

XXXXX	THEORY OF MACHINES	L	T	P	C
(Sub Code)	(B.E. Mechanical Engineering Programmer)	3	0	0	3

OBJECTIVES

- ✓ To study the basic components of mechanisms, analyzing the assembly with respect to the displacement, velocity, and acceleration.
- ✓ To study the basic concepts of toothed gearing and kinematics of gear trains.
- ✓ To analyzing the effects of friction in machine elements.
- ✓ To analyzing the force-motion relationship in components subjected to external forces and standard mechanisms.
- ✓ To analyzing the undesirable effects of unbalances resulting from prescribed motions in mechanism and the effect of dynamics of undesirable vibrations.
- ✓ To understand the new technology and market trend and market size, and various manufacturers.

UNIT - I 9 **KINEMATICS OF MECHANISMS**

Application: Kinematic inversions in NC lathe, shaper and slotting machine.

Mechanisms – Terminology and definitions – kinematics inversions of 4 bar and slide crank chain – kinematics analysis in simple mechanisms – velocity and acceleration polygons– Analytical methods – computer approach – cams – classifications – displacement diagrams - layout of plate cam profiles – derivatives of followers motion – circular arc and tangent cams.

UNIT - II 9 **GEARS AND GEAR TRAINS**

Application: Velocity and acceleration diagram- Diesel Engine.

Spur gear – law of toothed gearing – involute gearing – Interchangeable gears – Gear tooth action interference and undercutting – nonstandard teeth – gear trains – parallel axis gears trains – epicyclic gear trains – automotive transmission gear trains.

UNIT - III 8 **FRICTION IN MACHINE ELEMENTS**

Application: Belts, Rope and chain -Belt and roller conveyers.

Surface contacts – Sliding and Rolling friction – Friction drives – Friction in screw threads – Bearings and lubrication – Friction clutches – Belt and rope drives – Friction aspects in brakes– Friction in vehicle propulsion and braking.

UNIT - IV 7 **FORCE ANALYSIS**

Applications: Gear and Gear trains- wind turbines.

Classification of gears – Fundamental Law of toothed gearing and involute gearing – Length of path of contact and contact ratio - Interference and undercutting - Gear trains – Simple, compound and Epicyclic gear trains.

Applications: Roller follower- Turret lathe.

Static and Dynamic balancing – Balancing of revolving and reciprocating masses – Balancing machines –free vibrations – Equations of motion – natural Frequency – Damped Vibration – bending critical speed of simple shaft – Torsional vibration – Forced vibration – harmonic Forcing – Vibration isolation. (Gyroscopic principles)

UNIT – V1 BUSINESS STATISTICS AND CURRENT TRENDS**5**

Industry Adoption of Robotics - Widespread use of robotic arms with complex kinematic linkages in manufacturing. Integration of IoT in Machines - Real-time monitoring and predictive maintenance of mechanical components. Sustainable Mechanical Systems - Focus on lightweight, energy-efficient, and recyclable materials in kinematics.

TOTAL: 45 PERIODS**COURSEOUTCOMES:**

At the end of the course the students would be able to:

- CO1 Discuss the basics of mechanism.
- CO2 Solve problems on gears and gear trains.
- CO3 Examine friction in machine elements.
- CO4 Calculate static and dynamic forces of mechanisms.
- CO5 Calculate the balancing masses and their locations of reciprocating and rotating masses. Computing the frequency of free vibration, forced vibration and damping coefficient.
- CO6 Understand the impact of robotics, IoT, and sustainable materials on modern kinematic systems.

TEXT BOOKS

1. Uicker, J.J., Pennock G.R and Shigley, J.E., “Theory of Machines and Mechanisms”, Oxford University Press, 2017.
2. Ramamurthi. V, “Mechanics of Machines”, Narosa Publishing House, 3rd edition 2019.

REFERENCE BOOKS

1. AmitabhaGhosh and Asok Kumar Mallik, “Theory of Mechanisms and Machines”, Affiliated East-West Pvt. Ltd., 1988.
2. Rao.J.S. and Dukkupati.R.V. “Mechanism and Machine Theory”, New Age International Pvt. Ltd., 2nd edition, 2014.
3. Rattan, S.S, “Theory of Machines”, McGraw-Hill Education Pvt. Ltd., 5th edition 2019.
4. Robert L. Norton, Kinematics and Dynamics of Machinery, Tata McGraw-Hill, 2013.
5. Wilson and Sadler, Kinematics and Dynamics of Machinery, Pearson, 2008.

COs	PROGRAM OUTCOMES(POs)												PROGRAM SPECIFIC OUTCOMES (PSOs)		
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	3	2	2	2	-	-	-	-	-	-	-	1	3	2	2
CO2	3	3	3	2	2	-	-	-	-	-	-	1	3	2	2
CO3	3	2	2	2	2	-	1	-	-	-	-	-	2	2	3
CO4	3	3	3	3	2	-	-	-	-	-	-	1	3	2	-
CO5	3	3	3	3	2	-	-	-	-	-	-	2	3	3	2
CO6	2	2	3	1	3	2	3	-	1	-	2	2	2	3	-
Low (1) ; Medium (2) ; High (3)															

Subject Code XXXX	MANUFACTURING TECHNOLOGY – I (B.E. Mechanical Engineering)	L T P C 3 0 2 3
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COURSE OBJECTIVES:

1. To explain the fundamental principles and applications of various metal casting processes.
2. To comprehend the forming processes used in manufacturing and their working principles.
3. To impart knowledge on sheet metal operations and their industrial relevance.
4. To understand and analyze various manufacturing processes of plastic components.
5. To understand and apply various metal joining techniques used in industry.
6. To introduce and assess the impact of recent trends in manufacturing, including automation and smart manufacturing.
7. To develop practical skills in casting, joining, machining, forming, and sheet metal operations through hands-on laboratory experiments.

UNIT - 1 METAL CASTING PROCESSES 9

Applications: Engine blocks and transmission cases, aerospace components, turbine blades, aircraft frames.

Introduction to Sand Casting Sand Mould - Type of patterns - Pattern Materials - Pattern allowances, Cores - Molding machines - Melting furnaces - Principle of special casting processes – Shell investment - CO₂ casting - Defects in sand casting process- Remedies.

UNIT - 2 FORMING PROCESSES 7

Applications: Aircraft parts like wings, washing machine drums, additive manufacturing (3D printing).

Introduction to forming processes .Application, Working principle Hydro forming - Rubber pad forming - Metal spinning - Introduction of Explosive forming, magnetic pulse forming, peen forming, Super plastic forming.

UNIT - 3 SHEET METAL PROCESSES 5

Applications: Cars, washing machines, air plane wings, house-hold appliances like gas cylinders, beverage cans and building roofs of the shiny stainless steel storage tank.

Introduction to sheet metal, Application, characteristics- Typical shearing, bending and drawing operations - Stretch forming operations - Formability of sheet metal.

UNIT - 4 MANUFACTURE OF PLASTIC COMPONENTS 9

Applications: Car body parts, windows and doors Manufacturing.

Types and characteristics of plastics – Moulding of thermoplastics – working principles and typical applications – injection moulding – Plunger and screw machines – Compression moulding, Transfer Moulding – Typical industrial applications – introduction to blow moulding – Rotational moulding – Film blowing – Extrusion – Thermoforming – Bonding of Thermoplastics.

UNIT - 5 JOINING PROCESSES

Applications: Automotive manufacturing, construction, heavy engineering, power plants, oil and gas pipelines, railways, shipbuilding, defense and aerospace.

Introduction to welding - Arc welding, Gas metal arc welding - Submerged arc welding - Plasma arc welding, Resistance welding Processes - Electron beam welding - Laser beam Welding Friction welding ,Friction stir welding, Thermit welding, Weld defects -Inspection & Remedies.

UNIT - 6 RECENT TRENDS IN MANUFACTURING PROCESSES 6

Introduction to Business Statistics-Robotics and Automation Internet of Things (IoT) - Manufacturers - Market size -Dynamic components - Price differences in dynamic components- Indian government initiatives.

TOTAL: 45 PERIODS

OUTCOMES:

At the end of the course the students would be able to

1. Explain different metal casting processes, associated defects, merits and demerits
2. Summarize the working principles of metal forming processes.
3. Explain sheet metal operations and their role in product manufacturing.
4. Identify and describe suitable methods for the manufacture of plastic components.
5. Compare and select appropriate metal joining techniques for industrial applications.
6. Apply suitable molding Recent Trends technique for manufacturing Technology.
7. Demonstrate practical proficiency in machining, welding, forming, casting, and sheet metal fabrication through laboratory work.

TEXT BOOKS:

1. P.N.Rao Manufacturing Technology Volume 1 Mc Grawhill Education 5th edition, 2018.
2. Kalpakjian. S, "Manufacturing Engineering and Technology", Pearson Education India,5th Edition, 2017
3. Dr.Vijayaraghavan, G.K, Manufacturing processes. .Lakshmi publication Education 11th edition, 2025.

REFERENCES:

1. Roy. A. Lindberg, Processes and materials of manufacture, PHI / Pearson education, 2006.
2. Sharma, P.C., A Text book of production Technology, S.Chand and Co. Ltd., 2004
3. The International Journal of Advanced Manufacturing 2024

LIST OF EXPERIMENTS

1. Taper Turning
2. External Thread cutting
3. Internal Thread Cutting
4. Eccentric Turning
5. Knurling
6. Square Head Shaping
7. Hexagonal Head Shaping
8. Fabrication of simple structural shapes using Gas Metal Arc Welding
9. Joining of plates and pipes using Gas Metal Arc Welding/ Arc Welding /Submerged arc welding
10. Preparation of green sand moulds
- 11 Manufacturing of simple sheet metal components using shearing and bending operations.
12. Manufacturing of sheet metal components using metal spinning on a lathe

TOTAL: 45+30=75 PERIODS

MAPPING OF COs WITH POs AND PSOs															
COs	PROGRAM OUTCOMES (POs)												PROGRAM SPECIFIC OUTCOMES (PSOs)		
	PO 1	PO2	PO3	PO4	PO5	PO6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12	PSO 1	PSO 2	PSO 3
CO1	3	2	3	2	2	–	–	–	–	–	–	1	3	2	2
CO2	3	2	2	2	2	–	–	–	–	–	–	1	2	2	2
CO3	3	2	3	2	2	–	1	–	–	–	–	1	3	2	2
CO4	3	2	3	2	2	–	–	–	–	–	–	1	3	2	2
CO5	3	2	3	2	2	–	–	–	–	–	–	1	3	2	2
CO6	2	2	3	2	3	2	2	–	1	1	2	2	2	3	2
CO7	3	3	3	3	3	–	–	–	2	2	2	2	3	2	3
LOW (1) ; MEDIUM (2) ; HIGH (3)															

COURSE OBJECTIVES:

- ✓ To illustrate the different types of ferrous and non-ferrous alloys and their uses in engineering field.
- ✓ To learn selecting and applying various heat treatment processes and its microstructure formation.
- ✓ To learn the various testing procedures and failure mechanism in engineering field.
- ✓ To illustrate the different polymer, ceramics and composites and their uses in engineering field.
- ✓ To illustrate the different advanced materials and their uses in engineering field.
- ✓ To Learn about new materials, recycling, and technology in major industries.

UNIT - 1 METAL AND ALLOYS 9

Applications of metals and alloys: Building construction - Roofing, pipelines, and electrical wiring, Aircraft and automobile components, Electronic devices, Medical equipments

Iron and steel; Stainless steel and tool steels; Copper & its alloys—brass, bronze & cupronickel; Aluminium & Al-Cu-Mg alloys; Nickel based super alloys & Titanium alloys.

UNIT - 2 HEAT TREATMENT 9

Applications of various heat treatment processes: Applied in the aerospace and automotive industries for durable components, Cutting tools and high-strength fasteners, pressure vessels

Heat treatment overview and objectives, Heat treatment of Steel; Annealing, tempering, normalizing, spheroidising, austempering, martempering, case hardening, carburizing, nitriding, cyaniding, carbo-nitriding, flame and induction hardening, vacuum and plasma hardening.

UNIT - 3 MECHANICAL PROPERTIES AND TESTING 9

Applications: Manufacturing of sports equipment, Automobile components, Medical devices, springs,

Tensile, compression, torsion, fatigue, fracture and wear tests; Young's modulus; Relations between true and engineering stress-strain curves; Generalized Hooke's law; Yielding and yield strength; ductility, resilience, toughness; Hardness measurement their relation to strength; SN curve, endurance and fatigue limits

UNIT - 4 POLYMERS, CERAMICS AND COMPOSITES 7

Applications of polymers: Automotive parts - Bumpers, dashboards, and interior panels, **Ceramics:** Spark plugs, self lubricating bearings **Composites:** Carbide drills, Wind turbine blades

Polymers – Classification and applications; Polymerization techniques; Ceramics– Classification and applications; Oxide ceramics, ceramic insulators. *Composites* - Classification and applications,

Reinforcement, matrix, metal matrix composites, ceramic composites, polymer composites.

UNIT - 5 ADVANCED MATERIALS

6

Applications: *Optical materials: Solar Cells, televisions* **High temperature materials:** *Engines and turbines,* **Energy materials:** *Photovoltaic Materials, Materials used in batteries,*

Advanced materials – Classification and applications: biomaterials, optical materials, high temperature materials, energy materials, and nano materials.

UNIT - 6 BUSINESS STATISTICS AND CURRENT TRENDS

5

Market size and growth, sustainability, automation, and advanced material development across metals, eco-friendly polymers, ceramics, smart composites - recycling, lightweight materials in automotive, aerospace, healthcare, and energy sectors.

TOTAL: 45 PERIODS

OUTCOMES:

At the end of the course the students would be able to

1. Explain the influence of alloying elements on the properties and performance of ferrous and non-ferrous metals
2. Describe the different heat treatment and surface hardening processes for various materials.
3. Identify and compare various strengthening mechanisms, types of fractures, and mechanical testing methods used to determine material properties.
4. Describe the classification, properties, and applications of polymers, ceramics, and composites, including their processing techniques and key material types.
5. Describe the types and uses of advanced materials such as biomaterials, optical, high-temperature, energy, and nanomaterials.
6. Describe market trends, sustainability, and advanced materials in metals, polymers, ceramics, and composites for industries like automotive, aerospace, healthcare, and energy.

TEXT BOOKS:

1. Raghavan.V, “Materials Science and Engineering”, Prentice Hall of India Pvt. Ltd. 6th edition, 2019.
2. Kenneth G. Budinski and Michael K. Budinski, “Engineering Materials”, Prentice Hall of India Private Limited, 9th edition, 2018.
3. W.D. Callister, David G. Rethwisch, “Materials Science and Engineering: An Introduction”, 9th ed., Wiley & Sons, 2013.
4. Thomas H. Courtney, “Mechanical Behaviour of Engineering materials”, McGraw Hill, Singapore, 2000.

REFERENCES:

1. G.S. Upadhyay and Anish Upadhyay, “Materials Science and Engineering”, Viva Books Pvt. Ltd, NewDelhi, 2020.
2. Williams D Callister, “Material Science and Engineering” Wiley India Pvt. Ltd, 2nd edition Re print 2019.
3. Smith, W.F., Hashemi, J. & Prakash, R, Materials Science and Engineering, Tata McGraw Hill Education Pvt. Ltd., 2014.
4. Askeland, D, Materials Science and Engineering, Brooks/Cole, 2010
5. Advanced Materials Science Proceedings: advanced-materialsscience.peersalleyconferences.com

CO – PO MAPPING

CO	PO												PSO		
	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3
1	3	2	2	-	-	-	-	-	-	-	-	2	3	2	2
2	3	2	3	2	-	-	-	-	-	-	-	2	3	2	2
3	3	3	2	2	-	-	-	-	-	-	-	2	3	2	2
4	3	2	3	-	-	-	2	-	-	-	-	2	3	2	2
5	3	2	3	-	-	-	2	-	-	-	-	2	3	2	2
6	3	2	3	-	-	-	3	2	-	-	-	2	3	2	2
LOW (1) ; MEDIUM (2) ; HIGH (3)															

Steam - formation and its thermodynamic properties p-v, p-T, T-v, T-s, h-s diagrams. Determination of dryness fraction. Calculation of work done and heat transfer in non-flow and

flow processes using Steam Table and Mollier Chart.

UNIT - 5 THERMODYNAMIC RELATIONS

6

Applications: Pressure, Temperature, Volume, Entropy, Enthalpy, and Internal Energy.

Maxwell relations, TdS Equations, heat capacities relations - Energy equation, Joule Thomson experiment, Clausius - Clapeyron equation.

UNIT - 6 BUSINESS STATISTICS AND CURRENT TRENDS

5

Market Size and Growth, Thermal Energy Storage (TES): Advanced materials for phase change energy storage. Thermodynamics in Nano engineering: Nano - Scale Heat Transfer - Enhanced thermal conductivity using nanofluids. Molecular Thermodynamics - Energy transformations in nanomaterials, bioelectronics, and energy - efficient devices.

TOTAL: 45 PERIODS

OUTCOMES:

At the end of the course the students would be able to

1. Analyze engineering systems and calculate property changes in closed and open systems using the Zeroth and First Laws of Thermodynamics.
2. Apply the Second Law of Thermodynamics to evaluate the performance of thermal devices using energy and entropy calculations
3. Analyze the available and unavailable energy in open and closed systems using the principles of the Second Law of Thermodynamics.
4. Analyze steam properties and determine dryness fraction while calculating work and heat transfer using Steam Tables and Mollier Charts
5. Apply thermodynamic relations to analyze energy equations, the Joule-Thomson experiment, and phase change processes
6. Explore market growth in advanced materials for thermal energy storage, nano-scale heat transfer, and energy transformations in nanomaterials, bioelectronics, and energy efficient devices

TEXT BOOKS:

1. Nag.P.K., "Engineering Thermodynamics", 6th Edition, Tata McGraw Hill (2017), New Delhi.
2. Natarajan, E., "Engineering Thermodynamics: Fundamentals and Applications", 2nd Edition (2014), Anuragam Publications, Chennai.
3. Claus Borgnakke and Richard E. Sonntag, "Fundamentals of Thermodynamics", 11th Edition, Wiley Eastern, 2022.

REFERENCES:

- 1.
- 2.
- 3.
- 4.
- 5.

CO – PO MAPPING

CO	PO												PSO		
	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3
1	3	3	2	1	-	-	-	-	-	-	-	2	3	3	2
2	3	3	3	2	-	-	-	-	-	-	-	2	3	3	2
3	3	3	3	3	-	-	-	-	-	-	-	2	3	3	2
4	3	3	2	3	2	-	-	-	-	-	-	2	3	3	3
5	3	3	2	3	3	-	-	-	-	-	-	2	3	3	3
6	3	3	3	3	3	3	3	-	-	3	2	3	3	3	3
LOW (1) ; MEDIUM (2) ; HIGH (3)															

XXXXX
(Sub Code)

**TRANSFORMS AND PARTIAL DIFFERENTIAL
EQUATIONS
(III SEM FOR CIVIL & MECH)**

L T P C
3 1 0 4

COURSE OBJECTIVES:

To make the student conversant with the

- ✓ Concept of PDE for solving standard partial differential equations.
- ✓ Concept of Fourier series and its properties.
- ✓ Effective mathematical tools for the solutions of partial differential equations that model several physical processes.
- ✓ Fourier series techniques in solving heat flow problems used in various situations.
- ✓ Develop the concept of Z-transform techniques for discrete time systems.
- ✓ Real-world case studies on transforms and partial differential equations.

UNIT - 1 PARTIAL DIFFERENTIAL EQUATIONS

10

Applications: Space Weather Prediction, Traffic Flow Modeling, Control of Dynamic Systems.

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

UNIT - 2 FOURIER SERIES

10

Applications: Image Smoothing, Denoising Ophthalmology, Image in painting.

Dirichlet's conditions - Fourier series - Odd and even functions - Half range sine series and Half range cosine series - Root mean square value - Parseval's identity - Harmonic analysis. (C 13)

UNIT - 3 APPLICATIONS OF PARTIAL DIFFERENTIAL EQUATIONS

10

Applications: Heat Conduction (Heat Equation), Wave Propagation (Wave Equation), Electromagnetism (Maxwell's Equations).

Classification of PDE- Fourier series solutions of one dimensional wave equation - One dimensional equation of heat conduction - Steady state solution of two dimensional equation of heat conduction (Cartesian coordinates only).

UNIT - 4 FOURIER TRANSFORMS

10

Applications: Diffusion of Chemicals, Crystal Growth Chemical Reactions.

Fourier integral theorem (Statement only) - Fourier transform pair - Fourier sine transform and Fourier cosine transforms - Convolution theorem - Parseval's identity. (C 14)

UNIT - 5 Z-TRANSFORMS AND DIFFERENCE EQUATIONS

10

Applications: Orthogonal Frequency, Division Multiplexing (OFDM) , Modulation and Demodulation Interest Rate Models.

Z-transforms - Elementary properties - Convergence of Z-transforms - Initial and final value theorems -Inverse Z-transform using partial fraction and convolution theorem- Formation of difference equations - Solution of difference equations using Z - transforms.

APPLICATIONS OF TRANSFORMS AND PDE IN REAL

UNIT - 6 LIFE SCENARIO (C04)

10

Comparison the free and forced vibrations in a string using partial differential equations – Analysis of the digital suspension and mechanical feedback control system using Z-transforms and difference equations – Calculation of the temperature, regulation of speed and precision matching using difference equations – Determining the heat flow in parallel pipes using one dimensional heat equation – Calculation of periodic vibrations in structural beam using Fourier series – Calculation of diffusion in chemicals and study of unstable crystal growth using Fourier transforms.

TOTAL: 60 PERIODS

OUTCOMES:

At the end of the course, the students will be able to

1. Solve the given first order and second order partial differential equations using Lagrange's method and analytical method.
2. Calculate the Fourier series, Half range Sine series and Half range Cosine series for a given function using the concept of odd and even function.
3. Solve problems based on one-dimensional heat equation and one-dimensional wave equation using Fourier series techniques.
4. Analyze Fourier transform, Fourier Sine transform and Fourier Cosine transform for a given function using convolution theorem and Parseval's identity.
5. Calculate Z transform of a given function and obtain the solution of difference equations by using Z-transform techniques for discrete time systems.
6. Solve industrial case studies using Transforms and Partial Differential Equations.

TEXT BOOKS:

1. Grewal B.S., "Higher Engineering Mathematics", 44th Edition, Khanna Publishers, New Delhi, 2018.
2. Kreyszig E, "Advanced Engineering Mathematics ", 10th Edition, John Wiley, New Delhi, India, 2018.
3. Kandaswamy, Thilagavathy and Gunavathy, " Engineering Mathematics ", 28th Edition, S.Chand and CO, New Delhi, 2020

REFERENCES:

1. "Integral Transforms and Engineering: Theory, Methods, and Applications" by Abdon Atangana and Ali Akgül, published in 2023.
2. Bali. N.P and Manish Goyal, "A Textbook of Engineering Mathematics", 10th Edition, Laxmi Publications Pvt. Ltd, 2021.
3. James. G., "Advanced Modern Engineering Mathematics", 4th Edition, Pearson Education, New Delhi, 2016.
4. "Advanced Mathematics for Engineering Students" by S. Narayanan, T.K. Manicavachagom Pillay, and G. Ramanaiah are available in multiple volumes. Volume 3 was published on January 1, 2019.
5. Ramana. B.V., "Higher Engineering Mathematics", McGraw Hill Education Pvt. Ltd, New Delhi, 2018.

CO - PO MAPPING

CO	PO												PSO		
	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3
1	3	3	-	-	-	-	-	-	1	-	-	1	-	-	-
2	3	3	-	-	-	-	-	-	1	-	-	1	-	-	-
3	3	3	-	-	-	-	-	-	1	-	-	1	-	-	-
4	3	3	-	-	-	-	-	-	1	-	-	1	-	-	-
5	3	3	-	-	-	-	-	-	1	-	-	1	-	-	-
6	3	3	-	-	-	-	-	-	1	-	-	1	-	-	-

LOW (1) ; MEDIUM (2) ; HIGH (3)

(XXXXX)
Subject
Code

LIFE SKILL III – BASIC CONVERSATION SKILLS

L T P C
2 0 0 1

COURSE OBJECTIVES:

- ✓ To develop effective professional communication skills, including greetings, polite conversations, and intervening in dialogues.
- ✓ To introduce and practice framing questions using model auxiliaries (can, could, would) and WH questions in a technical environment.
- ✓ To apply tone, intonation, and voice modulation effectively in two-way conversations to enhance communication clarity and impact.
- ✓ To practice essential one-on-one conversation techniques to communicate effectively in interview settings.
- ✓ To practice various discussion activities.
- ✓ To understand the do's and don'ts of group discussions and perform group discussions.

UNIT – I PROFESSIONAL COMMUNICATION

2

Creating conversation - Professional greetings and courtesies - Introduction to polite conversation techniques – Intervening when two people are conversing - Polite disagreement

Practice: Initial greeting, Transitioning between conversations, Practicing professional greetings using conversation and Courtesy vocabularies in different scenarios (C 17)

Role-play: Conducting professional conversations

UNIT – II FRAMING QUESTIONS

2

Basics of framing questions using model auxiliaries (can, could, would, etc.) - WH questions and Yes/No questions in technical environment

Practice: Role - play exercises in question framing, Conducting Q&A sessions based on conversations, Effective questioning techniques in various settings

UNIT – III LISTENING TWO-WAY CONVERSATION

2

Understanding tone and intonation in conversations - Responding appropriately in two - way conversations, practicing real - life two - way conversations

Practices: Practicing two - way conversation with tone and intonation - Voice modulation

UNIT – IV TWO -WAY CONVERSATION – BASICS

2

“Basic one and one techniques in interview”

Practice: Conversation tips for effective two-way dialogue - Common conversation pit falls (how to avoid monotones, Long sentences and Breath control during conversation).

UNIT – V DISCUSSION

2

Techniques of discussion – Brainstorming questions, debate and argumentation, panel discussion

Practice: Asking brainstorming questions

UNIT – VI BASICS OF GROUP DISCUSSION

2

Dos and Don'ts of group discussion – Evaluation process

Practice: Three group discussions

TOTAL: 12 PERIODS

OUTCOMES:

At the end of the course the students will be able to

1. Initiate and manage professional conversations with correct greetings and courtesies.
2. Demonstrate proficiency in asking clear and appropriate questions in professional and technical conversations.
3. Adjust their tone and intonation based on the context of the conversation.
4. Confidently navigate one-on-one interviews and other personal conversations.
5. Formulate and ask open-ended brainstorming questions.
6. Understand the importance and purpose of group discussions in professional and academic settings.

REFERENCES:

1. “Advanced Communication Skills” by Mathew Richardson, Charlie Creative Lab, 2020.
2. Andy Gillett, Using English for Academic purposes for students in higher Education.
<https://www.uefap.org/reading/>
3. R. K. Agnihotri and A. L. Khanna. *English for Academic and Professional Purposes*. Macmillan India, 2008
4. **Swales, John M., and Christine B. Feak.** *Academic Writing for Graduate Students: Essential Tasks and Skills*. University of Michigan Press, 2012

CO – PO MAPPING

CO	PO												PSO		
	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3
1	-	-	-	-	-	-	-	-	3	3	-	3	-	-	-
2	-	-	-	-	-	-	-	-	3	3	-	3	-	-	-
3	-	-	-	-	-	-	-	-	3	3	-	3	-	-	-
4	-	-	-	-	-	-	-	-	3	3	-	3	-	-	-
5	-	-	-	-	-	-	-	-	3	3	-	3	-	-	-
6	-	-	-	-	-	-	-	-	3	3	-	3	-	-	-
LOW (1) ; MEDIUM (2) ; HIGH (3)															

XXXXX
(Lab Code)

**COMPUTER AIDED DESIGN AND DRAFTING
LABORATORY**

L T P C
0 0 4 2

COURSE OBJECTIVES:

- ✓ To acquaint the skills and practical experience in handling 2D drafting and 3D modelling software systems, standard drawing practices using fits and tolerances.
- ✓ To prepare assembly drawings using standard CAD packages.
- ✓ To Preparing standard drawing layout for modeled parts, assemblies with Bill of Materials.

PART I DRAWING STANDARDS & FITS AND TOLERANCES

Code of practice for Engineering Drawing, BIS specifications – Welding symbols, riveted joints, keys, fasteners - Reference to hand book for the selection of standard components like bolts, nuts, screws, keys etc. - Limits, Fits – Tolerancing of individual dimensions IS919- Specification of Fits – Preparation of production drawings and reading of part and assembly drawings, basic principles of Geometric Dimensioning&Tolerancing.

PART II 3D GEOMETRIC MODELING AND ASSEMBLY

Drawing, Editing, Dimensioning, Layering, Hatching, Block, Array, Detailing, Detailed Drawing.

1. Bearings – Bush Bearing
2. Valves – Safety and Non-return Valves.
3. Couplings – Flange, Oldham's, Muff, Gear couplings.
4. Joints – Universal, Knuckle, Gib & Cotter, Sleeve &Cotter joints.
Engine parts – Piston, Connecting Rod, Crosshead (vertical and horizontal), Stuffing box,
5. multi-plate clutch.
Machine Components – Screw Jack, Machine Vice, Lathe Tail Stock, Lathe Chuck, Plummer
6. Block, Vaneand Gear pumps.

TOTAL: 60 PERIODS

OUTCOMES:

Upon completion of the course, students will be able to

- ## CO – PO MAPPING

CO	PO												PSO		
	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3
1	1	2	2	2	3	-	-	-	2	3	2	2	3	2	3
2	2	2	2	2	3	-	-	-	-	2	-	2	3	2	2
3	2	2	3	2	3	-	-	-	-	2	2	2	3	2	3
Low (1) ; Medium (2) ; High (3)															