Shri Balasaheb Mane Shikshan Prasarak Mandal's,

ASHOKRAO MANE GROUP OF INSTITUTIONS

NH – 4, Vathar Tarf Vadgaon, Tal: -Hatkanangale, Dist: - Kolhapur-416112

Website: www.amgoi.edu.in

An Autonomous Institute

Curriculum Structure

and

Evaluation Scheme for

First Year B. Tech.

Department of Applied Sciences and Humanities

Semester: I & II

With Effect from Academic Year 2025-26

Head of Department	Dean Academics	Director	Campus Director
Dr. A. A. Suryawanshi	Dr. S. S. Patil	Dr. S. R. Chougule	Prof. P. B. Ghewari

ABBREVIATIONS

- **L:** Lecture
- **T:** Tutorial
- **P:** Practical
- **ISE I-** In Semester Evaluation I
- **ISE II-** In Semester Evaluation II
- **MSE:** Mid Semester Exam
- **ESE:** End Semester Exam
- **BSC** -Basic Science Courses
- **ESC:** Engineering Science Course
- **AEC:** Ability Enhancement Course
- **IKS:** Indian Knowledge System
- **VSEC:** Vocational and skill Enhancement Course
- **PCC**: Program Core Course
- **PEC**: Program Elective Course
- **CC:** Co-curricular Course

Group A
(Computer Science &Engineering/Electronics &Computer Engineering/Electronics &Telecommunication Engineering)

Department: Applied Science & Humanities

Semester: I

Type of Course	Course Code	Course Name	Teaching Scheme				Evaluation Scheme			
			L	T	P	Cr	Components	Max	Min for Passing	
BSC	25ASH101	Engineering Mathematics- I	3	1	-	4	ISE-I	10		40
							MSE	30		
							ISE-II	10		
							ESE	50	20	
BSC	25ASH102	Engineering Physics	3	-	-	3	ISE-I	10		40
							MSE	30		
							ISE-II	10		
							ESE	50	20	
ESC	25ASH104	Basic Electrical Engineering	3	-	-	3	ISE-I	10		40
							MSE	30		
							ISE-II	10		
							ESE	50	20	
ESC	25ASH105	Engineering Mechanics	3	-	-	3	ISE-I	10		40
							MSE	30		
							ISE-II	10		
							ESE	50	20	
VSEC	25ASH108	Programming in C	2	-	-	2	ISE-I	10		40
							MSE	30		
							ISE-II	10		
							ESE	50	20	
AEC	25ASH110	Communication Skills	1	-	-	1	ISE-I	5		20
							MSE	15		
							ISE-II	5		
							ESE	25	10	
BSC	25ASH112	Engineering Physics Laboratory	-	-	2	1	ISE	50	20	
ESC	25ASH114	Basic Electrical Engineering Laboratory	-	-	2	1	ISE	50	20	
ESC	25ASH115	Engineering Mechanics Laboratory	-	-	2	1	ISE	50	20	
							ESE(POE)	50	20	
VSEC	25ASH118	Programming in C Laboratory	-	-	2	1	ISE	50	20	
							ESE(POE)	50	20	
CC	25ASH120	Yoga & Meditation	-		2	1	ISE	50	20	
AEC	25ASH122	Communication Skills Laboratory	-	-	2	1	ISE	50	20	
	Total		**15**	**1**	**12**	**22**		**950**		
Total Contact Hours- 28					**Total Credits- 22**					

Group A
(Computer Science &Engineering/Electronics &Computer Engineering/Electronics &Telecommunication Engineering)

Department: Applied Science & Humanities
Semester: II

Type of Course	Course Code	Course Name	Teaching Scheme				Evaluation Scheme			
			L	T	P	Cr	Components	Max	Min for Passing	
BSC	25ASH201	Engineering Mathematics- II	3	1	-	4	ISE-I	10		40
							MSE	30		
							ISE-II	10		
							ESE	50	20	
BSC	25ASH203	Engineering Chemistry	3	-	-	3	ISE-I	10		40
							MSE	30		
							ISE-II	10		
							ESE	50	20	
ESC	25ASH206	Fundamentals of Electronics	3	-	-	3	ISE-I	10		40
							MSE	30		
							ISE-II	10		
							ESE	50	20	
ESC	25ASH207	Engineering Graphics	3	-	-	3	ISE-I	10		40
							MSE	30		
							ISE-II	10		
							ESE	50	20	
IKS	25ASH209	Architecture and Town Planning	2	-	-	2	ISE-I	10		40
							MSE	30		
							ISE-II	10		
							ESE	50	20	
PCC	25ASH211	Program Core Course	2	-	-	2	ISE-I	10		40
							MSE	30		
							ISE-II	10		
							ESE	50	20	
BSC	25ASH213	Engineering Chemistry Laboratory	-	-	2	1	ISE	50	20	
ESC	25ASH216	Fundamentals of Electronics Laboratory	-	-	2	1	ISE	50	20	
							ESE(POE)	50	20	
ESC	25ASH217	Computer Aided Engineering Graphics Laboratory	-	-	2	1	ISE	50	20	
							ESE(POE)	50	20	
VSEC	25ASH219	Workshop Practices	-	-	2	1	ISE	50	20	
CC	25ASH221	Social Life Skills	1	-	-	1	ISE	50	20	
	Total		**17**	**01**	**08**	**22**		**950**		
Total Contact Hours- 26							**Total Credits- 22**			

Group B

(Artificial Intelligence & Data Science/ Artificial Intelligence & Machine Learning/Electrical Engineering/ Mechanical Engineering/Civil Engineering)

Department: Applied Science & Humanities

Semester: I

Type of Course	Course Code	Course Name	Teaching Scheme				Evaluation Scheme			
			L	T	P	Cr	Components	Max	Min for Passing	
BSC	25ASH101	Engineering Mathematics- I	3	1	-	4	ISE-I	10		40
							MSE	30		
							ISE-II	10		
							ESE	50	20	
BSC	25ASH103	Engineering Chemistry	3	-	-	3	ISE-I	10		40
							MSE	30		
							ISE-II	10		
							ESE	50	20	
ESC	25ASH106	Fundamentals of Electronics	3	-	-	3	ISE-I	10		40
							MSE	30		
							ISE-II	10		
							ESE	50	20	
ESC	25ASH107	Engineering Graphics	3	-	-	3	ISE-I	10		40
							MSE	30		
							ISE-II	10		
							ESE	50	20	
IKS	25ASH109	Architecture and Town Planning	2	-	-	2	ISE-I	10		40
							MSE	30		
							ISE-II	10		
							ESE	50	20	
PCC	25ASH111	Program Core Course	2	-	-	2	ISE-I	10		40
							MSE	30		
							ISE-II	10		
							ESE	50	20	
BSC	25ASH113	Engineering Chemistry Laboratory	-	-	2	1	ISE	50	20	
ESC	25ASH116	Fundamentals of Electronics Laboratory	-	-	2	1	ISE	50	20	
							ESE(POE)	50	20	
ESC	25ASH117	Computer Aided Engineering Graphics Laboratory	-	-	2	1	ISE	50	20	
							ESE(POE)	50	20	
VSEC	25ASH119	Workshop Practices	-	-	2	1	ISE	50	20	
CC	25ASH121	Social Life Skills	1	-	-	1	ISE	50	20	
	Total		**17**	**01**	**08**	**22**		**950**		
Total Contact Hours- 26							**Total Credits- 22**			

Group B
(Artificial Intelligence & Data Science/ Artificial Intelligence & Machine Learning/Electrical Engineering/ Mechanical Engineering/Civil Engineering)

Department: Applied Science & Humanities

Semester: II

Type of Course	Course Code	Course Name	Teaching Scheme				Evaluation Scheme			
			L	T	P	Cr	Components	Max	Min for Passing	
BSC	25ASH201	Engineering Mathematics- II	3	1	-	4	ISE-I	10		40
							MSE	30		
							ISE-II	10		
							ESE	50	20	
BSC	25ASH202	Engineering Physics	3	-	-	3	ISE-I	10		40
							MSE	30		
							ISE-II	10		
							ESE	50	20	
ESC	25ASH204	Basic Electrical Engineering	3	-	-	3	ISE-I	10		40
							MSE	30		
							ISE-II	10		
							ESE	50	20	
ESC	25ASH205	Engineering Mechanics	3	-	-	3	ISE-I	10		40
							MSE	30		
							ISE-II	10		
							ESE	50	20	
VSEC	25ASH208	Programming in C	2	-	-	2	ISE-I	10		40
							MSE	30		
							ISE-II	10		
							ESE	50	20	
AEC	25ASH210	Communication Skills	1	-	-	1	ISE-I	5		20
							MSE	15		
							ISE-II	5		
							ESE	25	10	
BSC	25ASH212	Engineering Physics Laboratory	-	-	2	1	ISE	50	20	
ESC	25ASH214	Basic Electrical Engineering Laboratory	-	-	2	1	ISE	50	20	
ESC	25ASH215	Engineering Mechanics Laboratory	-	-	2	1	ISE	50	20	
							ESE(POE)	50	20	
VSEC	25ASH218	Programming in C Laboratory	-	-	2	1	ISE	50	20	
							ESE(POE)	50	20	
CC	25ASH220	Yoga & Meditation	-		2	1	ISE	50	20	
AEC	25ASH222	Communication Skills Laboratory	-	-	2	1	ISE	50	20	
	Total		**15**	**01**	**12**	**22**		**950**		
Total Contact Hours- 28							**Total Credits- 22**			

Program Core Course offered by the Departments

Sr.No	Department	Course Title	Course Code
1	Computer Science& Engineering	Data Communication	25ASH211A
2	Electronics & Tele-Communication Engineering	Sensors & Transducers	25ASH211B
3	Electronics & Computer Engineering	Measurement & Instrumentation	25ASH211C
4	Artificial Intelligence & Data Science Engineering	Fundamentals of Artificial Intelligence	25ASH111A
5	Artificial Intelligence & Machine Learning Engineering	Fundamentals of Artificial Intelligence	25ASH111B
6	Electrical Engineering	Power Plant Engineering	25ASH111C
7	Mechanical Engineering	Fundamentals of Mechanical Engineering	25ASH111D
8	Civil Engineering	Fundamentals of Civil Engineering	25ASH111E

General Instructions:

- **For Theory Courses:**

1. Two components of In Semester Evaluation (ISE), One Mid Semester Examination (MSE) and one End Semester Examination (ESE).
2. **ISE I and ISE II** are based on Online Objective Type Examination/Assignments/Mini projects/Quiz and Technical Puzzles/Surprise Test/Oral/ presentations /Seminar/ Innovative approach to problem solving.
3. **MSE**: will be conducted with 30% weightage based on first 50% syllabus
4. **ESE:** will be conducted on 100% course content having 30% weightage on first 50% course content and 70% weightage for remaining 50% syllabus.

- **For Laboratory Courses:**

1. **ISE** Assessment contains weightage like 20% for practical performance, 40% for Journal and 40% for Group Presentation/Oral/Quiz.
2. **ESE:** Assessment is based on oral examination/ Practical oral examination.

Engineering Mathematics-I

Course Name: **Engineering Mathematics-I** Course Code: **25ASH101**	**L**	**T**	**P**	**Credits**
	3	1	--	4
Evaluation Scheme:	**ISE-I**	**MSE**	**ISE-II**	**ESE**
Marks:	10	30	10	50

Pre-Requisite: Basics of matrices, derivative, probability and its properties.

Course Objective:	
1	Understand the concepts of linear algebra including matrix operations, system of linear equations, Eigen values, Eigen vectors, and transformations, and to apply them in solving engineering problems.
2	Understand and apply numerical methods for solving systems of simultaneous linear equations, with a focus on accuracy, computational efficiency, and stability.
3	Understand the concept of partial derivatives and apply them to solve problems involving multivariable functions, total derivatives, Euler's theorem, and optimization.
4	Introduce the fundamental concepts of probability using classical, empirical, and axiomatic approaches.

Course Outcomes:	
CO1	Explain the fundamental concepts of matrix theory including rank, linear dependence/independence, Eigen values, and eigenvectors, and interpret their applications in solving engineering problems.
CO2	Apply the concept of linear algebra to solve numerically linear simultaneous equations.
CO3	Apply partial differentiation techniques, including Jacobins, Euler's theorem, and optimization methods, to solve multivariable engineering problems.
CO4	Interpret and summarize the use of probability theorems, including Bayes' theorem, in solving practical and theoretical problems.

CO-PO Mapping:

CO	**PO1**	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**	**PO11**	**PSO1**	**PSO2**
CO1	3	2	-	-	-	-	-	-	-	-	1	-	-
CO2	3	2	-	-	-	-	-	-	-	-	1	-	-
CO3	3	2	-	-	-	-	-	-	-	-	1	-	-
CO4	3	2	-	-	-	-	-	-	-	-	1	-	-

Course Content		
Unit No.	**Unit title and Content**	**Hrs**
1	**Linear Algebra** Rank of a Matrix, System of Linear Equations, Linear Dependence and Independence, Linear and Orthogonal Transformations, Application to problems in Engineering.	7
2	**Eigen Values and Eigen Vectors** Eigen Values and Eigen Vectors, Cayley Hamilton theorem, Diagonalization of a matrix, Reduction of Quadratic forms to Canonical form by Linear and Orthogonal transformations. Application to problems in Engineering.	7
3	**Numerical Solution of Simultaneous linear equations** Gauss-elimination method, Gauss –Jordan method, Jacobi's iterative method and Gauss-Seidel method Eigen values and Eigen vectors, Rayleigh's power method. Application to problems in Engineering.	7
4	**Partial Differentiation** Introduction to functions of several variables, Limit, Continuity and Partial Derivatives. Euler's Theorem on Homogeneous functions, Partial derivative of Composite Function, Total Derivative and Change of Independent variables.	7
5	**Applications of Partial Differentiation** Jacobin and its applications, Errors and Approximations, Maxima and Minima of functions of two variables, Lagrange's method of undetermined multipliers and Applications to problems in Engineering	7
6	**Probability Theory** Definition of probability: classical, empirical and axiomatic approach of probability, Addition theorem of probability, Multiplication theorem of probability, Bayes' theorem of inverse probability, Properties of probabilities with proofs, Examples.	**7**

Text books:

1. Dr. B. S. Grewal, "Higher Engineering Mathematics", S. Khanna Publishers, Delhi, 42th Edition, 2012
2. P. N. Wartikar & J. N. Wartikar, "A Text Book of Applied Mathematics Vol. I & II", Pune Vidyarthi Griha Prakashan, Pune,6th Edition, 2007
3. R.K. Jain & S.R.K. Iyengar, "Advanced Engineering Mathematics", Narosa Publishing House, 5th Edition,2021

Reference books:

1. Erwin Kreyszig, "Advanced Engineering Mathematics", John Wiley & Sons, 10th Edition, 2011
2. H. K. Dass, "Advanced Engineering Mathematics", S. Chand & Company Pvt. Ltd, New Delhi, 21th Edition, 2014
3. G. V.Kumbhojkar, Probability and Random Processes, C. Jamnadas and Co., 14th Edition, 2010.

Engineering Physics

Course Name: **Engineering Physics** Course Code: **25ASH102/ 25ASH202**	**L**	**T**	**P**	**Credits**
	3	--	--	3
Evaluation Scheme:	**ISE-I**	**MSE**	**ISE-II**	**ESE**
Marks:	10	30	10	50

Pre-Requisite: Students should have the knowledge about basic physics.

Course Objective:	
1	Provide the useful fundamental concepts of Physics to Engineering discipline.
2	Introduce the student with new techniques of modern physics relevant to engineering.
3	Empower the student to comprehend technological advances.

Course Outcomes:	
CO1	Identify key concepts of optics, lasers, and semiconductors, and apply them to solve simple problems.
CO2	Apply the knowledge of quantum mechanics to solve related problems.
CO3	Apply the principles of acoustics to design efficient halls and utilize ultrasonic techniques in industrial and non-destructive testing applications.
CO4	Explain the fundamental concepts of crystal structures and Nanoscience.

CO-PO Mapping:

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

Course Content		
Unit No.	**Unit title and Content**	**Hrs**
1	**Optics** **Interference of Light**-Introduction, Interference in thin film of uniform thickness due to reflected and transmitted light, Wedge shaped film, Newton's rings experiment, Applications of interference. **Laser-** Quantum processes as absorption, spontaneous emission and stimulated emission, metastable states, population inversion, pumping, Ruby laser, Semiconductor laser, Applications of laser	7
2	**Quantum Mechanics** Matter waves and de-Broglie's hypothesis, Heisenberg's uncertainty principle and its application (Nonexistence of electron in nucleus), wave function and its properties, time independent and dependent Schrödinger wave equation, Introduction to quantum computing.	7
3	**Semiconductors** Band theory of Solids, Classification of semiconductors, Conductivity of semiconductor, Hall Effect and its applications, photodiode, light emitting diode, photovoltaic cell.	7
4	**Acoustics and Ultrasonics** **Acoustics** Reflection of sound (reverberation and echo); reverberation time, absorption of sound; absorption coefficient; Conditions of good acoustics; Sabine's formula for reverberation time, acoustic design of a hall; common acoustic defects and their remedies. **Ultrasonics** Ultrasonic Wave generation; Magnetostriction Oscillator; Piezoelectric Oscillator; Applications of ultrasonic waves.	7
5	**Crystal Structure** Fundamental concepts (Lattice, basis, unit cell, crystal system), Cubic system, Number of atoms per unit cell, coordination number, atomic radius, packing fraction, Miller Indices, Relation between lattice constant and density, Bragg's law of diffraction.	7
6	**Nanoscience and Nanotechnology** Introduction to nano-science and nanotechnology, Surface to volume ratio, two main approaches in nanotechnology -Bottom up technique and top down technique; Nano materials: Methods to synthesize nanomaterials (Ball milling, colloidal synthesis), properties and applications of nanomaterials. Characterization techniques – XRD, Scanning Electron Microscope.	**7**

Text books:
1. M. N. Avadhanulu, P. G. Kshirsagar& T. V. S. Arun Murthy, "A Textbook of Engineering Physics", S. Chand and Company Ltd, 11th Edition, 2018 2. R.K. Gaur & S.L. Gupta, "Engineering Physics", DhanpatRai Publications, New Delhi, 1st Edition, 2012 3. Dr. L. N. Singh, "Engineering Physics", Synergy Knowledgeware (Mumbai), 1st Edition, 2020

Reference books:
1. Ajoy Ghatak, "Optics", Mac Graw Hill Education (India) Pvt. Ltd, 1st Edition, 2020 2. Thomas Varghese, K.M. Balakrishna, "Nanotechnology: An Introduction to Synthesis, Properties and Applications of Nanomaterials", Atlantic Publishers & Distributors (P) Ltd, 1st Edition, 2024 3. A. J. Dekker, "Solid State Physics", Macmillan India Limited, 1st Edition, 2014

Basic Electrical Engineering

Course Name: **Basic Electrical Engineering** Course Code: **25ASH104/25ASH204**	**L**	**T**	**P**	**Credits**
	3	--	--	3
Evaluation Scheme:	**ISE-I**	**MSE**	**ISE-II**	**ESE**
Marks:	10	30	10	50

Pre-Requisite: Physics

Course Objective:	
1	To learn the basics of DC Circuit with Magnetic Circuit.
2	To analyze the basics of AC circuits.
3	To study the construction and working of Single-Phase Transformer.
4	To study the construction and working of DC Motor.
5	To study the construction and working of Single-Phase Induction Motor.

Course Outcomes:	
CO1	Explain basic terminologies related to DC& Magnetic circuits.
CO2	Analyze AC circuits with an interpretation of relation between Voltage, Current & Power.
CO3	Illustrate the working principle & construction of Single-Phase Transformer & DC Motor.
CO4	Compare the types of Single-Phase Induction Motor.

CO-PO Mapping:

CO	**PO1**	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**	**PO11**	**PSO1**	**PSO2**
CO1	3	2	-	-	-	-	-	-	-	-	1	-	-
CO2	3	2	-	-	-	-	-	-	-	-	1	-	-
CO3	3	2	-	-	-	-	-	-	-	-	1	-	-
CO4	3	2	-	-	-	-	-	-	-	-	1	-	-

Course Content		
Unit No.	**Unit title and Content**	**Hrs**
1	**DC Circuit** Conductor, Electric Current, Electromotive force, Potential difference, Power, Energy, Resistor, Inductor, Capacitor, Ohm's law, Kirchhoff's Current Law(KCL),Nodal Analysis, Kirchhoff's voltage law(KVL),Mesh Analysis, Series-Parallel Circuit, Star/Delta transformation, Numericals.	7
2	**Magnetic Circuit** Magnetic lines of force, Magnetic flux, Electromagnet, Magneto motive force, Reluctance, Magnetic flux density, Magnetic field strength, Permeability & its related terms, Magnetic circuits, Analogy between magnetic circuit and electric circuit, B-H Curve, Magnetic leakage &fringing, Numericals..	7
3	**Single Phase AC Circuit** Faraday's Laws of Electromagnetic Induction, Statically induced emf, Average value, RMS value, Form Factor, Peak Factor, Generation of Single Phase A.C supply, Phasor Representation of an Alternative Quantity, Phase of an Alternating Quantity, Reactance, Impedance, Power in ac circuit, Power Factor, Purely R,L,C AC Circuit, RLC series circuit. Numericals.	7
4	**Single-Phase Transformer** Operating Principle, Construction, Types, Working (No load & with load), EMF equation, Transformation Ratio, Losses, Efficiency, Condition for maximum Efficiency, Voltage regulation, Applications, Numericals.	7
5	**DC Motor** Basic principle of an electric motor, Construction, Working, Types, Toque Equation, Speed Equation, Back emf, Speed-Torque characteristics with Application in Electric Vehicles, Speed Control methods of DC Motor.	7
6	**Single-Phase Induction Motor** Operating Principle, Construction, Types, Working, Applications, Energy Efficient Motors.	**7**

Text books:

1. V.K. Mehta and Rohit Mehta, "Basic Electrical Engineering", S. Chand and Company Ltd, 6th Edition, 2012.
2. B. L. Theraja, "A Textbook of Electrical Technology – Volume I", S.Chand and Company Ltd,23rd Edition, 2024.
3. D. P.Kothari,I. J.Nagrath," Basic Electrical Engineering" S Tata McGraw Hill,4th Edition, 2019.

Reference books:

1. J.B. Gupta, "Basic Electrical Engineering", S.K. Kataria & Sons, 1st Edition, 2024.
2. S.K. Bhattacharya, "Basic Electrical and Electronics Engineering", Pearson, 2nd Edition, 2017.
3. Dr. Vivekananda Mukherjee & Dr. Aparajita Mukherjee, "Basic Electrical Engineering", Khanna Publishers, 2nd Edition, 2022.

Engineering Mechanics

Course Name: **Engineering Mechanics** Course Code: **25ASH105/ 25ASH205**	**L**	**T**	**P**	**Credits**
	3	--	--	3
Evaluation Scheme:	**ISE-I**	**MSE**	**ISE-II**	**ESE**
Marks:	10	30	10	50

Pre-Requisite: Students should have the knowledge of basic concepts of physics and mathematics.

Course Objective:	
1	Study the basic concepts of mechanics and system of forces.
2	Study the basic concept of statics equilibrium & various types of beams, trusses.
3	Study the centroid and moment of inertia.
4	Study the basic concepts kinematics and kinetics.
5	Know the concept of impact of elastic bodies.

Course Outcomes:	
CO1	Calculate resultant force for coplanar concurrent and noncurrent force system.
CO2	Apply static conditions of equilibrium to calculate reactive forces of structures like beams, trusses etc.
CO3	Determine center of gravity and moment of inertia.
CO4	Apply dynamic condition of equilibrium to calculate its motion parameters and reactive forces.

CO-PO Mapping:

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

Course Content		
Unit No.	**Unit title and Content**	**Hrs**
1	**Resolution and composition of force system** Introduction to Mechanics, Fundamental Law's of Mechanics, System of Forces, concept of Resultant, Composition and Resolution of Forces, Moment of a force, Couple, Varignon's theorem, Resultant of a concurrent and non-concurring force system.	7
2	**Equilibrium of rigid bodies and Friction** Concept of Equilibrium, conditions of equilibrium, Free body diagram, Lami's theorem. Friction, types of friction, laws of friction, Friction for bodies on horizontal and inclined planes.	7
3	**Analysis of Beams and Trusses** Beam, Types of supports, Types of beams, Types of loads, Analysis of beams. Introduction of Trusses, Perfect Truss, Imperfect Truss, Assumptions, Method of Joints & Method of Section (for Statically determinate plane trusses).	8
4	**Centroid & Moment of Inertia** Center of Gravity & Centroid, Moment of Inertia of Standard shapes, Parallel and perpendicular axis theorem, Moment of Inertia of composite figures, Radius of Gyration.	7
5	**Dynamics** Motion, Types of motion, motion diagrams, Introduction to Kinematics of Linear motion (Constant and variable acceleration), Motion under gravity. Kinetics of linear motion- D'Alembert's Principle, Work-Energy Principle, Impulse Momentum Principle.	8
6	**Impact of Elastic Bodies** Impact, Types of Impact, Law of conservation of Momentum, Coefficient of Restitution, Numerical on Direct central Impact.	5

Text books:

1. S. S. Bhavikatti, "Engineering Mechanics", New Age International Pvt. Ltd, 9th edition, 2023.
2. R. S. Khurmi, "Engineering Mechanics", S. Chand Publications, 22nd edition, 2019.
3. S. Timoshenko, D.H. Young, J.V. Rao, and S. Pati, "Engineering Mechanics", McGraw Hill Education, 5th Edition, 2017.

Reference books:

1. R. C. Hibbeler, "Engineering Mechanics", Pearson Publication, 14th edition, 2017.
2. Meriam J. L., Kraige L. G., "Engineering Mechanics – Statics, Vol.1", Wiley Student Edition, 8th Edition, 2017.
3. Meriam J. L., Kraige L. G., "Engineering Mechanics – Dynamics, Vol.2", Wiley Student Edition, 8th Edition, 2017.

Programming in C

Course Name: **Programming in C** Course Code:**25ASH108/25ASH208**	**L**	**T**	**P**	**Credits**
	2	--	--	2
Evaluation Scheme:	**ISE-I**	**MSE**	**ISE-II**	**ESE**
Marks:	10	30	10	50

Pre-Requisite: Basic Computer Operations and Mathematical Logic

Course Objective:	
1	Learn basic C programming concepts including syntax, data types, and operators.
2	Solve problems using loops, recursion, and algorithms.
3	Utilize functions and pointers to create efficient and reusable code.
4	Explore AI tools for code generation, debugging, and ethical programming practices.

Course Outcomes:	
CO1	Write and debug C programs using core programming constructs.
CO2	Implement searching and sorting with iterative and recursive methods.
CO3	Develop modular programs using pointers and structured programming.
CO4	Use AI tools responsibly for code generation and debugging.

CO-PO Mapping:

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

Course Content		
Unit No.	**Unit title and Content**	**Hrs**
1	**Introduction to C Programming** Introduction to C Programming Language, Structure of a C program: main () function, header files, syntax, Variables, Data types, and Constants, Input/output functions: scanf(), printf(). Writing and debugging simple programs.	3
2	**Operators in C** Arithmetic Operators, Relational Operators, Logical Operators, Unary Operators, Bitwise Operators, Ternary Operator, size-of operator.	2
3	**Control Structures and Loops** Decision-making structures: if, else, switch. Looping constructs: for, while, do-while. Nested loops and their applications. Practical use of control structures in problem-solving. Program control using break, continue.	7
4	**Functions and Recursion Functions in C** Definition, declaration, and calling functions. Function arguments, return values, and recursion. Recursive vs iterative solutions. Recursion problems, Scope and lifetime of variables.	**6**
5	**Arrays and Strings** Introduction to Arrays: Single-dimensional, Two-dimensional arrays. String handling in C: Arrays of characters, string functions. Searching and sorting algorithms (linear search, binary search, bubble sort), Introduction to pointers: Declaration, Pointer Dereferencing.	6
6	**Introduction to AI Tools:** Role of AI in programming and automation, Benefits, limitations and applications of using AI tools, Overview of Popular AI Tools, Ethical Use of AI Tools, and Prompt Engineering for Programming tools.	4

Text books:

1. Herbert Schildt," The Complete Reference", McGraw-Hill Education,4th Edition,2017
2. Yashwant Kanetkar ,"Let us C", BPB Publication, 9th Edition, 2022

Reference books:

1. E. Balagurusamy, Programming in ANSI C", McGraw-Hill Education ,8th Edition, 2019
2. Brian Kernighan, Dennis Ritchie,"C Programming Language", PHI Learning, 2nd Edition, 2011
3. Paul W. Watson "AI-Powered Developer Tools, Apress | ISBN: 978-1484296829

Communication Skills

Course Name: **Communication Skills** Course Code: **25ASH110/25ASH210**	**L**	**T**	**P**	**Credits**
	1	--	--	1
Evaluation Scheme:	**ISE-I**	**MSE**	**ISE-II**	**ESE**
Marks:	5	15	5	25

Pre-Requisite: Basic language proficiency, familiarity with written and spoken communication, openness to interactive learning.

Course Objective:	
1	Develop a comprehensive understanding of communication theories, models, and their practical application.
2	Build foundational language and grammar skills
3	Develop LSRW skills
4	Strengthen comprehension and critical analysis of spoken and written content.

Course Outcomes:	
CO1	Relate the fundamental concepts, types, levels, and barriers of communication and their significance in personal and professional contexts.
CO2	Analyze the components of English grammar, vocabulary, and sentence structure to identify and correct language errors effectively.
CO3	Apply listening, speaking, reading, and writing skills to communicate clearly and effectively in academic and workplace settings.
CO4	Construct structured and professional business correspondence using standard formats and principles of effective communication.

CO-PO Mapping:

CO	**PO1**	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**	**PO11**	**PSO1**	**PSO2**
CO1	-	-	-	-	-	-	-	1	2	-	2	-	-
CO2	-	-	-	-	-	-	-	1	2	-	2	-	-
CO3	-	-	-	-	-	-	-	2	3	-	2	-	-
CO4	-	-	-	-	-	-	-	2	3	-	1	-	-

Course Content		
Unit No.	**Unit title and Content**	**Hrs**
1	**Basics of Communication** **Communication**: Definition, importance in personal and professional life, **Levels**-interpersonal, intrapersonal, extra-personal, transpersonal, mass/media **Forms/Methods of communication**: verbal and non-verbal Elements, process, and communication cycle **Barriers to communication**: physical, mechanical, socio-cultural, psychological, linguistic/semantic, organizational, **Flow/channels of business communication**: Internal, External, Vertical, Horizontal, Diagonal, Grapevine	4
2	**Verbal Aptitude** **Grammar**: parts of speech-using articles, conjunctions and prepositions; using appropriate tenses **Vocabulary**: Affixation, idioms, confusable-homophones and homonyms **Syntax**: types of sentences, spotting errors in sentences with justification,	**3**
3	**Language Learning Skills (LSRW)** **Effective listening**: Advantages of listening, poor listening habits, types of listening, strategies for effective listening, listening barriers **Effective speaking**: Importance, group communication, public speaking **Effective reading**: Importance, types, common obstacles, tips and strategies **Effective writing**: Importance, paragraph writing techniques, diary/blog writing	4
4	**Formal Business Correspondence** • Principles-7Cs, structure/elements • Layout (**complete block**, modified block, semi-block) • Types (Job application, enquiry and replies, claim and adjustment)	3

Text books:

1. Sanjay Kumar, Pushpa Lata, "Communication Skills", Oxford University Press, 2016
2. Meenakshi Raman, Sangeeta Sharma, Communication Skills, Oxford University Press, 2017

Reference books:

1. Raymond Murphy, Essential English grammar, Cambridge University Press, 2024
2. Michael Swan, Basic English Usage, Oxford university Press, 1987
3. Syed S. Haidar & Raj Kumar Sharma, Introducing Phonetics, Atlantic Publisher & Distributors, 2021

Engineering Physics Laboratory

Course Name: **Engineering Physics Laboratory** Course Code: **25ASH112/25ASH212**	**L**	**T**	**P**	**Credits**
	--	--	2	1
Evaluation Scheme:	**ISE**			**ESE**
Marks:	50			--

Pre-Requisite: Students should have the basic physics knowledge and preliminary knowledge about the handling of instruments.

Course Objective:	
1	Provide an experimental foundation for the theoretical concepts introduced in the lectures.
2	Teach how to make careful experimental observations and how to think about and draw conclusions from such data.
3	Help students understand the role of direct observation in physics and to distinguish between inferences based on theory and the outcomes of experiments
4	Introduce the concepts and techniques which have a wide application in experimental science but have not been introduced in the standard courses.

Course Outcomes:	
CO1	Explain the electric properties of semiconductor materials.
CO2	Apply experimental procedures to investigate and interpret the optical, electrical and structural properties of materials.
CO3	Apply measurement techniques to determine physical parameters like wavelength, band gap, velocity etc.
CO4	Explain the principles of measurement technology and the functions of modern instruments in engineering.

CO-PO Mapping:

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

Course Content		
Experiment No.	**Experiment Title**	**Hrs**
1	Calculation of divergence of LASER beam.	**2**
2	Determination of wavelength of LASER using diffraction grating.	**2**
3	Determination of wavelength of light using Newton's ring experiment	**2**
4	Determination of radius of curvature of Plano convex lens.	**2**
5	Wedge shaped film- determination of thickness of thin paper/wire.	**2**
6	Study of crystal structure.	**2**
7	Determination of velocity of ultrasonic wave through different liquid media.	**2**
8	Calculation of band gap using Tauc plot.	**2**
9	Determination of interplaner spacing using Miller Indices.	**2**
10	Thin film deposition by chemical method.	**2**
11	Hall effect.	**2**
12	To study I-V characteristics of solar cell.	**2**
Note:	*Minimum 10 practical/experiments will be completed.	

Text books:

1. Dr. Ruby Das, C.S. Robinson, Rajesh Kumar &Prashant Kumar Sahu, "A Textbook of Engineering Physics Practical", Laxmi Publications Pvt Ltd, 2nd Edition, 2016
2. Dr. B. Srinivasa Rao, Kesava Vamsi Krishna V., and K. S. Rudramamba, "Engineering Physics Practicals",Laxmi Publications Pvt Ltd, 2nd Edition, 2014
3. S. K. Gupta, "Engineering Physics Practical", Krishna Media Prakashan (P) Ltd., Meerut, 1st Edition, 2014

Reference books:

1. A.K. Katiyar& C.K. Pandey, "Engineering Physics: Theory & Practical", Wiley India Pvt. Ltd., 2nd Edition, 2014
2. Dr. D. Zarena, "Engineering Physics - Laboratory Manual", Nitya Publications, Bhopal, 1st Edition, 2023
3. Anoop Singh Yadav, "Applied Physics Lab Manual", JBC Press, 1st Edition, 2018

Basic Electrical Engineering Laboratory

Course Name: **Basic Electrical Engineering Laboratory** Course Code: **25ASH114/25ASH214**	**L**	**T**	**P**	**Credits**
	--	--	2	1
Evaluation Scheme:	**ISE**			**ESE**
Marks:	50			--

Pre-Requisite: Fundamentals of Physics, Modern Physics

Course Objective:	
1	To provide hands-on experience with electrical components, circuits and instruments.
2	To train students in verifying theoretical laws such as Ohm's Law, Kirchhoff's Laws.
3	To reinforce theoretical concepts learned in the classroom through practical experiments in DC and AC circuit analysis.
4	To demonstrate the working principles of electrical machines including DC motors and transformers.
5	To introduce students to standard wiring systems & various types of protective devices used in electrical installations.

Course Outcomes:	
CO1	Analyze DC circuits & Magnetic circuits.
CO2	Analyze Energy Bill & performance of single phase AC circuits.
CO3	Evaluate the efficiency of the different machines.
CO4	Demonstrate operation of different wiring system & LT switchgear.

CO-PO Mapping:

CO	**PO1**	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**	**PO11**	**PSO1**	**PSO2**
CO1	3	3	-	-	2	-	-	2	-	-	-	-	-
CO2	3	3	-	-	2	-	-	1	-	-	2	-	-
CO3	3	2	-	-	2	-	-	2	-	-	-	-	-
CO4	3	2	-	-	2	-	-	2	-	-	-	-	-

Course Content		
Experiment No.	**Experiment Title**	**Hrs**
1	Introduction to Electrical Engineering laboratory equipment's, symbol & safety rules.	**2**
2	Verify Ohm's Law in DC circuits.	**2**
3	Verify Kirchhoff's Current Law (KCL) in DC electrical circuits.	**2**
4	Verify Kirchhoff's Voltage Law (KVL) in DC electrical circuits.	**2**
5	Plot BH curve of a given magnetic material and analyze its magnetic properties.	**2**
6	Calculate RMS, average and peak value of the signal using DSO.	**2**
7	To analyze series RLC circuit.	**2**
8	To perform load test on single phase transformer to determine efficiency & Voltage regulation.	**2**
9	To perform load test on a DC motor to determine efficiency.	**2**
10	Demonstration of Loop Wiring, Staircase Wiring, Godown Wiring.	**2**
11	Demonstration of Rewirable Fuse, HRC fuse, Miniature Circuit Breaker.	**2**
12	Analysis of energy bill (Residential & Commercial).	**2**
Note:	*Minimum 10 practical/experiments will be completed.	

Text books:

1. M. Tarangini, "Basic Electrical Engineering Laboratory", Firewall Media, 5th Edition, 2020.
2. Vijay M. Vaghela, "Laboratory Manual – Basic Electrical Engineering", Create space (Laboratory Manuals), 9th Edition, 2018.
3. S.K. Sahdev, "Basic Electrical Engineering (With Lab Manual)", Khanna Publishing House, 1st Edition, 2022.

Reference books:

1. J.B. Gupta," Laboratory Manual for Basic Electrical Engineering", S.K. Kataria & Sons, 6th Edition, 2019.
2. S.K. Bhattachary, "Experiments in Basic Electrical Engineering", Pearson, 8th Edition, 2017.
3. Stephen L.Herman, "The Complete Laboratory Manual for Electricity", Delmar/Cengage,3rd Edition, 2009.

Engineering Mechanics Laboratory

Title of the Course Name: **Engineering Mechanics Laboratory** Course Code: **25ASH115/25ASH215**	**L**	**T**	**P**	**Credits**
	--	--	2	1
Evaluation Scheme:	**ISE**			**ESE**
Marks:	50			50

Pre-Requisite: : Students should have the knowledge of basic concepts of physics and mathematics and preliminary knowledge about the handling of instruments.

Course Objective:	
1	Understand law of engineering mechanics.
2	Study the concepts of support reaction and moment.
3	Understand the concepts of centroid.
4	Study the concepts of coefficient of friction.
5	Know about resultant, support reaction and truss by graphical method

Course Outcomes:	
CO1	Make use of the equilibrium concept.
CO2	Identify support reaction, centroid and Coefficient of friction.
CO3	Solve the problems on resultant, support reaction and truss by graphical method.
CO4	Compare the analytical results with experimental results

CO-PO Mapping:

CO	**PO1**	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**	**PO11**	**PSO1**	**PSO2**
CO1	2	2	-	-	-	-	-	-	-	-	-	-	-
CO2	2	2	-	-	-	-	-	-	-	-	-	-	-
CO3	2	2	-	-	-	-	-	-	-	-	-	-	-
CO4	2	2	-	-	-	-	-	-	-	-	-	-	-

Course Content		
Experiment No.	**Experiment Title**	**Hrs**
1	To determine resultant of concurrent force system applying the Polygon law of forces with the help of Universal Force Table Apparatus.	**2**
2	To verify the Lami's Theorem with the help of Universal Force Table Apparatus.	**2**
3	To verify the Principle of moments with the help of Bell Crank Lever Apparatus.	**2**
4	To find out forces in Jib and Tie with the help of Jib Crane Apparatus by Analytical method.	**2**
5	To verify the reactions of a Simply Supported Beam at its supports with the help of Parallel Force Apparatus.	**2**
6	To determine the Coefficient of Friction between given pair of surfaces with the help of Inclined Plane Apparatus.	**2**
7	To find the Centroid of irregular shaped bodies.	**2**
8	To verify the reactions of a Simply Supported Beam at its supports using Graphical method.	**2**
9	To find out forces in Jib and Tie with the help of Jib Crane Apparatus by Graphical method.	**2**
10	To verify Law of Conservation of Momentum of Elastic Bodies and to find Coefficient od Restitution of given bodies.	**2**
11	To determine the Moment of Inertia of a Flywheel about its own axis of rotation	**2**
12	To find out forces in Truss using Graphical method.	**2**
Note:	*Minimum 10 practical/experiments will be completed.	

Text books:

1. R. K. Bansal, Sanjay Bansal, "Engineering Mechanics", Laxmi Publications Pvt. Ltd, 6th edition, 2023.
2. S. B. Junnarker, Dr. H. J. Shah, "Engineering Mechanics", Charotar Publishing HousePvt. Ltd, 24th edition, 2015.
3. S. N. Saluja, "Engineering Mechanics", Satya Prakashan, New Delhi, 23th edition, 2023.

Reference books:

1. Beer F .P., Johnston E. R.,"Vector Mechanics for Engineers -Statics, Dynamics", Tata McGraw Hill Publishing company Ltd., New Delhi, 12th Edition, 2019.
2. Shames Irving H., "Engineering Mechanics", Prentice Hall, New Delhi, 4th edition, 2023.
3. J. Suresh Kumar , K. Vijaya Kumar Reddy and Singer, "Singers Engineering Mechanics: Statics And Dynamics", B S Publications, 3rd edition, 2011.

Programming in C Laboratory

Course Name: **Programming In C Laboratory**	**L**	**T**	**P**	**Credits**
Course Code:**25ASH118/25ASH218**	--	--	2	1
Evaluation Scheme:	**ISE**			**ESE**
Marks:	50			50

Pre-Requisite: Basic Computer Operations and Mathematical Logic

Course Objective:	
1	Implement core C concepts like loops, functions, arrays, and pointers.
2	Solve problems using C for logic, recursion, and data handling.
3	Use AI tools and prompts for code generation and debugging.
4	Build mini projects in C with AI-assisted development.

Course Outcomes	
CO1	Write and debug C programs using control structures, functions, arrays, and pointers.
CO2	Apply recursion and arrays for searching, sorting, and matrix operations.
CO3	Use AI tools for code generation, debugging, and prompt design.
CO4	Develop mini projects combining C concepts with AI assistance.

CO-PO Mapping:

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

Course Content		
Unit No.	**Unit title and Content**	**Hrs**
1	To write a C program to display a message and perform basic arithmetic operations.	**2**
2	To write a C program using `if-else` and `switch` statements to perform decision-making tasks like finding the largest number or grade classification.	**2**
3	To write C programs using loops (`for`, `while`, `do-while`) to perform tasks like printing patterns, generating number series, and calculating factorial.	**2**
4	To develop a simple calculator using the `switch` statement that performs basic mathematical operations based on user input.	**2**
5	To write C programs that use functions (with and without arguments and return values) and implement recursion to solve problems like factorial of number.	**2**
6	To write a C program using one-dimensional arrays to perform operations such as searching, sorting, and finding the sum and average of elements.	**2**
7	To write C programs using 2D arrays for matrix operations such as addition, subtraction, and multiplication.	**2**
8	To write C programs to perform string operations such as length calculation, comparison, concatenation, reversal, and palindrome checking.	**2**
9	Evaluating Multiple AI-Generated Solutions for the Same C Programming Problem.	**2**
10	To Write an AI-automated system that prepares a simple template message based on user input.	**2**
11	Test how different prompts affect the C code generated by an AI tool	**2**
12	Develop mini project in C using all above concepts to solve problems like Student result system, Library management system by making use of AI...	**2**
Note:	*Any 10 practical/experiments will be completed.	

Text books:

1. Herbert Schildt," The Complete Reference", McGraw-Hill Education,4th Edition,2017
2. Yashwant Kanetkar ,"Let us C", BPB Publication, 9th Edition, 2022

Reference books:

1. E. Balagurusamy, "Programming in ANSI C", McGraw-Hill Education ,8th Edition, 2019
2. Brian Kernighan, Dennis Ritchie, "C Programming Language", PHI Learning, 2nd Edition, 2011
3. Paul W. Watson "AI-Powered Developer Tools", A press | ISBN: 978-1484296829

Yoga & Meditation

Course Name: **Yoga and Meditation** Course Code:**25ASH120/25ASH220**	**L**	**T**	**P**	**Credits**
	--	--	2	1
Evaluation Scheme:	**ISE**			**ESE**
Marks:	50			--

Pre-Requisite: No formal pre-requisites.

Course Objectives:	
1	Introduce students to the fundamental practices of yoga for physical, mental, and emotional well-being.
2	Develop awareness of breath, posture, and inner balance through structured asana and meditation sessions.
3	Enable students to manage stress, improve focus, and cultivate mindfulness in daily life.
4	Build a personal discipline through the practice of Padmasadhana, Pranayama, and Yoga Nidra.

Course Outcomes:	
CO1	Explain the basic principles and health benefits of foundational yoga practices.
CO2	Describe the purpose and process of Padmasadhana and Pranayama.
CO3	Illustrate the significance of Dharana and Dhyana practices.
CO4	Summarize the integrated approach to yoga through sessions combining asanas, pranayama, and meditation.

CO-PO Mapping:

CO	**PO1**	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**	**PO11**	**PSO1**	**PSO2**
CO1	-	-	-	-	-	-	-	1	1	-	2	-	-
CO2	-	-	-	-	-	-	-	1	1	-	2	-	-
CO3	-	-	-	-	-	-	-	1	1	-	2	-	-
CO4	-	-	-	-	-	-	-	1	1	-	2	-	-

Course Content		
Experiment No.	**Unit title and Content**	**Hrs**
01	Introduction to Yoga and Body Awareness. (Neck Rolls, Shoulder Rotation, Tadasana, Shavasana)	**02**
02	Foundation Asanas for Postural Alignment (Tadasana, Trikonasana, Vajrasana, Bhujangasana, Setu Bandhasana) Suryanamaskar with Mantra.	**02**
03	Padmasadhana – Part I (Preparation and Practice)	**02**
04	Padmasadhana – Part II (With Breath Awareness)	**02**
05	Pranayama Basics – Breath Awareness and Control	**02**
06	Pranayama Advanced – Energizing and Cleansing (Kapalabhati Kriya, Anulom-Vilom, Deep Ujjayi Breathing)	**02**
07	Dharana – Focus and Concentration through Trataka (Trataka [Candle Gazing], OM Chanting, Seated Gaze Focus in Padmasana or Sukhasana) Brahma Mudra	**02**
08	Dhyana – Guided Meditation and Mindfulness (Breath Meditation, Mindfulness of Thoughts, Sukhasana Meditation Position)	**02**
09	Integrated Padmasadhana with Silent Sitting (Full Padmasadhana Flow + 10–15 mins of Seated Silence in Padmasana or Sukhasana)	**02**
10	Yoga Nidra – (Guided Yoga Nidra in Shavasana posture)	**02**
11	Pratyahara – Sense Withdrawal and Digital Detox (Sound Meditation, OM Chanting, Silent Sitting with Eyes Closed in Padmasana)	**02**
12	Final Integrated Session (Tadasana, Trikonasana, Padmasadhana Series, Nadi Shodhana, Meditation in Sukhasana)	**02**

References:

1. Dr. R. Nagarathna&Dr. H.R. Nagendra, "Yoga for Students",Swami Vivekananda Yoga Prakashan (SVYASA)
2. Swami Satchidananda ,The Yoga Sutras of Patanjali,
3. B.K.S. IyengarYoga: The Path to Holistic Health Dorling Kindersley (DK Publishing)

Communication Skills Laboratory

Course Name: **Communication Skills Laboratory** Course Code: **25ASH122/25ASH222**	**L**	**T**	**P**	**Credits**
	--	--	2	1
Evaluation Scheme:	**ISE**			**ESE**
Marks:	50			--

Pre-Requisite: Basic ability to comprehend the ideas, basic Communication Skills, 12th Grammar knowledge.

Course Objective:	
1	Acquaint students with English phonology and make them practice correct pronunciation.
2	Provide them ample practice for developing their LSRW skills.
3	Strengthen their grammatical competence through practice.

Course Outcomes:	
CO1	Identify and list key components of self-introduction, phonetics, and grammar rules to build a foundation for effective English communication.
CO2	Analyze listening techniques and speaking patterns through audio-visual materials to identify strengths and areas for improvement in verbal communication.
CO3	Apply effective communication strategies in structured speaking tasks such as speeches, group discussions, and interviews.
CO4	Construct impactful and coherent narratives through story-telling and incident narration, demonstrating fluency, clarity, and expressiveness in speech..

CO-PO Mapping:

CO	**PO1**	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**	**PO11**	**PSO1**	**PSO2**
CO1	-	-	-	-	-	-	-	1	2	-	1	-	-
CO2	-	-	-	-	-	-	-	2	3	-	1	-	-
CO3	-	-	-	-	-	-	-	3	3	-	1	-	-
CO4	-	-	-	-	-	-	-	1	1	-	1	-	-

Course Content		
Experiment No.	**Experiment Title**	**Hrs**
1	**Introducing self and others** Adjectives, phrases and clauses to describe oneself and others Introducing oneself and others-demonstration	**2**
2	**Phonetics-1** Introduction to Phonetics-Consonants, Vowels and Diphthongs in English with videos samples	**2**
3	**General Grammar Applications (Discussion/ Overview)** Using proper tenses, correct use of articles, conjunctions and prepositions	**2**
4	**Solving general grammar exercises** Using proper tenses, correct use of articles, conjunctions and prepositions	**2**
5	**Listening practice** Listening comprehension, Strategies for effective listening with audio/video samples	**2**
6	**Speaking practice-1** Video samples of effective and ineffective public speeches, Extempore (JAM), prepared speeches	**2**
7	**Speaking practice-2** Prepared speeches	**2**
8	**Group Discussion-1** Group discussion tips, Do's and Don'ts, video samples Mock GD-1, analysis and comments on individual performances	**2**
9	**Group Discussion -2** Final GD participation	**2**
10	**Interview 1** Discussing interview FAQs in detail, video samples	**2**
11	**Interview 2** Mock interviews (prepared and formal)	**2**
12	**Incident Narration or Story telling** Practicing narration methods and techniques for effective narration.	**2**
Note:	*Minimum 10 practical/experiments will be completed.	

Text books:

1. Richards, J. C., & Bohlke, D. (2019). Speak now: Communicate with confidence (Levels 1–4). Oxford University Press.
2. Hancock, M. (2017). English pronunciation in use: Elementary (2nd ed.). Cambridge University Press
3. Azar, B. S., & Hagen, S. A. (2016). Basic English grammar (4th ed.). Pearson Education.

Reference books:

1. Better English Pronunciation Second J.D. O'Connor Oxford University Press, 1980
2. A Practical Course in Spoken English First J.K. Gangaj PHI Learning Pvt. Ltd 2014
3. English Language Laboratories Second Nira Konar PHI Learning 2014

Engineering Mathematics-II

Course Name: **Engineering Mathematics-II** Course Code: **25ASH201**	**L**	**T**	**P**	**Credits**
	3	1	--	4
Evaluation Scheme:	**ISE-I**	**MSE**	**ISE-II**	**ESE**
Marks:	10	30	10	50

Pre-Requisite: Basics of differential equations, Integration, Vectors, Probability and its properties.

Course Objective:	
1	Develop an understanding of differential operators such as gradient, divergence, and curl, along with their physical interpretations.
2	Enable students to analyze, trace, and interpret curves in various coordinate systems and compute their arc lengths using principles of differential calculus.
3	Develop the ability to evaluate double integrals in Cartesian and polar coordinates, and to apply them in solving engineering problems.
4	Introduce students to the solution of first-order, first-degree differential equations and to equip them with basic numerical methods for solving equations that cannot be solved analytically.
5	Introduce the concepts of discrete and continuous probability distributions.

Course Outcomes:	
CO1	Explain the concepts of gradient, divergence, and curl for scalar and vector fields by outlining their definitions, computation methods, and interpreting their significance through illustrative problems.
CO2	Apply the concepts of curve tracing, multiple integration, and first-order differential equations to solve geometrical, physical, and engineering problems.
CO3	Solve first-order differential equations using analytical and numerical methods, and apply them to practical problems
CO4	Apply Binomial, Poisson, and Normal distributions to solve basic probability problems.

CO-PO Mapping:

CO	**PO1**	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**	**PO11**	**PSO1**	**PSO2**
CO1	3	2	-	-	-	-	-	-	-	-	1	-	-
CO2	3	2	-	-	-	-	-	-	-	-	1	-	-
CO3	3	2	-	-	-	-	-	-	-	-	1	-	-
CO4	3	2	-	-	-	-	-	-	-	-	1	-	-

Course Content		
Unit No.	**Unit title and Content**	**Hrs**
1	**Vector Calculus** Derivative of vector valued functions, Velocity, Acceleration and related problems, Scalar and Vector point functions. Definition of Gradient, Divergence and Curl-problems. Solenoidal and Irrotational vector fields. Vector identities - div (ϕA), curl (ϕA), curl (grad ϕ), and div (curl A).	7
2	**Curve Tracing and Rectification** Tracing of curves (Cartesian and Polar), Rectification of plane curves (Cartesian and Polar form)	7
3	**Multiple Integration and its applications** Double Integrals and evaluation; Change of order of integration; Change into Polar Coordinates; Area enclosed by plane curves; Mass of a plane lamina	7
4	**Differential Equations of first order & first degree** Exact, Non-exact, Linear Equations, Bernoulli's Equations, Orthogonal trajectories (Rectangular and Polar), Applications to simple electrical circuits	7
5	**Numerical Solution of Differential Equations of First Order and First Degree** Introduction, Picard's method, Taylor's series method, Euler's method, Modified Euler's method, Runge-Kutta method of fourth order.	7
6	**Theoretical Probability Distributions** Binomial distribution, Poisson distribution, Normal distribution, Fitting of binomial distributions, Fitting of Poisson distributions Properties of binomial, Poisson and normal distributions, Examples.	**7**

Text books:

1. Dr. B. S. Grewal, "Higher Engineering Mathematics", S. Khanna Publishers, Delhi, 42th Edition, 2012
2. P. N. Wartikar & J. N. Wartikar, "A Text Book of Applied Mathematics Vol. I & II", Pune Vidyarthi Griha Prakashan, Pune,6th Edition, 2007
3. R.K. Jain & S.R.K. Iyengar, "Advanced Engineering Mathematics", Narosa Publishing House, 5th Edition,2021

Reference books:

1. Erwin Kreyszig, "Advanced Engineering Mathematics", John Wiley & Sons, 10th Edition, 2011
2. H. K. Dass, "Advanced Engineering Mathematics", S. Chand & Company Pvt. Ltd, New Delhi, 21th Edition, 2014
3. G. V.Kumbhojkar, Probability and Random Processes, C. Jamnadas and Co., 14th Edition, 2010.

Engineering Chemistry

Course Name: **Engineering Chemistry** Course Code: **25ASH103/25ASH203**	**L**	**T**	**P**	**Credits**
	3	--	--	3
Evaluation Scheme:	**ISE-I**	**MSE**	**ISE-II**	**ESE**
Marks:	10	30	10	50

Pre-Requisite: Students should have knowledge about basic chemistry related to periodic table, elements, electrochemistry, Water, Fuel and Metallic Materials, etc.

Course Objective:	
1	Acquire the knowledge of water quality parameters and treatment techniques.
2	Explore the advanced engineering materials, their synthesis, and applications.
3	Gain the knowledge of analytical techniques, fuels, and alternative energy systems.
4	Apply the fundamental concepts related to lubricants, corrosion, batteries, sensors, and green chemistry practices.

Course Outcomes:	
CO1	Describe the water quality parameters & treatment methods.
CO2	Outline the concepts of advanced engineering materials, electrochemical and instrumental techniques.
CO3	Illustrate the different properties and applications of fuels, lubricants, batteries, and smart sensors.
CO4	Apply the concepts of corrosion, control methods and green chemistry principles.

CO-PO Mapping:

CO	**PO1**	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**	**PO11**	**PSO1**	**PSO2**
CO1	3	1	-	-	-	-	-	-	-	-	-	-	-
CO2	3	1	-	-	-	-	-	-	-	-	-	-	-
CO3	3	1	-	-	-	-	-	-	-	-	-	-	-
CO4	3	1	-	-	-	-	-	-	-	-	-	-	-

Course Content		
Unit No.	**Unit title and Content**	**Hrs**
1	**Water Technology** Introduction, water quality parameters: acidity, alkalinity, chlorides, dissolved oxygen, and hardness of water (WHO standards), Disadvantages of hard water in hard water in steam generation boilers, numerical on hardness, Water treatment methods, Modern technique of atmospheric water generation.	7
2	**Advanced Engineering Materials** Introduction, Composition, Classification, Synthesis, Properties and Applications of Polymers (Specialty polymers, Commercial polymers, Natural Rubber, Synthetic Rubber), Smart & responsive materials, Cement (Portland Cement : Setting & Hardening, POP) Alloys (Fe, Cu, Al, Ni, Pb), Composite materials (FRP and GRP) & Nanomaterials	7
3	**Electroanalytical and Instrumental Methods of Chemical Analysis** **A] Electrochemistry and pH Analysis** Conductance Concepts, cell constant, Electrodes: Calomel (reference), glass (indicator), solid membrane (ion-selective), Conductometry & pH Metry. **B] Spectroscopic and Instrumental Techniques** Beer–Lambert law, Principle, instrumentation and applications of UV-Visible & IR Spectroscopy, Chromatography Advanced Techniques: SEM and XRD – principles and applications.	7
4	**Fuels and Combustion Technology** Introduction, Classification and properties of fuels, Calorific value: HCV, LCV, Dulong's formula, Bomb and Boy's calorimeter, Properties of Fuel, Analysis of coal, Petroleum refining. Alternative fuels: Biodiesel, Power alcohol, Hydrogen.	7
5	**Lubricants, Batteries and Smart Sensors** **Lubricants:** Introduction, Classification and significance, Properties of Lubricants **Batteries**: Ni-Cd, Li-ion – construction, working, applications, Fuel Cells: principle, advantages, and uses **Smart Sensors :** RFID and IONT materials	7
6	**Corrosion Science and Green Chemistry:** **Corrosion:** Definition, Types, Effects and mechanism, Pilling–Bedworth Rule, Factors affecting corrosion rate. Corrosion Control and Prevention Methods **Green Chemistry:** 12 principles, atom economy, E-factor, Green synthesis (e.g., polycarbonate)	**7**

Text books:

1. Jain, P. C., & Jain, Monika, "Engineering Chemistry", New Delhi: Dhanpat Rai Publications, 17th Edition, 2022.
2. Dara, S. S., & Umare, S. S., "A Textbook of Engineering Chemistry", New Delhi: S. Chand Publishing, 9th Edition, 2021
3. Singh, S. K., "Fundamentals of Engineering Chemistry": Theory & Practice, New Delhi: New Age International Publishers, 3rd Edition, 2020

Reference books:

1. Bahl, Arun; Bahl, B. S.; & Tuli, G. D., "Essentials of Physical Chemistry", New Delhi: S. Chand Publishing, 20th Edition, 2022
2. Bahl, Arun, & Bahl, B. S., "Advanced Organic Chemistry", New Delhi: S. Chand Publishing, 10th Edition, 2023
3. Willard, H. H., Merritt, L. L., Dean, J. A., & Settle, F. A., "Instrumental Methods of Analysis", New Delhi: CBS Publishers & Distributors, 7th Edition, 2004

Fundamentals of Electronics

Course Name: **Fundamentals of Electronics**	**L**	**T**	**P**	**Credits**
Course Code: **25ASH106/25ASH206**	3	--	--	3
Evaluation Scheme:	**ISE-I**	**MSE**	**ISE-II**	**ESE**
Marks:	10	30	10	50

Pre-Requisite: Fundamentals of Physics.

Course Objective:	
1	Understand the basic principles of semiconductor materials and operation of various diodes.
2	Illustrate the working of rectifier circuits with and without filters, and understand voltage regulation using Zener diodes.
3	Explain the construction, working, and characteristics of BJT and FET in different configurations.
4	Introduce the number systems, binary arithmetic, and various binary coding schemes used in digital electronics.
5	Demonstrate the use of logic gates and apply Boolean algebra laws and Apply Karnaugh Maps (K-Maps) to simplify logical expressions for efficient circuit design.

Course Outcomes:	
CO1	Describe the operation of semiconductor diodes and rectifier circuits.
CO2	Analyze BJT and FET characteristics in various configurations.
CO3	Use number systems for conversions and basic operations.
CO4	Simplify Boolean functions using K-Maps and design logic circuits.

CO-PO Mapping:

CO	**PO1**	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**	**PO11**	**PSO1**	**PSO2**
CO1	2	-	-	-	-	-	-	-	-	-	-	-	-
CO2	3	-	-	-	-	-	-	-	-	-	1	-	-
CO3	3	-	-	-	-	-	-	-	-	-	-	-	-
CO4	3	-	1	-	-	-	-	-	-	-	1	-	-

Course Content		
Unit No.	**Unit title and Content**	**Hrs**
1	**Semiconductor Diodes** Semiconductor Basics, Types of Diode, Characteristics of P-N Junction Diode, Solar Cell, Photodiode, Light Emitting Diode, Schottky Diode and Zener Diode.	7
2	**Rectifier Circuits** Rectifiers, Working of Half Wave and Full Wave Rectifiers, Center-tap Rectifier, Bridge Rectifier, Filters, Voltage Doubler Circuit, Zener Diode as Voltage Regulator.	7
3	**Bipolar Junction Transistor** Bipolar Junction Transistor (BJT) - Construction, Operation, Configurations (CC, CB, CE), Characteristics, Biasing, Applications – Amplifiers, Switching Circuits, Oscillator.	7
4	**Field Effect Transistors** Introduction to Field Effect Transistors (FETs) - Modes, Construction, Operation, Characteristics, Applications - Voltage Amplifiers, Analog Switches.	7
5	**Number Systems and Codes** Introduction to Number Systems, Binary Codes - BCD, Gray code, Excess-3 code, ASCII and EBCDIC codes, Binary Arithmetic, 1's and 2's complement representation.	7
6	**Logic Gates and Boolean Algebra** Logic Gates, Boolean Algebra - Laws and theorems of Boolean algebra, De Morgan's theorem,Boolean Function Representation - Sum of Products (SOP) and Product of Sums (POS), Canonical forms, Karnaugh Maps (K-Maps) for simplification.	**7**

Text books:

1. Donald Neamen, "Electronic Circuit Analysis", Mc-Graw Hill Publication.
2. Robert L. Boylestad & Louis Nashelsky, "Electronic Devices and Circuit Theory", PHI Publication.
3. Jacob Millman & Christos C. Halkias, "Integrated Electronics - Analog and Digital Circuits and Systems", McGraw-Hill Publication, 2000.

Reference books:

1. V.K. Mehta & Rohit Mehta, "Principles of Electronics", S. Chand Publication.
2. David A. Bell, "Electronic Devices and Circuits", Oxford University Press.
3. A.K. Sawhney**,** "Electrical and Electronic Measurements and Instrumentation", Dhanpat Rai& Co. Publication.

Engineering Graphics

Course Name: **Engineering Graphics**	**L**	**T**	**P**	**Credits**
Course Code: **25ASH107/25ASH207**	3	--	--	3
Evaluation Scheme:	**ISE-I**	**MSE**	**ISE-II**	**ESE**
Marks:	10	30	10	50

Pre-Requisite: Knowledge of fundamentals of simple geometrical theories and constructional procedure.

Course Objectives:
1. Illustrate fundamental principles of engineering drawing. 2. Construct the proper understanding of 'Theory of Projection'. 3. Improve the visualization skill. 4. Develop sectional views, true shapes and surface developments for engineering objects. 5. Interpret knowledge about principles of orthographic and Iso-metric projection of objects.

Course Outcomes:	
CO1	Apply the fundamentals of Engineering Drawing
CO2	Apply the basic principles of projections in points, lines, Planes and solids.
CO3	Draw solid sectioning and surfaces development
CO4	Apply the concept of orthographic and isometric projections of objects from given views.

CO-PO Mapping:													
CO	**PO1**	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**	**PO11**	**PSO1**	**PSO2**
CO1	3	3	-	-	-	-	-	-	1	-	-	-	-
CO2	3	3	-	-	-	-	-	-	1	-	-	-	-
CO3	3	3	-	-	-	-	-	-	1	-	-	-	-
CO4	3	3	-	-	-	-	-	-	2	-	-	-	-

Course Content		
Unit No.	**Unit title and Content**	**Hrs**
1	**Introduction to Engineering Drawing and AutoCAD** Introduction to Engineering drawing, lettering and numbering, types of projections (first angle and third angle), Systems and rules of Dimensioning Introduction to CAD Software, Basic 2D commands (Draw toolbar, modify toolbar, Layers, Dimensioning)	7
2	**Projection of Points and Lines** **Projection of Point :** Projections of points in all quadrants, shortest distance between two points **Projections of Lines:** Projections of lines inclined to both the reference planes (Excluding Traces of lines). Simple application based problems on projection of lines	7
3	**Projection of Plane and Solid** **Projections of Planes:** Projections of planes, inclined to both the Reference Planes **Projection of solid:** Projections of solids with the axis inclined to one and both reference planes (prism, pyramid, cone and cylinder only)	7
4	**Section of Solids & Surface Development** **Solid Sectioning:** Sections of solids (Prism, Pyramid, Cone and Cylinder), true shape of section **Surface Development:** Introduction, Methods of development, development of lateral surfaces of right solids, (prisms, pyramids, cone and cylinder	7
5	**Orthographic Projections** Introduction to projections, Principles of projection, Orthographic Projection by First angle projection method, Typical problems by first angle projection method.	7
6	**Isometric projection** : Introduction of isometric projection, Isometric lines, planes, non-isometric lines and planes, Isometric scale, Isometric projection and view, Construction of isometric view from given orthographic views.	**7**

Text books:
1. N.D.Bhatt, "Elementary Engineering Drawing", Charotar Publishing House, India, 49th Edition 2008. 2. R.K.Dhawan, "A Textbook of Engineering Drawing", S.Chand & Co, 3rdEdition 2019 3. B.C. Rana ,"Engineering Drawing and Computer Graphics", Pearson Education, 1stEdition 2010

Reference books:
1. P.S.Gill, "Engineering Graphics", S.K.Kataria and sons, New Delhi, 1stEdition 2001 2. K.Venugopal," Engineering Drawing & Graphics", New Age Publication, 5thEdition 2004 3. D.M. Kulkarni, "Engineering Graphics with AutoCAD", PHI publication, Revised 2009

Architecture and Town Planning

Course Name: **Architecture and Town Planning** Course Code: **25ASH109/ 25ASH209**	**L**	**T**	**P**	**Credits**
	2	--	--	2
Evaluation Scheme:	**ISE-I**	**MSE**	**ISE-II**	**ESE**
Marks:	10	30	10	50

Pre-Requisite: Students should have the knowledge of basic understanding of Indian history, culture, and traditional architectural principles

Course Objective:	
1	Understand the foundational concepts of Indian Knowledge Systems.
2	Study and explore historical evolution.
3	Understand traditional Indian architectural practices.
4	Study ancient Indian city planning systems.
5	Study the traditional Indian planning methods.

Course Outcomes:	
CO1	Explain the fundamental principles and key concepts of the Indian Knowledge System.
CO2	Explain traditional Indian architectural treatises.
CO3	Classify and interpret the fundamental principles of the Indian Knowledge System, and illustrate their relevance in contemporary contexts.
CO4	Interpret the goals of modern architectural designs and rephrase them in the context of sustainable development.

CO-PO Mapping:

CO	**PO1**	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**	**PO11**	**PSO1**	**PSO2**
CO1	2	2	-	-	-	-	-	-	-	-	-	-	-
CO2	2	2	-	-	-	-	-	-	-	-	-	-	-
CO3	2	2	-	-	-	-	-	-	-	-	-	-	-
CO4	2	2	-	-	-	-	-	-	-	-	-	-	-

Course Content		
Unit No.	**Unit title and Content**	**Hrs**
1	**Historical Awareness & Knowledge of Indian Philosophical System** **Ancient Indian History:** Basic understanding of the Indus Valley Civilization, Vedic period, Mauryan, Gupta, Mughal, and British periods. **Evolution of Indian Cities:** Knowledge of how Indian towns evolved – from ancient cities like Mohenjo-Daro and Varanasi to colonial and modern cities. **Basic familiarity with Vedic texts**: Upanishads, Puranas, and Agamas (especially Shilpa Shastra, and Natya Shastra). **Concepts:** Pancha Mahabhutas (five elements), Purusha Mandala, Chakra system, and Sacred Geometry.	5
2	**Shilpa Shastra** **Understanding principles of:** Vaastu Purusha Mandala, Orientation, zoning, and site planning, Proportion and symmetry, Materials and aesthetics, Temple architecture styles (Nagara, Dravidian, Vesara)	4
3	**Basic Knowledge of Geography and Ecology** Traditional Indian methods of climatic zoning, site selection, and water conservation (e.g., tanks, baolis, stepwells). Natural resource integration and eco-sensitive architecture.	**4**
4	**Urban Planning and Town Layouts in Ancient India Knowledge of:** Manasara, Mayamata, Bṛhat Samhita (ancient urban design texts).City plans of Jaipur, Madurai, Hampi, Fatehpur Sikri. Traditional bazaar streets**,** courtyards**,** sacred tanks and temple towns	5
5	**Cultural and Religious Context** Influence of Hinduism, Buddhism, Jainism and Islam on Indian architecture and city planning. Role of rituals, cosmology, and mythology in shaping the built environment.	5
6	**Basic Design and Drawing Skills & Comparative Knowledge** Interpret traditional Indian architectural diagrams**.** Sketch basic plans and elevations inspired by ancient Indian structures. Use symbolism and spatial hierarchies in design. **Comparative Knowledge:** Familiarity with modern urban design concepts so that comparisons can be made between traditional and modern planning. Study of sustainable and vernacular practices vs. modern industrial approaches.	5

Text books:
1. Binode Behari Dutt , "Town Planning in Ancient India", New Age International Pvt. Ltd, 9th edition, 2023. 2. Dr. S. S. Bhatti, "Town Planning and Architecture in India", 3. B. Mahadevan, "Introduction To Indian Knowledge System: Concepts And Applications"

Reference books:
1. Dr. R.P. Singh Kushwah, "Introduction To Architecture & Town Planning",S.K. Kataria & Sons, 2nd Edition,2015. 2. D. N. Shukla **,** "The Ancient Indian Science of Architecture", Munshiram Manoharlal Publishers Pvt. Ltd., New Delhi, Volume I, 1996. 3. Vidya Dhar Mahajan, "Town Planning in Ancient India", Thacker, Spink & Co., Calcutta, 1st Edition, 1925.

Engineering Chemistry Laboratory

Title of the Course Name: **Engineering Chemistry Laboratory** Course Code: **25ASH113/25ASH213**	**L**	**T**	**P**	**Credits**
	--	--	2	1
Evaluation Scheme:	**ISE**			**ESE**
Marks:	50			--

Pre-Requisite: Students should have Basic chemistry knowledge & preliminary knowledge about the handling of glasswares, apparatus and preparation of chemicals.

Course Objective:	
1	Understand the water quality parameters.
2	Explore the types, properties, and uses of polymers in various sectors.
3	Perform chemical analysis using instrumental methods.
4	Gain the practical knowledge of fuel and lubricant analysis.
5	Apply the chemical principles to real-world industrial and environmental applications.

Course Outcomes:	
CO1	Identify the quality of water sample for domestic & Industrial Purpose
CO2	Outline the synthesis mechanism of advanced materials:Thermosetting
CO3	Apply the analytical instruments to illustrate the materials.
CO4	Demonstrate the quality of Fuel & oil sample.

CO-PO Mapping:

CO	**PO1**	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**	**PO11**	**PSO1**	**PSO2**
CO1	3	1	-	-	1	-	-	-	-	-	-	-	-
CO2	3	1	-	-	1	-	-	-	-	-	-	-	-
CO3	3	1	-	-	1	-	-	-	-	-	-	-	-
CO4	3	1	-	-	1	-	-	-	-	-	-	-	-

Course Content		
Experiment No.	**Experiment Title**	**Hrs**
1	To determine hardness of water by EDTA method.	**2**
2	To determine alkalinity of water.	**2**
3	To determine acidity of water.	**2**
4	To determine the chloride content of water by Mohr's method.	**2**
5	To determine the Dissolved Oxygen of water by Winkler's method.	**2**
6	To prepare urea-formaldehyde resin.	**2**
7	To prepare Phenol-formaldehyde resin.	**2**
8	To determine the pH of Domestic / industrial waste water using pH meter.	**2**
9	To determine maximum wavelength of absorption of CuSO4/FeSO4/ KMnO4, verify Beer's law.	**2**
10	To determine strength of Acid / Base conductometrically.	**2**
11	Determination of Moisture content / Ash content of coal.	**2**
12	Determination of Saponification value / Acid value of oil.	**2**
Note:	*Minimum 10 practical/experiments will be completed.	

Text books:

1. Bhasin, S. K., & Rani, S., "Laboratory Manual on Engineering Chemistry" New Delhi: Dhanpat Rai Publishing Company Pvt. Ltd. 3rdEdition, 2008
2. Sethi, A. "Systematic Experiments in Chemistry", New Delhi: New Age International Publishers. ISBN: 9789360747930., 2nd Edition, 2008
3. Tiwari, S., "Engineering Chemistry Lab Manual", Chennai: Scitech Publications (India) Pvt. Ltd., 2ndEdition, 2013

Reference books:

1. Chatwal, G. R., & Anand, S. K., "Instrumental Methods of Chemical Analysis" Mumbai: Himalaya Publishing House, 5thEdition, 2025
2. Vogel, A. I., "Vogel's Qualitative Inorganic Analysis" New Delhi: Pearson India publication, 7th Edition, Revised by G. Svehla,2018
3. Sharma, B. K., "Environmental Chemistry" Meerut: Goel Publishing House, 4thEdition, 2011

Fundamentals of Electronics Laboratory

Title of the Course Name: **Fundamentals of Electronics Laboratory** Course Code: **25ASH116/25ASH216**	**L**	**T**	**P**	**Credits**
	--	--	2	1
Evaluation Scheme:	**ISE**			**ESE**
Marks:	50			50

Pre-Requisite: Students should have the basic physics knowledge and preliminary knowledge about the handling of instruments.

Course Objective:	
1	Understand the characteristics and working principles of basic semiconductor devices.
2	Analyze the behavior of rectifier circuits and voltage regulation techniques.
3	Study the input-output characteristics and applications of BJTs and FETs.
4	Verify the operation of logic gates and apply Boolean algebra theorems in circuit implementation.
5	Simplify logic expressions using Karnaugh Maps and implement optimized digital circuits.

Course Outcomes:	
CO1	Demonstrate the V-I characteristics of semiconductor devices like P-N junction diode, Zener diode, BJT and JFET.
CO2	Analyze the performance of Half-Wave and Full-Wave rectifiers and the use of Zener diode as a voltage regulator.
CO3	Verify the operation of basic and universal logic gates and implement logic functions using Boolean expressions.
CO4	Simplify Boolean expressions using De Morgan's theorems and Karnaugh Maps and design equivalent logic circuits.

CO-PO Mapping:

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

Course Content		
Experiment No.	**Experiment Title**	**Hrs**
1	Study and plot V-I characteristics of P-N Junction Diode	**2**
2	Study of Zener Diode as a Voltage Regulator	**2**
3	Study and plot the waveform of a Half-Wave Rectifier	**2**
4	Study and plot the waveform of a Full-Wave Rectifier	**2**
5	Input and Output Characteristics of BJT in Common Emitter (CE) Configuration	**2**
6	Study of BJT as an Amplifier	**2**
7	Study and plot V-I characteristics of JFET (Drain and Transfer characteristics)	**2**
8	Verify the truth tables of Basic Logic Gates	**2**
9	Verify the truth tables of Universal Gates	**2**
10	Implement logic expressions using basic gates.	**2**
11	Verification of De Morgan's Theorems	**2**
12	Karnaugh Map (K-Map) simplification and circuit implementation	**2**
Note:	*Minimum 10 experiments to be performed.	

Text books:

1. Donald Neamen, "Electronic Circuit Analysis", Mc-Graw Hill Publication.
2. Robert L. Boylestad & Louis Nashelsky, Electronic Devices and Circuit Theory, PHI Publication.
3. Jacob Millman & Christos C. Halkias, Integrated Electronics - Analog and Digital Circuits and Systems, McGraw-Hill Publication, 2000.

Reference books:

1. V.K. Mehta & Rohit Mehta, "Principles of Electronics", S. Chand Publication.
2. David A. Bell, Electronic Devices and Circuits, Oxford University Press.
3. A.K. Sawhney, Electrical and Electronic Measurements and Instrumentation, Dhanpat Rai& Co. Publication.

Computer Aided Engineering Graphics Laboratory

Course Name: **Computer Aided Engineering Graphics Laboratory** Course Code: **25ASH117/25ASH217**	**L**	**T**	**P**	**Credits**
	--	--	2	1
Evaluation Scheme:	**ISE**			**ESE**
Marks:	50			50

Pre-Requisite: Knowledge of simple geometrical theories and their constructional procedure by thinking ability with mensuration

Course Objective:	
1	Adapt basic knowledge of drawing standards, various geometrical constructions along with different curves.
2	Interpret projection of points, lines, planes & solids with reference to principal plane.
3	Impart the construction of sectioning effect of various solids and true shapes of specific sectional surfaces also develop lateral surfaces of various kinds of solids.
4	Transform three dimensional object views into two dimensional orthographic views.
5	Transform two dimensional orthographical views into three dimensional isometric views.

Course Outcomes:	
CO1	Apply basic commands of CAD and use of AutoCAD for practicing geometric construction, solids in Engineering Drawing.
CO2	Demonstrate and projections of points, lines, planes and Solids by appropriate method
CO3	Develop lateral surfaces of solid cut sections and their projections.
CO4	Draw Orthographic and Isometric drawings of simple objects.

CO-PO Mapping:													
CO	**PO1**	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**	**PO11**	**PSO1**	**PSO2**
CO1	3	3	-	-	-	-	-	-	2	-	-	-	-
CO2	3	3	-	-	-	-	-	-	1	-	-	-	-
CO3	3	3	-	-	-	-	-	-	1	-	-	-	-
CO4	3	3	-	-	-	-	-	-	2	-	-	-	-

Course Content		
Experiment No.	**Experiment Title and Contents**	**Hrs**
1	Introduction of drawing: Types of line, lettering, dimensioning	**2**
2	Problems on Geometric construction	**2**
3	Problems on Engineering curves	**2**
4	Problems on Projection of Points and Lines	**2**
5	Problems on Projection of Planes	**2**
6	Problems on Projection of Solids	**2**
7	Problems on Solid Sectioning and Development	**2**
8	Problems on Orthographic Projections (without section).	**2**
9	Problems on Isometric Projections.	**2**
10	Introduction of AutoCAD & Basic Commands: at least 4 Figures are to drawn using AutoCAD (Geometric construction, Solids, Orthographic views, Isometric views)	**2**

Text books:

1. N.D.Bhatt,"Elementary Engineering Drawing", Charotar Publishing House, India, 49th Edition 2008.
2. R.K.Dhawan, "A Textbook of Engineering Drawing", S.Chand& Co, 3rd Edition 2019
3. B.C. Rana ,"Engineering Drawing and Computer Graphics", Pearson Education, 1st Edition 2010

Reference books:

1. P.S.Gill, "Engineering Graphics", S.K.Kataria and sons, New Delhi, 1st Edition 2001
2. K.Venugopal," Engineering Drawing & Graphics", New Age Publication, 5th Edition 2004
3. D.M. Kulkarni," Engineering Graphics with AutoCAD", PHI publication, Revised 2009

Workshop Practice

Course Name: **Workshop Practice** Course Code: **25ASH119/25ASH219**	**L**	**T**	**P**	**Credits**
	--	--	02	1
Evaluation Scheme:	**ISE**			**ESE**
Marks:	50			--

Pre-Requisite: Familiarity with different basic materials, tools, equipment, and manufacturing processes commonly used in the engineering field. Additionally, safety awareness and a willingness to work collaboratively are crucial for successful participation.

Course Objectives:	
1	Impart knowledge and skills to use various tools, machines, equipment and measuring instruments to assure accuracy, safety at workplace, team working and development of right attitude.
2	Develop a sheet metal model for specific application
3	Perform different joining operations
4	Perform different basic machining operations
5	Introduce about advanced manufacturing processes.

Course Outcomes:	
CO1	Develop wooden parts and sheet metal article using sheet metal tools.
CO2	Apply edge preparation for simple joints by welding process.
CO3	Apply basic machining skills to develop cylindrical job.
CO4	Illustrate advanced and non traditional manufacturing techniques.

CO-PO Mapping:

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

Course Content		
Experiment No.	**Experiment Title and Contents**	**Hrs**
1	Demonstration and introduction of different tools, measuring instruments, machines used in workshop	**2**
2	Demonstrate different carpentry operations useful for making wooden articles, patterns, furniture etc. by using different hand & power tools	**2**
3	To make small wooden jobs like dovetail joint, Butt joint, T joints using carpentry tools	**2**
4	Demonstration of different sheet metal operations useful for sheet metal objects by performing cutting, bending, folding, operations	**2**
5	To make small jobs using GI sheet involving development, marking, cutting bending, brazing and soldering operations- i)Tray ii) Funnel iii) Electric meter cover and similar articles	**2**
6	Exercise in Arc welding (MMAW) to make a square butt joint / Exercise in Resistance (Spot) welding to make a lap joint	**2**
7	Demonstrate different machining operations like facing, Turning, Knurling, Center Drilling, Chamfering on cylindrical part	**2**
8	A job on turning of a Mild Steel cylindrical job using center lathe	**2**
9	Demonstration of advance manufacturing technique- Electric discharge machining (EDM) / Laser cutting	**2**
10	Demonstration of Non- traditional manufacturing method- 3D Printing	**2**

Text books:

1. RS Khurmi , JK Gupta, "A Textbook of Workshop Technology", S. Chand Publication, New Delhi.
2. Swarn Singh, "Workshop Practice", S K Kataria and Sons, 2nd edition 2019, Reprint 2024.

Reference books:

1. K. C. John, "Mechanical Workshop Practice", Prentice Hall Publication, New Delhi, 2010.
2. S. K. Hazra, Chaudhary and A. K. Chaudhary, "Workshop Technology-I", Media promoters & Publisher private limited, Mumbai.

Social Life Skills

Course Name: **Social Life Skills** Course Code:**25ASH121/ 25ASH221**	**L**	**T**	**P**	**Credits**
	1	--	--	1
Evaluation Scheme:	**ISE**			**ESE**
Marks:	50			--

Pre-Requisite: Basic Communication Skills, Respect and Empathy, Confidence and Willingness to Engage.

Course Objective:	
1	Foster self-awareness and empathy to enhance students' social skills and interpersonal relationships.
2	Develop critical and creative thinking skills to approach problems with analytical and innovative perspectives.
3	Equip students with strategies to manage stress and emotions effectively for emotional resilience.
4	Enhance decision-making abilities through informed choices and understanding their consequences.
5	Build problem-solving skills by teaching structured approaches to address challenges effectively.

Course Outcomes:	
CO1	Explain, and apply self-awareness and empathy concepts to enhance personal growth and interpersonal relationships
CO2	Apply analytical and imaginative strategies to generate innovative solutions.
CO3	Recall key concepts of stress and emotion management
CO4	Apply the steps involved in the decision-making process and the problem-solving

CO-PO Mapping:

CO	**PO1**	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**	**PO11**	**PSO1**	**PSO2**
CO1	-	-	-	-	-	-	2	-	2	1	1	-	-
CO2	-	-	-	-	-	-	1	-	1	1	1	-	-
CO3	-	-	-	-	-	-	1	-	1	1	1	-	-
CO4	-	-	-	-	-	-	2	-	2	1	1	-	-

Course Content		
Unit No.	**Unit title and Content**	**Hrs**
1	**Social Skills** **Self- Awareness** Discovering Self, My Strengths & Weaknesses, Self-Esteem and Its Importance Overcoming Low Self-Esteem, Setting Goals for Self **Empathy** Stepping Into Other's Shoe, Mirror Game, Treat Others Respectfully, Let Us be Caring and Compassionate, The Comforters	**3**
2	**Thinking Skills** **Critical Thinking** Let Us be Analytical, Enhancing Analytical Abilities, Fact or Fiction, Applying Common Sense, Because... **Creative Thinking** New Ways to Do a Thing: Thinking Out of The Box, Approaching Problems Differently, Let Us be Imaginative, In the Creative List, Space Travel	4
3	**Emotional Skills** **Coping With Stress** Am I Stressed? What Causes Stress?, Stress–Symptoms & Impact Stress-NegativeorPositive|StrategiestoOvercomeStress-StressManagement **Coping With Emotions** Am I Emotional? Emotions Collage, Coping with Negative Emotions, How Can I Manage Anger?, Managing Anger	3
4	**Decision Making** Making Informed Choices, Practicing Making Decisions, I Can Decide!| Decision Making Wheel!, Ripple Effects of Decision Making. **Problem Solving** Understanding the Process of Problem Solving, Problem Solving through Power Model, I Can Solve My Problems!, Barriers to Problem Solving, Solving Difficult Problems	4

Text books:

1. Dweck, C. S. (2006). Mindset: The new psychology of success (1st ed.). Random House.
2. Goleman, D. (2006). Emotional intelligence: Why it can matter more than IQ (10th ed.). Bantam Books.
3. Johnson, D. W., & Johnson, F. P. (2017). Joining together: Group theory and group skills (12th ed.). Pearson.

Reference books:

1. Durlak, J. A., Domitrovich, C. E., Weissberg, R. P., & Gullotta, T. P. (Eds.). (2015). Handbook of social and emotional learning: Research and practice (1st ed.). Guilford Press.
2. Elias, M. J., & Arnold, H. (Eds.). (2006). The educator's guide to emotional intelligence and academic achievement: Social-emotional learning in the classroom (1st ed.). Corwin Press.
3. Sternberg, R. J., & Sternberg, K. (2016). Cognitive psychology (7th ed.). Cengage Learning.

Data Communication

Course Name: **Data Communication**	**L**	**T**	**P**	**Credits**
Course Code: **25ASH211A**	2	--	--	2
Evaluation Scheme:	**ISE-I**	**MSE**	**ISE-II**	**ESE**
Marks:	10	30	10	50

Pre-Requisite: Basic Computer Fundamentals

Course Objective:	
1	To introduce the fundamental principles of data communication, transmission modes, and various transmission media used for reliable and efficient communication.
2	To develop foundational knowledge of data signals, encoding techniques, and network structures including topologies, categories, and essential networking devices.
3	To explain the role of communication protocols, addressing schemes, and layered network architectures for enabling standardized data exchange over the internet.

Course Outcomes:	
CO1	Explain the basic concepts of data communication, data flow, and various transmission media used in computer networks.
CO2	Classify different types of data signals and demonstrate basic modulation and encoding techniques used for communication.
CO3	Identify and categorize computer networks, topologies, and networking devices along with their functions, advantages, and disadvantages.
CO4	Explain protocols, addressing schemes (IPv4/IPv6), and compare the OSI and TCP/IP reference models with respect to layered communication.

CO-PO Mapping:

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

Course Content		
Unit No.	**Unit title and Content**	**Hrs**
1	**Basics of Communication** **Data Communication**–Definition, Components(Sender, Receiver, Message, Medium, Protocol), Data representation, Data Flow (Simplex, Half Duplex, Full Duplex)	4
2	**Transmission media** Transmission Modes (Serial vs Parallel, Asynchronous vs Synchronous) Guided Media: Twisted pair cable, Coaxial cable, Optical Fiber cable. Unguided Media: Radio waves, Microwaves, Infrared.	4
3	**Data Signals &Encoding** Analogs Digital Data and Signals, Signal Characteristics Analog-to-Analog conversion–AM, FM,PM. Digital-to-Analog conversion–ASK, FSK,PSK, Basics of Sampling and Pulse Code Modulation	6
4	**Networks** Definition, Uses, Topologies(Bus, Star, Ring, Mesh, Hybrid), Categories(LAN, MAN, WAN), Networking Devices, Advantages & Disadvantages	**4**
5	**Protocols &Standards** Protocols, Standards, Standards Organizations Logical Addressing: IPV4 Addresses: IPV4-Address Space, Notation, Classful, Classless Addressing,IPV6Addresses –Structures, Address Space	6
6	**Network Models** Layered Tasks, The OSI model, Layers in the OSI model, TCP/IP protocol suit, Comparison of OSI & TCP/IP.	4

Text books:

1. Behrouz A. Forouzan, "Data Communications and Networking", McGraw Hill Education, 5th Edition , 2013

Reference books:

1. William Stallings, "Data and Computer Communications", Pearson Education, 10th Edition, 2013.
2. Andrew S. Tanenbaum and David J. Wetherall, "Computer Networks", Pearson Education, 5th Edition, 2010.

Sensors and Transducers

Course Name: **Sensors and Transducers** Course Code:**25ASH211B**	**L**	**T**	**P**	**Credits**
	2	--	--	2
Evaluation Scheme:	**ISE-I**	**MSE**	**ISE-II**	**ESE**
Marks:	10	30	10	50

Pre-Requisite: Basic Knowledge of Physics and Electronics.

Course Objective:	
1	Introduce the fundamental principles of sensors and transducers.
2	Provide an understanding of different types of sensors used in engineering applications.
3	Develop the ability to select appropriate sensors based on applications.
4	Familiarize students with signal conditioning and interfacing techniques.
5	Introduce the fundamental principles of sensors and transducers.

Course Outcomes:	
CO1	Describe the working and classification of sensors and transducers.
CO2	Identify and illustrate the working of different types of sensors.
CO3	Demonstrate sensor signal conditioning and interfacing with microcontrollers.
CO4	Summarize smart sensors, MEMS, IoT integration and their applications.

CO-PO Mapping:

CO	**PO1**	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**	**PO11**	**PSO1**	**PSO2**
CO1	2	-	-	-	-	-	-	-	-	-	-	-	-
CO2	2	2	-	-	-	-	-	-	-	-	2	-	-
CO3	3	1	-	-	2	3	-	-	-	-	2	-	-
CO4	2	-	-	-	2	3	-	-	-	-	2	-	-

Course Content		
Unit No.	**Unit title and Content**	**Hrs**
1	**Introduction to Sensors and Transducers** Definition of Sensors, Transducers and Actuators, Comparison, Classification, General Characteristics, Selection Criteria of Transducers.	5
2	**Passive Sensor Technologies** Resistive Sensors - Potentiometers, Strain Gauges, Capacitive Sensors - Principle, Displacement, Pressure and humidity sensing, Inductive Sensors - Linear Variable Differential Transformer (LVDT), Proximity Sensors, Eddy Current Sensors, Moisture Sensors, Advantages, Disadvantages, Applications - Displacement and Position Measurement, Strain and Load Monitoring, Environmental Monitoring, Industrial Automation and Safety.	6
3	**Thermal and Magnetic Sensors** Temperature Sensors - Thermocouple, RTD, Thermistor, IC Temperature Sensors, Magnetic Sensors - Hall Effect Sensors, Magneto-resistive Sensors, Applications - Wearable and Healthcare Devices, Consumer Electronics and Security Systems.	5
4	**Optical and Ultrasonic Sensors** Photodiode, Phototransistor, LDR, Fiber Optic Sensor, Piezoelectric Effect and Piezoelectric Sensors, Applications - Automatic Light Control Systems, Distance and Object Detection, Vibration and Pressure Detection.	5
5	**Signal Conditioning and Sensor Interfacing** Need for Signal Conditioning, Amplifiers, Filters (Low-pass, High-pass), Analog-to-Digital Conversion (ADC), Wheatstone Bridge Circuit, Basic Interfacing with Microcontrollers, Overview of Data Acquisition Systems (DAQ).	4
6	**Smart Sensors and Emerging Technologies** Concept and Architecture of Smart Sensors, Introduction to MEMS (Micro-Electro-Mechanical Systems), Sensors in Automation.	**4**

Text books:

1. A.K. Sawhney, Electrical and Electronic Measurements and Instrumentation, Dhanpat Rai& Co. Publication.
2. D. Patranabis, Sensors and Transducers, 2nd Edition, PHI Learning Pvt. Ltd.
3. R.K. Rajput, Sensors and Transducers, S. Chand Publications.

Reference books:

1. Jacob Fraden, Handbook of Modern Sensors: Physics, Designs and Applications, Springer.
2. John Turner and Martyn Hill, Instrumentation for Engineers and Scientists, Oxford Science Publications.
3. Ristic L., Sensor Technology and Devices, Artech House.

Measurements and Instrumentation

Course Name: **Measurements and Instrumentation** Course Code: **25ASH211C**	**L**	**T**	**P**	**Credits**
	2	--	--	2
Evaluation Scheme:	**ISE-I**	**MSE**	**ISE-II**	**ESE**
Marks:	10	30	10	50

Pre-Requisite: Basic Knowledge of Physics and Electronics

Course Objective:	
1	To introduce the fundamental principles of electronic instrumentation systems.
2	To provide an understanding of different types of electronic measuring instruments.
3	To develop the ability to analyze and interpret measurement data.
4	To familiarize students with signal conditioning, error analysis, and data acquisition techniques.
5	To introduce the fundamental principles of electronic instrumentation systems.

Course Outcomes:	
CO1	Explain the principles, characteristics, and components of electronic measurement systems including transducers and signal conditioning circuits.
CO2	Apply operational amplifier configurations and design signal conditioning circuits suitable for instrumentation applications.
CO3	Analyze and implement methods for measuring physical parameters using electronic techniques, data acquisition systems, and microcontroller interfacing.
CO4	Demonstrate awareness of emerging technologies in instrumentation, including smart sensors, IoT integration, wireless systems, and virtual instrumentation.

CO-PO Mapping:

CO	**PO1**	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**	**PO11**	**PSO1**	**PSO2**
CO1	3	2	1	-	-	-	-	-	-	-	-	-	-
CO2	3	2	3	1	-	-	-	-	-	-	-	-	-
CO3	3	3	3	2	-	-	-	-	-	-	-	-	-
CO4	2	1	2	-	-	-	-	-	-	-	-	-	-

Course Content		
Unit No.	**Unit Title and Content**	**Hrs**
1	**Basics of Instrumentation** Definition of instrumentation system, block diagram, types of instrumentation systems, standards and calibration, static and dynamic characteristics of instruments.	5
2	**Transducers and Sensors** Classification, selection criteria, working of resistive, capacitive, inductive, piezoelectric and optical transducers, applications.	3
3	**Op-amp and Signal Conditioning** Introduction to Operational Amplifiers, Ideal Op-Amp Characteristics, Op-Amp Configurations, Applications, Signal Conditioning - Need for signal conditioning, amplifiers, fitters, bridges, sample and hold circuits, analog to digital conversion	**6**
4	**Measurement of Physical Parameters** Measurement of temperature, pressure, flow, displacement, level using electronic methods and sensors.	4
5	**Data Acquisition and Interfacing** Block diagram of DAQ system, signal digitization, microcontroller interfacing, real-time data monitoring.	4
6	**Recent Trends in Instrumentation** Smart sensors, wireless instrumentation, Introduction to IoT in instrumentation, virtual instrumentation and Lab VIEW introduction.	**6**

Text books:

1. H.S. Kalsi, Electronic Instrumentation, Tata McGraw Hill, 3rd Edition, 2010.
2. A.K. Sawhney, Electrical and Electronic Measurements and Instrumentation, Dhanpat Rai & Co., 19th Revised Edition, 2011.
3. David A. Bell, Electronic Instrumentation and Measurements, PHI Learning, 2nd Edition, 2013.

Reference books:

1. John G. Webster, Measurement, Instrumentation, and Sensors Handbook, CRC Press, 2nd Edition, 2014.
2. E.O. Doebelin, Measurement Systems: Application and Design, McGraw-Hill, 5th Edition, 2004.
3. Robert B. Northrop, Introduction to Instrumentation and Measurements, CRC Press, 3rd Edition, 2014.
4. Ristic L., Sensor Technology and Devices, Artech House.
5. Wilson, J. S. (Ed.). (2004). Sensor Technology Handbook.
6. Ripka, P. &Tipek, A. (Eds.). (2007). Modern Sensors Handbook.

Fundamentals of Artificial Intelligence

Course Name: **Fundamentals of Artificial Intelligence**	**L**	**T**	**P**	**Credits**
Course Code: **25ASH111A/B**	2	--	--	2
Evaluation Scheme:	**ISE-I**	**MSE**	**ISE-II**	**ESE**
Marks:	10	30	10	50

Pre-Requisite: Students should have the knowledge about basic physics.

Course Objective:	
1	To introduce the foundational concepts and scope of Artificial Intelligence.
2	To explore real-world applications of AI and its societal impact.
3	To enable students to understand basic intelligent behavior in machines.
4	To motivate students to explore future technologies like AI Machine Learning etc.

Course Outcomes:	
CO1	Discuss the fundamentals, history, and types of Artificial Intelligence.
CO2	Describe the concept of intelligent agents and their roles in real-life AI systems.
CO3	Examine basic problem-solving strategies and search techniques using agent models.
CO4	Demonstrate simple applications of AI in various domains such as healthcare, education, and entertainment.

CO-PO Mapping:

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

Course Content		
Unit No.	**Unit title and Content**	**Hrs**
1	**Introduction to AI** Definition and scope of AI, Brief history of AI, Types of AI: Narrow, General, Super, AI vs Human Intelligence.	**4**
2	**Intelligent Systems & Agents** Intelligent systems in daily life, Concept of agents, Examples of simple AI agents (e.g., Siri, Google Assistant) , PEAS framework (simplified).	5
3	**AI Problem Solving** Concept of problems and goal-based agents, Introduction to problem-solving in AI, Puzzle solving (e.g., tic-tac-toe), Concept of search.	5
4	**Basics of Learning in AI** What is learning?, Definition of Machine Learning (ML), Types of ML: Supervised, Unsupervised, Reinforcement (examples only), Difference between AI and ML.	**5**
5	**Applications of AI** Simple applications of AI, AI in games, entertainment, transport, home appliances, Real-world applications (healthcare, education, smart assistants, etc.). Concept of Chatbots and Recommendation Systems, Overview of image and speech recognition	5
6	**Ethics and Future of AI** Ethical concerns in AI (privacy, bias, etc.), AI and employment, Future trends (autonomous cars, smart cities), Case Study on AI in society.	**4**

Text books:

1. Simplified AI for Beginners – Dr. Dinesh Bhatt, BPB Publications
2. Artificial Intelligence Basics – Tom Taulli, A press
3. Artificial Intelligence: Foundations of Computational Agents by David Poole and Alan Mackworth, Cambridge University Press (selected simple chapters)

Reference books:

1. Introduction to AI – Wolfgang Ertel, Springer (Chapters 1–3 recommended)
2. Selected online videos & modules (NPTEL, Google AI Learn, etc.) for visualization and interaction.

Power Plant Engineering

Course Name: **Power Plant Engineering** Course Code: **25ASH111C**	**L**	**T**	**P**	**Credits**
	2	--	--	2
Evaluation Scheme:	**ISE-I**	**MSE**	**ISE-II**	**ESE**
Marks:	10	30	10	50

Pre-Requisite: Basic Electrical Engineering, Basics of Thermodynamics

Course Objective:	
1	To learn the concepts of power, energy and power plant.
2	To analyze the layout and operation of modern thermal & Nuclear power plant.
3	To understand energy conversion processes in Hydro, Diesel & Gas Power Plant.
4	To study the concepts of electric power generation using non-conventional sources.
5	To understand load estimation, load curves and factor affecting the cost of power generation.

Course Outcomes:	
CO1	Identify types of conventional and non-conventional power plants.
CO2	Illustrate the working and layout of steam, nuclear, Hydro, Diesel & Gas power plants.
CO3	Explain the construction & working of Solar, Wind, Biomass, and Geothermal & Tidal Power Plants.
CO4	Interpret load curves and calculate load factor, capacity factor and related economic parameters.

CO-PO Mapping:

CO	**PO1**	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**	**PO11**	**PSO1**	**PSO2**
CO1	3	-	-	-	-	1	-	-	-		1	-	-
CO2	3	-	-	-	-	1	-	-	-	1	1	-	-
CO3	3	-	-	-	-	1	-	-	-	1	1	-	-
CO4	3	2	-	-	-	-	-	-	-	1	-	-	-

Course Content		
Unit No.	**Unit title and Content**	**Hrs**
1	**Introduction to Power Plants and Energy Sources** Importance of electrical Power in day to day life, Various sources of energy: Conventional (Non-Renewable) & Non-Conventional (Renewable), Global and Indian energy scenario, Structure of Power System, Concept of base load and peak load plants.	4
2	**Thermal & Nuclear Power Plant** **Thermal Power Plant** Introduction, selection of site for thermal power plant, Rankine cycle, plant layout, Boiler, Economizers, Air pre heaters, Super heaters, condensers, cooling tower & spray pond, Thermal Power Plant in India. **Nuclear Power Plant** Selection of site, schematic plant layout, nuclear fission, materials used as Nuclear fuel, Nuclear reactor, Nuclear Power Plants in India.	6
3	**Hydro & Diesel Power Plant** **Hydro Power Plant** Selection of site, Classification of Hydro-electric plants according to-quantity of water available, available head. General arrangement & operation, Plant functions of different components, Hydro Turbines, pumped storage plant, Hydro Power Plants in India. **Diesel Power Plant** Selection of site, Main components& its function, Different types of engines their working, Applications.	5
4	**Solar & Wind Power Plant** **Solar Power Plant** The sun, Direct & Diffused Radiation, Solar cell fundamentals, Solar PV system, Solar Concentrators, Solar Thermal Generation, Solar PV & Thermal applications, Solar Power Plants in India. **Wind Power Plant** Role & potential of wind energy, site selection, Classification of wind turbines & Generation-Horizontal axis, Vertical axis, Wind Power Plants in India.	5
5	**Future Renewable Power Plant** **Biomass Power Plant** Layout of power plant-Bio-chemical based (e.g. biogas), Thermo-chemical based (e.g. Municipal waste), Agrochemical based (e.g. bio-diesel. **Geothermal Power Plant**-Introduction, Dry steam systems, Wet steam system **Tidal Power Plant**-Single Basin, Double Basin.	4
6	**Economics of Power Generation** Term commonly used in system operation-Connected load, Cold reserve, Hot reserve, Spinning reserve. Factor affecting the cost of power generation-Average demand, Maximum demand, Plant capacity factor, Plant use factor, Load factor & Plant load factor (Simple Numerical).	**4**

Text books:
1. P.K. Nag, "Power Plant Engineering, "S. Chand and Company Ltd, 8th Edition, 2017 2. Arora and Domkundwar,"A Course in Power Plant Engineering" Dhanpat Rai& Co., 8th Edition, 2016 3. B.R. Gupta,, "Generation of Electrical Energy S. Chand & Co.Ltd publication House, 7th Edition, 2017

Reference books:
1. Erwin Kreyszing, "Power Plant Technology", McGraw-Hill Education,1st Edition, 2017 2. S.N.Singh, "Electric Power Generation, Transmission and Distribution", PHI Learning,2nd Edition, 2011 3. Farshid Zabihian, "Power Plant Engineering", CRC Press, 1st Edition, 2021

Fundamentals of Mechanical Engineering

Course Name: **Fundamentals of Mechanical Engineering** Course Code: 25ASH111D	**L**	**T**	**P**	**Credits**
	2	--	--	2
Evaluation Scheme:	**ISE-I**	**MSE**	**ISE-II**	**ESE**
Marks:	10	30	10	50

Pre-Requisite: General Physics and Chemistry.

Course Objective:	
1	Introduce the fundamental concepts relevant to engineering systems.
2	Describe the types, structure, and operation of internal combustion engines and refrigeration systems.
3	Identify and enumerate different link-based mechanisms with basic understanding of power transmission components
4	Apply basic machining skills using machine tools and CNC, and utilize knowledge of materials and manufacturing processes.

Course Outcomes:

CO1	Explain fundamental engineering concepts related to thermodynamics, heat transfer, and their applications in engineering systems.
CO2	Identify and describe the types, construction, and operation of internal combustion engines and refrigeration systems.
CO3	Identify and classify various link-based mechanisms and illustrate the working principles and applications of various power transmission components
CO4	Recognize machine tools and summarize materials and manufacturing processes.

CO-PO Mapping:

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

Course Content		
Unit No.	**Unit title and Content**	**Hrs**
1	**Introduction to Thermodynamics** Thermodynamic system, Zeroth law, first law of thermodynamics, PMM-I, limitations of first law, Second law of thermodynamics, PMM-II. Heat transfer: Modes of heat transfer (no numerical treatment).	4
2	**Applications of Thermal Engineering** IC Engines: Construction and working of two strokes, four stroke S.I. and C.I. engines, comparison between SI-CI engines, two stroke-four stroke engines. Refrigeration and air conditioning: Simple vapour compression refrigeration system, working of Domestic refrigerator and Split air conditioner.	5
3	**Introduction to Machine and its Elements** Definitions of link or element, Kinematic Pairs, Kinematic chain, Mechanism and Machine. Difference between machine and mechanism, Different Mechanisms.	4
4	**Power Transmitting Devices** Types of Belts and belt drives, Chain drive, rope drive, Types of gears, Types of Couplings, Types of friction clutch, Power transmission shafts, axles, keys, types of Keys, Sliding Contact and Rolling Contact Bearing, Bush and ball bearings, Types of brakes.	5
5	**Machine Tools and Processes** Construction and Working of Lathe (centre), Drilling (Radial) and Milling (Horizontal) Machine. Study of different operations performed on Lathe, Drilling ang Milling Machine. Introduction to CNC.	5
6	**Materials and Manufacturing Processes** Engineering materials-Types and applications, Introduction to manufacturing processes-Sand Casting Process, metal joining processes - Welding (Electric arc, Gas welding), Brazing and Soldering. Introduction to additive manufacturing.	**5**

Text books:

1. Basant Agrawal and C. M. Agrwal, "Basic Mechanical Engineering", Wiley India Pvt. Ltd, 2008.
2. Pravin Kumar, "Basic Mechanical Engineering", Pearson India Education Ltd, 2nd Edition, 2018.
3. R.K. Rajput, "A Text book of Thermal Engineering", Laxmi Publication, Delhi, 10th Edition, 2022.

Reference books:

1. V.B.Bhandari, "Design of Machine Element", Tata McGraw-Hill Publication, 2nd Edition, 2007.
2. Hajara and Choudhari, "Workshop Technology" Vol. 1 and 2, Standard Publishers, 14th Edition, 2010.
3. Sadhu Singh, "Elements of Mechanical Engineering", S. Chand and Company Ltd, 2010.

Fundamentals of Civil Engineering

Course Name: **Fundamentals of Civil Engineering**	**L**	**T**	**P**	**Credits**
Course Code: **25ASH11E**	2	--	--	2
Evaluation Scheme:	**ISE-I**	**MSE**	**ISE-II**	**ESE**
Marks:	10	30	10	50

Pre-Requisite: Knowledge of fundamentals of simple geometrical theories and constructional procedure.

Course Objective:	
1	To introduce students to the field of Civil Engineering.
2	To impart knowledge of various building materials & concepts of building planning.
3	To develop an understanding of surveying and leveling techniques.
4	To provide insights into civil infrastructure components & sustainable construction practices.

Course Outcomes:	
CO1	Explain the role of Civil Engineering in the development of society.
CO2	Identify and classify building materials based on their properties & principles of building planning
CO3	Understand basic surveying techniques and leveling principles.
CO4	Identify different types and components of infrastructure systems & sustainable construction materials

CO-PO Mapping:

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

Course Content		
Unit No.	**Unit title and Content**	**Hrs**
1	**Introduction to Civil Engineering** History of Civil Engineering, Introduction to all branches of engineering and their application in allied branches, Building components – Elements of substructure & superstructure, Foundation – Function and Classification.	5
2	**Building Material** Types, Properties, and Uses of Building Materials - Stones, Aggregates, Bricks, Cement, Sand, Steel, Concrete, Glass, Bitumen, FRP, Roofing & Flooring Material- Types.	4
3	**Building Planning** Building plans, principles of planning, building bylaws - building line & control line, height of building, open space requirements, built-up and super built-up area, F.S.I., setbacks.	5
4	**Surveying & Leveling** Horizontal Measurement: Principles of Surveying, Classification & Types of Surveys, Elements of Linear & Angular Measurement, Bearing System and its types. Vertical Measurements: Terms used in leveling, Bench Mark & its Types, Introduction to leveling instrument, Contours, Characteristics of Contour & use of contour maps.	5
5	**Infrastructure** Roads: Classification, Cross section and components, Railway: cross section and components of railway track, Bridges: components and types, Dams: purpose, selection of site and types.	5
6	**Sustainable construction materials** Introduction, need, significance, construction materials like bamboo, green cement, plastic waste bricks etc.	**4**

Text books:

1. S. S. Bhavikatti, Basic Civil Engineering, New Age International Publications, 2009
2. Gopi S, Basic Civil Engineering, Pearson Publication, 2010.
3. B. C. Punmia, Ashok Kumar Jain and Arun Kumar Jain, Basic Civil Engineering Laxmi Publications (P) Ltd, New Delhi.

Reference books:

1. S. K. Duggal, Building Materials, New Age International Pub., New Delhi.
2. N. N. Basak, Surveying & Levelling, Tata Mc. Grew, 2011.