketch book	Computer display and print out	Total Marks
1	6	9	15
2	10	15	25
3	10	0	10
Total Marks	26	24	50

Students must submit the computer printouts and the sketches drawn on the graph sheets at the end of the examination. Both Internal and External examiners must jointly evaluate the solutions (Sketches), Computer display and Printouts of each student for 50 Marks.

Textbooks:

Sl. No	Text Book title	Author	Volume and Year of Edition
1	Engineering Graphics	K.R. Gopalakrishna	39 th Edition, 2017, Subhash Publications, Bangalore
2	Engineering Drawing	N.D. Bhatt & V.M. Panchal	53 rd Edition, 2019, Charotar Publishing House, Gujarat

Reference Books:



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Sl. No	Text Book title	Author	Volume and Year of Edition
1	Fundamentals of Engineering Drawing with an Introduction to Interactive Computer Graphics for Design and Production	Luzadder Warren J., Duff John M.	Eastern Economy, 2005, Prentice-Hall of India Pvt. Ltd., New Delhi.
2	Engineering Drawing and Graphics + Autocad	K. Venu Gopal & V. Prabu Raja	4 th Edition , 2005, New Age International Publishers, New Delhi.
3	Computer Aided Engineering Drawing	Dr. M. H Annaiah, Dr. C. N Chandrappa & Dr. B. Sudheer Premkumar	5 th Edition, 2015, New Age International Publishers, New Delhi
4	Computer Aided Engineering Drawing	S. Trymbaka Murthy	3 rd Edition, 2006, I.K. International Publishing House Pvt. Ltd., New Delhi.
5	Electric Power Distribution	Amarjit Singh Pabla	6 th Edition, 2011, McGraw Hill Education (India) Private Limited
6	Engineering Visualisation	S.N. Lal, & T Madhusudhan	1 st Edition, 2022, Cengage Publication
7	Electrical Engineering Drawing	Bhattacharya S. K.,	2 nd Edition, 2005, New Age International publishers
8	PCB Design Using AutoCAD	Chris Schroder	1 st Edition, 1997, EDN Series for Design Engineers
9	Design of Steel Structures,	K. S. Sai Ram	3 rd Edition, 2020, Pearson
10	Design of Foundation Systems: Principles and Practices	Nainan P. Kurian	3 rd Edition, 2005, Narosa publications



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Course Outcomes:

Course outcome: After the successful completion of the course, the student will be able to	
CO1	Understand drawing as a communication mode, also expose to standards and conventions followed in the preparation of engineering drawings.
CO2	Acquire the knowledge of generating orthographic views of points, lines, planes and solids in different positions using modern tool (CAD) usage.
CO3	Gain the visualization skill of expressing pictorial views (3D) of an object in to 2D and vice versa using principles of projections.
CO4	Develop lateral surfaces of solids.
CO5	Analyze the real time engineering components.

Course Articulation Matrix:

PO/PSO CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PSO1	PSO2
CO1	1	1	1		3	1			1		1		
CO2	1	1	2		1	1			1		1		
CO3	1	2	2		1	1			1		1		
CO4	2	1	1		3	1			1		1		
CO5	2	2	2		3	1			1		1		



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Department: Computer Science and Engineering	Semester: I / II
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Subject: Department Skill Lab-1 (common for CS, IS, AIML,DS, CY, RA)				
Subject Code:	25CS107 / 25CS207		L – T – P - S:	0-0-28-2
			Credit	1

Sl. No	Course Objectives
1	Introduce basics of computer and its applications.
2	Study and practice basic UNIX commands and Shell scripts.
3	Familiarize with the basic elements of HTML.

LAB CONTENT:

Sl. No	Experiment Description
1	Demonstration of PC hardware and software 1. Computer system layout • Computer front panel indicators, switches and rare side connectors • Identification of SMPS, Mother board, CPU, RAM, add on cards 2. Software installations • Install windows OS with portions. • Install Ubuntu OS.
2	MS-Office 3. Using MS-word application create a resume. 4. Create a presentation on any of the given topic using MS-power point, create Master Slide with suitable slide design, slide layout, background color, slide number & date. Use this Master slide to demonstrate operations. [NOTE: The presentation must consist of at least 10 slides and also the presentation must be organized]. 5. Using a suitable excel spread sheet application, create a worksheet containing the pay details (Basic pay, DA, HRA, other allowance, deductions, PT, Insurance, Gross and Net salary) of the employees using formulae. 6. Using a suitable spread sheet application create a table of five students for their marks scored in five subjects (max. marks 100). Perform the



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	following operations for the given data. • Calculate the percentage of each student. • Assign the grade for each student based on their average marks: <table><tr><th>GRADE</th><th>Average Marks</th></tr><tr><td>S</td><td>>90</td></tr><tr><td>A</td><td>>=80 and <=90</td></tr><tr><td>B</td><td>>=70 and < 80</td></tr><tr><td>C</td><td>>=60 and < 70</td></tr><tr><td>D</td><td>>=50 and <60</td></tr><tr><td>E</td><td>>= 40 and <50</td></tr><tr><td>F</td><td>< 40</td></tr></table> • Highlight the data cell with green colour if a student scores above 20 and highlight with red colour, if a student scores less than 10 using formatting toolbar. • Draw a Bar/Pie/ line graph for the given data. • Draw the line graph for the marks scored by each student in different subjects • At least with an example clearly demonstrate relative reference and absolute reference formulation. • Perform filter option for the given data (At least 2-3 different filter operations must be done in exam).	GRADE	Average Marks	S	>90	A	>=80 and <=90	B	>=70 and < 80	C	>=60 and < 70	D	>=50 and <60	E	>= 40 and <50	F	< 40
GRADE	Average Marks																
S	>90																
A	>=80 and <=90																
B	>=70 and < 80																
C	>=60 and < 70																
D	>=50 and <60																
E	>= 40 and <50																
F	< 40																
3	Linux Commands and shell Scripts 7. Execution of basic UNIX Commands which includes: • Introduction to vi editor • Creating directories and subdirectories • Creating files, listing file attributes • Changing file permissions • Creating hard link and symbolic link • grep and sed command for pattern matching • expr command, environment variables and wild cards • Write a shell script to perform integer and floating point arithmetic operations.																



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	Write a shell script to find out the factorial of the given number.
4	HTML 8. Introduction to HTML, Design web page using following tags: Headings, <p>Anchor tag , <href>, , <form>, , <meta>, <table> <div> and <svg>. 9. Design the webpage to describe an ordered list of at least 4 states and unordered list of at least 4 cities. 10. Design the webpage for student registration with the following fields - Student USN. - Student name. - Student branch.
5	Basic Learning: - Designing of google sheet and google form template. - Demonstration of Google group creation for group intimations. - Using application like Canva, Creation of poster, invitation/brochure and certificate.

Course Outcomes:

Course outcome	Descriptions
CO1	Explain the basic computer hardware components and system
CO2	Create documents using MS-word, Spreadsheet and presentation applications.
CO3	Demonstrate the use of basic Linux/UNIX commands and shell scripting.
CO4	Design and develop basic web pages using HTML and forms for user input and display.
CO5	Create and manage applications using tools such as Google Forms, Sheets, Groups, and Canva.



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Course Articulation Matrix

PO/PSO CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PSO1	PSO2
CO1	3	1	1						2				
CO2	3	2	2		3	2	2	2	2		2		
CO3	3	2	2		3	2	2	2			2		
CO4	3	2	3		3	2	2	2	2		2		
CO5	3	2	3		3	2	2	2	2		2		



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Department: Electronics and Communication Engineering		Semester:	I / II
Subject: Department Skill lab-1			
Subject Code:	25EC107/ 25EC207	L – T – P - S:	0-0-28-2 (In Hrs)
		Credits:	1

Sl. No.	Course Objectives
1	Impart knowledge on innovations and their application in real world.
2	Inculcate skill required in the students to analyze, design and Demonstrate.
3	Promote familiarity with datasheets of integrated circuits for practical Application.
4	Encourage innovation through open-ended experiments and real-world circuit design tasks.

LAB CONTENT:

Sl. No.	Experiment Description
1	Resistor color code and measurement of Resistance.
2	A) Measurement of Voltage, Current, Resistance using digital multimeter. B) Learning Soldering and De-soldering.
3	Demonstration of voltmeter, ammeter and cathode ray oscilloscope (CRO) usage.
4	Measurement of Amplitude, Frequency and Time using CRO and ASG.
5	Design of A) Simple LED circuit with switch B) Simple LED circuit with potentiometer C) Push button LED circuit



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6	Analyzing the possible faults in the circuit/ component A) Fault Diagnosis in a Resistor Voltage Divider B) Fault Identification in Logic Gate Circuits (AND, OR, NOT)
7	Lab Experiments to Find Wattage: A) Direct Measurement of Voltage and Current ($P = V * I$): B) Measurement of Current and Resistance ($P = I^2 * R$) C) Measurement of Voltage and Resistance ($P = V^2 / R$)
8	Reading and analysis of the data sheets of the following ICs. A) LM317 (Adjustable Voltage Regulator) B) LM741 (Op-Amp)
9	Implementation of full adder using MATLAB-Simulink.
10	Open ended experiment

Course Outcomes:

Course outcome	Description
CO1	Identify and measure basic electronic components accurately (L1)
CO2	Demonstrate the use and principles of operation of basic electronic measuring instrument; digital multimeters, voltmeters, ammeters, CROs, and function generators (L2)
CO3	Apply the principles of soldering and de-soldering of electronic components on a PCB with proper safety and technique (L2)
CO4	Illustrate simple electronic circuits using LEDs, switches, push buttons, and potentiometers (L2)
CO5	Find the faults in basic analog and digital circuits (L1).

Course Articulation Matrix

PO/PSO CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PSO1	PSO2
CO1	2												
CO2	2		2										
CO3													
CO4	2				1								
CO5	2				1								



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Department: Electronics and Telecommunication Engineering	Semester:	I/II
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Subject: Department Skill Lab - I				
Subject Code:	25ET107		L – T – P - S:	0-0-28-2
			Credit	1

Sl. No	Course Objectives
1	Impart knowledge on innovation and their applications in real world.
2	Inculcate skill required in the students to analyze, design and demonstrate.

LAB CONTENT:

Sl. No	Experiment Description
1.	Identification of Measuring Devices
2.	Relation between Voltage Current and Resistance.
3.	Measurement of Frequency and Time Period.
4.	Color Coding of Resistors and Identify the Terminals of a Diode/ Transistor.
5.	Soldering and de-soldering.
6.	Design and verify regulated power supply.
7.	Demonstration of Hardware parts of computer.
8.	Verification of basic logic gates using integrated circuits.
9.	Develop an electronic module through the skills and submit a report.

Text Books:

Sl No	Text Book title	Author	Volume and Year of Edition
1	Electronics Device and Circuit Theory	Robert L Boylested, Louis Nashelsky	Pearson Publication- 2013
2	Digital Principles and Design	Donald D Givone	Tata McGraw-Hill-2007

Reference Books:



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Sl No	Text Book title	Author	Volume and Year of Edition
1	Basic Electronics	D P Kothari, I J Nagrath	McGraw Hill Education-2014
2	Electronics Devices and Circuits	David A. Bell	Prentice Hall India-2008

Course Outcomes:

Course outcome	Descriptions
CO1	Understand the basic concepts of electronic components and their characteristics.
CO2	Articulate skills required for an electronics engineer and apply the basic engineering knowledge to solve engineering problems.
CO3	Demonstrate handson skill in using electronic testing and measuring instruments.
CO4	Design and implement mini projects showcasing innovations and application of basic electronic principles in real life problems.

Course Articulation Matrix

PO/PSO CO	P01	P02	P03	P04	P05	P06	P07	P08	P09	P010	P011	PSO1	PSO2
CO1	2			3	3								
CO2	2		2										
CO3		1		1									
CO4		1		1	3								



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Department: Biomedical Engineering			Semester:	I/II
Subject: Department Skill Lab-1				
Subject Code:	25BM107/25BM207	L – T – P - S:	0-0-28-2 (In Hrs)	
			Credits:	1

Sl. No	Course Objectives
1	To introduce the basic components of electrical, electronic, and computer systems and their functions in practical circuits and computing environments.
2	To enable students to understand and operate standard electronic instruments and verify logic gates used in digital electronics.
3	To develop proficiency in using Microsoft Office tools such as Word, Excel, and PowerPoint for document creation, data analysis, and presentation.
4	To provide students with practical knowledge of biomedical measurements and conduct case studies on medical imaging and laboratory techniques.

Sl. No	Lab Contents
1	Basic components of electronics and electrical.
2	Working principle of CRO, ASG, Power supply, Multimeter.
3	Study and verification of Basic Gates (AND, OR & NOT)
4	Study and verification of Universal Gates (NAND & NOR)
5	Basic components of computer and its applications.
6	Study the Microsoft office Word create your resume, also prepare pi chart and bar chart insert in MS Word.
7	Using Microsoft office Excel perform the below operations. a) Addition b) count the number c) Highest num d) Lowest number e) Average f) prepare pi chart and bar chart
8	Prepare 10 slides about biomedical equipment in Microsoft office PPT. also prepare pi chart and bar chart insert in PPT.
9	Case study on imaging and Laboratory.



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Course Outcomes:

Course outcome	Descriptions
CO1	Identify and explain the basic components of electrical, electronic, and computer systems.
CO2	Demonstrate the working and application of fundamental electronic instruments and logic gates.
CO3	Create and format professional documents using Microsoft Word, including data visualization.
CO4	Analyze and present data using Microsoft Excel, including basic statistical operations and charting.
CO5	Demonstrate the ability to use Microsoft PowerPoint and understand biomedical and diagnostic technologies

Course Articulation Matrix:

PO/PSO CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PSO1	PSO2
CO1	3	2											
CO2	3	2	2	2	2								
CO3			2		1								
CO4	2	2	2	3	1								
CO5	2		1		1								



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Department: Civil Engineering	Semester: I/II
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Subject: Department Skill Lab - I				
Subject Code:	25CV107/207		L – T – P - S:	0-0-28-02
			Credit	1

Sl. No	Course Objectives
1	Identify and understand commonly used building materials and tools in construction.
2	Perform basic tests on bricks and cement to evaluate their properties.
3	Gain knowledge about types of cement, their composition, and field/laboratory tests.
4	Understand plastering techniques, mortar preparation, and participate in technical field visits for practical exposure

LAB CONTENT:

Sl. No	Experiment Description
1	Identification and demonstration of building materials and tools used in the construction of building work
2	Masonry: Types of masonry, Types of Bonds. Tests on bricks- Crushing strength, water absorption
3	Introduction to Cement- Types of Cement, Manufacturing of Cement, Chemical Composition of Cement, Properties of Cement, Storage and Handling of Cement Testing of Cement Field Tests: Color Test, Float Test, Smell Test, Lumps Test, Temperature Test Laboratory Tests: Fineness Test, Consistency Test, Initial and Final Setting Time, Specific Gravity Test
4	Plastering -Mortar and its types, purpose, materials, methods of plastering. Fineness modulus of fine aggregates, Compressive Strength Test of cement mortar.
5	Technical field visit to construction sites, Water treatment plant, RMC plant.



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Text Books:

Sl No	Text Book title	Author	Volume and Year of Edition
1	Building Materials	S.K. Duggal	5th Edition, 2022
2	Construction Technology – Vol. 1	S.P. Arora & S.P. Bindra	22nd Edition, 2020

Reference Books:

Sl No	Text Book title	Author	Volume and Year of Edition
1	Engineering Materials	Rangwala	42nd Edition, 2021
2	Building Construction	B.C. Punmia	11th Edition, 2018
3	Building Materials and Construction	G.C. Sahu	2nd Edition, 2020

Course Outcomes:

Course outcome	Descriptions
CO1	Identify various building materials and demonstrate their usage and tools in construction work.
CO2	Explain different types of masonry and bonds, and perform basic tests on bricks.
CO3	Describe the types, composition, properties, and manufacturing process of cement; conduct relevant field and laboratory tests
CO4	Apply knowledge of mortar, plastering techniques, and perform fineness and compressive strength tests
CO5	Interpret practical aspects of construction through field visits to construction sites, RMC, and water treatment plants

Course Articulation Matrix

PO/PSO CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PSO1	PSO2
CO1	3	2											
CO2	3	3	3		2								
CO3	3	3	3		3								
CO4	2	2		2	2	2					2		
CO5	2								2		2		



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Department: Electrical & Electronics Engineering	Semester: I/II
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Subject: Department Skill Lab - I				
Subject Code:	25EE107/207		L – T – P - S:	0-0-28-02
			Credit	1

Sl. No	Course Objectives
1	To introduce students to the fundamental electrical tools, meters, components, and safety measures
2	To develop hands-on skills in electrical circuit construction and measurement
3	To provide practical experience in electrical system design and motor control.

LAB CONTENT:

Sl. No	Experiment Description
1	Demonstration of meters & components, tools & safety measures used in electrical laboratory.
2	Measurement and Analysis of Voltage and Current in Series and Parallel Configurations of Batteries and Solar Panels
3	Design and Development of a Multi socket Electrical Extension Board
4	Comparative Measurement of Luminous Intensity in Different Lighting Systems (CFL, LED, and Incandescent Lamps)
5	Wiring and Operation of Three-Phase Motor Starters: Direct-On-Line (DOL) and Star- Delta Starters
6	Control Circuit Implementation for Forward and Reverse Operation of an Induction Motor

Course Outcomes:

Course outcome	Descriptions
CO1	Able to introduce students to the fundamental electrical tools, meters, components, and safety measures.
CO2	Able to develop hands-on skills in electrical circuit construction and measurement.
CO3	Able to provide practical experience in electrical system design and motor control.



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Course Articulation Matrix

PO/PSO CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PSO1	PSO2
CO1	3	2			1			2				2	2
CO2	3	2			1			2				2	2
CO3	3	2			1			2				2	2



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Department: Mechanical Engineering	Semester:	I/II
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Subject: Department Skill Lab-1				
Subject Code:	25ME107/207		L – T – P - S:	0-0-28-02
			Credits:	1

Sl. No	Course Objectives
1	To expose the students of engineering to the methodology of problem solving used by the engineer in the innovative design of products.
2	To understand basic optimization techniques.
3	To formulate the conceptual design of a product for satisfying human needs.
4	To provide basic skills to a beginner in elementary fabrication processes like fitting, welding and sheet metal working used in product design and manufacturing.

LAB CONTENT:

Experiment Description
Introduction: Definition of Mechanical Engineering, Application of mechanical Engg in industries, skills to be possessed by mechanical engineer, Definition of innovation in Mechanical Engineering, types of innovation. Engineering Materials, Metals, Non- metals, Plastics, Ceramics, and Composites. Various manufacturing process with application, secondary operations, Quality, Quality Function Deployment Matrix - House of Quality diagram Fitting - Demonstration on fitting tools, fitting operations and joints. - Preparation of models involving rectangular, triangular, semi-circular and dovetail joints (Minimum 3 models) Welding - Demonstration of electric arc welding, tools and equipments. - Preparation models using electric arc welding – butt joint, lap joint, T joint or L – joint (Minimum 3 models) Sheet metal and Soldering - Demonstration on Sheet metal, Sheet metal tools, Soldering, Soldering tools. Development of cone, Cylinder and combination of Solids (Minimum 2 models)



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Text Books:

SI No	Text Book title	Author	Volume and Year of Edition
1	Hajra Chaudhary	Work shop technology	Media Promoters, January 2008

Reference Books:

SI No	Text Book title	Author	Volume and Year of Edition
1	Hajra Chaudhary	Elements of Mechanical Engineering	Media Publishing. & Promoters.

Course Outcomes:

Course outcome	Descriptions
CO1	Able to understand and apply the methodology of problem solving in the innovative design of products
CO2	Able to understand & apply simple optimization techniques for innovative product design
CO3	Able to carry out an initial conceptual design of a product for human needs.
CO4	Able to acquire basic skills in elementary fabrication processes like fitting, welding, drilling, grinding, sheet metal operations etc necessary to develop an engineering product.
CO5	Understand the safe operation of equipment and the correct use of personal protective equipment (PPE) to avoid accidents and injuries.

Course Articulation Matrix

PO/PSO CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PSO1	PSO2
CO1	3	2	3				1			1	1		
CO2			3				1			1	1		
CO3	3	2	3				1			1	1		
CO4	3	2	3				1			1	1		
CO5					3	2							



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Department: Humanity Sciences	Semester: I/II
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Subject: Communicative English			
Subject Code:	25HS108/25HS208	L – T – P - S:	14-0-0-16 (In Hrs)
		Credit:	1

Sl. No	Course Objectives
1	Develop effective interpersonal communication skills
2	To understand the structure of the English language.
3	Enhance pronunciation, vocabulary and grammar.
4	Promote functional and pragmatic competence and to build-up writing skills needed for academic success.

Module	Description	Hrs
I	Introduction to communication: Communication –meaning, definition, types of communication. Communication: barriers to communication; accuracy, brevity, clarity and appropriateness in communication.	3
II	Technical English: Grammar - Articles, Sentences: Assertive, Imperative, Interrogative and Exclamatory, Punctuation.	3
III	Vocabulary building: Synonym and antonym, Homophones, Idioms	3
IV	Writing skill: Drafting: Resume and Curriculum Vitae. Self-Introduction, Paragraph writing,	3
V	Reading: unseen passage. Comprehension.	2

Reference Books:

Sl No	Text Book title	Author	Volume and Year of Edition
1	K .Floyd	Interpersonal Communication: The Whole Story	McGraw hill (2009)
2	Raymond Murphy	Intermediate English Grammar	Cambridge university press (2007)



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Course Outcomes:

Course outcome	Descriptions
CO1	Speak fluently and confidently by using perfect terminology, stress, voice-modulation, intonation and vocabulary.
CO2	Write purposefully and concisely-crafting and neatly tailored grammatically appropriate texts.
CO3	Usage of grammar-with proper and correct tenses, modals and punctuations.
CO4	Read and interpret text using the strategies like skimming and

Course Articulation Matrix

PQ/PSO CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PSO1	PSO2
CO1								2		3	3		
CO2								2		3	3		
CO3								2		3	3		
CO4								2		3	3		



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Department: Humanity Sciences		Semester:	I/II
Subject: Universal Human Values-I			
Subject Code:	25HV108/208	L – T – P - S:	14-0-0-16 (In Hrs)
		Credits:	1

Sl. No	Course Objectives
1	This introductory course input is intended: To help the students appreciate the essential complementarity between 'VALUES' and 'SKILLS' to ensure sustained happiness and prosperity which are the core aspirations of all human beings
2	To facilitate the development of a Holistic perspective among students towards life and profession as well as towards happiness and prosperity based on a correct understanding of the Human reality and the rest of existence. Such a holistic perspective forms the basis of Universal Human Values and movement towards value-based living in a natural way.
3	To highlight plausible implications of such a Holistic understanding in terms of ethical human conduct, trustful and mutually fulfilling human behavior and mutually enriching interaction with Nature.
4	This course is intended to provide a much needed orientation input in value education to the young enquiring minds.

Module	Description	Hrs
I	Introduction to Value Education: -Understanding Value education. -Self-exploration as the process for Value Education. -The Basic Human Aspirations and their fulfillment. -Right Understanding, Relationship and Physical Facility. -Happiness and Prosperity-Current Scenario. -Method to Fulfill the Basic Human Aspirations. Bloom's Taxonomy Level: L₁ – Remembering, L₂ – Understanding.	3



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II	Harmony in the Human Being: -Understanding the Human being as the Co-existence of the Self and Body. -Distinguishing between the Needs of the Self and the Body. -The Body as an Instrument of the Self. -The response of the self and the body. -Understanding Harmony in the Self. -Harmony of the Self with the Body -Programme to ensure self-regulation and Health Bloom's Taxonomy Level: L₁ – Remembering, L₂ – Understanding.	3
III	Harmony in the Family and Society: -Understanding Harmony in the Family – The Basic Unit of Human Interaction -'Trust' – the Foundational Value in Relationship. - 'Respect' – as the Right Evaluation. -Other Values in Human –to- Human Relationship -Understanding Harmony in the society. -Vision for the Universal Human Order. Bloom's Taxonomy Level: L₁ – Remembering, L₂ – Understanding.	3
IV	Harmony in the Nature(Existence): -Understanding Harmony in the Nature. -Interconnectedness, self-regulation and Mutual Fulfilment among the Four Orders of Nature. -Realizing Existence as Co-existence at All Levels. -The Holistic Perception of Harmony in Existence. Bloom's Taxonomy Level: L₁ – Remembering, L₂ – Understanding.	3
V	Implications of the Holistic Understanding – a Look at Professional Ethics: -Basis for universal Human Values. -Definitiveness of (Ethical) Human Conduct. -Professional Ethics in the light of Right Understanding. -A Basis for Humanistic Education, Humanistic Constitution and Universal Human Order. -Holistic Technologies, Production Systems and Management Models- Typical Case Studies. -Strategies for transition towards Value-based life and profession. Bloom's Taxonomy Level: L₁ – Remembering, L₂ – Understanding.	2



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Text Books:

Sl No	Text Book title	Author	Volume and Year of Edition
1	A Foundation Course in Human Values and Professional Ethics,	R R Gaur, R Sangal G P Bagaria,	Excel Books, New Delhi, 2010
2	The Teacher's Manual Teachers' Manual for A Foundation Course in Human Values and, Professional Ethics,	R R Gaur, R Asthana, G P Bagaria	2nd Revised Edition, Excel Books, New Delhi, 2019. ISBN 978-93-87034-53-2

Reference Books:

Sl No	Text Book title	Author	Volume and Year of Edition
1	Jeevan Vidya: EkParichaya,.	A Nagaraj,	Jeevan Vidya Prakashan, Amarkantak, 1999.
2	Human Values,	A.N. Tripathi,	New Age Intl. Publishers, New Delhi, 2004
3	The Story of Stuff (Book). . i) Small is Beautiful ii) Slow is Beautiful	- E. F Schumacher. - Cecile Andrews	

Course outcome	Descriptions
CO1	By the end of the course, students are expected to become more aware of themselves, and their surroundings (family, society, nature); they would become more responsible in life, and in handling problems with sustainable solutions, while keeping human relationships and human nature in mind.
CO2	They would have better critical ability, also become sensitive to their commitment towards what they have understood (human values, human relationship and human society).
CO3	It is hoped that they would be able to apply what they have learnt to their own self in different day-to-day settings in real life, at least a beginning would be made in this direction.
CO4	This is only an introductory foundational input. It would be desirable to follow it up by Faculty-student or mentor-mentee programs throughout their time with the institution & Higher level courses on



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	human values in every aspect of living
CO5	Leads to form strategies for transition towards Value-based life and profession.

Course Articulation Matrix

PO/PSO CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PSO1	PSO2
CO1						3	3	3	2	3			
CO2				2		3	3	3	2	3			
CO3				2		3	3	3	2	3			
CO4				2		3	3	3	2	3			
CO5				2		3	3	3	2	3			



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Department: Civil Engineering		Semester:	I/II
Subject: Environmental Studies (HS Course)			
Subject Code:	25EN109/25EN209	L – T – P - S:	14-0-0-16 (In Hrs)
		Credits:	01

Sl. No	Course Objectives
1	Analyze an overall impact of specific issues in Environment and to Develop EIA & Environmental Management Plan.
2	Develop analytical skills, critical thinking and demonstrate socio-economic skills for Sustainable Development.
3	Identify the major challenges in Environment and Evaluate possible solutions.
4	Recall Importance of Natural resources, Energy, Acts & Environmental Education.

Module	Description	Hrs
I	Introduction: Environment - Components of Environment, Atmosphere (Structure & Composition), Hydrological cycle. Ecosystem: Types & Function of Ecosystem, Effects of human activities on environment –Agriculture, Industry Environmental Impact Assessment (EIA), Sustainable Development goals (SDG's).	3
II	Natural Resources- types of resources, Water resources – Surface and subsurface water, Quality aspects, Drinking water quality standards, Forest, Mineral Resources, Legal frameworks in conservation of natural resources, EMP .	2
III	Environmental Pollution (Causes, effect and control) – Air pollution, Water Pollution, Noise pollution, Land Pollution, Environmental Acts & Regulations to control Pollution, NGT - Legal Framework, Role of CPCB & SPCB.	3
IV	Global Environmental Issues: Global Warming, Acid rain & Ozone layer depletion (Causes, effect and control), Climate change, Carbon sequestration, Energy: Types, alternative sources of Energy.	3
V	Waste Management & Disposal: Municipal Solid Waste, E-Waste, Biomedical Waste, Hazardous waste (Management & Disposal), National Environmental policy, Disaster management Plan .	3

Text Books:



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Sl No	Text Book title	Author	Volume and Year of Edition
1	Environmental Engineering	Howard S. Peavy, Donald R. Rowe, George T	McGraw Hill International Edition. New York,2000
2	Environmental Engineering vol-II	S. K. Garg	Environmental Engineering vol-II M/s Khanna Publishers, New Delhi 2010

Reference Books:

Sl No	Text Book title	Author	Volume and Year of Edition
1	Environmental Engineering	Peavy,H S,Rowe and Tchobanoglous G	VOL -2 McGraw-Hill Co, 2015
2	Environmental Studies	R Rajagopalan	From Crisis to Cure”, Oxford University Press, 2005,
3	Environmental Studies	Benny Joseph	Tata McGraw– Hill Publishing Company Limited(2005), Delhi.

Course Outcomes: At the end of the course students were able to

Course outcome	Descriptions
CO1	Develop critical thinking and/or observation skills, and apply them to the analysis of a problem or question related to the environment,
CO2	Develop EIA & Environmental Management Plan & DMP
CO3	Know the major challenges in Environment and possible solutions.
CO4	Know Environmental Acts & Regulations to control Pollution
CO5	Examine Practical Problems and Necessary solutions with respect to betterment of Environment & Society



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Course Articulation Matrix:

PO/PSO CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PSO1	PSO2
CO1	2	2	2	2	2	2	3		1				
CO2	2	2	2			2	3			2	2		
CO3	2	2				2	3			2			
CO4	2					2	3	3					
CO5	2	2	2	2	2	2	3		2	1			



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Department: Mathematics			Semester:	II
Subject: Advanced Calculus and Numerical Methods				
Subject Code:	25MA201		L – T – P - S:	42-0-0-48 (In Hrs)
			Credits:	3

Sl. No	Course Learning Objectives
This course will enable the students to :	
1	Study the differential equations of higher order and its applications.
2	Study the numerical methods enabling them to acquire the knowledge of these mathematical tools
3	Concrete foundation of Integral calculus, vector calculus.
4	Study the partial differential equations and its applications.
Pre –Requisites	
Fundamentals of calculus, sets, relations, functions, approximation of accuracy for finding the roots and interpolation.	

Suggested Software: Matlab/Scilab/Python

Unit	Description	Hrs
I	Differential Equations of higher order: Linear Differential Equations with constant coefficients-Inverse differential operators, Particular Integrals of e^{ax} , $\sin ax$, $\cos ax$, x^m . The solution of differential equation by the method of variation of parameters. Applications to oscillation of simple pendulum, oscillation of spring and L-C-R circuits. Using Modern tool, find the solution of Linear Differential equations. (Text I: 13.1 to 13.8, 14.3, 14.4, Text II: 2.1 to 2.4, Text III: 1.1 to 1.3, 5.1, 6.1)	9
II	Numerical Methods: Finite differences. Interpolation using Newton's forward and backward difference formulae, and Lagrange's interpolation formulae (all formulae without proof) - problems. Solution of polynomial and transcendental equations-Newton-Raphson and Regula-Falsi method (only formulae) - problems. Using Modern tool, find the solution of Algebraic and transcendental equations. (Text I: 29.6, 29.10, Text II: 17.2, 17.3, Text III: 6.5)	9



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III	Partial Differential Equations: Formation of PDE's by elimination of arbitrary constants and functions. Solution of non-homogeneous PDE by direct integration. Solution of Lagrange's linear PDE, Method of separation of variables. Solution of one dimensional heat and wave equations by the method of separation of variables. (Text I: 17.2, 17.4, 17.5, 18.5)	8
IV	Integral Calculus: Multiple Integrals- Evaluation of double and triple integrals. Evaluation of double integrals by changing the order of integration. Applications: Area (polar curves) and volume. Beta and Gamma functions: Definitions, Relation between beta and gamma functions – problems on Relation between beta and gamma functions. Using Modern tool, find the area, volume of Cartesian curves and the solution of Improper integrals. (Text I: 7.1 to 7.8, 7.14, to 7.16)	8
V	Vector Calculus: Vector Differentiation- Scalar and vector fields. Gradient, curl and divergence, directional derivatives and the physical interpretation. Solenoidal and irrotational vector fields -problems. Vector Integration- Statement and problems on Green's theorem. Applications to work done by a force. Using Modern tool, find gradient, divergent, curl and their geometrical interpretation and verification of Green's Theorem. (Text I: 8.5, 8.6, 8.7, 8.11, 8.17, Text II: 8.2 to 8.4, 8.9 to 8.11, 9.1)	8

Text Books:

Sl No	Text Book title	Author	Volume and Year of Edition
1	Higher Engineering Mathematics	B.S. Grewal	43 rd Edition Khanna Publications, 2015.ISBN:9788174091956
2	Advanced Engineering Mathematics	E. Kreyszig, John Wiley & Sons	10 th Edition JonWiley & Sons, 2015. ISBN: 9780470913611
3	MATLAB Programming for Engineers	Stephen J Chapman	7 th Edition, Cengage, 2024. ISBN: 9798214001531

Reference Books:

Sl No	Text Book title	Author	Volume and Year of Edition
1	Advanced Engineering Mathematics	C. Ray Wylie, Louis C. Barrett, McGraw-Hill	6 th Edition. 1995, ISBN:9780071135436



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		Book Co	
2	A Text Book of Engineering Mathematics	N.P. Bali and Manish Goyal	7 th Edition Lakshmi Publishers, 2010, ISBN: 9788131808030.
3	Higher Engineering Mathematics	B.V.Ramana, Tata McGraw-Hill	1st Edition, Tata McGraw-Hill, 2006, ISBN:9780070634190
4	Introductory Linear Algebra with Applications	Bernard Kolam, David R Hill	7 th Edition, Pearson Education, 2003, ISBN:81-297-0176-6

Course Outcomes:

Course Outcome: After the successful completion of the course, the student will be able to	
CO1	Understand the basic concepts of higher order differential equations, numerical methods, vector calculus, partial differential equations and integral calculus. (L1)
CO2	Formulate and solve the problems on differential equations, Vector Calculus, Numerical techniques and partial differential equations. (L2)
CO3	Make use of the methods of differential equations, calculus and numerical methods in Engineering field. (L2)
CO4	Use modern tool to solve/visualize Engineering problems. (L3)
CO5	Analyse the concept of partial differential equation and vector calculus in the engineering field. (L3)

Course Articulation Matrix

PO/PSO CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PSO1	PSO2
CO1	3	2											
CO2	3	1									1		
CO3	3	2	1								1		
CO4	1				2						1		
CO5		2	1								1		



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Department: Computer Science and Engineering		Semester: II
Subject: Programming with Python		
Subject Code:	25CS204	L – T – P - S: 42-0-0-48 (In Hrs)
		Credits: 3

Sl. No	Course Objectives
1	Recognize fundamental Python syntax, data types, operators, and control flow structures.
2	Implement user-defined and built-in functions, including recursion and anonymous functions.
3	Differentiate between various compound data types such as strings, lists, tuples, and dictionaries.
4	Construct Python programs that handle file operations and manage exceptions effectively.

Module	Description	Hrs
I	Introduction: Python Overview, Getting Started with Python, Comments, Python Identifiers, Reserved Keywords, Variables, Standard Data Types, Operators, Statement and Expression, String Operations, Boolean Expressions, Control Statements, Iteration – while Statement, Input from Keyboard. Text 1: 3.1 to 3.15	9
II	Functions: Introduction, Built-in Functions, Composition of Functions, User Defined Functions, Parameters and Arguments, Function Calls, the return Statement, Python Recursive Function, The Anonymous Functions, Writing Python Scripts. Strings: Compound data type, len, slicing, strings are immutable, traversal, escape characters, formatting operator, formatting functions. Text 1: 4.1 to 4.10 and 5.1	9
III	Lists: Basic operations, traversal, deletion, built in list operators, built in list Methods Tuples: Creating tuples, accessing values in tuples, tuples are immutable, tuple assignment, return values, basic tuple operations, built in tuple functions. Text 1: 5.2, 6.1	8
IV	Dictionaries: Creation, accessing values, updating, deletion, properties of keys, basic operations, built in methods Files: Text Files, opening and closing file, file object attributes, writing and reading a file, renaming file, deleting a file, file related methods,	8



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	Text 1: 6.2 .7.1	
V	Directories: Basic commands Exceptions: Built in exceptions, handling exceptions, exceptions with arguments, user defined exceptions. Text 1: 7.2, 7.3 to 7.5	8

Text Books:

Sl No	Text Book title	Author	Volume and Year of Edition
1	Introduction to computing and problem solving using python	E Balagurusamy	Frist Edition ,2016

Reference Books:

Sl No	Text Book title	Author	Volume and Year of Edition
1	Automate The boring stuff with Python: Practical Programming for total beginners	Al Sweigar T	3 rd Edition August 2024
2	Think Python How to Think Like a Computer Scientist	Allen B. Downey	Third Edition, June 2024

Course Outcomes

Course outcome	Descriptions
CO1	Explain basic concepts of Python programming.
CO2	Develop Python programs using built-in and user-defined functions.
CO3	Analyze and apply appropriate data structures for solving problems.
CO4	Implement basic file and directory operations in Python.
CO5	Design and implement error handling in Python.



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Course Articulation Matrix:

PO/PSO CO	P01	P02	P03	P04	P05	P06	P07	P08	P09	P010	P011	PSO1	PSO2
CO1	1	1	1						1		2		
CO2	1	1	1						1		2		
CO3	3	3	2		2	2	2	1	1		2		
CO4	3	2	2		2	2	2	1	1		2		
CO5	3	3	3		2	2	2	1	1		3		



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Department: Computer Science and Engineering		Semester: II
Subject: Programming with Python		
Subject Code:	25CS206	L – T – P - S:
		0-0-28-2 (In Hrs)
		Credits: 1

Sl. No	Course Objectives
1	To Introduce Python syntax, data types, operators, and control flow structures.
2	To enable developing user-defined and use appropriate built-in functions.
3	To enable Understanding various compound data types such as strings, lists, tuples, and dictionaries.
4	To empower in Constructing Python programs that handle file operations and manage exceptions.

Unit	Description
1a	Write a Python program to convert the given number of seconds to Hours, Minutes and Seconds and display the result.
1b	Write a Python program to compute and display the maturity amount for the deposit made in $A = P \left(1 + \frac{r}{n} \right)^{nt}$ Where, • P = principal amount (initial investment) • r = annual nominal interest rate (as a decimal) • n = number of times the interest is compounded per year • t = number of years
2a	Write a Python program to simulate a simple calculator. The program should accept two numerical inputs and an operator (+, -, , /) from the user. Based on the operator, perform the corresponding arithmetic operation and display the result. Ensure that the program handles division by zero.
2b	Write a Python script that prints prime numbers less than n.
3a	Write a python program to find factorial of a number using Recursion.



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3b	Write a Python function analyze text(text) that: • Calculates total characters (excluding spaces) • Counts total words • Counts vowels and consonants
4a	Write a Python program to generate the nth Fibonacci number using an iterative (non-recursive) approach.
4b	Write a Python function string stats(text) that: • Counts the total number of characters (excluding spaces) • Finds the number of uppercase, lowercase, digits, and special characters Return a clean report
5a	Write a program to accept a list of student marks. Perform the following operations: find the highest, lowest, average marks, and sort the list in ascending order.
5b	Accept a list of student records (name, roll, branch) and convert each into a tuple. Store all tuples in a list and display them neatly using a loop.
6a	Define a function that takes two tuples representing coordinates (x1, y1) and (x2, y2), and calculates the Euclidean distance between them.
6b	Read N numbers from the console and create a list. Develop a program to print the mean, variance, and standard deviation with suitable messages.
7a	Write a program that inputs a text file. The program should print all of the unique words in the file in alphabetical order.
7b	Write a Python program that accepts the names and marks of 3 subjects, stores them in a dictionary, and displays the subjects, marks, total, and average.
8a	Write a Python program that reads a text file and counts the frequency of each word using a dictionary. Display the result sorted by the word.
8b	Accept names and grades for 3 students. Store in a dictionary and display the students' names with their grades, highest grade, and lowest grade.
9a	Write a Python program to read a file and display its contents. If the file is not found, handle the exception and display a proper message.
9b	Create a dictionary of 3 cities and their populations. Ask the user to enter a city name and print the population. Handle the case when the city is not in the dictionary.
10a	Write a Python program that takes two numbers as input and divides them. Handle exceptions such as division by zero and invalid input.
10b	Write a program that raises a custom exception if the entered age is less than 18



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Course Outcomes:

Course outcome	Descriptions
CO1	Understand and apply fundamental programming concepts in Python.
CO2	Implement Python functions and use modular programming to solve problems.
CO3	Develop Python scripts to perform structured data operations and analysis.
CO4	Apply file handling techniques to process text data
CO5	Design robust Python programs using exception handling.

Course Articulation Matrix:

PO/PS O CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO1	PO1	PSO	PSO
CO1	3	3			2								
CO2	3	3	2		2								
CO3	3	3	2	1	2	1		1	2		2		
CO4	3	2	2	1	3	1		1	2		2		
CO5	3	2	2	1	2	1	2	1	2		2		