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

w.e.f. July 2024

S.No.	Subject Code	Category Code	Subject Name	Maximum Marks Allotted					Total Marks	Contact Hours Per Week			Total Credits
				Theory			Practical			L	T	P	
				End. Sem.	Mid Sem. Exam.	Quiz/ Assignment	End Sem.	Lab Work					
1	IP801M	PEC-III	Professional Elective Course-III	70	20	10	-	-	100	3	1	-	4
2	IP802M	OEC-IV	Open Elective Course-IV	70	20	10	-	-	100	3	1	-	4
3	IP803M	PI	Major Project / Internship	-	-	-	150	100	250	-	-	16	8
			Total	140	40	20	150	100	450	6	2	16	16

Note: 1. Departmental BOS will decide list of three optional subjects for PEC III as well as for OEC IV.

Professional Elective Course-III		
S.No.	Subject Code	Subject Name
1	IP801M A	Computer Integrated Manufacturing
2	IP801M B	Management Information System
3	IP801M C	Industrial Psychology & Human Behaviour
4	IP801M D	Finite Element Methods

Open Elective Course-IV		
S.No.	Subject Code	Subject Name
1	IP802M A	Entrepreneurship & Management Concepts
2	IP802M B	Work Design and Ergonomics
3	IP802M C	Computer Aided Design
4	IP802M D	Concurrent Product Design

Note: 2. Students going for internship would have to opt MOOC/NPTEL subjects decided / listed by the HOD / Coordinator.

Professional Elective Course-III		
S.No.	Subject Code	Subject Name
1	IP801M D	NPTEL-1
2	IP801M E	NPTEL-2
3	IP801M F	NPTEL-3

Open Elective Course-IV		
S.No.	Subject Code	Subject Name
1	IP802M D	NPTEL-4
2	IP802M E	NPTEL-5
3	IP802M F	NPTEL-6

Note: 3. For Major Project / Internship, evaluation is based on work done, quality of report, presentation and performance in viva-voce through department project supervisor / Industry Project Coordinator.

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

PEC: Professional Elective Course, OEC: Open Elective Course, PI: Project and Internship

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COURSE CONTENTS   **w.e.f. July 2024**

Subject Code	Subject Name	Maximum Marks Allotted					Total Marks	Hours/ Week			Total Credits
		Theory			Practical						
IP801M A	Computer Integrated Manufacturing	End Sem	Mid-sem Exam	Quiz/ Assignment	End sem	Lab work	100	L	T	P	4
		70	20	10	-	-		3	1	-	

Course Objective:

- To explain the scope of Computer Integrated Manufacturing Business forecasting and aggregate production plan
- To explain the Computer Aided Process Planning (CAPP)
- To be provide the knowledge about automated material handling, automated storage and Retrieval System.
- To familiar about CAM, Computer Numerical Control, Manual and Computer Aided Part Program.

Course Content:

COMPUTER INTEGRATED MANUFACTURING
(IP801M A)

Module 1 Introduction to CIM: Objectives of CIM, Enterprise wide Integration of CIM Information requirements of manufacturing organizations, Scope of Computer Integrated Manufacturing Business forecasting and aggregate production plan, Production Activity Control (PAC), Manufacturing as a system, Production processes on volume-variety axes, Importance of batch and job shop production, CIM definition and CIM wheel, Evolution and benefits of CIM, Automation, Types of Automation, Advantages of Automation.

Module II Computer Aided Process Planning (CAPP): Introduction to CAPP, Objectives to CAPP, Introduction to Process Planning, Approaches to Process Planning, Manual Experience-based Process Planning, Computer Aided Process Planning, Approaches to Computer Aided Process Planning, Variant Process Planning, Advantages and Disadvantages, Generative Process Planning, Advantages and Disadvantages, Knowledge-based Process Planning, Feature Recognition in Computer Aided Process Planning, Approaches to Part Feature Recognition, Recent Trends in Computer Aided Process Planning.

Module III Computer Aided Manufacturing: Introduction to CAM, Numerical Control system, Suitability of NC technology, Need of NC system, Features and classification of NC system, Computer Numerical Control, Features of CNC , Direct Numerical Control, NC words used in part program, Manual and Computer Aided Part Program, APT Programming.

Module IV Automated Material Handling and Storage: Introduction and Objectives of Automated Material Handling, Principles of Automated Material Handling, Factors considered in selection of automated material handling equipment's, Material handling Equipment, Conveyor systems, Cranes and Hoists, Industrial Trucks, Monorail, Automated Guided Vehicle, Automated storage and Retrieval System.

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Module V Group Technology: Importance of batch and job shop production, Merits of converting zigzag process layout flow to smooth flow in cellular layout, Production flow Analysis and clustering methods, Concept of part families and coding, Opitz, MIClass and Dclass coding, FMS.

Text Books
1. Roa. P.N. CAD/CAM, Tata McGraw Hill Publishing Co.
2. S. Kant Vajpay, Principles of CIM, PHI Publishing Co.
3. Radhakrishan P.CAD/CAM/CIM, New age Publishing Co.

References
1. Zeid A. CAD/CAM, Tata McGraw Hill Publishing Co.
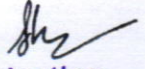2. **Roa. CAD/CAM, Tata McGraw Hill Publishing Co.**
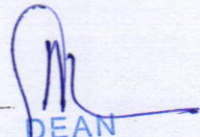
Course Outcomes:

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

CO1	Understand the scope of Computer Integrated Manufacturing
CO2	Do Business forecasting and aggregate production plan
CO3	Understand automated material handling, automated storage and Retrieval System.
CO4	familiar about CAM, Computer Numerical Control, Manual and Computer Aided Part Program
CO5	To learn group technology.

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

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COURSE CONTENTS   w.e.f. July 2024

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	
IP801M B	Management Information System	70	20	10	-	-	100	3	1	-	4

Course Objective:

- To acquire the basic knowledge Management Information System.
- To establish knowledge regarding system engineering, information & e business technology, planning & controlling and enterprise management system.

Course content:

MANAGEMENT INFORMATION SYSTEM
(IP 801M B)

Module-I: Management Information System (MIS): Concept of MIS, Definition, role of Management Information System, Objectives and benefits, MIS as strategic tool, obstacles and challenges for MIS, functional and cross functional systems, hierarchical view of CBIS, structured and unstructured decision, Decision process and MIS, information system components and activities, Value chain and MIS support. Database and data structures.

Module -II: System Engineering : System concepts, System control , Types of System, handling System, complexity system, efficiency and effectiveness, classes of system ,data processing system, business function processing system transaction processing system, Integrated information processing system, application processing system ,system analysis, need for system analysis, procedure for analyzing the existing system, work system model and comparison with input-process-output model, five views of work system, knowledge based systems.

Module -III: Information and e business technology: Information concepts, classification of information method of data and information collection, Value of information, information storage and retrieval system, general model of a human as an information processor, MIS and the Information and knowledge, introduction to e business, models of e business, MIS in web environment, MIS and e business, Information technology and computer NW support to MIS

Module -IV: Planning and control Concepts: concept of corporate planning, dimensions of planning, Essentiality of strategic planning, Development of business strategic, types of strategies, tools of planning, MIS strategic business planning, (SDLC) system development life cycle, system investigation, analysis of needs, design and implementation phases, Control and Maintenance of Information Systems.

Module -V: Enterprise management System: EMS system concept, Enterprise resource planning (ERP)system ERP models and modules, benefits of ERP, ERP product Evolution, ERP implementation (ERP) from MRP, information management in SCM, Customer relationship management (CRM), Integrated data model in ER. Business Process Re-Engineering (BPR), significance and functions,

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References

1. Davis and Olson, Management Information Systems, TMH
2. James O' Brian, Management Information Systems, TMH
3. Oz, Management Information Systems, Cengage
4. Alter Stevenson, Information Systems: Foundation of E-Business; (Prentice-Hall, USA)
5. Jayaraman, Business Process Re-Engineering, TMH.
6. Garg. V.K.; ERP, PHI
7. Kelkar SA; Management Information Systems A Concise Study; PHI Learning.
8. Radhakrishnan R and Balasubramanian S; Business Process Reengineering; PHI Learning.
9. Alex Leon; ERP, TMH
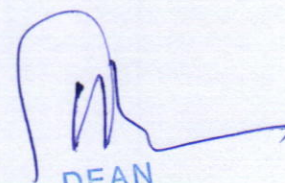10. Jawadekar WS; MIS- text and cases; TM

Course Outcomes:

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

CO1	To acquire the basic knowledge Management Information System.
CO2	To establish knowledge regarding system engineering.
CO3	To build-up knowledge of information & e-business technology.
CO4	To know about planning & controlling concepts.
CO5	To know about enterprise management system.

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

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

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COURSE CONTENTS   **w.e.f. July 2024**

Subject Code	Subject Name	Maximum Marks Allotted					Total Marks	Hours/Week			Total Credits
		Theory			Practical						
IP801MC	Industrial Psychology & Human Behavior	End Sem	Mid-sem Exam	Quiz/ Assignment	End sem	Lab work	100	L	T	P	4
		70	20	10	-	-		3	1	-	

Course Objective:

- To acquire the basic knowledge of Industrial Psychology & human behavior.
- To establish knowledge regarding maintenance of human resource, industrial relations & group behavior.

Course content:

INDUSTRIAL PSYCHOLOGY AND HUMAN BEHAVIOR
(IP801MC)

Module -I Industrial Psychology: Basic concepts, Role and Application, Discipline, Fatigue, Accidents, Labor welfare, Supervision.

Module –II Maintenance of Human Resource: Health, Safety, Labor welfare, Welfare measures, Human Relations, Personnel audit, Industrial Safety, Safety efforts by government, Safety programs.

Module – III Industrial Relations: Objective, Industrial unrest, Industrial peace, Parties in industrial relations, Organizational conflicts, Industrial disputes and their settlement, Impact of Conflicts, Sources of conflicts, Labor policy, Worker's grievances, Suggestion system

Module - IV Human Behavior: Attitudes and Job satisfaction, Emotions and Moods, Personality and values, Perception and Decision making.

Module –V Group Behavior: Foundation of group behavior, Understanding work teams, Communication, power and Politics, Conflicts and Negotiations

Reference Books:

1. Industrial Organization and Engineering Economics – T.R. Banga and S.C. Sharma
2. Organization Behavior – Stephen P. Robbins, Timathy A. Judge and Neharika Vohra
3. organizational Behavior part-1 and Part-2 –John B. Miner

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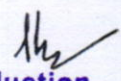**Jabalpur (M.P.)**

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Course Outcomes:

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

CO1	To acquire the basic knowledge of industrial psychology.
CO2	To establish knowledge regarding maintenance of human resource.
CO3	To build-up knowledge of industrial relations.
CO4	To know about human behavior.
CO5	To know about group behavior.

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

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

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COURSE CONTENTS   w.e.f. July 2024

Subject Code	Subject Name	Maximum Marks Allotted					Total Marks	Hours/Week			Total Credits
		Theory			Practical						
	Finite Element Method**S**	End Sem	Mid-sem Exam	Quiz/ Assignment	End sem	Lab work		L	T	P	
IP801M D		70	20	10	-	-	100	3	1	-	4

Course Objective:
- To get the knowledge of finite element methods.
- To enhance the knowledge about coordinates and matrices and various approaches of FEM.
- To provide the knowledge of high order & iso parametric formulation.
- To gain the knowledge about solid and structural mechanisms.

Course content:

FINITE ELEMENT METHODS
(IP801M D)

Module -I.
GENERAL PROCEDURE OF FINITE ELEMENT METHOD
Basic concept of FEM, Engineering applications, Comparison of FEM with other methods of analysis, Discretization of the domain-Basic element shapes, discretization process, Interpolation polynomials, Selection of the order of the interpolation polynomial, Convergence requirements, Linear interpolation

Module -II
polynomials in terms of global and local coordinates, Formulation of element characteristic matrices and vectors-Direct approach, variational approach, weighted residual approach, Assembly of element matrices and vectors and derivation of system equations together with their solution.

Module -III
HIGH-- ORDER AND ISO-PARAMETRIC ELEMENT FORMULATIONS
Introduction, Higher order one-dimensional element, Higher order elements in terms of natural coordinates and in terms of classical interpolation polynomials, Continuity conditions, Iso-parametric elements, Numerical integration in one, two and three-dimensions.

Module -IV
SOLID AND STRUCTURAL MECHANICS
Introduction, Basic equations of solid mechanics, Static Analysis-Formulation of equilibrium equations, analysis of trusses and frames, analysis of plates, analysis of three-dimensional problems, analysis of solids of revolution, Dynamic Analysis-Dynamic equations of motion, consistent and lumped mass matrices, consistent mass matrices in global coordinate system, Dynamic response calculation using FEM

Module -V
APPLICATIONS AND GENERALISATON OF THE FINITE ELEMENT METHOD Energy balance and rate equations of heat transfer, Governing differential equation for the heat conduction in three-dimensional bodies, Derivation of finite element equations for one-dimensional, two-dimensional, unsteady state and radiation heat transfer problems and their solutions, Solution of Helmholtz equation and Reynolds equation, Least squares finite element approach.

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RECOMMENDED BOOKS:

1. The Finite Element Method in Engineering – S.S. Rao, Pub.- Pergamon Press.
2. Numerical Methods in Finite Element Analysis—Klaus-Jurgen Bathe and Edwar L. Wilson, Pub.-PHI.
3. The Finite Element Method – O.C. Zienkiewicz – McGraw-Hill
4. The Finite Element Methods for Engineers – K.H. Huebner – Wiley, New York
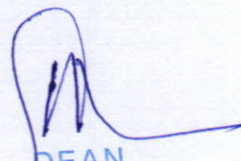
Course Outcomes:

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

CO1	To acquire the knowledge about general procedures of FEM.
CO2	To enhance the knowledge about coordinates and matrices and various approaches of FEM.
CO3	To provide the knowledge of high order & iso parametric formulation.
CO4	To gain the knowledge about solid and structural mechanisms.
CO5	To acquire the knowledge about applications and generalization of FEM.

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

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

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COURSE CONTENTS   w.e.f. July 2024

Subject Code	Subject Name	Maximum Marks Allotted					Total Marks	Hours/ Week			Total Credits
		Theory			Practical						
IP802M A	Entrepreneurship & Management Concepts	End Sem	Mid-sem Exam	Quiz/ Assignment	End sem	Lab work	100	L	T	P	4
		70	20	10	-	-		3	1	-	

Course Objective:

- Explain the meaning of management its characteristics and clarify management as science or profession.
- To be familiar intellectual property system, copyrights, trademark, and intellectual property rights.
- To explain the marketing concept and advertising CRM and marketing research.
- To provide the knowledge of entrepreneur? classification, function, and sociological and economic theories of entrepreneurship.

Course Content:

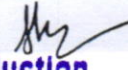### ENTREPRENEURSHIP & MANAGEMENT CONCEPTS (IP802M A)

Module I : Management: Importance, definition and functions; schools of theories, BCG matrix, SWOT analysis, steps in decision making, structured and unstructured decision; dimensions of organizations, departmentalization, spam and line of control, technology and Mintzberg organization typology, line and staff organization, business process reengineering and process of change management, leader & manager, leadership grid, Maslow's need hierarchy and Herzberg two factor theory, team work and stress management, , HR planning placement and training
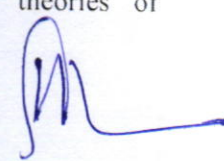
Module II: Marketing: Importance, definition, core concepts of need want and demand, exchange & relationships, product value, cost and satisfaction (goods and services) marketing environment; selling, marketing and societal marketing concepts; four P's, product, price, placement, promotion; consumer, business and industrial market, market targeting, advertising, publicity, CRM and market research.

Module III: Finance: Nature and scope, forms of business ownerships, balance sheet, profit and loss account, fund flow and cash flow statements, breakeven point (BEP) and financial ratio analysis, pay-back period, NPV and capital budgeting.

Module IV : Intellectual Property System: Introduction, Definition of Intellectual property, Concept of Intellectual Property, Different Types of IP, Intellectual Property Rights (IPR), Benefits of securing IPRs;, Rationale behind Intellectual Property, Enforcement of IPRs, Patent Law in India, Interpretations and Implementations, Copyrights and related rights, Trademarks, Geographical indications, Industrial designs, Trade secrets and layout of Integrated circuits , Indian Legislations for the protection of various types of Intellectual Properties; TRIPs and various provisions in TRIPs Agreement.

Module V: Entrepreneurship: Definition and concepts, characteristics, comparison with manager, Becoming an Entrepreneur, Need for Entrepreneurship, Benefits of Self-Employment, who is an entrepreneur? Sensing opportunities- Sources of Idea, Creating Efforts, SWOT Analysis, Entrepreneur and Economy, classification and function of entrepreneurs, sociological and economic theories of entrepreneurship, entrepreneur traits and behavior, roles in economic growth.

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COURSE CONTENTS   **w.e.f. July 2024**

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	
IP802M B	Work Design & Ergonomics	70	20	10	-	-	100	3	1	-	4

Course Objective:

- To acquire the basic knowledge of work study, work processes & motion study.
- To establish knowledge regarding work sampling, measuring and motion economy.

Course content:

WORK DESIGN AND ERGONOMICS
(IP 802M B)

Module I:
Introduction to work study - Productivity – scope of motion and time study - Work methods design.

Module II:
Motion study-process analysis – process chart – flow diagram – assembly process chart – man and machine chart – two handed process chart - Micro motion and memo motion study. Work measurement and its methods.

Module III:
Work sampling – Determining time standards from standard data and formulas – Predetermined motion time standards – work factor system – methods time measurement, Analytical Estimation.

Module IV:
Measuring work by physiological methods – heart rate measurement – measuring oxygen consumption– establishing time standards by physiology methods.

Module V:
Motion economy- Ergonomics practices – human body measurement – layout of equipment – seat design - design of controls and compatibility – environmental control – vision and design of displays. Design of work space, chair table.

RECOMMENDED BOOKS:
1. Barnes, Raeph.M., "Motion and Time Study – Design and Measurement of Work ", John Wiley & sons, New York, 1990.
2. McCormick, E.J., "Human Factors in Engineering and Design", McGraw Hill.
3. ILO, "Introduction to Work study ", Geneva, 1974.

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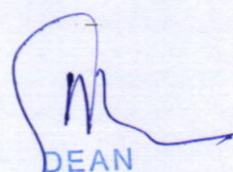
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Course Outcomes:

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

CO1	To acquire the basic knowledge of work study.
CO2	To establish knowledge regarding motion study.
CO3	To build-up knowledge of work sampling.
CO4	To know about work measuring.
CO5	To know about motion economy.

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

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

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(AICTE Model Curriculum Based Scheme)
Bachelor of Technology (B.Tech.) VIII Semester (Industrial & Production Engineering)

COURSE CONTENTS   **w.e.f. July 2024**

Subject Code	Subject Name	Maximum Marks Allotted					Total Marks	Hours/Week			Total Credits
		Theory			Practical						
	Computer Aided Design	End Sem	Mid-sem Exam	Quiz/ Assignment	End sem	Lab work	100	L	T	P	4
IP802M C		70	20	10	-	-		3	1	-	

Course Objective:
- To be familiar with CAD, Automation and CAD, computer software and their application.
- To creating Drawing, Various drawing commands, Editing Drawing.
- To draw Geometric modeling, wire frame model, parametric representation of synthetic curves.
- To perform 2D and 3D geometric transformations.
- To study methods to solve engineering problems, Computer Aided Engineering (CAE) and design.

COMPUTER AIDED DESIGN
(IP802M C)

MODULE- I: Fundamental of CAD, Automation and CAD, Product Cycle & CAD, Introduction to computer Hardware, Design of workstation, Graphics terminal. Operator input & output devices, CPU and Secondary storage. Introduction to computer software and their application.

MODULE- II: Computer Aided Drafting - Creating Drawing: Various drawing commands: Line, Pline, Ellipse, Circle, Arc, Hatch, Text, Dimension, Limits, Scale, Grid, Layers, Fill, Snap, Trace, Modules, Ortho. Editing Drawing: c: Move, Erase, Copy, Zoom, Pan, View, Chamfer, Break, Explode, Extend, Trim, Help, Rotate, Mirror etc. Other Utilities: Block, Array, Save, Quit, Plot Advanced Features of Auto- CAD: UCS, 3D-line, 3D-Objects, DXF & DXB files.

MODULE–III: Geometric modeling- introduction, wire frame model, data structures for computer graphics, Review of vector algebra, lines, circle, ellipses, parabolas, hyperbolas, conics, parametric representation of synthetic curves: Hermite cubic splines, Bezier curve, b spline curves, rational curves. Curves: Algebraic and geometric forms, tangents and normal, blending functions
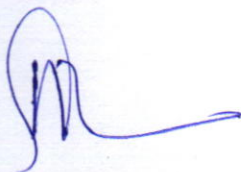
MODULE–IV: 2D and 3D geometric transformations, homogenous coordinates, translation, rotation, scaling, reflection, shear, and transformations between coordinate systems, affine transformations.3-D geometric transformations, 3-D viewing operations and graphics projections, visual realism, hidden line removal, shading and color models.

MODULE –V: Methods to solve engineering problems- analytical, numerical, experimental, their merits and comparison, discretization into smaller elements and effect of size/ shape on accuracy, importance of meshing, boundary conditions, Computer Aided Engineering (CAE) and design, chain-bumping-stages vs concurrent-collaborative design cycles, computer as enabler for concurrent design & Finite Element Method (FEM), degree of freedom (DOF), mechanical systems with mass, damper and spring, stiffness constant K for tensile, bending & torsion; Practical applications of FEA in new design, optimization/cost-cutting and failure analysis.

Reference Books:
1. Inside AutoCAD by Ranker
2. CAD/CAM – principle and application By P N Rao, TMH
3. CAD/CAM – Zeid Ibrahim, TMH
4. Practical Finite Element Analysis by Gokhle Nitin
5. Finite Element Analysis, Theory and programming By Krishnamoorthy, TMH

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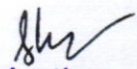**Jabalpur (M.P.)**

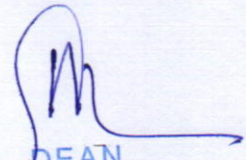**DEAN**
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Course Outcomes:

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

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COURSE CONTENTS
w.e.f. July 2024

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	
IP802M D	Concurrent Product Design	70	20	10	-	-	100	3	1	-	4

Course Objective:

- To acquire the basic knowledge of concurrent product design.
- To establish knowledge regarding design process, design cost estimations, material & manufacturing process selection and product development approaches.

Concurrent Product Design
(IP 802M D)

Module I:

Introduction: Types of design, importance of design, design considerations, product life cycle, technology life cycle, benchmarking, and mass customization. Concurrent design team its elements.

Module II:

Product Design Process: Steps in design, Functional requirement analysis, Axiomatic design, Product design specifications, concurrent design model.

Module III:

Material And Manufacturing Process Selection In Design: Factors influencing material and process selection, approaches, tools and software used in selection. Design For 'X': An introduction: Design for manufacturing, assembly and dissemble, an overview of DF'X'. Deign for maintainability and serviceability, design for environment, design for aesthetic, design for packaging, design for handling, design for safety, etc.

Module IV:

Design Cost Estimation: Need, cost indexes, categories; cost-capacity factors; design to cost and life cycle costing.

Module V:

Product Development Approaches: Concurrent engineering, partnership with supplier, collaborative and Internet based design, Design Project Management: PDM tools.

Reference Books
1. Dieter George E., Engineering Design, McGraw Hill Publication, 2000.
2. Ulrich Karl T and Eppinger Steven D., Product design and development, McGraw Hill Publication, 1995.
3. Chitale A.K. and Gupta R.C. Product Design and Manufacture, Prentice-Hall of India, New Delhi
4. Bralla, James G., Handbook of Product Design for Manufacturing, McGraw Hill Publication

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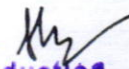Jabalpur (M.P.)
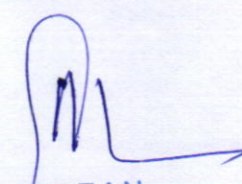
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Course Outcomes:

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

CO1	To acquire the basic knowledge of concurrent product design.
CO2	To establish knowledge regarding product design process.
CO3·	To build-up knowledge of material & manufacturing process selection.
CO4	To know about design cost estimation.
CO5	To know about product development approaches.

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

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

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COURSE CONTENTS   w.e.f. July 2024

Subject Code	Subject Name	Maximum Marks Allotted					Total Marks	Hours/ Week			Total Credits
		Theory			Practical						
IP803M	Major project /Internship	End Sem	Mid-sem Exam	Quiz/ Assignment	End sem	Lab work	250	L	T	P	8
		-	-	-	150	100		-	-	16	

Major project /Internship
(IP803M)

The Major Project Work provides students an opportunity to do something on their own and under the supervision of a guide. Each student shall work on an approved project, which should be selected from some real life problem as far as possible, which may involve fabrication, design or investigation of a technical problem. The project work involves sufficient work so that students get acquainted with different aspects of manufacturing, design or analysis. The students also have to keep in mind that in final semester they would be required to implement whatever has been planned in the major project in this semester. It is possible that a work, which involves greater efforts and time, may be taken up at this stage and finally completed in final semester, but partial completion report should be submitted in this semester and also evaluated internally. At the end of semester, all students are required to submit a synopsis.

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