MANAKULA VINAYAGAR INSTITUTE OF TECHNOLOGY

An Autonomous Institution

Affiliated to Pondicherry University, Approved by AICTE, New Delhi.

Accredited by NAAC with 'A' Grade

Kalitheerthalkuppam, Puducherry- 605 107.

Department of Mechanical Engineering

B.Tech. Mechanical Engineering

REGULATION -2025

ACADEMIC YEAR - 2025-2026

(First Year Curriculum & Syllabus)

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Department of Mechanical Engineering

B.Tech- MECH
2025-2026
(FIRST YEAR CURRICULUM)

SEMESTER I							
Sl.No	**Course Code**	**Course Title**	**Category**	**L**	**T**	**P**	**Credits**
Induction program							
Theory							
1	25UMAT11	Matrices & Calculus	BSC	3	1	0	4
2	25UPHT13	Physical science for Mechanical Engineering	BSC	3	0	0	3
3	25UHST13	Universal Human Value	HSC	2	0	0	2
4	25UMET14	Concepts of Engineering in Biology	BSC	3	0	0	3
Integrated Course							
5	25UMEI15	Manufacturing Processes & practice	PC	3	0	2	4
6	25UHSI16	Professional Communications for Engineers	HSC	1	0	2	2
Practical							
7	25UPHP13	Physical science lab	BSC	0	0	2	1
8	25UGEP18	Design Thinking &Idea Lab	ESC	1	0	2	2
9	25UGEP19	Engineering Graphics and Auto CAD	ESC	0	0	2	1
Employability Enhancement Course							
10	25UPCE11	Career Development Skills	SEC	0	0	2	0
Mandatory Course							
11	25UMCC11	IKS- Concept & application in Engineering and Science	MCC	0	0	2	0
12	25UMCC12	Environmental Science & Sustainability	MCC	2	0	0	0
		Total Credits		**18**	**1**	**14**	**22**

SEMESTER II							
Sl.No	**Course Code**	**Course Title**	**Category**	**L**	**T**	**P**	**Credits**
Theory							
1	25UMAT21	Differential Equations And Transforms	BSC	3	1	0	4
2	25UMET22	Engineering Mechanics	ESC	3	1	0	4
3	25UMET23	AppliedElectrical, Electronics and Instrumentation Engineering	ESC	3	0	0	3
4	25UMET24	Machining Processes	PC	3	0	0	3
Integrated Course							
5	25UCSI27	Problem solving using Programming Language	ESC	1	0	2	2
Practical							
6	25UEEP26	Electrical & Electronics Lab	ESC	0	0	2	1
7	25UMEP27	Machining Processes Lab	PC	0	0	2	1
8	25UGEP28	Fabrication Lab	ESC	0	0	2	1
Employability Enhancement Course							
9	25UPCE21	Commmunication skills	SEC	0	0	2	0
10	25UCCC22	Certificate course -I	CCC	0	0	4	0
Mandatory Course							
11	25UMCC21	IKS in humanities & Social Science	MCC	0	0	2	0
12	25UMCC22	Holistic wellness	MCC	0	0	1	0
			Total Credits	**13**	**2**	**17**	19

SYLLABUS

SEMESTER-I

25UMAT11	Matrices & Calculus

Category	L	T	P	Credit
BS	3	1	0	4

Course Prerequisite

- Nil

Course Objective

- To understand and gain the knowledge of matrix algebra, partial differentiation, double integration, triple integration and their application, curl, divergence. To familiar with vector differential operators, integral theorems (Green's, Stoke's, Gauss divergence).

Course Outcome

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

CO1	Find eigenvalues and eigenvectors, verify the Cayley-Hamilton theorem, and perform orthogonal diagonalization.	K3
CO2	Compute partial derivatives, determine total derivatives, Jacobians, employ Taylor's series, and find extremes of functions of two variables.	K3
CO3	Demonstrate proficiency in evaluating double integration and triple integration and using them to compute area and volume.	K3
CO4	Compute gradients, divergence, curl, directional derivatives, and apply vector identities to solve vector field problems.	K3
CO5	Apply Green's theorem, Stoke's theorem and Gauss divergence theorem.	K3

Syllabus

UNIT I MATRICES 12

Eigenvalues and Eigen vectors of a real matrix, Characteristic equation, Properties of Eigenvaluesand Eigenvectors- Cayley-Hamilton Theorem, Diagonalization of matrices.Reduction of a quadraticform to canonical form by orthogonal transformation -Nature of quadratic forms.

UNIT II FUNCTIONS OF SEVERAL VARIABLES 12

Partial derivatives-Total derivative- Differentiation of implicit functions, Change of variables-Jacobians and their properties-Taylor's series for functions of two variables- Maxima and minima,Lagrange's method of undetermined multipliers.

UNIT III INTEGRAL CALCULUS 12

Multiple Integral – Change of order of integration (Cartesian form). Applications: Areas as a double integral (Cartesian form) – Volume as a triple integral (Cartesian form).

UNIT IV VECTOR DIFFERENTIATION 12

Scalar and vector valued functions-gradient, tangent plane – directional derivative-divergence and curl- scalar and vector potentials. Statement of vector identities-simple problems.

UNIT V VECTOR INTEGRATION 12

Line, surface and volume integrals- statements of Green's, Stoke's and Gauss Divergence theorems – verification and evaluation of vector integrals using them.

TOTAL PERIODS: 60

Text Book

1. Kreyszig.E, "Advanced Engineering Mathematics", John Wiley and Sons, 10th Edition, New Delhi, 2016.
2. Grewal.B.S., "Higher Engineering Mathematics", Khanna Publishers, New Delhi, 44th Edition, 2018.

Reference Book & Web Resources

1. Bali. N., Goyal. M and Watkins. C, "Advanced Engineering Mathematics", Firewall Media (An imprint of Lakshmi Publications Pvt., Ltd.,), New Delhi, 7th Edition, 2009.
2. Jain. R.K and Iyengar. S.R.K, "Advanced Engineering Mathematics", Narosa Publications, New Delhi, 5th Edition, 2016.
3. Narayanan. S and Manicavachagom Pillai. T. K, "Calculus" Volume I and II, S. Viswanathan Publishers Pvt. Ltd., Chennai, 2009.
4. Ramana. B.V, "Higher Engineering Mathematics", McGraw Hill Education Pvt. Ltd, New Delhi, 2016.
5. Sivaramakrishna Das. P, Vijayakumari. C, "Engineering Mathematics", Pearson

Online Courses/NPTEL/SWAYAM:

https://nptel.ac.in/courses/111106100

https://nptel.ac.in/courses/111104125

https://nptel.ac.in/courses/111105121

https://nptel.ac.in/courses/111107112

Mapping with Programme Outcomes

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PSO1	PSO2
CO1	3	2	2	2	-	-	-	-	1	-	1	-	-
CO2	3	2	2	2	-	-	-	-	1	-	1	-	-
CO3	3	2	2	2	-	-	-	-	1	-	1	-	-
CO4	3	2	2	2	-	-	-	-	1	-	1	-	-
CO5	3	2	2	2	-	-	-	-	1	-	1	-	-

Assessment Methodology	Assessment Tools	Marks
Test		25
Problem Based Assignment / Mind Mapping / Quiz	Google Classroom / MS/Kahoot	5
Visualization Projects(Wolfram Alpha, GeoGebra&Kahoot,)	Demo and Viva	5
Attendance		5
Total		40

25UPHT13	Physical Science for Mechanical Engineering

Category	L	T	P	Credit
BS	3	0	0	3

Preamble/ Course Objective

- To understand basics of crystal physics.
- To enhance the fundamental knowledge of elasticity and its applications relevant to engineering streams.
- To familiarize students with thermal properties and applications
- To identify the various types, preparation and applications of polymer used in the industrial processes
- To understand the chemical and electrochemical corrosion nature of metals and the protective methods
- To bring adaptability to the concepts of Nanochemistry and to acquire the required skills to become a perfect engineer

Prerequisite

NIL

Course Outcome

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

CO1	Apply the basic knowledge of crystal structure in solids.	K3
CO2	Understand the elastic nature of materials and determine the elastic moduli of different materials.	K2
CO3	Understand the concept of thermal expansion in solids and liquids and apply heat transfer principles to real-world applications such as heat exchangers, refrigerators, ovens, and solar water heaters.	K3
CO4	Understand types, synthesis, and applications of polymers and moulding techniques.	K2
CO5	Identify types and causes of corrosion and apply methods for its control.	K4
CO6	Analyze nanoscale materials, their synthesis, properties, and uses.	K4

Syllabus

Unit-I

Crystal physics

Single crystalline, polycrystalline and amorphous materials–single crystals: unit cell, crystal systems, Bravais lattices, directions and planes in a crystal, Miller indices–inter-planar distances coordination number and packing factor for SC, BCC, FCC and HCP -crystal imperfections: point defects, line defects–Burger vectors, stacking faults–role of imperfections in plastic deformation-growth of single crystals: solution and melt growth techniques**.**

Unit -II

Mechanical Properties of Solids and Fluids (9)

Elasticity–Hooke‟s law-stress–strain-modulus of elasticity-stress-strain diagram-Poisson‟s ratio-rigidity modulus- twisting couple on a cylinder-moment of inertia - torsional pendulum method. Bendingofbeams-bendingmoment-cantileverdepression-theoryandexperiment-oungsmodulusdetermination–uniformandnon-uniformbending-I-shapegirders.Viscosity-

flowofmotion-Reynoldsnumber.Properties of fluids

Unit -III

Heat Transfer and Thermal Applications (9)

Transfer of heat energy – thermal expansion of solids and liquids – expansion joints – bimetallic strips-thermalconduction,convectionandradiation—heatconductionsinsolids—thermal conductivity - Forbe's and Lee's disc method: theory and experiment – conductionthroughcompoundmedia(seriesandparallel)—thermalinsulation—applications:heatexchangers, refrigerators, ovens and solar water heaters.

Unit- IV

Polymer Chemistry (9)

Classification-Natural and synthetic; Thermoplastic and Thermosetting, Functionality – Degree of polymerization. polymerization mechanism of radical. Preparation, properties and uses of PVC, TEFLON, Nylons, Bakelite, and epoxy resin, buna S, buna N. Rubbers – vulcanization Moulding Techniques, Compression, injection and Extrusion Moulding, Conducting polymers - classification and applications. Polymer composites – FRP, Bullet Proof Plastics

Unit-V

Corrosion (9)

Corrosion –Introduction - factors – types – chemical, electrochemical corrosion (galvanic, differential aeration), corrosion control – sacrificial anode method and impressed current cathodic method. Uses of inhibitors, metallic coating – anodic coating, cathodic coating. Metal cladding, Electroplating of Copper and Anodizing.

Unit VI

Nanochemistry (9)

Basics - distinction between molecules, nanoparticles and bulk materials; size-dependent properties. Nanoparticles: nano cluster, nano rod, nanotube (CNT) and nanowire. Synthesis: precipitation, thermolysis, hydrothermal, solvo

thermal, electrode position, chemical vapour deposition, laser ablation; Properties and applications. Introduction to electrochemistry-Battery and Fuel cell -Introduction to battery and fuel cells

Text Book:

1. Engineering Physics Vol I & II (4th Edition) Author: P.K. Palanisamy Publisher: ScitechPublications, 2022

2. Engineering Physics (3rd Edition) Authors: Bhattacharya, D.K. & Poonam Tandon Publisher: Oxford University Press , 2023

3. Engineering Physics (Updated Edition) Authors: Gaur, R.K. & Gupta, S.L. Publisher: Dhanpat Rai Publishers , 2024

4. Physical Metallurgy: Principles and Practice (4th Edition) Author: Raghavan, V. Publisher: PHI Learning , 2023

5. Principles of Physics (12th Edition) Authors: Resnick, Halliday & Walker Publisher: Wiley , 2022

6. **Engineering Physics Vol I & II (4th Edition)** Author: P.K. Palanisamy Publisher: ScitechPublications, 2022

7. **Engineering Chemistry (18th Edition)** Authors: Jain, P.C. & Jain, Monica Publisher: Dhanpat Rai & Sons Year: 2023

8. **A Textbook of Engineering Chemistry (16th Edition)** Authors: Dara, S.S. &Umare, S.S. Publisher: S. Chand &Co. , 2022

9. **Engineering Chemistry (5th Edition)** Author: Sharma, B.K. Publisher: Krishna Prakashan,

2024

10. **Engineering Chemistry (2nd Edition)** Authors: Gopalan, R., Venkappayya, D. & Nagarajan, S. Publisher: Vikas Publishing Year: 2023
11. **Engineering Chemistry (Updated)** Author: Chawla, Shashi Publisher: Dhanpat Rai Year: 2022

Reference Book & Web Resources

1. Balasubramaniam,R.*"Callister'sMaterialsScienceandEngineering".*WileyIndiaPvt. Ltd., 2017
2. Resnick,R.,Halliday,D.,&Walker,J.*"PrinciplesofPhysics*",WileyIndiaPvt.,2018.
3. R.S. Khurmi, J.K. Gupta ,**Thermal Engineering,** S. Chand Publishing, **ISBN**: 978-8121926774
4. S. S. Dara, "A Textbook of Engineering Chemistry", S. Chand & Co., Ltd. New Delhi.,2021
5. B. K. Sharma, "Engineering Chemistry", 3rd edition Krishna Prakashan Media (P) Ltd., Meerut, 2021

Weblink

1. **https://archive.nptel.ac.in/courses/115/105/115105129/**
2. **https://onlinecourses.nptel.ac.in/noc20_ph16/preview**
3. **https://nptel.ac.in/courses/113105081**
4. **https://archive.nptel.ac.in/courses/104/105/104105124/**
5. **https://archive.nptel.ac.in/courses/113/104/113104082**

Mapping with Programme Outcomes

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PSO1	PSO2
CO1	3	1	1	0	0	1	0	0	1	0	2	0	0
CO2	3	2	0	1	0	1	0	0	1	0	2	2	0
CO3	3	2	1	1	0	2	1	0	1	0	2	2	0
CO4	3	1	1	1	2	2	2	2	1	1	2	3	3
CO5	3	3	3	3	3	1	2	1	2	2	2	3	2
CO6	3	3	3	3	3	1	2	1	2	2	2	3	2

Assessment Methodology	**Assessment Tools**	**Marks**
Test		25
MCQ unit wise 10 questions	Moodle / Google form	5
Virtual lab based assignment	Demo and viva	5
Attendance		5
Total		**40**

25UHST13	UNIVERSAL HUMAN VALUES	Category	L	T	P	Credit
		HS	2	0	0	2

Preamble/ Course Objective

- To highlight the plausible implications of such a holistic understanding in terms of ethical human conduct, trustful, mutually fulfilling human behaviour, and mutually enriching interaction with Nature

Prerequisite

NIL

Course Outcome

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

CO1	Understand holistic vision of life.	K2
CO2	Enhance socially responsible behavior.	K2
CO3	Understand the responsibility of environmental work.	K2
CO4	Understand the Competence and Capabilities for Maintaining Health and Hygiene.	K2
CO5	Appreciate the aspiration for excellence (merit) and gratitude for all.	K2

Syllabus

UNIT I INTRODUCTION TO VALUE EDUCATION (9)

Right Understanding, Relationship and Physical Facility (Holistic Development and the Role of Education) Understanding Value Education, Self-exploration as the Process for Value Education, Continuous Happiness and Prosperity the Basic Human Aspirations, Happiness and Prosperity Current Scenario, Method to Fulfil the Basic Human Aspirations.

UNIT II HARMONY IN THE HUMAN BEING (9)

Understanding Human being as the Co-existence of the Self and the Body, distinguishing between the Needs of the Self and the Body, The Body as an Instrument of the Self, Understanding Harmony in the Self, Harmony of the Self with the Body, Programme to ensure self-regulation and Health.

UNIT III HARMONY IN THE FAMILY AND SOCIETY (9)

Harmony in the Family, the Basic Unit of Human Interaction, Trust, Foundational Value in Relationship, Respect, Right Evaluation, Other Feelings, Justice in Human-to-Human Relationship, Understanding Harmony in the Society, Vision for the Universal Human Order.

UNIT IV HARMONY IN THE NATURE/EXISTENCE (9)

Understanding Harmony in the Nature, Interconnectedness, self-regulation and Mutual Fulfilment among the Four Orders of Nature, Realizing Existence as Co-existence at All Levels, The Holistic Perception of Harmony in Existence. Describing, Defining, Classifying, providingexamples or evidence, writing introduction and conclusion.

UNIT V IMPLICATIONS OF THE HOLISTIC UNDERSTANDING (9)

Natural Acceptance of Human Values, Definitive- ness of (Ethical) Human Conduct, A Basis for Humanistic Education, Humanistic Constitution and Universal Hu- man Order, Competence in Professional Ethics Holistic Technologies, Production Systems and Management Models- Typical Case Studies, Strategies for Transition towards Value-based Life and Profession.

TOTAL PERIODS: 45

TEXT BOOKS:

1. Premvir Kapoor, “Professional Ethics and Human Values”, Khanna Book Publishing Company, New Delhi, 2022.

2. R RGaur,R Asthana, G P Bagaria, “The Textbook - A Foundation Course in Human Values and Professional Ethics”, Excel Books, New Delhi, 2nd Revised Edition, 2019.
.

REFERENCES:

1. Annie Leonard, “The Story of Stuff”, 2011.
2. A.N. Tripathi,“Human Values”, New Age Intl. Publishers, New Delhi, 2004.
3. Mohandas Karamchand Gandhi, “The Story of My Experiments with Truth”, FP classic, 2009.
4. A Nagaraj, JeevanVidyaPrakashan, Amarkantak, “VanVidya: EkParichaya”, 1999.
5. RR Gaur, R Asthana, G P Bagaria, “The Teacher’s Manual- Teachers Manual for A Foundation Course in Human Values and Professional Ethics”, 2nd Revised Edition, 2019

CO-PO Mapping

COs	**PO1**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**	**PO11**
CO1	–	–	–	2	2	3	2	–	–	2
CO2	–	–	–	3	2	3	3	2	–	2
CO3	–	–	–	2	3	3	2	–	–	2
CO4	1	–	–	2	–	2	2	2	–	–
CO5	1	–	–	–	2	2	3	2	–	2

Assessment Methodology	**Assessment Tools**	**Marks**
Test		25
Case study analysis	Group discussion and report	5
Value-based project proposal	Presentation and peer evaluation	5
Attendance		5
Total		**40**

25UMET14	CONCEPTS OF ENGINEERING IN BIOLOGY

Category	L	T	P	Credit
BS	3	0	0	3

Preamble/ Course Objective

1. Understand fundamental concepts where engineering intersects with biological sciences.
2. Analyze biological processes and energy dynamics from an engineering perspective.
3. Explain transport phenomena in living systems and their applications in medicine.
4. Explore current advancements in molecular biology, nanobiotechnology, and biomimetics.
5. Apply ergonomic principles and biomechanics in engineering design related to biological systems.

Course Outcome

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

CO1	Describe the fundamental principles of biology as applied to engineering including biopolymers and macromolecules.	K2
CO2	Analyze the mechanisms of photosynthesis, respiration, and energy assimilation in biological systems.	K4
CO3	Interpret transport mechanisms and fluid flow in biological systems using mathematical and biophysical models.	K2,K3
CO4	Examine the applications of nanobiotechnology and biomimetics in engineering fields such as healthcare, agriculture, and prosthetics.	K4,K5
CO5	Apply ergonomics, biomechanics, and rehabilitation engineering concepts in bioengineering system design.	K3,K6

SYLLABUS

Unit 1: Understanding Basics (9L)

Engineering perspectives of biological sciences: Where engineering meets biology and where biology meets engineering. Biology as an integrated Science. **Biopolymers and macromolecules** – Structure and Function: Organic and inorganic molecules; Unique Properties of Carbon; Carbohydrates, Amino Acids and proteins, Lipids, Nucleic Acids, Vitamins and Minerals; The Rise of Living Systems.

Unit 2: Biological Processes and Bioenergetics (9L)

EnergyDynamics in Biology – Introduction to Energy in Biological Systems,Photosynthesis: Mechanism and Significance,Energy Assimilation in Living Organisms,Aerobic Respiration,Anaerobic Respiration and Fermentation,Comparative Study: Aerobic vs Anaerobic Systems,Applications of Energy Systems in Biology,Recent Advances and Case Studies.

Unit 3: Living Systems (9L)

Transport Phenomena in Biological Systems: Introduction to Transport Phenomena in Biology,Membrane Structure and Transport Mechanisms,Membrane Channels and Ion Channels,Fluid Flow in Biological Systems,Mass Transfer in Biological Systems,Mathematical Models and Biophysical Principles,Applications of Transport Phenomena in Biology and Medicine.

Unit 4: Molecular Biology (9L)

Current trends and advances in cell and molecular biology; **Landmark Discoveries**: Landmark discoveries in the field of Molecular Biology. **Nanobiotechnology:** Micro-/Nanotechnologies for Interfacing Live Cells; Nanotechnology in Medicine - Diagnostics and Therapy, Biosensors& Nanotechnology in Agriculture.**Biomimetics:** Introduction about Biomimetics Nature inspired processes applicable to the field of Engineering. **Biomechanics:** Human body motion and Prosthetics.

Unit 5: Ergonomics(9L)

Introduction to Ergonomics; Elements of Anthropometry; Physiology, Anatomy; Mechanical Properties of Bone and Soft Tissues Rehabilitation engineering, Biomimetics; Bio Material Handling; Hand Tool Design; Human Information Processing; Applications of Principles of Biomechanics in two and three dimensional kinematics; Properties of Fluid Mechanics; Introduction to Bio sensors and 3D Printing and Biomaterials.

Text Book

1. "Biology for Engineers" by Arthur T. Johnson, Publisher: CRC Press, ISBN: 9780367201842.
2. Transport Phenomena in Biological Systems – *by George A. Truskey, Fan Yuan, David F. Katz,* Publisher: Pearson. (2009)
3. Ergonomics for Beginners: A Quick Reference Guide – *by Jan Dul and Bernard Weerdmeester,* Publisher: CRC Press, ISBN : 9780429145353 (2008)

Reference Book & Web Resources

1. "Molecular Biology of the Cell" by Alberts et al., Publisher: Garland Science, ISBN: 9780815344643, relevance unit 1,3,4
2. "Biochemistry" by Jeremy M. Berg, John L. Tymoczko, and LubertStryer, Publisher: W.H. Freeman, ISBN: 9781464126109, relevance unit 2,4
3. "Nanobiotechnology: Concepts, Applications and Perspectives" by Christ of M. Niemeyer and Chad A. Mirkin, Publisher: Wiley-VCH, ISBN: 9783527313820, relevance unit 5
4. Biomimetics: Nature-Based Innovation – *by Yoseph Bar-Cohen,* Publisher: CRC Press, ISBN : 9780429093708, relevance unit 4 & 5 (2012)
5. Principles of Anatomy and Physiology – *by Gerard J. Tortora and Bryan H. Derrickson,* Publisher: Wiley, ISBN, 0470084715, 9780470084717,April 2008

Web Resources

1. **https://www.youtube.com/watch?v=1T-2Sgb4d7k&list=PLM2QtThIQ70Na3hTrcaaOXoXCp5tBCjHB**
2. **https://www.youtube.com/watch?v=hTF4NZC29mU**
3. **https://www.youtube.com/watch?v=ZN1bZ6Q_mG4**

Mapping with Programme Outcomes

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PSO1	PSO2
CO1	3	2	-	-	-	-	-	-	-	-	2	2	1
CO2	3	3	2	2	-	-	-	-	-	-	2	2	1
CO3	3	3	3	2	2	-	-	-	-	-	3	2	2
CO4	3	2	2	2	3	2	2	-	2	1	3	1	3
CO5	2	2	3	2	2	2	1	2	3	2	3	3	2

Assessment Methodology	Assessment Tools	Marks
Cognitive domain (Knowledge & Understanding)	CAT - I CAT - 2 Model Examinations	25
Affective domain (Reflection)	Online Quiz, Group discussion, Assignments, Mind Mapping	05
Behavioral domain (Application & Practice)	Role plays Community engagement Presentations.	05
Attendance		05
Total		40

25UMEI15	Manufacturing Processes & Practice

Category	L	T	P	Credit
PC	3	0	2	4

Prerequisite
Nil.

Preamble/ Course Objective

- To understand the fundamentals of casting processes, including pattern making, moulding, and identification of casting defects and their remedies.
- To gain knowledge of various welding techniques, equipment, applications, and the analysis of
- To study the principles for non-traditional machining techniques such as EDM, ECM, ECG, AJM, and USM.
- To understand the structure, types, and processing methods of polymers and plastics for industrial manufacturing applications.

Course Outcome

CO1	Understand the various casting methods, pattern and core making, moulding techniques, and identify casting defects and their remedies.	K2
CO2	Explain different welding processes, equipment, standards, and analyze common welding defects and applications.	K3
CO3	Demonstrate knowledge of metal forming processes like rolling, forging, and extrusion, including terminology, equipment, and defect analysis.	K3
CO4	Introduction to non-traditional machining techniques such as EDM, ECM, ECG, AJM, and USM.	K3
CO5	Understand the structure, classification, and processing methods of plastics and polymers for industrial product manufacturing.	K2

Syllabus

UNIT-I (09)
Introduction to manufacturing processes – classification – steps involved in casting process – different types of casting – pattern and core making – materials, types and allowances – mouldingtoolsandequipment-propertiesofmouldingsand-castingdefectsandremedies.
UNIT-II (09)
Types of welding processes–weldability-gas welding–oxyacetylene welding-Introduction to arc welding – types and equipment – resistance welding – types and applications - welding defects– Introduction to welding standards – welding of dissimilar metals and non-metals.
UNIT-III (09)
Classification of metal forming processes – Rolling, Forging, Extrusion, Drawing and other Sheet metal operations: terminology used, processes, machines and defects.
UNIT-IV (09)
Unconventional Machining-Introduction to unconventional machining – Electrical Discharge Machining (EDM), Electrochemical machining (ECM), Electrochemical grinding (ECG), Abrasive jet machining (AJM) and Ultrasonic machining (USM).
UNIT-V (09)
Plastics and polymers–structure of polymers–additives in plastics–thermoplastics and thermo setting plastics – manufacturing of plastic products – different moulding methods– forming or shaping methods – laminating methods – machining of plastics – joining plastics– industrial applications of plastics.

Laborator Practice Syllabus (15)

- Fitting shop- Symmetric Fitting, Acute angle Fitting.
- Carpentry- Half Lap Joint, Corner Mortise Joint.
- Casting- Demo.
- Smithy-Demo.
- Plastic moulding & glass cutting- Demo.
- Sheet metal- Rectangular Tray, Funnel
- Grinding – surface finish – lapping, honing, buffing, broaching- Demo

Text Book

1. B.S.NagendraParashar&R.K.Mittal – Elements of Manufacturing Processes, Prentice Hall India Pvt. Ltd.,latest edition.
2. S.K.HajraChoudry-working shop technology, Vol-I, media promoters and publishers pvt.Ltd, latest edition.

Reference Book

1. Roy A lindberg-Processes and Materials of manufacturing, Prentice Hall India pvt.Ltd, latest edition.
2. Welding and Welding Technology, by Richard L. Little latest edition.
3. A Textbook of Manufacturing Technology by R.K. Rajput.Latest edition.
4. Manufacturing Processes for Engineering Materials by SeropeKalpakjian and Steven R. Schmid, latest edition.
5. Fundamentals of Modern Manufacturing by Mikell P. Groover, latest edition.

Web Resources

1. www.Myebookslibrary.com/workshoptechnology-by-hajrachoudry-vol.1-pdf-download.pdf**.**

Mapping with Programme Outcomes

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PSO1	PSO2
CO1	3	3	2	-	1	1	-	-	1	-	1	-	2
CO2	3	3	2	-	2	2	-	-	1	-	1	-	2
CO3	3	3	3	-	2	1	-	-	1	-	1	-	2
CO4	3	2	2	-	3	-	-	-	1	-	1	-	2
CO5	3	2	2	-	2	2	-	-	1	-	1	-	2

Assessment Methodology	Assessment Tools	Marks
Theory Test	Evaluation	15
Internal Assessment (Assignments/Quiz/Seminar)		10
Laboratory Work (Fitting, Carpentry, Sheet Metal, etc.)	Performance evaluation	10
Viva-Voce		5
Model Practical		5
Attendance		5
Total	—	**50**

25UHSI16	PROFESSIONAL COMMUNICATION FOR ENGINEERS	Category	L	T	P	Credit
		HS	1	0	2	2

Course Prerequisite:

- Nil

Course Objective:

- To improve the communicative competence of learners
- To learn to use basic grammatic structures in suitable contexts
- To acquire lexical competence and use them appropriately in a sentence and understand their meaning in a text
- To help learners use language effectively in professional contexts
- To develop learners' ability to read and write complex texts, summaries, articles, blogs, definitions, essays and user manuals

Course Outcome

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

CO1	Use appropriate words in a professional context.	K2
CO2	Gain understanding of basic grammatic structures and use them in right context.	K2
CO3	Speak fluently and accurately in formal and informal communicative contexts	K2
CO4	Write definitions, descriptions, narrations and essays on various topics	K2
CO5	Express their opinions effectively in both oral and written medium of communication	K4

SYLLABUS

UNIT I INTRODUCTION TO COMMUNICATION (9)

EFFECTIVE COMMUNICATION:(1)

What is effective communication? (Explain using activities) Why is communication critical for excellence during study, research and work? What are the seven C's of effective communication? What are key language skills? What is effective listening? What does it involve? What is effective speaking? What does it mean to be an excellent reader? What should you be able to do? What is effective writing? How does one develop language and communication skills? What does the course focus on? How are communication and language skills going to be enhanced during this course? What do you as a learner need to do to enhance your English language and communication skills to get the best out of this course?

FUNDAMENTALS OF COMMUNICATION: (9**)**

Reading - Reading brochures (technical context), telephone messages / social media messages relevant to technical contexts and emails. Writing - Writing emails / letters introducing oneself. Grammar - Present Tense (simple and progressive); Question types: Wh/ Yes or No/ and Tags. Vocabulary - Synonyms; One word substitution; Abbreviations & Acronyms (as used in technical contexts).

LAB ACTIVITY: Extempore (Oral), Conversation on asking directions, Listening – Telephone conversation; Speaking Self-introduction; Telephone conversation – Video conferencing etiquette.

UNIT II NARRATION AND SUMMATION (9)

Reading - Reading biographies, travelogues, newspaper reports, Excerpts from literature, and travel & technical blogs. Writing - Guided writing-- Paragraph writing Short Report on an event (field trip etc.) Grammar –Past tense (simple); Subject-Verb Agreement; and Prepositions. Vocabulary - Word forms (prefixes& suffixes); Synonyms and Antonyms. Phrasal verbs.

LAB ACTIVITY: Listening – Travel podcast; Speaking – Narrating and sharing personal experiences through a podcast, Autobiography of a famous Personality

UNIT III DESCRIPTION OF A PROCESS / PRODUCT (9)

Reading – Reading advertisements, gadget reviews; user manuals. Writing - Writing definitions; instructions; and Product /Process description. Grammar - Imperatives; Adjectives; Degrees of comparison; Present & Past Perfect Tenses. Vocabulary - Compound Nouns, Homonyms; and Homophones, discourse markers (connectives & sequence words).

LAB ACTIVITY: Listening – Railway / Airport Announcements, Travel Vlogs; Speaking – Describing a place or picture description

UNIT-IV VISUALIZATION AND CLASSIFICATION(9)

Listening – TED talks Speaking – Interviewing a celebrity/Famous Personality Reading – Company profiles, Business Letters Vocabulary– Discourse Markers, Linking words and Phrases Collocation. Grammar – Pronouns, Conjunction, Preposition Writing – Interpretation of Charts and Graphs

LAB ACTIVITY: Picture Description, about purchasing a product, Summarizing a TED talk, Role play, Narrating an unforgettable event

UNIT V EXPRESSION COMMUNICATION (9)

Listening – Watching Movies / Listening to Dialogues and Conversations Speaking – Role play, Panel Discussion, Debate Reading – Blogs, Novels, Short Stories Vocabulary – Phrasal Verbs Grammar– Simple/Compound/Complex Sentences, Error Spotting, Punctuation. Writing – Descriptive Essay, Dialogue Writing

LAB ACTIVITY: Listening /Reading Comprehension, Developing a story using given Vocabulary, Mini Presentation on General topic (ICT tools), Group Discussion

TOTAL PERIODS: 45

TEXTBOOKS

1.Technical Communication: Principles and Practice Meenakshi Raman &Sangeeta Sharma Oxford University Press 3rd Edition (or latest)

2.Communication Skills Sanjay Kumar &PushpLata, Oxford University Press, 2nd Edition (2015)

Reference Book

1.A Course Book on Technical English By Lakshmi Narayanan, Scitech Publications (India) Pvt. Ltd.(English For Technical Communication (With CD) By AyshaViswamohan, McGraw-Hill Education, ISBN : 0070264244.)

2. Effective Communication Skill, Kulbhusan Kumar, R S Salaria, Khanna Publishing House.

3. Learning to Communicate – Dr. V. Chellammal, Allied Publishing House, New Delhi,2003.

4.Effective Technical Communication*:* M. Ashraf Rizvi, McGraw-Hill Education, 2nd Edition (2017)

Mapping with Programme Outcomes													
COs	**PO1**	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**	**PO11**	**PSO1**	**PSO2**
CO1	1	1	-	-	2	-	-	-	-	3	2	-	-
CO2	1	2	-	-	2	-	-	2	-	3	2	-	-
CO3	1	2	-	-	-	-	-	1	-	3	2	-	-
CO4	1	3	-	-	3	-	1	2	-	3	2	-	-
CO5	1	2	-	-	2	-	1	3	-	3	2	-	-

Assessment Methodology	**Assessment Tools**	**Marks**
Test		15
Listening and reading Comprehension	Online tool	5
Speaking assessment (Oral)	review	10
Online assessment test	Online tool	10
Content creation Competition	Peer review	5
Attendance		5
Total		**50**

25UPHP13	PHYSICAL SCIENCE LAB

Category	L	T	P	Credit
BS	0	0	2	1

Preamble/ Course Objective

- To provide an experimental foundation for the theoretical concepts introduced in the lectures
- To help students understand the role of direct observation in physics and to distinguish between inferences based on theory and the outcomes of experiments
- To introduce the concepts and techniques which have a wide application in experimental science
- To gain a practical knowledge of Engineering Chemistry in relevance to Industrial applications.
- To inculcate experimental skills to test basic understanding of water quality parameters, such as, acidity, alkalinity, hardness, DO, chloride and copper
- To demonstrate the synthesis of nanoparticles

Prerequisite: Nil

Course Outcome

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

CO1	Apply the elastic nature of materials and determine the elastic moduli of different materials.	K3
CO2	Analyse thermal properties of various material testing methods and use them in suitable applications	K3
CO3	Understand measurement technology, usage of new instruments and real time applications in engineering studies.	K3
CO4	Estimate water quality parameters such as total dissolved solids, total hardness, and chemical oxygen demand using volumetric analysis methods.	K3
CO5	Determine the concentration of metal ions such as copper in a given solution using volumetric or instrumental techniques.	K3
CO6	Synthesize metal nanoparticles using basic chemical methods and analyze their properties using suitable characterization techniques.	K3

Syllabus (20)

1. Determination of Young‟s modulus of given material by non-uniform bending method.
2. Determination of viscosity of the given liquid using Poiseuille‟smethod.
3. Determination of Thermal conductivity of a bad conductor –Lee‟sDiscmethod
4. Determinationof the thickness of a given thin material– Airwedgemethod
5. Determination of the wavelength of Laser and particle size of given powder.
6. Determination of dissolved oxygen in water.
7. Determination of total hardness of water by EDTA method
8. Preparation of Cu nanoparticles by precipitation method.
9. Estimation of available chlorine in bleaching powder
10. Estimation of copper in copper sulphate solution

Text Book

1. Practical Physics – *S.L. Gupta & V. Kumar*
2. A Textbook of Practical Physics – *M.N. Srinivasan*

3. Engineering Physics Practical Manual – *Dr.Arumugam M.*
4. Engineering Physics Lab Manual – *R.K. Shukla &Anchal Srivastava*
5. Advanced Practical Physics for Students – *B.L. Worsnop and H.T. Flint*
6. P.C. Jain & Monica Jain – *Engineering Chemistry*
7. S.S. Dara & S.S. Umare – *A Textbook of Engineering Chemistry*
8. R. Gopalan, D. Venkappayya, S. Nagarajan – *Engineering Chemistry*
9. Shashi Chawla – *Engineering Chemistry*
10. K. Mukkanti – *Practical Engineering Chemistry*

Reference Book & Web Resources

1. Elements of Properties of Matter – *D.S. Mathur*
2. Engineering Physics – *R.K. Gaur & S.L. Gupta*
3. B.Sc. Practical Physics – *C.L. Arora*
4. Experimental Physics – *Worsnop and Flint*
5. P.C. Jain & Monica Jain – *Engineering Chemistry*
6. S.S. Dara & S.S. Umare – *A Textbook of Engineering Chemistry*
7. R. Gopalan, D. Venkappayya, S. Nagarajan – *Engineering Chemistry*
8. Shashi Chawla – *Engineering Chemistry*
9. K. Mukkanti – *Practical Engineering Chemistry*
10. Dr. Sudha Rani – *Laboratory Manual of Engineering Chemistry*

Web resources

1. **https://vlab.co.in**
2. **https://ocw.mit.edu**
3. **https://nptel.ac.in/courses/115**
4. **http://hyperphysics.phy-astr.gsu.edu**
5. **https://nptel.ac.in**
6. **https://vlab.co.in**
7. **https://www.khanacademy.org/science/chemistry**
8. **https://chem.libretexts.org**
9. **http://www.chemcollective.org**

Mapping with Programme Outcomes

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PSO1	PSO2
CO1	3	3	0	3	0	1	1	1	1	0	2	1	0
CO2	2	1	1	1	0	0	1	1	1	0	1	0	0
CO3	2	2	1	1	1	0	1	1	1	0	1	0	0
CO4	3	2	2	2	2	1	1	1	1	1	0	2	0
CO5	3	2	2	2	2	1	1	1	1	1	0	3	0
CO6	3	3	3	3	3	1	2	1	2	2	1	1	1

Assessment Methodology	Assessment Tools	Marks
Laboratory Conduction	Observation	10
Record work		10
Model exam		15
Viva		5
Virtual lab assignment	Review	5
STEM based model creation	Presentation	5
Attendance		10
Total		60

25UGEP18	DESIGN THINKING AND IDEA LABORATORY	Category	L	T	P	Credit
		ES	1	0	2	2

Course Prerequisite

- Basic Knowledge of Science and interest in creative problem solving

Course Objective

- To introduce students to the principles, methodologies, and frameworks of design thinking for solving real-world problems.To cultivate user-centric, empathetic, and creative thinking through experiential learning and hands-on activities.

Course Outcome

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

CO1	Understand and apply fundamental learning theories and memory techniques to improve cognitive and retention skills.	K2
CO2	Develop emotional intelligence and apply the fundamentals of design thinking to analyze and solve user-centric problems.	K3
CO3	Demonstrate creative problem-solving skills and understand the engineering product design process through design thinking principles.	K4
CO4	Apply rapid prototyping and testing methods while fostering inclusive practices by appreciating individual differences in team settings..	K5
CO5	Design user-centered engineering solutions by integrating feedback and iterative development to address real-world customer challenges.	K6

Syllabus

UNIT I LEARNING AND MEMORY FUNDAMENTALS

An Insight to Learning- Understanding the Learning Process, Kolb's Learning Styles, Assessing and Interpreting

Remembering Memory- Understanding the Memory process, Problems in retention, Memory enhancement techniques

UNIT II: EMOTIONAL INTELLIGENCE AND INTRODUCTION TO DESIGN THINKING

Emotions: Experience & Expression-Understanding Emotions: Experience & Expression, Assessing Empathy, Application with Peers

Basics of Design Thinking-Definition of Design Thinking, Need for Design Thinking, Objective of Design Thinking, Concepts & Brainstorming, Stages of Design Thinking Process (explain with examples) – Empathize, Define, Ideate, Prototype, Test.

UNIT IIICREATIVE THINKING AND PRODUCT DESIGN

Being Ingenious & Fixing Problem-Understanding Creative thinking process, Understanding Problem Solving, Testing Creative Problem Solving

Process of Product Design- Process of Engineering Product Design, Design Thinking Approach, Stages of Product Design, Examples of best product designs and functions, Assignment – Engineering Product Design

UNIT I V PROTOTYPING AND APPRECIATING DIVERSITY

Prototyping & Testing-What is Prototype? Why Prototype? Rapid Prototype Development process, Testing, Sample Example, Test Group Marketing

Celebrating the Difference- Understanding Individual differences & Uniqueness, Group Discussion and Activities to encourage the understanding, acceptance and appreciation of Individual differences

UNIT V CUSTOMER-CENTRIC DESIGN AND ITERATIVE DEVELOPMENT

Design Thinking & Customer Centricity-Practical Examples of Customer Challenges, Use of Design Thinking to Enhance Customer Experience, Parameters of Product experience, Alignment of Customer Expectations with Product Design

Feedback, Re-Design & Re-Create- Feedback loop, Focus on User Experience, Address "ergonomic challenges, User focused design, rapid prototyping & testing, final product, Final Presentation – "Solving Practical Engineering Problem through Innovative Product Design & Creative Solution".

TEXTBOOKS:

1. Marilee Sprenger, Learning and Memory: The Brain in Action, ASCD Publishers Ltd.
2. IdrisMootee, Design Thinking for Strategic Innovation,2013, John Wiley & Sons Inc

REFERENCE BOOKS

1. Peter G. Rowe, Design Thinking: Understanding How Designers Think and Work, MIT Press, 1991.
2. Don Norman, The Design of Everyday Things, Basic Books, 2013.
3. Tom Kelley and David Kelley, Creative Confidence: Unleashing the Creative Potential Within Us All, Crown Business, 2013.
4. Todd ZakiWarfel, Prototyping: A Practitioner's Guide, Rosenfeld Media, 2009.
5. Clive L. Dym, Patrick Little, Elizabeth J. Orwin, Engineering Design: A Project-Based Introduction, Wiley, 2011.
6. Karl T. Ulrich and Steven D. Eppinger, Product Design and Development, McGraw-Hill Education, 2015.
7. Charles Platt, Make: Electronics: Learning Through Discovery, Maker Media, 2011.

IDEA LABORATORY ACTIVITIES:

1. Schematic and PCB layout design of a suitable circuit, fabrication and testing of the circuit.
2. Machining of 3D geometry on soft material such as soft wood or modelling wax.
3. 3D scanning of computer mouse geometry surface. 3D printing of scanned geometry using FDM or SLA printer.
4. 2D profile cutting of press fit box/casing in acrylic (3 or 6 mm thickness)/cardboard, MDF (2 mm) board using laser cutter & engraver.
5. 2D profile cutting on plywood /MDF (6-12 mm) for press fit designs.
6. Familiarity and use of welding equipment.
7. Familiarity and use of normal and wood lathe.
8. Embedded programming using Arduino and/or Raspberry Pi.
9. Design and implementation of a capstone project involving embedded hardware, software and machined or 3D printed enclosure.

CO-PO Mapping

Cos	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11
CO1	2	-	-	–	–	–	–	–	-	-	3
CO2	-	2	2	–	–	1	2	2	2	-	-
CO3	2	3	3	2	–	2	–	-	-	2	2
CO4	-	-	2	3	2	2	1	3	2	-	2
CO5	-	2	3	2	3	2	-	2	3	2	3

ASSESSMENT METHODOLOGY	ASSESSMENT TOOLS	MARKS
Knowledge & Concept Understanding	Quiz (MCQs, Short Questions on Creative Thinking, Design Process)	10
Case Study Analysis (Real-world product design & customer-centric approach)	Presentation / Group Activity	15
Prototype Development & Creativity	Models	25
Attendance		10
Total		**60**

25UGEP19	ENGINEERING GRAPHICS & AutoCAD

Category	L	T	P	Credit
ES	0	0	2	1

Prerequisite: Nil

Preamble/ Course Objective

- To develop knowledge of standard practices in engineering drawing, including lettering, line work, dimensioning, and projection techniques.
- To enable students to construct and interpret conic sections, spirals, involutes, helix curves, and projections of points, lines, planes, and solids.
- To understand the development and intersection of surfaces like cylinder-cylinder and cylinder-cone, essential for fabrication and design.
- To build skills in creating accurate isometric and orthographic projections for effective engineering communication.
- To introduce students to AutoCAD for creating 2D engineering drawings, enhancing their ability to use modern engineering tools.

Course Outcome

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

CO1	Apply the principles of engineering drawing standards, including lettering, line types, dimensioning, and accurately construct conic sections, spirals, involutes, and helix curves.	K2
CO2	Interpret and generate projections of solid objects and their sectional views, aiding in better understanding of internal features in engineering components.	K3
CO3	Develop the lateral surfaces of solids essential for manufacturing and fabrication processes.	K3
CO4	Create isometric and orthographic projections of engineering objects to effectively communicate design intent.	K3
CO5	Utilize computer-aided drafting tools, particularly AutoCAD, to produce accurate 2D engineering drawings of simple geometries, enhancing proficiency in modern engineering software.	K3

Syllabus

UNIT-I(6)

Introduction to Standards for Engineering Drawing practice, Lettering, Line work and Dimensioning. Conic sections, Involutes, Spirals, Helix.

UNIT-II(6)

Projection of Points, Lines and planes
Projection of Solids.

UNIT-III(6)

Sections of solidsand Development of surfaces

UNIT-IV(6)

Isometric projections and Conversion of pictorial to Orthographic views

UNIT-V(6)

Computer Aided Drafting: Introduction to Computer Graphics and Drafting, AutoCAD,2-D diagrams of simple geometries using Auto- CAD script.

Text Book

1. K.R.Gopalakrishna and SudhirGopalakrishna, Engineering Graphics ,Inzinc Publishers, latest edition.
2. K.Venugopal, Engineering Drawingand Graphics AutoCAD,4th edition,NewAgeInternational Publication Ltd, latest edition

Reference Book

1. N.D.Bhatt, Engineering Drawing,49th edition,Chorotar Publishing House, latest edition.
2. DavidIcook and Robert NMc Dougal, Engineering Graphics and Design with computer applications, Holt – Sounders Int. Edn, latest edition.
3. James D Bethuneandet.al., Modern Drafting ,PrenticeHallInt, latest edition.
4. Engineering Drawing by N.D. Bhatt and V.M. Panchallatest edition.
5. Fundamentals of Engineering Drawing" by Luzader Warren Jlatest edition.

Web Resources

1. **https://nptel.ac.in/courses/112/103/112103019/**
2. **https://archive.org/details/engineeringdrawingndbhatt**

Mapping with Programme Outcomes													
COs	**PO1**	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**	**PO11**	**PS O1**	**PS O2**
CO1	2	2	2	2	-	2	-	-	1	-	2	1	-
CO2	2	2	2	2	-	1	-	-	1	-	2	1	-
CO3	2	2	2	2	-	2	-	-	1	-	2	1	-
CO4	2	2	2	2	-	1	-	-	1	-	2	1	-
CO5	2	2	2	2	-	2	-	-	2	-	2	1	-

Assessment Methodology	**Assessment Tools**	**Marks**
Laboratory Conduction	Observation	10
Record work		10
Model exam		15
Viva		5
Real Model Drawing	Review	5
CAD Simulation Test		5
Attendance		10
Total		60

25UPCE11	**Career DevelopmentSkills**

Category	**L**	**T**	**P**	**Credit**
SEC	0	0	2	0

Preamble/ Course Objective

To empower students with the skills for self-discovery, goal achievement, effective time management, and personal effectiveness, alongside foundational knowledge in career planning, emotional intelligence, higher education, competitive exams, and entrepreneurship

Prerequisite: Basic communication skills and foundational knowledge of workplace behavior

Course Outcome

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

CO1	Help students assess themselves, explore career options, and set actionable goals through structured planning.
CO2	Develop motivation, enhance personality effectiveness, and instill discipline for personal and professional growth.
CO3	Build awareness and practice of grooming, hygiene, positive attitudes, manners, and professional behavior.
CO4	Strengthen self-awareness, time and stress management, and emotional intelligence for balanced personal development.
CO5	Introduce students to higher education paths, competitive exams, and the fundamentals of entrepreneurship and business planning

Syllabus

UNIT 110 Hrs

Career Planning: Introduction to Career Planning - Self-Assessment for Career Planning - Exploring Career Options- Developing a Career Plan;

Goal Settings: Understanding Goal Setting - Setting Effective Goals - Action Plan Development - Practical Exercises

UNIT 2 **10 Hrs**

Motivation – I: Definition and Importance of Motivation - Types of Motivation - Theories of Motivation - Factors Affecting Motivation

Personality Effectiveness: Components of Personality Effectiveness - Communication Skills - /Interpersonal Skills - Practical Exercises

Building Personality and Discipline: Introduction to Personality Development - Building Positive Habits - Discipline and Self-Control - Practical Application

UNIT 310Hrs

Grooming, hygiene and Cleanliness: Personal Hygiene Practices - Body Grooming Techniques - Environmental Cleanliness - Mental and Social Impact of Grooming and Hygiene.

Attitudes, Manners and Behaviour: Understanding Attitudes - Developing Positive Attitudes - Manners and Etiquette - Procedures and Protocols

UNIT 410Hrs

Self- Awareness & Self Confidence: Introduction to Self-Awareness- Understanding Strengths and Weaknesses- Building Self-Confidence- Practical Application

Time Management:Introduction to Time Management - Planning and Prioritizing Tasks- Overcoming Procrastination- Practical Time Management

Stress Management: Understanding Stress- Stress Management Techniques-Coping Strategies-Practical Application

Emotional Intelligence:Introduction to Emotional Intelligence- Managing Emotions- Social Awareness and Relationship Management-Practical Exercises

UNIT 5 **8 Hrs**

Introduction to Higher Education, Competitive exams:Overview of Higher Education- Competitive Exams Overview - Exam Preparation Techniques

Introduction to Entrepreneurship: Understanding Entrepreneurship- Developing a Business Idea - Business Planning

Text Book

1. Soft skills for Managers by Dr. T. KALYANA CHAKRAVATHI

2. Personal Development and Soft Skills by BARUN K MITRA, Oxford Higher Education

Reference Book

2. The Emotionally Intelligent Workplace by DANIEL GOLEMAN.
3. Communication skills and soft skills an integrated approach by E. SURESH KUMAR, P. SREEHARI, J SAVITHRI.
4. Top Talking in English (international communication skills) by CHARLES T. RAJENDRA
5. Soft skills by RAJ LAKSHMI SURYAVANSHI, Gurucool Publishing

Mapping with Programme Outcomes

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11
CO1								2	2	2	2
CO2					2			2			2
CO3							2	2			2

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11
CO4								2	2		2
CO5						2	2				2

Course Contents and Lecture Schedule

Unit/UNIT No	Topic	No. of Periods
UNIT 1	Introduction to Career Planning	1
	Self-Assessment for Career Planning	2
	Exploring Career Options	2
	Developing a Career Plan	2
	Understanding Goal Setting	1
	Setting Effective Goals	1
	Action Plan Development	1
UNIT 2	Definition and Importance of Motivation	1
	Types of Motivation	1
	Theories of Motivation	1
	Factors Affecting Motivation	1
	Components of Personality Effectiveness	1
	Communication Skills	1
	Interpersonal Skills	1
	Introduction to Personality Development	1
	Building Positive Habits	1
	Discipline and Self-Control	1
UNIT 3:	Personal Hygiene Practices	1
	Body Grooming Techniques	1
	Environmental Cleanliness	1
	Mental and Social Impact of Grooming and Hygiene	3
	Understanding Attitude	
	Developing Positive Attitudes	2
	Manners and Etiquette	1
	Procedures and Protocols1	1
UNIT 4	Introduction to Self-Awareness	1
	Understanding Strengths and Weaknesses	2
	Building Self-Confidence	1
	Planning and Prioritizing Tasks	1
	Overcoming Procrastination	1
	Understanding Stress	1
	Stress Management Techniques	1
	Coping Strategies	1

Unit/UNIT No	Topic	No. of Periods
	Managing Emotions	1
	Social Awareness and Relationship Management	1
UNIT 5	Overview of Higher Education	2
	Competitive Exams Overview	2
	Exam Preparation Techniques	1
	Understanding Entrepreneurship	1
	Developing a Business Idea	1
	Business Planning	1

Assessment Methodology	Assessment Tools	Marks
Career Development Portfolio	Assignment	20
Personality Development Assignment	Assignment	20
Goal Setting and Action Plan Project	Project	15
Grooming and Etiquette Demonstration	Practical/Demo	15
Time and Stress Management Project	Project	20
Attendance and Class Participation	Continuous Assessment	10
Total		**100**

25UMCC11	IKS – CONCEPTS AND APPLICATIONS IN ENGINEERING AND SCIENCE	Category	L	T	P	Credit
		MCC	0	0	2	0

Course Prerequisite

- Basic understanding of science and engineering fundamentals

Course Objective

- Familiarize students with traditional Indian knowledge systems and their scientific
- foundations
- Explore the integration of ancient wisdom with modern engineering practices
- Understand sustainable technologies and innovations rooted in Indian traditions
- Develop appreciation for indigenous knowledge in solving contemporary challenges
- Foster research mindset towards validating and modernizing traditional practices

Course Outcome

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

CO1	Understand the historical development and scientific basis of Indian Knowledge Systems	K2
CO2	Analyze traditional Indian practices in mathematics, astronomy, metallurgy, andmedicine	K4
CO3	Apply IKS principles to contemporary engineering and scientific problems	K3
CO4	Evaluate the sustainability aspects of traditional Indian technologies	K5
CO5	Create innovative solutions by integrating traditional knowledge with modernscience	K1

Syllabus

UNIT I INTRODUCTION TO INDIAN KNOWLEDGE SYSTEMS

Historical overview of Indian Knowledge Systems - Scientific methodology in ancient India - Major texts and scholars: Vedas, Upanishads, Charaka Samhita, Sushruta Samhita - Transmission and preservation of knowledge - Contemporary relevance and global recognition.

UNIT II: MATHEMATICS AND ASTRONOMY IN ANCIENT INDIA

Indian contributions to mathematics: Zero, decimal system, trigonometry - Aryabhata, Brahmagupta, Bhaskara's contributions - Astronomical observations and calendar systems - Navigation techniques and geographical knowledge - Applications in modern engineering calculations.

UNIT III: METALLURGY, MATERIALS, AND ARCHITECTURE

Ancient Indian metallurgy: Iron pillar of Delhi, Wootz steel - Traditional building materials and techniques -Architectural marvels: Structural engineering principles - Water harvesting and management systems - Sustainable construction practices.

UNIT IV: MEDICINE AND LIFE SCIENCES

Ayurveda: Principles and scientific validation - Traditional agricultural practices and crop management – Biodiversity conservation methods - Food preservation techniques - Biotechnology applications in traditional practices.

UNIT V: INTEGRATION WITH MODERN SCIENCE AND TECHNOLOGY

Validating traditional knowledge through modern scientific methods - Case studies of successful IKS-modern science integration - Intellectual property and traditional knowledge protection - Research opportunities and career prospects - Future directions and challenges

TEXTBOOKS:

1. SubhashKak, "The Nature of Physical Reality", Mount Meru Publishing, 2016
2. B.V. Subbarayappa, "Indian Astronomy: A Source Book", Nehru Centre, 2008
3. KapilaVatsyayan, "Traditional Indian Art and Culture", Cambridge University Press, 2015

REFERENCE BOOKS & WEB RESOURCES

1. P.P. Divakaran, "The Mathematics of India: Concepts, Methods, Connections",Springer, 2018
2. S.N. Sen, "Ancient Indian History and Civilization", New Age International, 2010
3. National Mission for Manuscripts - www.namami.gov.in
4. Digital Library of Traditional Ecological Knowledge - www.frlht.org
5. CSIR Traditional Knowledge Digital Library - www.tkdl.res.in

CO PO Mapping

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

Assessment Methodology	Assessment Tools	Marks
Major IKS Integration Project	Project	20
Traditional Knowledge Practical Demonstration	Practical/Demo	20
Scientific Validation Assignment	Assignment	15
Heritage Site/Museum Field Report	Field Work	15
Innovation Proposal Presentation	Presentation	20
Attendance and Lab Participation	Continuous Assessment	10
Total		**100**

25UMCC12	EnvironmentalScience & Sustainability

Category	L	T	P	Credit
MCC	2	0	0	0

Prerequisite: Nil

Preamble/ Course Objective

- This course provides comprehensive understanding of environmental science principles and sustainability concepts essential for engineering professionals. The objectives are to:
- Understand fundamental concepts of environmental science and ecology
- Analyze environmental problems and their engineering solutions
- Develop awareness about sustainable development and green technologies
- Explore renewable energy systems and waste management strategies
- Foster environmental consciousness and responsible engineering practices

Course Outcome

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

CO1	Understand fundamental principles of environmental science and ecosystem dynamics	K2
CO2	Analyze various types of pollution and their impact on human health and environment	K3
CO3	Apply principles of sustainable development in engineering design and decision-making	K4
CO4	Evaluate renewable energy technologies and waste management systems	K5
CO5	Design environmentally sustainable solutions for engineering problems	K6

Syllabus

UNIT I: Introduction to Environmental Science and Ecology (6 Hours) - Definition, scope and importance of environmental science - Structure and function of ecosystems - Biogeochemical cycles: Carbon, nitrogen, phosphorus, sulfur cycles - Biodiversity and its conservation - Environmental impact assessment principles.

UNIT II: Environmental Pollution and Control (6 Hours) - Air pollution: Sources, effects, and control measures - Water pollution: Industrial and domestic sources, treatment methods - Soil pollution: Causes, effects, and remediation techniques - Noise pollution: Sources, effects, and control - Solid waste management: 3R principles, waste-to-energy.

UNIT III: Sustainable Development and Green Technologies (6 Hours) - Concept of sustainable development and SDGs - Life cycle assessment (LCA) principles - Green building concepts and LEED certification - Cleaner production and industrial ecology - Environmental management systems (ISO 14001)

UNIT IV: Renewable Energy and Climate Change (6 Hours) - Solar energy systems: Photovoltaic and thermal applications - Wind energy: Technology and site assessment - Hydroelectric and geothermal energy systems - Climate change: Causes, effects, and mitigation strategies - Carbon footprint and carbon trading mechanisms

UNIT V: Environmental Regulations and Case Studies (6 Hours) - Environmental laws and regulations in India - Environmental clearance procedures - Corporate environmental responsibility - Case studies of environmental disasters and lessons learned - Future trends in environmental technology

Text Book

1. G. Tyler Miller Jr., "Environmental Science: Working with the Earth", Cengage Learning, 2019
2. C. Anil Kumar, "Environmental Science and Engineering", PHI Learning, 2018
3. Benny Joseph, "Environmental Science and Engineering", Tata McGraw-Hill, 2017

Reference Book & Web Resources

6. Richard T. Wright, "Environmental Science: Toward a Sustainable Future", Pearson, 2017
7. Daniel B. Botkin, "Environmental Science: Earth as a Living Planet", Wiley, 2018
8. Central Pollution Control Board - www.cpcb.nic.in
9. Ministry of Environment and Forests - www.moef.gov.in
10. UN Environment Programme - www.unep.org
11. NPTEL Environmental Science Courses - nptel.ac.in

Mapping with Programme Outcomes

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

Assessment Methodology	Assessment Tools	Marks
Cognitive domain (Knowledge & Understanding)	CAT - I CAT - 2 Model Examinations	25
Affective domain (Reflection)	Group discussions on sustainability issues. Debates on case studies.	05
Behavioral domain (Application & Practice)	Field visit reports	05
Attendance		05
Total		40

SEMESTER-II

25UMAT21	DIFFERENTIAL EQUATIONS AND TRANSFORMS

Category	L	T	P	Credit
BS	3	1	0	4

Prerequisite : Nil

Preamble/ Course Objective

- To introduce mathematical tools to solve first order differentiation equations.
- To gain knowledge of problem-solving techniques of PDE.
- To understand concept of the Laplace transform.
- To inculcate the computation knowledge in Laplace transforms.
- To acquaint with Fourier Transform techniques used in a wide variety of situations involving functions that are not necessarily periodic.

Course Outcome

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

CO1	Solve higher order differential equations	K3
CO2	Formulate and solve various types of partial differential equations	K3
CO3	Apply Laplace transforms and initial and final value theorems to solve engineering problems involving step, impulse and periodic functions.	K3
CO4	Apply Laplace transforms to solve ordinary differential equations with constant coefficients and simultaneous ordinary differential equations	K3
CO5	Apply Fourier transform techniques, including Fourier integral theorem, properties of Fourier transforms, convolution, and Parseval's identity	K3

Syllabus

UNIT I ORDINARY DIFFERENTIAL EQUATIONS 12

Differential Equations (Higher order): Linear differential equations of higher order – with constant coefficients, the operator D, Euler 's linear equation of higher order with variable coefficients - simultaneous linear differential equations, solution by variation of parameters method.

UNIT II PARTIAL DIFFERENTIAL EQUATIONS 12

Formation of partial differential equations- Solutions of standard types of first order partial differential equations- Lagrange's linear equation- Linear partial differential equations of second and higher order with constant coefficients of both homogeneous and non-homogeneous types.

UNIT III LAPLACE TRANSFORM 12

Existence conditions-Transforms of elementary functions- Properties, Transform of unit step function and unit impulse function -Transforms of derivatives and integrals- Transforms of Periodic Functions- Initial and final value theorems.

UNIT IV INVERSE LAPLACE TRANSFORM 12

Inverse Laplace Transforms – Properties, Convolution theorem, Application - Solution of ordinary differential equations with constant coefficients -Solution of simultaneous ordinary differential equations.

UNIT V FOURIER TRANSFORM 12

Fourier Integral theorem (statement only), Fourier transform and its inverse – Properties, Fourier sine and cosine transform - Properties, Convolution and Parseval's identity.

TOTAL PERIODS: 60

Text Book

1. Veerarajan. T, "Transforms and Partial Differential Equations", Tata McGraw Hill Education Pvt.Ltd., New Delhi, Second reprint, 2012.

2. Grewal. B.S, "Higher Engineering Mathematics", 43rd Edition, Khanna Publishers, Delhi, 2015.

Reference Book & Web Resources

1. Grewal B.S., "Higher Engineering Mathematics", Khanna Publishers, New Delhi, 43rd Edition, 2015.
2. Ramana B.V., "Higher Engineering Mathematics", Tata McGraw-Hill, New Delhi, 2010.
3. Bali N.P and Manish Goyal., "A Text Book of Engineering Mathematics", Laxmi Publications(P) Ltd, 2011.
4. Erwin Kreyszig, "Advanced Engineering Mathematics", John Wiley & Sons, New Delhi, 9th Edition, 2011.
5. Ray Wylie. C and Barrett. L. C, "Advanced Engineering Mathematics" Tata Mc Graw Hill EducationPvt Ltd, 6th Edition, New Delhi, 2012.

Online Courses/NPTEL/SWAYAM:

1. https://nptel.ac.in/courses/111106139
2. https://nptel.ac.in/courses/111101153
3. https://nptel.ac.in/courses/111107119

Mapping with Programme Outcomes

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	3	2	2	2	-	-	-	-	1	-	1	-	-	-
CO2	3	2	2	2	-	-	-	-	1	-	1	-	-	-
CO3	3	2	2	2	-	-	-	-	1	-	1	-	-	-
CO4	3	2	2	2	-	-	-	-	1	-	1	-	-	-
CO5	3	2	2	2	-	-	-	-	1	-	1	-	-	-

Assessment Methodology	Assessment Tools	Marks
Test		25
Problem Based Assignment / Mind Mapping / Quiz	Google Classroom / MS/Kahoot	5
Visualization Projects(Wolfram Alpha, GeoGebra&Kahoot,)	Demo and Viva	5
Attendance		5
Total		40

25UMET22	Engineering Mechanics

Category	L	T	P	Credit
ES	3	1	0	4

Prerequisite: Nil

Preamble/ Course Objective:

1	To apply the fundamental concepts in determining the effect of forces on a particle.
2	To Make use of various principles in the determination of effect of forces in a rigid body
3	To understand the concepts of centroid, moment of inertia and mass moment of inertia
4	To Solve problems in static friction and forces acting on the trusses
5	To understand the dynamics of particles and rigid bodies

Course Outcome

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

CO1	Apply the Fundamental concepts of Mechanics and operation of forces to solve equilibrium of particles in 2D and 3D.	K3
CO2	Apply Varignon's theorem to equilibrium of rigid bodies in 2D & 3D.	K3
CO3	Apply the concepts of force system in practical applications.	K3
CO4	Evaluate the centroid, moment of inertia and mass moment of inertia of composite plane area and sections.	K3
CO5	Apply the concepts of dynamics in particles and rigid bodies.	K3

UNIT-I **STATICS OF PARTICLES** **(12)**

Introduction – Units And Dimensions – Laws of Mechanics – Newton's Laws -lami's Theorem- Parallelogram, Triangular Law and Polygon Law of Forces principle of Transmissibility - Vectorial Representation of Forces –

Fundamental Vector Operations of Forces – Free Body Diagram – Equilibrium of a Particle in 2 D – Forces in Space – Equilibrium of a Particle in Space – Equivalent Systems of Forces.

UNIT-II **STATICS OF RIGID BODIES** **(12)**

Moments and Couples – Moment of a force about a point and about an axis – Vectorial representation of moments and couples – Scalar components of a moment – Varignon‟s theorem –Single equivalent force - Free body diagram – Types of supports and their reactions - Equilibrium of Rigid bodies in 2Dand 3D

UNIT-III **APPLICATION OF FORCE SYSTEM** **(12)**

Friction Force: Types of Friction - Laws of Coulomb Friction – Simple Contact Friction - Two Bodies in Contact - Ladder Friction. Analysis of trusses by method of joints.

UNIT-IV **PROPERTIES OF SURFACES** **(12)**

Centroid of areas – simple and composite areas - Theorem of Pappus and Guldinus – Centre of mass– simple and composite volumes - Moment of inertia - simple and composite areas – Parallel axis theorem and perpendicular axis theorem - Polar moment of inertia - Radius of gyration – Product of inertia - Mass moment of inertia of simple solids.

UNIT-V **DYNAMICS OF PARTICLES AND RIGID BODIES** **(12)**

Displacement, Velocity and Acceleration – Relative Motion -Curvilinear Motion - Newton's Laws of Motion – D' Alembert's Principle, Work Energy Principle - Impulse and Momentum – Impact of Elastic Bodies. Rigid Body Motion - Translation and Rotation – General Plane Motion of Simple Rigid Bodies.

TEXT BOOKS:	
1	Rajasekaran S and Sankarasubramanian G., “Engineering Mechanics Statics and Dynamics”, 3rd Edition, Vikas Publishing House Pvt. Ltd., 2017.
2	Beer, F.P and Johnston Jr. E.R., “Vector Mechanics for Engineers (In SI Units): Statics and Dynamics”, 12th Edition, Tata McGraw-Hill Publishing company, New Delhi (2019)
Reference Book & Web Resources	
1	Bhavikatti, S.S and Rajashekarappa, K.G., “Engineering Mechanics”, New Age International (P) Limited Publishers, 2019.
2	Hibbeller, R.C and Ashok Gupta, “Engineering Mechanics: Statics and Dynamics”, 14th Edition, Pearson Education 2017.
3	Kottiswaran. N, Engineering Mechanics (Statics and Dynamics), Sri Balaji Publications, Erode
4	Dubey, N.H, “Engineering Mechanics – Statics and Dynamics”, McGraw Hill Education (India) Pvt Ltd.
WEB REFERENCES:	
1	https://nptel.ac.in/courses/112/105/112105164/
2	https://nptel.ac.in/courses/112/103/112103109

Mapping with Programme Outcomes													
COs	**PO1**	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**	**PO11**	**PSO1**	**PSO2**
CO1	3	2	3	1		2	1		1		1	1	1
CO2	3	2	3	1		2	1		1		1	1	1
CO3	3	2	3	1		2	1		1		1	1	1
CO4	3	2	3	1		2	1		1		1	1	1
CO5	3	2	3	1		2	1		1		1	1	1

Assessment Methodology	**Assessment Tools**	**Marks**
Test	Pen & paper	25
Problem based Assignment	Google form	5
MCQ	Online Quiz	5
Attendance		5
Total		40

25UEET23	APPLIED ELECTRICAL, ELECTRONICS AND INSTRUMENTATION ENGINEERING

Category	L	T	P	Credit
ES	3	0	0	3

Prerequisite : Nil

Course Objective:

• To highlight the plausible implications of such a holistic understanding in terms of ethical human conduct, trustful, mutually fulfilling human behaviour, and mutually enriching interaction with Nature.

Course Outcome

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

CO1	Understand holistic vision of life.	K2
CO2	Enhance socially responsible behavior.	K2
CO3	Understand the responsibility of environmental work.	K2
CO4	Understand the Competence and Capabilities for Maintaining Health and Hygiene.	K2
CO5	Appreciate the aspiration for excellence (merit) and gratitude for all.	K2

Preamble/ Course Objective:

Students will be able to:

- Understand the fundamental concepts of electrical circuits and apply network laws to analyze them.
- Learn the working principles and applications of electrical machines and power systems.
- Gain basic knowledge of semiconductors, electronic devices, and analog circuits.
- Understand digital electronics and apply Boolean logic to design simple digital systems.

Introduce the concepts of instrumentation and transducers used in measurement systems across industries.

Course Outcome

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

CO1	Analyze DC and AC electrical circuits using Ohm's law, Kirchhoff's laws, and basic circuit analysis techniques	K3
CO2	Explain the working principles of transformers, motors, and the structure of power systems	K2
CO3	Describe the functioning of basic semiconductor devices and analog electronic circuits.	K2

CO4	Apply logic gates and Boolean algebra to design and analyze simple digital circuits	K3
CO5	Identify appropriate sensors and measurement instruments for physical quantities used in industrial applications	K3

SYLLABUS

Unit I: Fundamentals of Electrical Engineering
Ohm's Law, Kirchhoff's Laws - Mesh and Nodal Analysis - Introduction to AC circuits: RMS, Average value, Power Factor - Single-phase and Three-phase systems – Star and Delta connections-Power and Energy measurement using wattmeter

Unit II: Electrical Machines and Power Systems
Transformers: Construction, Principle, EMF equation - DC Machines: Working of DC generator and motor (brief) - Induction Motors: Construction and Principle - Basics of Power Generation, Transmission, and Distribution.

Unit III: Fundamentals of Electronics Engineering
Semiconductor Basics: Intrinsic & Extrinsic semiconductors - Diodes: PN junction diode, Zener diode and their applications - BJT and FET: Operation and characteristics (qualitative) - Rectifiers and Voltage Regulation

Unit IV: Digital Electronics
Number Systems: Binary, Decimal, Hexadecimal - Logic Gates: AND, OR, NOT, NAND, NOR, XOR - Boolean Algebra and Simplification - Basic Combinational Circuits: Half Adder, Full Adder, Multiplexer - Introduction to Microcontrollers (e.g., 8051 or Arduino basics)

Unit V: Instrumentation and Measurements
Measurement Systems: Functional Elements - Transducers: Types, Selection criteria - Measurement of Physical Parameters: Temperature, Pressure, Displacement, Flow Sensors in Industrial Applications - Basic concepts of Data Acquisition and PLCs

Text Book

1. Basic Electrical Engineering, D. P. Kothari and I. J. Nagrath – Tata McGraw Hill – 2010
2. Basic Electrical, Electronics and Instrumentation Engineering, R. Muthusubramanian, S. Salivahanan, K.A. Muraleedharan – Tata McGraw Hill – 2010
3. Applied Electronics, R. S. Sedha – S. Chand Publishing – 2008
4. Electronic Devices and Circuits, David A. Bell – Oxford University Press – 2010
5. Electronic Instrumentation, H. S. Kalsi – Tata McGraw Hill – 3rd Edition – 2010

Reference Book

1. **Fundamentals of Electrical Engineering,** Leonard S. Bobrow – Oxford University Press – 2nd Edition – 2011
2. **Electrical and Electronic Technology,** Edward Hughes, John Hiley, Keith Brown, Ian

McKenzie Smith – Pearson Education – 10th Edition – 2012
3. **Digital Principles and Applications,** Donald P. Leach, Albert Paul Malvino – Tata McGraw Hill – 7th Edition – 2011
4. **Measurement Systems: Application and Design**, Ernest O. Doebelin – McGraw Hill – 5th Edition – 2004
5. **Transducers and Instrumentation,** D.V.S. Murty – PHI Learning – 2nd Edition – 2008

Web Resources

1. NPTEL Course on Basic Electrical Technology
   https://nptel.ac.in/courses/108/105/108105053
2. NPTEL Course on Basic Electronics
   https://nptel.ac.in/courses/117/106/117106086
3. Tutorials Point – Basic Electrical and Electronics
   https://www.tutorialspoint.com/basic_electrical_engineering/index.htm
4. All About Circuits – Electronics Textbook
   https://www.allaboutcircuits.com/textbook
5. Electronics-Tutorials Online Reference
6. https://www.electronics-tutorials.ws/

Mapping with Programme Outcomes

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO 9	PO10	PO11	PSO1	PSO2
CO1	3	2	2	2	2	-	-	-	-	-	1	3	-
CO2	3	2	2	2	2	-	-	-	-	-	1	3	-
CO3	3	2	2	2	2	-	-	-	-	-	1	3	-
CO4	3	3	3	2	3	-	-	-	-	-	2	3	-
CO5	3	2	2	3	3	-	-	-	-	-	2	3	-

Assessment Methodology	Assessment Tools	Marks
Test		25
MCQ unit wise 10 questions	Moodle / Google form	5
Virtual lab based assignment	Demo and viva	5
Attendance		5
Total		**40**

25UMET24	MACHINING PROCESSES

Category	L	T	P	Credit
PC	3	0	0	3

Prerequisite: Nil

Preamble/ Course Objective

- Introduce the fundamentals of turning operations on lathes, including machine types, work holding devices, machining parameters, and calculation of material removal rate and machining time. Familiarize students with drilling and allied operations.
- Provide insight into basic machining operations using shaper, planer, and slotting machines, including their types and specific operations.
- Explore advanced machining operations, with a focus on milling machines, their classifications, operations.
- Explore surface finish processes, classifications, and grinding techniques to achieve desired surface quality using appropriate machines and parameters.
- Develop an understanding of cutting tools and cutting fluids, covering tool materials, geometry; wear mechanisms, tool life criteria, and the selection and properties of cutting fluids.

Course Outcome

CO1	Understand and apply the fundamentals of turning operations on lathesand describe various drilling machines and allied operations such as boring	K2
CO2	Explain the working principles and operations of basic machining tools including shapers	K1
CO3	Demonstrate knowledge of milling operations and advanced	K2
CO4	Explain the working principles of surface finishing processes	K3
CO5	Analyze cutting tool materials	K3

Syllabus

UNIT-I (09)

TURNING, DRILLING AND ALLIED OPERATIONS Lathe–Types, Designation, Work holding devices–Cutting Speed, Feed and Depth of Cut, MRR-Operations, Machining Time. Drilling Machines - Types, Operations, Machining Time - Boring, Reaming and Tapping (Definition of operations only)

UNIT-II (09)

BASIC MACHINING OPERATIONS Shaper, Types, Shaping Operations, Planner, Types, Planning Operation, Slotting Machine Operations.

UNIT-III (09)

ADVANCED MACHINING OPERATIONS Milling Machine, Types, Milling Process, Milling Operations, MRR, Machining Time. Gear Hobbing.

UNIT-IV (09)

SURFACE FINISHING PROCESS Surface Finish and Surface Roughness Honing – Lapping – Super finishing – Abrasive Belt Finishing – Mass Finishing Processes – Polishing–Buffing. Grinding: Types of grinding–Types of Grinding machines–Size and specification of Grinding machines-Work Holding Devices–Grinding Operations-Grinding Fluids–Grinding

UNIT-V **(09)**

CUTTING TOOLS/FLUIDS Tool Materials, Nomenclature and Geometry of Cutting Tools, Tool wear Mechanisms, Tool Life–Tool Life Criteria. Cutting Fluids-Categories, Desirable Properties, Selection of Cutting Fluids.

Text Book

1.B.S.NagendraParashar,R.K.Mittal."ElementsofManufacturingProcesses"-Prentice-Hall of India Pvt. Ltd; New Delhi -1, latest edition.

2.R.K.Singal,MridulSingal,RishiSingal."Fundamentals of Machining and Machine Tools"-I.K. International Publishing Home Pvt.Ltd;New Delhi, latest edition.

Reference Book

1. Roy.A.Lindberg,"ProcessandMaterialsofManufacture",PrenticeHallIndiaPvt. Ltd, latest edition.
2. Machining: Fundamentals and Recent Advances" by João Paulo Davim, latest edition.
3. Modern Machining Processes by P. Pandey and H. Shan latest edition.
4. Manufacturing Engineering and Technology by SeropeKalpakjian and Steven R. Schmid, latest edition.
5. A Textbook of Manufacturing Technology by R.K. Rajput.Latest edition.

Web Resources

2. **https://onlinecourses.nptel.ac.in/noc23_me16/preview**
3. **https://onlinecourses.nptel.ac.in/noc23_me99/preview**

Mapping with Programme Outcomes

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PSO1	PSO2
CO1	2	2	-	-	3	-	-	-	-	2	-	-	2
CO2	2	2	-	2	3	-	-	-	-	-	-	-	2
CO3	2	-	2	-	2	-	-	-	-	-	-	-	2
CO4	2	3	3	2	2	-	-	-	-	-	-	-	2
CO5	2	3	-	-	3	2	2	-	-	-	-	-	2

Assessment Methodology	Assessment Tools	Marks
Knowledge & Understanding	CAT-1 CAT-2	10
Assignments		10
Seminar / Presentation	Demo	5
Model Examination	For all 5 Units	10
Attendance		5
Total		**40**

25UCSI27	PROBLEM SOLVING USING PROGRAMMING LANGUAGE	Category	L	T	P	Credit
		ES	1	0	2	2

Course Prerequisite:

- Programming in C
- Web Technology

Course Objective:

- To impart the knowledge of Python basic structure, components, object storage, exception handling, SQL and Web design.

Course Outcome

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

CO1	Understand Python's basic concepts, data types, variables, and control statements.	Understand
CO2	Understand the components of Python programming and storage statements.	Understand
CO3	Understand the functions, modules, packages, and interfaces in Python.	Understand
CO4	Understand the exception handling and Sql	Understand
CO5	Develop a web application using HTML	Apply

SYLLABUS

UNIT I INTRODUCTION (9)

Basic Hardware of Computers – Python Programming-History - Features -basic syntax - Data types - variables - Manipulating Numbers - Text Manipulations - Control Statements- Python Built-in Functions.

UNIT II COMPONENTS OF PYTHON PROGRAMMING (9)

Operator Basics - Numbers - String - List - Tuples - Dictionaries - Files - Object Storage - Type Conversion - Type Comparison - Statements – Assignments.

UNIT III FUNCTIONS AND PACKAGE (9)

Classes and Objects - creating a class, class methods, class inheritance. Functions Definition and Execution - Arguments - Return Values - Advanced Function Calling - Modules - Importing modules – Packages and Interfaces - Creating a module.

UNIT IV EXCEPTION HANDLING AND SQL (9)

Exception Handling in Python- SQL-DDL, Insert/Delete/Update, Simple Queries (select/ project/ join/ aggregate queries), Complex queries (With Clause, Nested Sub queries, Views)

UNIT V HTML (9)

HTML – Form Elements, Input types and Media elements - CSS3, Selectors, Box Model, Backgrounds and Borders, Text Effects, Animations, Multiple Column Layout, User Interface

TOTAL PERIODS: 45

TEXTBOOKS:

1. Martin C. Brown, “The Complete Reference - Python”, Tata McGraw Hill Indian Edition, 2010. (UNIT 1-3)
2. Krishnan, “Database Management Systems”, McGraw Hill Higher Education, 3rd Edition, 2002(Unit 4)
3. Robin Nixon, “Learning PHP, MySQL, JavaScript, CSS & HTML5”, O’Reilly

publishers, 3rd Edition, 2014(Unit 5)

REFERENCES

1. Wesley J Chun, -Core Python Applications Programming, Prentice Hall, 2012.
2. Eric Matthes, "A Hands-On, Project-Based Introduction to Programming", 2nd Edition,2019.
3. James F. Kurose, "Computer Networking: A Top-Down Approach", Pearson Education, 6th Edition, , 2012
4. Paul Deitel, Harvey Deitel, Abbey Deitel, "Internet & World Wide Web - How to Program", Pearson Education, 5th Edition, 2012
5. Silberschatz, Korth and Sudarshan, "Database System Concepts", McGraw-Hill (Indian Edition released), 7th Edition, 2021

ONLINE/ NPTEL COURSES:

1. Programming, Data Structures and Algorithms using Python- https://nptel.ac.in/courses/106106145
2. The Joy of Computing using Python-https://nptel.ac.in/courses/106106182
3. Python for Data Science- https://nptel.ac.in/courses/106106212

PRACTICE EXERCISES:

1. Identify and solve simple real-life/scientific/technical problems. (Electricity Billing, Retail shop billing, Sin series, etc).
2. Python programming using simple statements and expressions (exchange the values of two variables, circulatethe values of n variables, distance between two points).
3. Scientific problems using Conditionals and Iterative loops. (Number series, Number Patterns, pyramid pattern)
4. Implementing real-time/technical applications using Lists and tuples.
5. Implementing real-time/technical applications using Sets and dictionaries. (Language, components of an automobile, Elements of a civil structure, etc.- operations of Sets &Dictionaries)
6. Implementing programs using Functions. (Factorial, largest number in a list, area of a shape)
7. Implement DDL and DML Commands. Platform can be Oracle.
8. Implement View.
9. Creation of college website using HTML
10. Implementation of various types of CSS.

CO PO Mapping

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11
1	3	2	2	1	3	-	-	1	1	-	3
2	3	2	2	1	3	-	-	1	1	-	3
3	3	2	2	1	3	-	-	1	1	-	3
4	3	2	2	1	3	-	-	2	1	-	3
5	3	3	3	2	3	-	-	3	1	3	3

Assessment Methodology	Assessment Tools	Marks
Theory Test		15
Coding assignments	Online submission	10
Mini project implementation	Code demo and documentation	10
Model Practical		10
Attendance		5
Total		50

25UEEP26	ELECTRICAL AND ELECTRONICS ENGINEERING LAB

Category	L	T	P	Credit
ES	0	0	2	1

Prerequisite : Nil

Preamble/ Course Objective:

The objective of the Basic Electrical and Electronics Engineering Lab is :

- To provide foundational knowledge of electrical and electronic components and their behavior in basic DC and AC circuits.
- To develop practical skills in operating and testing electrical machines such as transformers, DC motors, and induction motors under load conditions.
- To enable students to analyze and verify the characteristics of semiconductor devices such as diodes, rectifiers, and Zener diodes.
- To introduce digital logic circuits and enhance understanding of number systems, logic gates, and combinational circuits using hands-on implementation.
- To expose students to transducers and instrumentation concepts for measurement of physical quantities and amplification of low-level signals.

Course Outcome

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

CO1	Apply Ohm's Law and Kirchhoff's Laws to verify basic electrical circuit behaviour.	K3
CO2	Analyze the performance characteristics of single-phase transformers, DC machines, and induction motors under varying load conditions.	K4
CO3	Demonstrate the VI characteristics of PN junction and Zener diodes and construct rectifier circuits with and without filters.	K3
CO4	Implementation of basic digital logic circuits including logic gates, half adder and full adder using discrete components.	K3
CO5	Analyze the working of transducers like LVDT and instrumentation amplifiers for measurement of physical parameters.	K4

SYLLABUS – LIST OF EXPERIMENTS (30)

1. Verification of Ohm's Law and Kirchhoff's Laws (KVL & KCL).
2. Measurement of three phases power using two wattmeter method.
3. Load test on single phase transformer.
4. Load test on DC shunt motor.
5. Open circuit characteristics of DC Shunt generator.
6. Load test on single phase induction motor.
7. VI Characteristics of PN Junction Diode and Zener Diode.
8. Half-Wave and Full-Wave Rectifiers with and without Filter.
9. Verification of Logic Gates and Implementation of Boolean Expressions.

10. Implementation of Half Adder and Full Adder using Logic Gates.
11. Gain Measurement of an Instrumentation Amplifier.
12. Measurement of displacement using LVDT.

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PSO1	PSO2
CO1	3	2	1	1	1	-	-	-	-	2	-	2	-
CO2	3	3	2	2	2	-	-	-	-	2	1	2	-
CO3	3	2	1	2	2	-	-	-	-	2	1	2	-
CO4	3	2	3	2	2	-	-	-	-	2	1	2	-
CO5	3	3	3	3	3	-	-	-	-	2	1	2	-

Assessment Methodology	Assessment Tools	Marks
Laboratory Conduction	Observation	10
Record work		10
Model exam		15
Viva		5
Virtual lab assignment	Review	10
Attendance		10
Total		60

25UMEP27	MACHINING PROCESS LAB

Category	L	T	P	Credit
PC	0	0	2	1

Prerequisite: Manufacturing Process

Preamble/ Course Objective : The objective of this course is to provide students with hands-on experience and theoretical knowledge of essential manufacturing processes involving both conventional and modern machine tools.

Course Outcome

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

CO1	Demonstrate the ability to perform basic lathe operations such as plain turning, facing, step turning, chamfering, grooving, knurling, taper turning, and thread cutting.	**K3**
CO2	Identify and describe the functions of various machine tools such as lathe, shaper, milling, grinding	**K3**
CO3	Operate shaping, milling, grinding, and hobbing machines to manufacture mechanical components such as cubes, contours, cylindrical parts, and spur gears.	**K3**
CO4	Develop and simulate CNC part programs to produce components with specified dimensions.	**K3**
CO5	Design simple machine elements using CAD tools and fabricate them using 3D printing technology.	**K3**

Syllabus (30)

Lathe:

- Plain turning and facing
- Step turning, grooving, chamfering and knurling
- Taper turning and external thread cutting using lathe

Shaping Machine:

- Cube shaping, V-Shaping

Milling Machine:

- Spline , key way milling
- Contour milling using vertical milling machine

Gear Cutting:

- Spur gear cutting in Hobbing machine

Grinding Machine:

- Cylindrical grinding

3D Printing:

- Designing and Printing of Machine Elements

Text Book

- B.S.NagendraParashar&R.K.Mittal – Elements of Manufacturing Processes, Prentice Hall India Pvt. Ltd.,2011.
- R.K.Singal, MridulSingal, Rishi Singal. “Fundamentals of Machining and MachineTools”-I.K.InternationalPublishingHomePvt.Ltd;NewDelhi,2008.

Reference Book & Web Resources

- Department of Mechanical Engineering "Manufacturing Process Laboratory Manual", MVIT, 2023
- Kalpakjain S, Schimd S, “Manufacturing Engineering and Tech”, Pearson Education, 7th edition, New Delhi, 2018
- Machining: Fundamentals and Recent Advances" by João Paulo Davim, latest edition. 2008
- Roy.A.Lindberg, “Process and Materials of Manufacture”, Prentice Hall India Pvt.Ltd,2006.
- https://openoregon.pressbooks.pub/manufacturingprocesses45

Mapping with Programme Outcomes

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PSO1	PSO2
CO1	3	-	3	-	2	-	-	-	1	1	-	2	-
CO2	2	1	-	-		-	-	-	-	1	-	2	-
CO3	3	-	3	-	2	-	-	-	1	-	-	2	-
CO4	3	2	3	2	3	-	-	-	1	1	2	3	-
CO5	3	2	3	3	3	-	-	-	1	1	3	3	-

Assessment Methodology	Assessment Tools	Marks
Laboratory Conduction	Observation	20
Record work		10
Model exam		15
Viva		5
Attendance		10
Total		60

25UGEP28	FABRICATION LAB

Category	L	T	P	Credit
ES	-	-	2	1

Prerequisite:

- Basic understanding of **forces**, **energy**, **motion**, and **electricity**.
- Exposure to **basic fitting**, **carpentry**, and **sheet metal** work.

Preamble/ Course Objective

1. To practice the usage of various tools towards assembly and dis-assembly of different items / equipment.
2. To make simple part / component using welding processes.
3. To train on the basic wiring practices of boards, machines, etc.
4. To provide a hands-on experience on the use of electronic components, equipment, sensors and actuators.
5. To expose to modern computer tools and advanced manufacturing / fabrication processes.

Course Outcome

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

CO1	Assemble and dis-assemble various items / equipment.	K3
CO2	Make simple parts using suitable welding processes.	K3
CO3	Setup wiring of distribution boards, machines, etc.	K3
CO4	Utilize the electronic components to fabricate a simple equipment, aided with sensors and actuators.	K3
CO5	Assemble and dis-assemble various items / equipment.	K3

Syllabus

LIST OF ACTIVITIES

(A). Dis-assembly & Assembly Practices

i) Tools and its handling techniques.

ii) Dis-assembly and assembly of home appliances – Grinder Mixer Grinder, Ceiling Fan, Table Fan & Washing Machine.

iii. Dis-assembly and assembly of Air-Conditioners & Refrigerators.

iv. Dis-assembly and assembly of a Bicycle, IC Engines.

(B). Metal Joining

i. Welding Procedure, Soldering and Brazing & Safety Measures.

ii. Power source of Arc Welding – Gas Metal Arc Welding & Gas Tungsten Arc Welding processes.

iii. Hands-on session of preparing base material & Joint groove for welding.

iv. Hands-on session of Carbon Steel & Stainless Stell plates / pipes, for fabrication of a simple part.

(C). Electrical Wiring Practices

I. Electrical Installation tools, equipment & safety measures.

II. Hands-on session of basic electrical connections for Fuses, Miniature Circuit Breakers and Distribution Box,

III. Hands-on session of electrical connections for Lightings, Fans, Calling Bells.

IV. Hands-on session of electrical connections for Motors & Uninterruptible Power Supply.

(D). Electronics Components / Equipment Practices

i. Electronic components, equipment & safety measures.

ii. Dis-assembly and assembly of Computers.

iii. Hands-on session of Soldering Practices in a Printed Circuit Breaker.
iv. Hands-on session of Bridge Rectifier, Op-Amp and Tran impedance amplifier.
v. Hands-on session of integration of sensors and actuators with a Microcontroller.
vi. Demonstration of Programmable Logic Control Circuit.

(E). Contemporary Systems

i. Demonstration of Solid Modeling of components.
ii. Demonstration of Assembly Modeling of components.
iii .Fabrication of simple components / parts using 3D Printers.
iv. Demonstration of cutting of wood / metal in different complex shapes using Laser Cutting Machine.

Text Book

1. Stephen Christena, Learn to Weld: Beginning MIG Welding and Metal Fabrication Basics, Crestline Books,latest edition.
2. H. Lipson, Fabricated - The New World of 3D Printing, Wiley, latest edition.

Reference Book & Web Resources

1. Code of Practice for Electrical Wiring Installations (IS 732:2019)
2. A.S. Sedra and K.C. Smith, Microelectronic Circuits, Oxford University Press, 7th ed. (Indian edition).
3.Fabrication and Welding Engineering by Roger Timings, latest edition.
4.Welding and Metal Fabrication, International Edition by Larry Jeffus, latest edition.
5.Introduction to Microelectronic Fabrication, Volume 5 by Richard Jaeger, latest edition.

Mapping with Programme Outcomes													
COs	**PO 1**	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**	**PO11**	**PSO1**	**PSO2**
CO1	3	2	2	-	3	2	-	1	2	2	-	2	-
CO2	3	2	3	-	3	3	2	2	2	2	2	2	-
CO3	3	2	2	-	3	3	-	1	2	2	2	2	-
CO4	3	3	2	2	3	2	-	2	2	2	-	3	-
CO5	3	2	3	2	3	-	2	2	2	2	2	3	-

Assessment Methodology	**Assessment Tools**	**Marks**
Cognitive domain (Knowledge & Understanding)	Model Examinations	20
Affective domain (Reflection)	Lab Records & Observation	20
Behavioral domain (Application & Practice)	Hands-on Practice (Dis-assembly, Welding, Wiring, Soldering, 3D Printing)	15
Attendance		05
Total		60

25UPCE21	COMMMUNICATION SKILLS

Category	L	T	P	Credit
SEC	0	0	2	0

Preamble/ Course Objective: Ability to plan and manage their career paths effectively. It focuses on developing self-assessment, goal setting, and decision-making skills. Students will learn to research career options and align them with personal strengths and values.

Prerequisite: Carrier Development Skills

Course Outcome

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

CO1	Develop sustained motivation and enhance interpersonal skills for effective communication and teamwork.
CO2	Build active listening and conversation skills essential for collaborative and respectful team interactions
CO3	Strengthen reading comprehension and writing clarity through critical analysis and audience-focused expression.
CO4	Improve public speaking and presentation skills while fostering self-assessment through SWOT analysis.
CO5	Promote team collaboration and communication through practical activities like debates and group problem-solving

Syllabus

UNIT 1: 10 Hrs

Motivation –II: Intrinsic vs. Extrinsic Motivation- Goal Setting and Achievement -

Building and Sustaining Motivation

Interpersonal skills: Effective Communication - Active Listening - Conflict Resolution - Teamwork and Collaboration

UNIT 2: **10Hrs**

Listening Skills: Roles and Responsibilities in a Team - Building Trust and Respect Among Team Members – Effective Team Communication

Conversation skills: Starting and Maintaining a Conversation - Non-Verbal Communication Cues- Active Listening and Responding.

UNIT 3: 10 Hrs

Reading Skills: Skimming and Scanning Techniques – Critical reading and Interpretation

Writing Skills:Grammar and Syntax - Clarity and Conciseness- Audience Awareness

UNIT 4: 10 Hrs

Presentation Speaking Skills: Speech Structure and Organization – Verbal Delivery Techniques

Public speaking skills: Confidence and overcoming Anxiety –Effective message Delivery

SWOT Analysis: Identifying Internal Factors – Analyzing External Factors

UNIT 5: 8 Hrs

Team Building: Roles and Responsibilities in a team – Communication and Trust – Conflict resolution and Problem Solving

Active Sessions: Debate – Picture Connector

Text Book

1. Soft skills for Managers by Dr. T. KALYANA CHAKRAVATHI
2. Personal Development and Soft Skills by BARUN K MITRA, Oxford Higher Education

Reference Book

1. The Emotionally Intelligent Workplace by DANIEL GOLEMAN.
2. Communication skills and soft skills an integrated approach by E. SURESH KUMAR, P. SREEHARI, J SAVITHRI.
3. Top Talking in English (international communication skills) by CHARLES T. RAJENDRA
4. Soft skills by RAJ LAKSHMI SURYAVANSHI, Gurucool Publishing

Mapping with Programme Outcomes

Cos	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11
CO1:								2	2	2	2
CO2:									3	3	
CO3:										3	
CO4:								2		2	2
CO5:									3	3	

Assessment Methodology	Assessment Tools	Marks
Test 1 (Modules 1-2)	Internal Tests	15
Test 2 (Modules 3-5)	Internal Tests	15

Assessment Methodology	Assessment Tools	Marks
Presentation Skills Demonstration	Practical Assessment	15
Public Speaking and Confidence Assessment	Practical Assessment	10
SWOT Analysis Report	Assignment	10
Active Listening and Conversation Skills Demo	Practical Assessment	10
Team Building Activity and Leadership Role	Project	10
Debate Participation and Performance	Practical Assessment	10
Attendance and Class Participation	Continuous Assessment	5
		100

25UMCC21	IKS IN HUMANITIES AND SOCIAL SCIENCE	Category	L	T	P	Credit
		MCC	0	0	2	0

Course Prerequisite:

- Basic understanding of Indian history and culture

Course Objective:

- This course explores Indian Knowledge Systems in the context of humanities and social sciences, providing students with a deeper understanding of India's intellectual heritage.

Course Outcomes:

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

CO1	Understand the philosophical foundations and methodologies of Indian knowledge systems in the humanities.	Understand
CO2	Analyze Indian contributions to literature, arts, social organization, and governance systems	Analyze
CO3	Apply principles from Indian philosophical traditions to contemporary social and ethical issues	Apply
CO4	Evaluate the relevance and adaptability of traditional knowledge in modern social contexts	Evaluate
CO5	Create connections between ancient wisdom and contemporary challenges in society	Create

Syllabus

UNIT I: Philosophical Foundations of Indian Knowledge Systems (6 Hours) - Darshanas (Schools of Philosophy): Samkhya, Yoga, Nyaya, Vaisheshika, Mimamsa, Vedanta - Epistemology in Indian philosophy: Pramanas (means of knowledge) - Ethics and moral philosophy in Indian traditions - Concept of Dharma, Artha, Kama, and Moksha - Comparative study with Western philosophical traditions

UNIT II: Indian Literary and Artistic Traditions (6 Hours) - Sanskrit literature: Vedas, Upanishads, Puranas, Epics (Ramayana, Mahabharata) - Classical poetry and drama: Kalidasa, Bhartrhari, Bhasa - Regional literature and folk traditions - Indian classical music and dance: Theoretical foundations - Visual arts: Sculpture, painting, and architectural styles - Aesthetics in Indian tradition: Rasa theory and Alamkarashastra

UNIT III: Social Organization and Governance (6 Hours) - Ancient Indian social structure and organization - Varna and Ashrama systems: Historical context and evolution - Village self-governance: Panchayati Raj origins - Arthashastra: Principles of statecraft and administration - Justice system: Dharmashastra and Rajadharma - Economic systems: Trade, agriculture, and crafts

UNIT IV: Educational Systems and Knowledge Transmission (6 Hours) - Gurukula

system: Teacher-student relationship - Ancient universities: Nalanda, Takshashila, Vikramshila - Oral tradition and preservation of knowledge - Women's education in ancient India - Integration of spiritual and material learning - Comparison with modern educational approach

UNIT V: Contemporary Relevance and Applications (6 Hours) - Indian knowledge systems in modern governance - Traditional conflict resolution mechanisms - Environmental consciousness in Indian traditions - Community-based development models - Gender studies: Women in Indian philosophical traditions - Relevance of Indian ethics in corporate governance - Cultural preservation and modernization challenges

LEARNING ACTIVITIES

Research Projects: 1. **Philosophical Analysis Project** - Study of a specific philosophical school - Comparison with contemporary thought - Presentation of findings

2. **Literary Heritage Study**
   - Analysis of classical texts
   - Cultural significance evaluation
   - Creative interpretation through modern media
3. **Social Systems Research**
   - Historical analysis of governance models
   - Contemporary applications study
   - Policy recommendation development
4. **Case Study Analysis**
   - Traditional knowledge applications
   - Success stories and challenges

Future implementation strategies

TEXTBOOKS

1. S. Radhakrishnan, "Indian Philosophy", Oxford University Press, 2008
2. A.L. Basham, "The Wonder That Was India", Rupa Publications, 2017
3. KapilaVatsyayan, "Traditional Indian Art and Culture", Cambridge University Press, 2015

REFERENCE BOOKS

1. Heinrich Zimmer, "Philosophies of India", Princeton University Press, 1989
2. RomilaThapar, "Early India: From the Origins to AD 1300", Penguin Books, 2015
3. K.M. Munshi, "The History and Culture of the Indian People", BharatiyaVidyaBhavan
4. Digital Library of India: https://www.dli.gov.in
5. Sahapedia - Encyclopedia of Indian Culture: https://www.sahapedia.org
6. Indian Council of Historical Research: https://ichr.ac.in

Archaeological Survey of India: https://asi.nic.in

Mapping with Programme Outcomes

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11
CO1	1	1	-	-	1	2	2	2	2	3	3
CO2	2	2	1	1	2	2	2	3	3	3	3

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11
CO3	2	2	2	2	3	3	3	3	3	3	3
CO4	2	2	2	2	3	3	3	3	3	3	3
CO5	3	3	3	3	3	3	3	3	3	3	3

Assessment Methodology	Assessment Tools	Marks
Philosophical Analysis Assignment	Assignment	25
Comparative Study Project (Ancient vs Modern)	Project	20
Literary/Artistic Tradition Presentation	Presentation	20
Heritage Site Visit and Report	Field Work	10
Contemporary Application Case Study	Assignment	15
Attendance and Class Participation	Continuous Assessment	10
Total		100

25UMCC22	HOLISTIC WELLNESS	Category	L	T	P	Credit
		MCC	0	0	1	0

Course Prerequisite

- Nil

Course Objective

- Foundational concepts of holistic wellness, emphasizing the integration of physical, mental, emotional, and Internal well-being. create a balanced lifestyle that promotes overall health and happiness through practical activities.
- Explore advanced techniques in mental, emotional, and spiritual well-being, with an emphasis on creating sustainable wellness habits.

Course Outcome

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

CO1	Understand the basic principles of holistic wellness. Apply strategies for maintaining physical health, including nutrition and exercise	Understand
CO2	Practice mindfulness techniques to enhance mental and emotional well-being.	Analyze
CO3	Develop a personal wellness plan incorporating various aspects of holistic health.	Apply
CO4	Apply advanced techniques in mindfulness, meditation, and stress management.	Evaluate
CO5	develop resilience and adaptability in maintaining wellness. Refine and sustain a personalized holistic wellness plan.	Create

Syllabus

UNIT I INTRODUCTION TO HOLISTIC AND PHYSICAL WELLNESS

Overview of holistic wellness: physical, mental, emotional, and internal health- The importance of balance in overall well-being. Importance of physical activity and exercise- Understanding nutrition and its role in health- Sleep hygiene and its impact on well-being.

Hands-on activity: Self-assessment of current wellness status.Designing a personalized fitness and nutrition plan.

UNIT II: MENTAL AND EMOTIONAL WELLNESS:

Stress management techniques- The role of Yoga, mindfulness and meditation in mental health- Emotional intelligence and its impact on relationships-Music therapy.

Hands-on activity: Practicing Yoga, mindfulness and emotional regulation exercises.

UNIT III: INTEGRATING WELLNESS PRACTICES:

Combining physical, mental, emotional, and Internal wellness practices into daily life - Developing a balanced wellness plan.

Hands-on activity: Creating a comprehensive personal wellness plan.

UNIT IV: EMOTIONAL RESILIENCEAND ADVANCED MINDFULNESS

Deepening mindfulness practices for enhanced mental clarity- Exploring different forms of meditation (e.g., guided, transcendental, movement-based). Building emotional resilience through positive psychology practices- Cognitive-behavioural strategies for managing stress and anxiety.

Hands-on activity: Developing and practicing a resilience toolkit. Daily meditation practice and journaling reflections.

UNIT V: INTERNAL GROWTH AND SUSTAINING WELLNESS PRACTICES:

Exploring the deeper aspects of internal wellness and self-actualization- Reflective practices for discovering life purpose and meaning. Strategies for maintaining wellness habits over the long term- Adapting wellness plans to life changes and challenges-

Hands-on activity: Revising and finalizing a long-term personal wellness plan. Creating a vision board or personal mission statement.

TEXTBOOKS:

1. Jayanna, Krishnamurthy., Science & Practice of Integrative Health & Wellbeing Lifestyle., White Falcon Publishing (2020).
2. Rosenberg, Marshall Bertram., Nonviolent Communication: A Language of Life., Puddle Dancer Press, Encinitas, CA (2015).
3. Patel, Kamlesh. Heartfulness Way: Heart-Based Meditations for Spiritual Transformation, Kamlesh Patel, 2018.

REFERENCE BOOKS

1. B.K.S Iyengar., Yoga: The Path to Holistic Health., Dorling Kindersley Limited, City of Publication (2001)
2.Goleman Daniel., Emotional Intelligence., Bloomsbury India, India, (2021).
3.James Allen., As a Man Thinketh., Maple Press, Noida, (2010)
4.Swami Budhanandha., Will power and its development., AdvaitaAshramaMayavati, Pithoragarh, Himalayas from its Publication Department, Calcutta. (2001)
5.KalderdonAdizesIchak., What Matters in Life: Lessons I Learned from Opening My Heart
., WS Press, Newtown, PA (2023)
6. Jayanna, Krishnamurthy., Science & Practice of Integrative Health & Wellbeing Lifestyle., White Falcon Publishing (2020).
7. Lipton, Bruce., The Biology of Belief 10th Anniversary Edition: Unleashing the Power of Consciousness, Matter & Miracles, Hay House, Carlsbad (2015).

WEB RESOURCES

1. Learning Suryanamskar
2. Yoga for well-being
3. Nutritional Educational contents
4. Introduction to Psychology
5. Guided Meditation
6. Simplified physical exercises instructions
7. Simplified Physical Exercises
8. Life skills and value education
9. James Allen Library

CO PO Mapping

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11
CO1						2		2			
CO2						2					
CO3						2					3

CO PO Mapping											
COs	**PO1**	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**	**PO11**
CO4						2					3
CO5						2					3

Assessment Methodology	**Assessment Tools**	**Marks**
MCQ Test		30
Presentation		20
Activity		20
Assignment		20
Attendance		10
Total		100