Jabalpur Engineering College, Jabalpur

(Declared Autonomous by MP Govt., Affiliated to RGPV, Bhopal)

(AICTE Model Curriculum Based Scheme)

Bachelor of Technology (B.Tech.) III Semester (Industrial & Production Engineering)

w.e.f. July 2023

S.No.	Subject Code	Category Code	Subject Name	Maximum Marks Allotted					Total Marks	Contact Hours Per Week			Total Credits
				Theory			Practical						
				End. Sem.	Mid Sem. Exam.	Quiz/ Assignment	End Sem.	Lab Work		L	T	P	
1	MA31	BSC	Mathematics-III	70	20	10	-	-	100	3	1	-	4
2	CH32	HSMC	Energy & Environmental Engineering	70	20	10	-	-	100	3	1	-	4
3	IP33	PCC	Mechanics of Materials	70	20	10	30	20	150	3	-	2	4
4	IP34	PCC	Machine Drawing & CAD	70	20	10	30	20	150	3	-	2	4
5	IP35	PCC	Thermodynamics	70	20	10	30	20	150	3	-	2	4
6	IP36	ESC	Software Lab - I	-	-	-	30	20	50	-	-	4	2
Total				**350**	**100**	**50**	**120**	**80**	**700**	**15**	2	**10**	**22**
7	IP37	DLC	Self-Learning Presentation (SWAYAM/NPTEL/MOOC)	-	-	-	-	-	-	-	-	-	8
8	IP38	MC	NSS/NCC/Swatchhata Abhiyan/Rural Outreach	Qualifier									
Additional Course for Honours or Minor Specialization				Permitted to opt for maximum two additional MOOC courses in subject code IP37 for the award of Honours (Minor Specialization).									

Note: MOOC/NPTEL subjects shall be taken with permission of HOD/Coordinator

1 hour lecture (L) = 1 credit	1 hour Tutorial (T) = 1 credit	2 hour Practical (P) = 1 credit

BSC: Basic Science Course, HSMC: Humanities & Social Sciences including Management Course, PCC: Professional Core Course, ESC: Engineering Science Course, MC: Mandatory Course, DLC: Distance Learning Course

DEAN
Academic
JEC, Jabalpur (M.P.)

Jabalpur Engineering College, Jabalpur (M.P.)

(Declared Autonomous by Govt. of Madhya Pradesh and Affiliated to RGPV, Bhopal)

(AICTE Model Curriculum Based Scheme and Syllabus)

Bachelor of Technology (B.Tech.) III Semester, Branch (CE/ME/IP)

COURSE CONTENT **w.e.f. July 2023**

Subject Code	Subject Name	Maximum marks Allotted			Total marks	Hours/Week			Total Credit
MA31	MATHEMATICS-III	Theory			100	L	T	P	4
		End Sem	Mid-Sem Exam	Quiz/ Assignment		3	1	0	
		70	20	10					

Module 1: Numerical Method-I (08 hours)

Roots of algebraic and transcendental equations: Bisection method, Regula-Falsi method, Newton-Raphson method, Iteration method, Graffes root squaring method, Solution of system of linear equations: Gauss elimination method, Gauss Jordan method, LU decomposition method, Relaxation method, Jacobi and Gauss-Seidel methods.

Module 2: Numerical Method-II (08 hours)

Interpolation: Finite difference operator and their relationships, Difference tables, Newton, Gauss, Bessel and Stirling's interpolation formulae, Divided differences,Lagrange interpolation and Newton's divided difference interpolation. Numerical differentiation and Integration: First and second order derivatives by various interpolation formulae, Trapezoidal, Simpsons $1/3^{rd}$ and $3/8^{th}$ rules.

Module 3: Numerical Method-III (10 hours)

Numerical solution of ordinary differential equations: Solution of ODE by Taylor series, Picard's method , Modified Euller method, Runge-Kutta method, Predictor corrector method. Partial differential equations: Finite difference, solution of two-dimensional Laplace and Poission's equations, Implicit and explicit methods for one dimensional heat equation (Bendre Schmidt and Crank-Nicholson methods), Finite difference explicit method for wave equation.

Module 4: Applied Statistics (08 hours)

Curve fitting by the method of least squares- Fitting of straight lines, Second degree parabolas and more general curves. Test of significance: Large sample test for single proportion, Difference of proportions, single mean, difference of means and difference of standard deviations.

Module 5: Concept of Probability (06 hours)

Probability Mass function, Probability Density Function, Discrete Distribution (Binomial, Poisson's distribution), Continuous Distribution (Normal, Exponential Distribution).

Books References:

1. P. Kandasamy, K.Thilagavathy, K. Gunavathi, Numerical Methods, S. Chand & Company, 2^{nd} Edition, Reprint 2012.
2. S.S. Sastry, Introductory methods of numerical analysis, PHI, 4^{th} Edition, 2005.
3. B.S. Grewal, Higher Engineering Mathematics, Khanna Publisher, 35^{th} Edition, 2010.
4. N.P. Bali and Manish Goyal, A text book of Engineering Mathematics, Laxmi Publications, Reprint, 2010.
5. S. Ross, A First Course in Probability, 6^{th} Edition, Pearson Education India 2002.
6. W. Feller, An Introduction to Probability Theory and its Applications, Vol. 1, 3^{rd} Edition, Wiley 1968. Statistics.

Course Outcomes:

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

1. Mathematical tools for Numerical Solution of algebraic and transcendental equations.
2. Estimate the value of function by various interpolation methods.
3. Determine derivative and integrals by numerical methods.
4. Solve the ODE and PDE by finite difference/numerical methods.
5. Apply probability distribution and statistics in various techniques dealing with engineering problems.

Dr. O.P. Chauhan
H.O.D.
Deptt. of App. Mathematics

DEAN
Academic
JEC, Jabalpur (M.P.)

JABALPUR ENGINEERING COLLEGE, JABALPUR (M.P.)
(Declared Autonomous by MP Govt. Affiliated to RGPV, Bhopal)

(AICTE Model Curriculum Based Scheme)
Bachelor of Technology (B.Tech.) III Semester
Branch- Common to (CE/EE/EC/CSE/IT/IP/AI&DS /MT)
COURSE CONTENTS

w.e.f. July 2023

Subject Code	Subject Name	Maximum Marks Allotted			Total Marks	Hours/Week			Total Credits
CH32	Energy & Environmental Engineering	Theory				L	T	P	4
		End Sem	Mid-sem Exam	Quiz/ Assignment					
		70	20	10	100	3	1	-	

Module 1:

A. **Introduction to Energy Science:**
World & Indian Energy Scenario, Overview to Energy Systems, Energy sustainability and Environment. Fossil Fuels. Alternatives for fossil fuels: biomass, wind, solar, nuclear, wave, tidal, hydrogen & geothermal energy.

B. **Batteries:**
Classification of Batteries, Important Applications, Lead-Acid battery, Ni-Cd battery & Li battery. Fuel Cell: Hydrogen-Oxygen Fuel cell.

Module2: Environmental Pollution A:

I. **Air Pollution**
Causes, Effects & Control Measures of Air Pollution: Primary and Secondary air pollutants and photo-chemical smog. Climate changes, Global warming, Ozone layer depletion. Pollution case studies: Bhopal gas Disaster and London smog Disaster.

II. **Water Pollution**
Definition, Causes, Effects and Control Measures (Primary & Secondary waste water treatment), Acid Rain and Marine pollution. Pollution case studies: Minamata Tragedy, Ganga Action Plan, Major oil spills of the 20^{th} & 21^{st} century. Water conservation, Rain water harvesting and Water Shed Management.

III. **Noise Pollution**
Causes, Effects & Control Measures.

Module3: Environmental Pollution B:

I. Sources, Adverse effects and Control measures of Soil Pollution, Thermal Pollution, Nuclear Pollution & Nuclear hazards. Major case studies.

II. Solid waste management: Municipal Solid Waste (MSW), Collection and disposal methods. Disaster Management.

III. Introduction to carbon footprint, ways to reduce carbon footprint, Carbon trading.

Module 4: Ecosystem & Biodiversity:

Concept of an ecosystem; Structure and function of an ecosystem; Producers, consumers and decomposers; Energy flow in the ecosystem; Ecological succession; Food chains, food webs and ecological pyramids; Introduction, types, characteristic features, structure and function of the following ecosystem (a.)Forest ecosystem (b) Grassland ecosystem (c) Desert ecosystem (d) Aquatic ecosystems (ponds, streams, lakes, rivers, oceans, estuaries)

Introduction ,Definition: genetic, species and ecosystem diversity; Bio-geographical classification of India; Value of biodiversity: Biodiversity at global & National levels; India as a mega-diversity nation; Hot-spots of biodiversity; Threats to biodiversity: habitat loss, poaching of wildlife, man-wildlife conflicts; Endangered and Endemic species of India; Conservation of Biodiversity: In-situ and Ex-situ conservation of biodiversity. Environment Protection Act.

Module 5: Corrosion & its prevention:

Theories of Corrosion and Mechanism – Dry (Direct Chemical attack), Wet (Electro Chemical Theory) Atmospheric corrosion, Galvanic Series, Galvanic and Concentration Cell Corrosion, Corrosion by sea water. Factors Influencing and Control of Corrosion – Proper Design, Use of pure metal and metal alloys, passivity, cathodic protection – Sacrificial anode and Impressed Current. Modifying the environment, Use of inhibitors.

Protective coatings:

Hot dipping, Electroplating, Metal spraying metal cladding & cementation.

TEXT BOOKS

1. A text book of Engineering Chemistry by Jain & Jain, Dhanpat Rai Publishing Company, New Delhi
2. Chemistry of Engineering Materials by C.P. Murthy, C.V. Agarwal and A. Naidu BS Publication Hyd.
3. A text book of Environmental Chemistry and Pollution control by S.S. Dara & Dr. D. D. Mishra, S. Chand & Co, New Delhi
4. Energy,Environment Ecology and Society by Dr.Pushpendra,Vayu Education of India New Delhi
5. Energy, Environment Ethics and Society, by Dr.S.Deswal & Dr.A.Deswal Dhanpat Rai Publishing Company, New Delhi

REFERENCE BOOKS

1. J.C. Kuriakose and J. Rajaram, "Chemistry in Engineering and Technology", Vol.1 & 2, Tata Mcgraw Hill Publishing Company (P) Ltd., New Delhi
2. Mars G. Fontana, "Corrosion Engineering", Tata Mcgraw Hill Publishing Company (P) Ltd., New Delhi.
3. De A.K., Environmental Chemistry, Wiley Eastern Ltd.
4. J.P.Gupta, A Text book of Energy, Environment Ethics & Society" Dhanpat Rai Publishing Company.

JABALPUR ENGINEERING COLLEGE, JABALPUR (M.P.)
(Declared Autonomous by MP Govt. Affiliated to RGPV, Bhopal)

COURSE OUTCOME: At the end of the course the student will be able to

CO1	Apply the concept of sustainability of renewable energy to overcome the shortcoming of energy from non-renewable sources. Understanding of Energy devices.
CO2	Develop an understanding related to Water, Air and Noise pollution.
CO3	Understand the importance of Soil, Thermal and Nuclear pollution. Illustrate municipal practices in solid waste management. Define carbon footprints.
CO4	Understand the interrelationship of different species in variety of ecosystems. Conservation of Biodiversity & awareness of Environmental protection Act.
CO5	Recognize the origin as well as types of corrosion and apply appropriate protection mechanism to control corrosion.

DEAN
Academic
JEC, Jabalpur (M.P.)

Prof & Head
Applied Chemistry Dept
Govt Engineering College
JABALPUR-482011

Jabalpur Engineering College, Jabalpur
(Declared Autonomous by MP Govt., Affiliated to RGPV, Bhopal)
(AICTE Model Curriculum Based Scheme)
Bachelor of Technology (B.Tech.) III Semester (Industrial & Production Engineering)

COURSE CONTENTS **w.e.f. July 2023**

Subject Code	Subject Name	Maximum Marks Allotted					Total Marks	Hours/Week			Total Credits
		Theory			Practical						
IP33	Mechanics of Materials	End Sem	Mid-sem Exam	Quiz/ Assignment	End sem	Lab work	150	L	T	P	4
		70	20	10	30	20		3	-	2	

Course Objective:

- To calculate the stresses and strain of different members of machines.
- To draw shear force and bending moment diagram for various types of beams with different loadings.
- To apply theories of failures to different materials and loading conditions.
- To study torsion and stresses of shafts.

Course Content:

MECHANICS OF MATERIALS
(IP33)

Module-I: Mechanical Properties of Materials: Ductility, malleability, hardness, toughness, fatigue, creep, behavior of materials under tension, compression, bending, shear, ductile and brittle materials, failure of MS and CI in tension and torsion, ductile and brittle failures.

Stress and strain: stresses in members of a structure, axial loading, normal stress, shear stress, bearing stress, analysis of simple structures, stress on oblique plane under axial loading, stepped rods, members in series and parallel, stress strain diagram, Hooke's law, modulus of elasticity, elastic and plastic behavior of materials, deformation under axial loading, statically indeterminate problems, stress due to temperature, Poisson's ratio, Bulk modulus, shear strain, relation among elastic constants, residual stress, fiber reinforced composite materials.

Module-II: Transformation of stress and strain, principal stresses, normal and shear stress, Mohr's circle and its application to two-dimensional analysis, Shear force and BM diagram for various types of loading, stresses in thin-walled pressure vessel.

Module-III: Bending: pure bending, symmetric member, deformation, and stress, bending of composite sections, eccentric axial loading, beams of unsymmetrical sections, shear stresses in beams, distribution of shear stresses. Deflection of beams, moment area method,

Module-IV: Torsion in shafts: stresses in a shaft, deformation in circular shaft, angle of twist, stepped hollow, thin walled-hollow transmission shafts, transmission shaft under combined bending and torsion; Leaf springs; helical springs, open and closed coil, stress in spring wire, deflection of helical spring, springs in series and parallel.

Module-V: Theories of failures: maximum normal stress & shear stress theory; maximum normal and shear strain energy theory; maximum distortion energy theory; application of theories to different materials and loading conditions Columns: stability of structures, Euler's formula for columns with different end conditions, Rankin's formula.

H.O.D.
Industrial & Production
Engineering
Jabalpur

DEAN
Academic
JEC, Jabalpur (M.P.)

References:

1. Beer FP, Johnson ER, Dewolf JT: Mechanics of Materials; TMH
2. Rattan; Strength of materials; TMH
3. Nash William; Schaum's Outline of Strength of Materials; TMH.
4. Negi; strength of materials; TMH
5. Singh Arbind K; Mechanics of Solids; PHI
6. Strength of Materials, Sadhu Singh,
7. Kamal K and Ghai RC; Advanced Mechanics of Materials; Khanna Pub.

List of experiments (Expendable):

1. Standard tensile test on MS and CI test specimen
2. Direct/ cross Shear test on MS and CI specimen
3. Transverse bending test on wooden beams to obtain modulus of rupture
4. Fatigue test
5. Brinell Hardness tests
6. Vicker hardness test
7. Izod/Charpy impact test

Course Outcomes:

At the completion of this course, students should be able to-

CO1	Calculate stresses and strain in different members of the materials.
CO2	Draw Shear force and Bending moment diagram for different types of beams with different loadings.
CO3	Find out deflection deformation and stress for different types of beams
CO4	Calculate torsion and stresses of shafts.
CO5	Calculate critical load by apply Euler's theory and Rankine's formula for column and strut.

Mapping of Course outcomes (COs) with Program Outcomes (POs):

Course Outcomes	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	2	2	1	0	0	2	1	1	0	1	1	1
CO2	2	2	1	1	1	0	0	1	0	1	0	1
CO3	2	1	1	1	1	0	0	1	0	1	1	1
CO4	3	3	2	2	2	2	1	0	1	1	1	1
CO5	2	1	2	2	1	2	1	0	1	1	1	1

H.O.D.
Industrial & Production Engineering Department
Jabalpur Engineering College
Jabalpur (M.P.)

DEAN
Academic
JEC, Jabalpur (M.P.)

Jabalpur Engineering College, Jabalpur
(Declared Autonomous by MP Govt., Affiliated to RGPV, Bhopal)
(AICTE Model Curriculum Based Scheme)
Bachelor of Technology (B.Tech.) III Semester (Industrial & Production Engineering)

COURSE CONTENTS **w.e.f. July 2023**

Subject Code	Subject Name	Maximum Marks Allotted					Total Marks	Hours/Week			Total Credits
		Theory			Practical						
IP34	Machine Drawing & CAD	End Sem	Mid-sem Exam	Quiz/ Assignment	End sem	Lab work	150	L	T	P	4
		70	20	10	30	20		3	-	2	

Course Objective:

- To enable the students to prepare a detailed assembly drawing for machine components.
- To provide knowledge of CAD software for 2D and 3D modeling, basic design concepts

MACHINE DRAWING & CAD
(IP34)

MODULE I:

Drawing conventions, drawing and dimensioning IS codes, sectional views and sectioning, surface finish and tolerances, representation of machine parts such as external and internal threads, slotted heads, square ends, and flat radial ribs, slotted shaft, splined shafts, bearings, springs, gears. Rivet heads and riveted joints, types of welded joints and representation.

MODULE II

Assembly Machine Drawing: Basic concept, plotting technique, assembly and blow up of parts, bill of materials, product data. Cotter and knuckle joints, pedestal and footstep bearings, crosshead, stuffing box, IC engines parts- piston and connecting rods, lath machine parts.

MODULE III

CAD software for 2D and 3D modeling, basic design concepts, design process, stages/phases in design, flowchart, problem formulation, design considerations (strength, manufacturing, maintenance, energy, environment, economics and safety), design for recycle and reuse, design and safety factors for steady and variable loads, impact and fatigue considerations, reliability and optimization, standardization in design.

MODULE IV

Design of components subject to static loads: Riveted joints, welded joints, threaded joints, pin, knuckle, and cotter joints.

References:

1. Bhat, ND; Machine Drawing; Charotar
2. Singh A; Machine Drawing; TMH
3. Narayana and Reddy; Machine Drawing; New age, Delhi.
4. Agarwal and Agrawal; Engineering Drawing; TMH
5. Shigley JE et al; Mechanical Engineering Design, TMH
6. Kulkarni SG; Machine Design; TMH
7. Mubeen and Mubeen; Machine Design.

List of Experiments (Expendable):

1. Introduction to Compute Aided Drafting software for 2D and 3D Modeling
2. Computer Aided Drafting of simple machine parts
3. 3D Modeling of simple solid shapes
4. Design and drawing of parts contained in the syllabus

H.O.D. Industrial & Production Engineering Department Jabalpur Engineering College Jabalpur (M.P.)

DEAN Academic EC, Jabalpur (M.P.)

Course Outcomes:

At the completion of this course, students should be able to-

CO1	Understand Indian standard for machine drawing.
CO2	Understand Fits and Tolerance in technical drawing.
CO3	Draw assembly drawing of joints, couplings, and machine elements.
CO4	Draw assembly drawing of I.C. Engine parts and Lathe machine parts.

Mapping of Course outcomes (COs) with Program Outcomes (POs):

Course Outcomes	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	2	1	2	1	0	1	2	1	0	1	1	2
CO2	2	2	2	1	1	1	2	1	0	2	1	2
CO3	3	2	2	2	1	0	1	1	1	3	2	2
CO4	3	2	3	2	1	0	1	1	2	3	2	2

H.O.D.
Industrial & Production
Engineering Department
Jabalpur Engineering College
Jabalpur (M.P.)

DEAN
Academic
JEC, Jabalpur (M.P.)

Jabalpur Engineering College, Jabalpur
(Declared Autonomous by MP Govt., Affiliated to RGPV, Bhopal)
(AICTE Model Curriculum Based Scheme)
Bachelor of Technology (B.Tech.) III Semester (Industrial & Production Engineering)

COURSE CONTENTS **w.e.f. July 2023**

Subject Code	Subject Name	Maximum Marks Allotted					Total Marks	Hours/Week			Total Credits
		Theory			Practical						
IP35	Thermodynamics	End Sem	Mid-sem Exam	Quiz/ Assignment	End sem	Lab work	150	L	T	P	4
		70	20	10	30	20		3	-	2	

Course Objective:

- To understand laws of thermodynamics and their applications
- To know heat engine, heat reservoir, entropy, entropy change
- To understand Real gas, its deviation with ideal gas Maxwell relations and their applications
- To understand Pure Substance, phase, phase-transformations use of steam table and Mollier chart
- To know working of Air standard cycles, Carnot, Otto, Diesel, Dual cycles

Course Contents:

THERMODYNAMICS
(IP35)

Module -I: Basic concepts: Concept of an ideal gas, gas laws, Zeroth law of thermodynamics, Avogadro's hypothesis, heat, and work transfer. First law of thermodynamics- Statement of first law of thermodynamics, first law applied to closed system, first law applied to a closed system undergoing a cycle, processes analysis of closed system, flow process, flow energy, steady flow process, relations for flow processes, and limitations of first law of thermodynamics.

Module-II: Second law of thermodynamics, heat engine, heat reservoir, refrigerator, heat pump, COP, EPR, available energy, Carnot's theorem, Carnot's cycle, efficiency of Carnot's cycle, statement of second law reversible and irreversible processes, consequence of second law, entropy, entropy change for ideal gas, T-S diagrams, availability, and irreversibility. Gibbs and Helmholtz functions.

Module-III: Real gas, deviation with ideal gas, Vander-wall's equation, evaluation of its constants, limitations of the equation. The law of corresponding states compressibility factor, generalized compressibility chart, P-V-T surface of a Real gas, thermodynamics relations, Maxwell relations and their applications.

Module-IV: Pure Substance, phase, phase-transformations, formation of steam, properties of steam, PVT surface, HS, TS, PV, PH, TV diagram, processes of vapor measurement of dryness fraction, use of steam table and Mollier chart.

Module-V

Air standard cycles, Carnot, Otto, Diesel, Dual cycles, and their comparison, two stroke and four stroke engines, Brayton cycle, non-reactive gas mixture, PVT relationship, mixture of ideal gases, properties of mixture of ideal gases, internal energy, enthalpy and specific heat of gas mixtures, enthalpy of gas-mixtures

H.O.D.
Industrial & Production
Engineering Department
Jabalpur Engineering College
Jabalpur (M.P.)

DEAN
Academic
JEC, Jabalpur (M.P.)

References:

1. P.K. Nag; Engineering Thermodynamics; TMH
2. Van GJ; Thermodynamics; John Wylen
3. Cengel Y; Thermodynamics; TMH
4. Arora CP; Thermodynamics; TMH
5. Engineering Thermodynamics by Omkar Singh New Age International.
6. Engineering Thermodynamics by Ratha Krishanan PHI India Pvt. Ltd.
7. Engineering Thermodynamics by M. Achuthan, PHI India.

List of Experiments (Expendable):

1. To find mechanical equivalent of heat using Joule's apparatus
2. To study working of impulse and reaction steam turbine by models.
3. To study working of Gas turbines by models and to identify various processes of Brayton Cycle.
4. To calculate COP of vapor compression refrigeration system and to plot on T-s, p-H diagrams.
5. To plot specific fuel consumption versus rpm diagrams for diesel and petrol engines

Course Outcomes:

At the completion of this course, students should be able to-

CO1	Analyze the laws of thermodynamics, and their applications
CO2	Explain working of heat engine, heat reservoir, entropy, entropy change.
CO3	Explain Real gas, its deviation with ideal gas Maxwell relations and their applications.
CO4	Analyze Pure Substance, phase, phase-transformations use of steam table and Mollier chart
CO5	Understand working of Air standard cycles, Carnot, Otto, Diesel, Dual cycles

Mapping of Course outcomes (COs) with Program Outcomes (POs):

Course Outcomes	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	3	3	1	1	1	0	2	1	2	0	1	2
CO2	3	3	2	1	1	0	0	0	1	1	1	2
CO3	2	3	1	1	2	1	1	1	0	0	1	2
CO4	2	3	0	1	1	1	1	0	1	1	0	2
CO5	2	2	2	1	1	0	0	1	0	0	1	2

H.O.D.
Industrial & Production
Engineering Department
Jabalpur Engineering College
Jabalpur (M.P.)

DEAN
Academic
JEC, Jabalpur (M.P.)

Jabalpur Engineering College, Jabalpur
(Declared Autonomous by MP Govt., Affiliated to RGPV, Bhopal)
(AICTE Model Curriculum Based Scheme)
Bachelor of Technology (B.Tech.) III Semester (Industrial & Production Engineering)

COURSE CONTENTS

w.e.f. July 2023

Subject Code	Subject Name	Maximum Marks Allotted					Total Marks	Hours/Week			Total Credits
		Theory			Practical						
		End Sem	Mid-sem Exam	Quiz/ Assignment	End sem	Lab work		L	T	P	
IP36	Software Lab - I	-	-	-	30	20	50	-	-	4	2

Course Objective:

- The primary objective of this courseware is to teach students the basic commands necessary for professional 2D mechanical drawing
- Identify and use the key components of the AutoCAD
- Use the fundamental features of AutoCAD.
- Use the precision drafting tools in AutoCAD to develop accurate technical engineering drawings.
- Demonstrate a high level of comfort and confidence with AutoCAD through hands-on practice.

SOFTWARE LAB-I

Module -I: Fundamentals of CAD, design process, Application of computers for design, Benefits of CAD, Computer configuration for CAD applications, Computer peripherals for CAD, Design workstation, Graphic terminal, CAD software- definition of system software and application Introduction to Auto CAD, Setting up drawing environment, commands and system variables, coordinate system.

Module -II: Feminization with various 2D draw commands like Line, circle, array, **Arc, Limits, layer, text,** Rectangle, Polygon, Ellipse, Hatch, with exercise. Creating text style, creating dimension style, creating multi leader style.

Module -III: Feminization with various 2D editing commands like Erase, Undo, Copy, move, trim, extend fillet, rotate, mirror, Scale, Chamfer, Zoom with exercise. Plotting and publishing drawing.

Module -IV: Introduction to 3D modelling, user coordinate system, complex 3D geometry, extruded solids and surfaces, revolved solid and surfaces, editing on solid component, fillet and chamfer on solid, editing faces of solid.

Student Learning Outcomes:

1. Demonstrate basic concepts of the AutoCAD software
2. Apply basic concepts to develop construction (drawing) techniques
3. Ability to manipulate drawings through editing and plotting techniques
4. Understand geometric construction
5. Produce 2D Orthographic Projections
6. Understand and demonstrate dimensioning concepts and techniques
7. Understand Section and Auxiliary Views
8. Become familiar with Solid Modeling concepts and techniques

H.O.D.
Industrial & Production
Engineering Department
Jabalpur Engineering College
Jabalpur (M.P.)

DEAN
Academic
JEC, Jabalpur (M.P.)