



**SCHEME OF EXAMINATION
&
DETAILED SYLLABUS**

**MASTER OF TECHNOLOGY
M.Tech (ME)
PRODUCTION ENGINEERING
Sem-I to IV**



Bhopal-Chiklod Road, Near Bangrasia Chouraha,
Vill-Mendua, Distt-Raisen(Madhya Pradesh), Ph:07480-295707
e-mail-info@aisectuniversity.ac.in website: www.aisectuniversity.ac.in

COURSE STRUCTURE OF M.TECH (Advanced Production System)

Semester – I			Theory		Assignment		
Subject Code	Subject Name	Total Marks	Max Marks	Min Marks	Max Marks	Min Marks	Aggregate Pass Marks
TMPS 101	Advanced Mathematics	100	70	25	30	11	36
TMPS 102	Advanced in Mfg. Technology	100	70	25	30	11	36
TMPS 103	Comp. Integrated Manufacturing	100	70	25	30	11	36
TMPS 104	Computer aided Process Planning	100	70	25	30	11	36
TMPS 105	Mfg Automation and Mechatronics	100	70	25	30	11	36
Practical Group			Term End		Lab Work		
TMPS 106	Lab-I	100	70	25	30	11	36
TMPS 107	Lab-II	100	70	25	30	11	36
Semester – II			Theory		Assignment		
Subject Code	Subject Name	Total Marks	Max Marks	Min Marks	Max Marks	Min Marks	Aggregate Pass Marks
TMPS 201	Supply Chain Management	100	70	25	30	11	36
TMPS 202	FMS AND FEA	100	70	25	30	11	36
TMPS 203	Operation Management	100	70	25	30	11	36
TMPS 204	Robotics and Automated Material Handling	100	70	25	30	11	36
TMPS 205	Reliability and Total Productive Maintenance	100	70	25	30	11	36
Practical Group			Term End		Lab Work		
TMPS 206	Lab-III	100	70	25	30	11	36
TMPS 207	Lab-IV	100	70	25	30	11	36
Semester - III			Theory		Assignment		
Subject Code	Subject Name	Total Marks	Max Marks	Min Marks	Max Marks	Min Marks	Aggregate Pass Marks
TMPS 301(A)	Elective I	100	70	25	30	11	36

TMPS 302(B)	Elective II	100	70	25	30	11	36
Practical Group		Term End			Lab Work		Total Marks
					End Sem. Practical/Viva	Practical Record/ Assignment/ Quiz/ Presentation	
TMPS 303	Seminar					100	100
TMPS 304	Dissertation Part I (Literature review/Problem Formulation/Synopsis)				120	80	200

Elective I

- A) CNC Machines
- B) MIS and ERP

Elective –II

- A) Flexible Competitive Mfg. System
- B) Total Quality Management
- C) CI Process Inventory System

Semester - IV								
Practical Group		Term End			Credits	Lab Work		Total Marks
		L	T	P		End Sem. Practical/Viva	Practical Record/ Assignment/ Quiz/ Presentation	
TMPS 401	Dissertation Part - II	-	-	20	20	300	200	500
	Total	-	-	20	20	300	200	500

SEMESTER-I
AISECT UNIVERSITY, Bhopal, (M.P.)

Scheme of Examination

Department: Mechanical Engineering

Subject Code	Subject Name	Credits	Maximum marks Allotted					Duration of Exam.		
			Theory			Practical		Total	Theory	Practical
			End Sem	Mid Sem	Assgn.	End Sem	Term work			
TMPS - 101	Advance mathematics	4(3-1-0)	70	20	10			100	3 hr	

TMTP-101 Advanced Mathematics

Course outcomes:

1. Students will be able to analyze and develop the mathematical model of thermal system.
2. Student should able analyze the reliability and maintainability of the series and parallel thermal system.
3. Students will be able to solve differential equations using numerical techniques.

SYLLABUS

UNIT 1

Linear Algebra: Linear transformation, vector spaces, hash function, Hermite polynomial, Heavisite's unit function and error function. Elementary concepts of Modular mathematics

UNIT 2

Solution of Partial Differential Equation (PDE) by separation of variable method, numerical solution of PDE (Laplace, Poisson's, Parabolic) using finite difference methods, Elementary properties of FT, DFT, WFT, Wavelet transform, Haar transform.

UNIT 3

Probability, compound probability and discrete random variable, Binomial, Normal and Poisson's distributions, Sampling distribution, elementary concept of estimation and theory of hypothesis, recurred relations.

UNIT 4

Stochastic process, Markov process transition probability transition probability matrix, just and higher order Markov process, Application of Eigen value problems in Markov Process, Markov chain. Queuing system, transient and steady state, traffic intensity, distribution queuing system, concepts of queuing models (M/M/1: Infinity/ Infinity/ FC FS), (M/M/1: N/ Infinity/ FC FS), (M/M/S: Infinity/ Infinity/ FC FS)

UNIT 5

FEM: Variational functionals, Euler Lagrange's equation, Variational forms, Ritz method, Galerkin's method, discretization, finite elements method for one dimensional problems.

REFERENCE BOOKS:

1. Higher Engineering Mathematics by B.V. Ramana, Tata Mc Hill.
2. Advance Engineering Mathematics by Ervin Kreszig, Wiley Easten Edd.
3. Applied Numerical Methods with MATLAB by Steven C Chapra, TMH.
4. Advance Engineering Mathematics, O'Neil, Cengage (Thomson)
5. Introductory Methods of Numerical Analysis by S.S. Shastry,
6. Krishmurthy Finite element TMH
7. Buchanan Finite element analysis(Schaum Outline S) TMH
8. Numerical Solution of Differential Equation by M. K. Jain
9. Numerical Mathematical Analysis By James B. Scarborough
10. Fourier Transforms by J. N. Sheddon
11. Advance Mathematics for Engr and Sc, Spiegel, Schaum Series, TMH

(Board of studies)

(Academic Council)

(Registrar)

Seal

AISECT UNIVERSITY, Bhopal, (M.P.)

Scheme of Examination

Department: Mechanical Engineering

Subject Code	Subject Name	Credits	Maximum marks Allotted					Duration of Exam.		
			Theory			Practical		Total	Theory	Practical
			End Sem	Mid Sem	Assig n.	End sem	Term work			
TMPS - 102	Advances in manufacturing technology	4(3-1)	70	20	10	-	-	100	3 hr	-

SYLLABUS

UNIT 1

Metal cutting and tool materials: Orthogonal and oblique cutting -Types of tool wear, Abrasion. Diffusion, Oxidation. Fatigue and Adhesive wear - Prediction of tool life - Monitoring of tool wear, Cutting forces and vibration - Tool materials, cemented carbide, Coated carbide, Cermet, Ceramic, CBN and PCD - Selection of machine parameters and Tools.

UNIT 2

Special machining: Deep hole drilling - Gun drills - Gun boring - Trepanning - Honing - Lapping - Super finishing - Burnishing - Broaching - High speed machining.

UNIT 3

Unconventional machining: Principles, processes, Various influencing parameters and Applications of - Ultrasonic machining, Electro Discharge Machining, Electro Chemical Machining, Electron and Laser Beam Machining, Plasma Arc Machining and Water Jet Machining.

UNIT 4

Rapid prototyping: Stereo lithography - Laminated object manufacturing – selective laser sintering - solidier - Vacuum casting - Resin injection - Applications of RPT - Surface roughness terms - Influence of machining' parameters on surface roughness - Micro finishing process.

UNIT 5

Artificial intelligence and expert systems: Introduction - Pattern recognition - Control strategies - Heuristic search, Forward and Backward reasoning - Search algorithms - Game playing - Knowledge representation - structural representation of knowledge - Expert systems in manufacturing.

REFERENCE BOOKS:

1. Armarego E.J:A. and Brown RH., "The machining of metals ", Prentice Hall
2. Battacharya," Theory of metal cutting ", NCB Agency
3. HMT Manual, "Non-traditional machining methods "
4. Rich E. and Knight K, "Artificial Intelligence ", TMH
5. Pham D.7.; "Expert Systems in Engineering ", IFS Publishers, Springer- Verlag
6. Durvent WR, "The Lithographic handbook ", Narosa Publishers, 1995.
7. Pandey P.S. and Shah N. "Modern Manufacturing Processes ", /980.
8. Sadasivan TA. and Sarathy D. "Cutting tools for Productive Machining ", Widia Publication.

(Board of studies)

(Academic Council)

(Registrar)

Seal

AISECT UNIVERSITY, Bhopal, (M.P.)

Scheme of Examination

Department: Mechanical Engineering

Subject Code	Subject Name	Credits	Maximum marks Allotted					Duration of Exam.		
			Theory			Practical		Total	Theory	Practical
			End Sem	Mid Sem	Assig n.	End sem	Term work			
TMPS - 103	Computer integrated manufacturing	4(3-1)	70	20	10	-	-	100	3 hr	-

SYLLABUS

UNIT 1

Computer integrated manufacturing System Definition, CIM wheel concept, Evolution of CIM, CIM and system view of manufacturing, and CIM IT & Concurrent Engineering, Elements of CIM system, CIM hardware and software.

UNIT 2

Computer Aided Design Historical background, Development of CAD, CAD system hardware, Software, Graphics standards, Basic definitions, Modes of graphic operation, User interface, Software modules, Modeling and viewing.

UNIT 3

2D - Representation and Transformation of Points - transformation of Lines -Rotation. Reflection. Scaling and combined transformations - 3D scaling - shearing - Rotation - Reflection - Translation - Projections parametric representation of Ellipse, Parabola, Hyperbola

UNIT 4

Wire frame, Surface and Solid modeling - Solid modeling packages - Finite Element Analysis (FEA) -Introduction and procedures - Solution Techniques - Introduction to CAX packages.

UNIT 5

Manufacturing Planning and Control - CAD/CAM Integration - Principles of Computer Integrated Manufacturing - Hierarchical Network of Computers - Local Area Networks -

Process Planning: Computer Aided Process Planning - Retrieval and Generative approaches.

UNIT 6

CNC Machine Tool and Programming Development of CNC Technology, Principles, Features, NC, CNC, DNC concepts, Classification of CNC Machine Tools, CNC Controller, CNC Programming for various Controllers - SI numeric, Fanuc Program, G&M codes, Part Programming of Prismatic and revolved components, APT part programming using CAD, CAM S/w.

REFERENCE BOOKS:

1. Groover, Production System & CIM: PHI
2. Zeid, CAD/CAM Theory & Practice: Mc Graw Hills

(Board of studies)

(Academic Council)

(Registrar)

Seal

AISECT UNIVERSITY, Bhopal, (M.P.)

Scheme of Examination

Department: Mechanical Engineering

Subject Code	Subject Name	Credits	Maximum marks Allotted			Duration of Exam.	
			Theory	Practical	Total	Theor	Practica

			End Sem	Mid Sem	Assig n.	End sem	Term work		y	l
TMPS - 104	Computer aided process planning	4(3-1)	70	20	10	-	-	100	3 hr	-

SYLLABUS

UNIT 1

Introduction: The Place of Process Planning in the Manufacturing cycle - Process Planning and Production Planning - Process Planning and Concurrent Engineering, CAPP, Group Technology.

UNIT 2

Part design representation: Design Drafting - Dimensioning - Conventional tolerancing - Geometric tolerancing - CAD - input / output devices - topology - Geometric transformation - Perspective transformation - Data structure - Geometric modelling for process planning - GT coding - The optiz system - The MICLASS system.

UNIT 3

Process engineering and process planning: Experienced, based planning - Decision table and decision trees - Process capability analysis - Process Planning - Variant process planning - Generative approach - Forward and Backward planning, Input format, AI.

UNIT 4

Computer aided process planning systems: Logical Design of a Process Planning - Implementation considerations - manufacturing system components, production Volume, No. of production families - CAM-I, CAPP, MIPLAN, APPAS, AUTOPLAN and PRO, CPPP.

UNIT 5

An intergraded process planning systems: Totally integrated process planning systems - An Overview - Modulus structure - Data Structure, operation - Report Generation, Expert process planning.

REFERENCE BOOKS:

1. Gideon Halevi and Roland D. Weill, "Principles of Process Planning ", A logical approach, Chapman & Hall, 1995.

2. Tien-Chien Chang, Richard A. Wysk, "An Introduction to automated process planning systems ",Prentice Hall, 1985.
3. Chang, T.C., " An Expert Process Planning System ", Prentice Hall, 1985.
4. Nanua Singh, "Systems Approach to Computer Intergrated Design and Manufacturing ", John Wiley & Sons, 1996.
5. Rao, "Computer Aided Manufacturing ", Tata McGraw Hill Publishing Co., 2000.

(Board of studies)

(Academic Council)

(Registrar)

Seal

AISECT UNIVERSITY, Bhopal, (M.P.)

Scheme of Examination

Department: Mechanical Engineering

Subject Code	Subject Name	Credits	Maximum marks Allotted					Duration of Exam.		
			Theory			Practical		Total	Theory	Practical
			End Sem	Mid Sem	Assig n.	End sem	Term work			
TMPS - 105	Manufacturing Automation and	4(3-1)	70	20	10	-	-	100	3 hr	-

SYLLABUS

UNIT 1

Fundamental of Manufacturing and Automation; Manufacturing industries, Types of production, Function in manufacturing, Organisation & Information process in manufacturing, Plant layout, Production concept and mathematical model automation strategies

UNIT 2

Analysis of Automated Flow Lines Terminology, Analysis of transfer lines, Partial automation, Automated flow lines with storage buffers, Computer simulation of automated flow lines.

UNIT 3

Automated Assembling System Design for automated assembly, types of automated assembly, Past feeding devices, Analysis of multi-station assembly M/c, Analysis of single station assembly m/c.

UNIT 4

Mechatronics Introduction to Mechatronics - Systems - Mechatronics in Products - Measurement Systems -Control Systems -Traditional design and Mechatronics Design.

UNIT 5

Sensors & Transducers Introduction - Performance Terminology - Displacement, Position and Proximity - Velocity and Motion - Fluid pressure - Temperature sensors - Light sensors - Selection of sensors - Signal processing - Servo systems.

UNIT 6

Microprocessors in Mechatronics Introduction - Architecture - Pin configuration - Instruction set - Programming of Microprocessors using 8085 instructions - Interfacing input and output devices - Interfacing D/A converters and A/D converters -Applications - Temperature control - Stepper motor controller, Traffic light controller.

UNIT 7

Programmable Logic Controllers Introduction, basic structure, input-output processing, programming, Mnemonic, Timers, Internal relays and counters, data handling, Analog input / output - Selection of PLC.

UNIT 8

Design & Mechatronics Designing, Possible design solutions. Case studies of Mechatronics systems.

REFERENCE BOOKS:

1. Groover, Production System & CIM: PHI
2. Zeid, CAD/CAM Theory & Practice: Mc Graw Hills
3. Ramesh Gaonkar, Microprocessor Architecture, Programming and Appl. Wiley East P
4. Ghosh P.K., Sridhar P.R., Intro. to Microprocessors for Engineers and Sc., PHI

(Board of studies)

(Academic Council)

(Registrar)

Seal

SEMESTER-II
AISECT UNIVERSITY, Bhopal, (M.P.)

Scheme of Examination

Department: Mechanical Engineering

Subject Code	Subject Name	Credits	Maximum marks Allotted					Duration of Exam.		
			Theory			Practical		Total	Theory	Practical
			End Sem	Mid Sem	Assig n.	End sem	Term work			
TMPS - 201	Supply chain management	4(3-1)	70	20	10	-	-	100	3 hr	-

SYLLABUS

UNIT 1

Introduction: Logistics - Concepts, Definitions. Approaches, factors affecting logistics. Supply chain basic tasks of the supply chain - the new corporate model.

UNIT 2

Supply chain management: The new paradigm, the modular company, and the network relations. Supply process, Procurement process - Distribution management.

UNIT 3

Evolution of supply chain models: Strategy and structure - factors of supply chain - Manufacturing strategy stages, supply chain progress - model for competing through supply chain management - PLC grid, supply chain redesign - Linking supply chain with customer.

UNIT 4

Supply chain activity systems: Structuring the SC, SC and new product, functional roles in SC, SC design frame-work, collaborative product commerce (CPC).

UNIT 5

SCM organisation and information system: The management task, logistics organisation, the logistics information systems -Topology of SC application - MRP, ERP, Warehouse management system, product data management - cases.

REFERENCE BOOKS:

1. Scharj, P.B., Lasen, TS., Managing the global supply chain , Viva books, New Delhi
2. Ayers, J:B., "Hand book of supply chain management ", The St. Lencie press, 2000.
3. Nicolas, J:N., "Competitive manufacturing management-continuous improvement ", Lean production, customer focused quality, McGraw-Hill, NY; 1998.
4. Steudel, 1Ij: and Desruelle, P., "Manufacturing in the nineties-How to become a mean, lean and world class competitor ", Van Nostrand Reinhold; NY, 1992.

(Board of studies)

(Academic Council)

(Registrar)

Seal

AISECT UNIVERSITY, Bhopal, (M.P.)

Scheme of Examination

Department: Mechanical Engineering

		Credits	Maximum marks Allotted	Duration of Exam.
--	--	---------	------------------------	-------------------

Subject Code	Subject Name		Theory			Practical		Total	Theory	Practical
			End Sem	Mid Sem	Assig n.	End sem	Term work			
TMPS-202	FMS AND FEA	4(3-1)	70	20	10	-	-	100	3 hr	-

SYLLABUS

UNIT 1

CM System: Concurrent engineering and design methodology, collaborative product development, Product data management for manufacturing and design data reuse product life cycle management, arid collaborative product, commerce, Advance manufacturing, Cellular, Synchronous Agile, Lear, Manufacturing system, concept of rapid prototyping, reverse engineering, re-engineering, case studies.

UNIT 2

FMS: Definition of FMS, types and configuration, concept, types of flexibility and performance measures, Function of FMS host computer, FMS host and area controller, function distribution. Development and implementation: Planning phase integration, system configuration, FMS layouts, simulation, FMS project development steps.

UNIT 3

Basics of FEM - Initial value and boundary value problems - weighted residual, Galerkin and Raleigh Ritz methods - Review of Variational calculus -Integration by parts - Basics of Variational formulation.

UNIT 4

Steps in FEA - Descretization, interpolation, derivation of element characteristic matrix function, assembly and imposition of boundary conditions - Solution and post processing, One-dimensional analysis in solid mechanics and heat transfer.

UNIT 5

Global and Natural co-ordinates - Shape functions for one and two dimensional elements - Three noded triangular and four noded quadrilateral element - non linear analysis - Iso parametric elements - Jacobian matrices and transformations - Basics of two dimensional axi symmetric analysis.

UNIT 6

FE analysis of metal casting - Special considerations, latent heat incorporation. gap element - Time stepping procedures - crank - Nicholson ,algorithm - Prediction of grain structure - Basic concepts of plasticity - Solid and flow formulation - Small incremental deformation formulation - FE analysis of metal cutting. chip separation criteria, incorporation of strain rate dependency

REFERENCE BOOKS:

1. Vajpayee, Principles of CIM, PHI
2. Seshu, Text book of Finite Element Analysis, PHI

(Board of studies)

(Academic Council)

(Registrar)

Seal

AISECT UNIVERSITY, Bhopal, (M.P.)

Scheme of Examination

Department: Mechanical Engineering

Subject Code	Subject Name	Credits	Maximum marks Allotted					Duration of Exam.		
			Theory			Practical		Total	Theory	Practical
			End Sem	Mid Sem	Assig n.	End sem	Term work			
TMPS - 203	Operation management	4(3-1)	70	20	10	-	-	100	3 hr	-

SYLLABUS

UNIT 1

Operations Management: Introduction, Systems concept, Decisions, Organization, Objectives and

Evolution of Operations Management, comparing production of tangible goods and services,

Operations Strategy, Type of Production Systems, Role of Production Manager.

UNIT 2

Facilities Planning & Production Planning Control: Plant location, Plant layout and Material Handling, Layout analysis, Procedures such as CORELAP, CRAFT etc. Organization & Functions of PPC CAPP, Make or Buy Decision, Forecasting Methods & its relationship with Product Life Cycle, Case Studies.

UNIT 3

Aggregate Planning and Master Scheduling: Strategies of Aggregate Planning, Graphic & and Charting methods, Application of LP, Master Scheduling, Job Shop Scheduling and Sequencing Algorithms Gantt Chart, Line Balancing, LOB, Case Studies.

UNIT 4

Maintenance Management: Types of maintenance strategies, Breakdown, Preventive and Predictive maintenance, Individual and Group Replacement Policies, Case Studies.

UNIT 5

Materials Management as part of supply chain, Purchasing, stores and vendor selection, Inventory Models, Selective Inventory Control, MRP, MRP-II, Lot size Techniques, Just - In - Time system of manufacturing, Kaizen, Total Productive Maintenance (TPM), BPR, SCM, ERP etc.& Case Studies.

REFERENCES:

1. Hop W, Spearman M; Factory Physics; TMH
2. Charry S.N.; Production & Operations Management; TMH.
3. Chase, Aquilino, Production & Operations Management, TMH.
4. Eilon S. Production Planning and Control, McMillon Pub.
5. Vollmann; Mfg planning and control for SCM; TMH
6. Nahmias Steven; Production and Operations analysis; TMH

7. Bedi Kaniska; Production and Operations Management; Oxford Pub
8. Dobler & Lee, Purchasing & Materials Management, PHI.
9. Chitle A.K., Gupta R.C. Materials Management, PHI.
10. Monk Joseph; Schaum's outline of Operations Management; McGraw Hill.

(Board of studies)

(Academic Council)

(Registrar)

Seal

AISECT UNIVERSITY, Bhopal, (M.P.)

Scheme of Examination

Department: Mechanical Engineering

Subject Code	Subject Name	Credits	Maximum marks Allotted					Duration of Exam.		
			Theory			Practical		Total	Theory	Practical
			End Sem	Mid Sem	Assig n.	End sem	Term work			
TMPS - 204	Robotics and automated material handling	4(3-1)	70	20	10	-	-	100	3 hr	-

Pattern:

SYLLABUS

UNIT 1

Introduction: Basic concepts - Robot anatomy - Robot configurations - Basic robot motions - Types of drives - Applications - Material handling - processing - Assembly and Inspection - safety considerations.

UNIT 2

Transformations and kinematics: Vector operations - Translational transformations and Rotational transformations - Properties of transformation matrices- Homogeneous transformations and Manipulator - Forward solution - Inverse solution.

UNIT 3

Controls and end effectors: Control system concepts - Analysis - control of joints - Adaptive and optimal control - End effectors - Classification - Mechanical - Magnetic - Vacuum - Adhesive - Drive systems - Force analysis and Gripper design.

UNIT 4

Robot programming: Methods - Languages -Computer control and Robot Software -VAL system and Language.

UNIT 5

Sensory devices: Non optical and optical position sensors - Velocity and Acceleration - Range - Proximity - touch - Slip - Force - Torque - Machine vision - Image components - Representation - Hardware - Picture coding - Object recognition and categorization - Software consideration.

UNIT 6

Automated Material Handling and Storage: Functions types and analysis of material handling equipment, Design of conveyor and AGV system, Storage system performance, AS/RS, Carovsel storage system, WIP storage system, Interfacing handling, Storage within manufacturing

REFERENCE BOOKS:

1. Fu KS., GonzalezR.C., and Lee C.S.G., "Robotics control, sensing, vision, and intelligence
McGraw-Hill Book Co., 1987.

2. Klafter R.D., Chmielewski TA. and Negm IV. .. Rohot Engineering An Intergrated approach
Prentice Hall of India, New Delhi, 1994
3. Deb S.R., " Robotics Technology and Flerihle Auto"w(i('fl ", Tata McGraw-Hill Publishing
Co., Ltd.. 1994.
4. Craig J..J. " Introduction to Robotic.s Mechanics and Control ". Addison-Wesley, 1999.
5. Groover MP.. "/nduslriul roholic.s Technology}'. programming and application.
McGraw-
Hill Book Co., /995.

(Board of studies)

(Academic Council)

(Registrar)

Seal

AISECT UNIVERSITY, Bhopal, (M.P.)

Scheme of Examination

Department: Mechanical Engineering

Subject Code	Subject Name	Credits	Maximum marks Allotted					Duration of Exam.		
			Theory			Practical		Total	Theory	Practical
			End Sem	Mid Sem	Assig n.	End sem	Term work			
TMPS - 205	Reliability and total productive maintenance	4(3-1)	70	20	10	-	-	100	3 hr	-

SYLLABUS

UNIT 1

Introduction: Reliability function - MTBF - MTTF - mortality curve - availability - Maintainability.

Unit 2

Failure data analysis: Repair time distributions - exponential, normal, log normal, gamma, and Weibull- reliability data requirements - Graphical evaluation.

UNIT 3

Reliability prediction: Failure rate estimates - Effect of environment and stress - Series and Parallel systems - RDB analysis - Standby Systems - Complex Systems.

UNIT 4

Reliability management: Reliability demonstration testing - Reliability growth testing - Duane curve - Risk assessment - FMEA, Fault tree.

UNIT 5

Total productive maintenance: Causes of Machine Failures - Downtime - Maintenance policies - Restorability predictions - Replacement models - Spares provisioning - Maintenance management - Cleanliness and House Keeping.

REFERENCE BOOKS:

1. Paul Kales, Reliability for technology, "Engineering; and Management", Prentice Hall, New Jersey, 1998.
2. Modarres, "Reliability and Risk Analysis ", Meral DekkerInc., 1993.
3. Gopalakrishnan.P, and Banerji A.K., "Maintenance and, spare Parts Management ", Prentice Hall of India, New Delhi, 1996.

(Board of studies)

(Academic Council)

(Registrar)

Seal

Semester-III

AISECT UNIVERSITY, Bhopal, (M.P.)

Scheme of Examination

Department: Mechanical Engineering

Subject Code	Subject Name	Credits	Maximum marks Allotted					Duration of Exam.		
			Theory			Practical		Total	Theory	Practical
			End Sem	Mid Sem	Assig n.	End sem	Term work			
TMPS 301(A)	CNC Machines	4(3-1)	70	20	10	-	-	100	3 hr	-

SYLLABUS

UNIT 1

Introduction to CNC machine tools: Development of CNC Technology, principles, features, advantages, economic benefits, applications, CNC, DNC concept, classification of CNC Machine, types of control, CNC controllers, characteristics, interpolators.

UNIT 2

Structure of CNC machine tool: CNC Machine building, structural details, configuration and design, guide ways - friction and anti friction and other types of guide ways, elements used to convert the rotary motion to a linear motion - Screw and nut, recirculating roller screw, planetary roller screw, recirculating roller screw, rack and pinion, torque transmission elements - gears, timing belts, flexible couplings, Bearings.

UNIT 3

Drives and controls: Spindle drives - DC shunt motor, 3 phase AC induction motor, feed drives - stepper motor, servo principle, DC & AC servomotors. Open loop and closed loop control, Axis measuring system - synchro, synchro-resolver, gratings, moire fringe gratings, encoders, inductosyn, laser interferometer.

UNIT 4

CNC PROGRAMMING: Coordinate system, structure of a part program, G & M Codes, Manual part programming for Fanuc, Heidenhain, Sinumeric control system, CAPP, APT part programming using CAD/CAM, Parametric Programming.

UNIT 5

Tooling and maintenance of CNC: Cutting tool materials, carbide insets classification, qualified, semi qualified and preset tooling, tooling system for Machining centre and Turning centre, work holding devices, maintenance of CNC Machines.

Reference Book:

1. HMT. Mechatronics. Tata McGraw-Hill Publishing Company Limited, New Delhi
2. James Madison. "CNC Machining Hand Book ". Industrial Press Inc.. 1996.
3. Steve Krar, Arthur Gill. "CNC Technology and Programming ", McGraw-Hill
4. Berry Leathan, Jones, Introduction to Computer Numerical Control, Pitman. London
- 4, Hans B.Kiej, 7:Fredericx Waters, "Computer Numerical Control ", MacMillan McGraw
- 5, Bernard Hodgers, "CNC Part Programming Work Book ". cizv and Guid, Macmillan
6. David Gribbs, "An Introduction to CNC Machining ", Ca,\".\`ell, /9R7,
- 7, Sadasivan. 7:A, and .S'arathy, D.,"Cutting Tools for Productive Machining, Widia P
8. Radhakrishnan. P. "Computer Numerical Control Machines ". New Central Book Ag
9. Peter Smid, "CNC Programming Hand Book ", Industrial Press Inc., 2000.Web

(Board of studies)

(Academic Council)

(Registrar)

Seal

AISECT UNIVERSITY, Bhopal, (M.P.)

Scheme of Examination

Department: Mechanical Engineering

Subject Code	Subject Name	Credits	Maximum marks Allotted					Duration of Exam.		
			Theory			Practical		Total	Theory	Practical
			End Sem	Mid Sem	Assig n.	End sem	Term work			
TMPS - 301(B)	MIS and ERP	4(3-1)	70	20	10	-	-	100	3 hr	-

SYLLABUS

UNIT 1

Management Information System (MIS) definition, 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, Operation and mgt support, Decision process and MIS, info system components and activities, Value chain and MIS support.

UNIT 2

System concepts: types, definition, characteristics, feedback (Pull) and feed-forward (Push) control, system stress and entropy, computer as closed system, law of requisite variety, open and flexible (Adaptive) systems, work system model and comparison with

input-process-output model, five views of work system: structure, performance, infrastructure, context and risk and their effect on product performance.

UNIT 3

Info concepts: define data, info, knowledge, intelligence and wisdom. Information characteristics and attributes, info measurement and probability, characteristics of human as info processor.

UNIT 4

Planning and control Concepts: terminologies, difficulties in planning, system analysis and development plan-purpose and participants, info planning, (SDLC) system development life cycle for in-house and licensed sw, system investigation, analysis of needs, design and implementation phases, training of Operational personnel, evaluation, Control and Maintenance of Information Systems.

UNIT 5

E-business components and interrelationship, Evolution of Enterprise Resource Planning (ERP) from MRP, Supply chain management (SCM) and Customer relationship management (CRM), Integrated data model, strategic and operational issues in ERP, Business Process Re-Engineering (BPR), significance and functions, BPR, information technology and computer NW support to MIS.

UNIT 6

ERP Implementation, role of consultants, vendors and users, customization, methodology of ERP implementation and guidelines for ERP implementation, ERP modules.

Reference books:

1. Davis and Olson, MIS, TMH
 2. James O' Brian, MIS, TMH
 3. Business Process Re-Engineering, Jayaraman, TMH.
 4. ERP by V.K. Garg, PHI
 5. ERP by Alex Leon, and manuals of SAPP, MFG-pro.
-

(Board of studies)

(Academic Council)

(Registrar)

Seal

AISECT UNIVERSITY, Bhopal, (M.P.)

Scheme of Examination

Department: Mechanical Engineering

Subject Code	Subject Name	Credits	Maximum marks Allotted					Duration of Exam.		
			Theory			Practical		Total	Theory	Practical
			End Sem	Mid Sem	Assig n.	End sem	Term work			
TMPS - 302(A)	Flexible competitive mfg. Systems	4(3-1)	70	20	10	-	-	100	3 hr	-

SYLLABUS

UNIT 1

Manufacturing in a competitive environment: Automation of manufacturing process - Numerical control - Adaptive control - material handling and movement - Industrial robots - Sensor technology - flexible, fixturing - Design for assembly, disassembly and service.

UNIT 2

Group technology: Part families - classification and coding - Production flow analysis - Machine cell design - Benefits.

UNIT 3

Flexible manufacturing systems: introduction - Components of FMS - Application work stations - Computer control and functions - Planning, scheduling and control of FMS - Scheduling - Knowledge based scheduling - Hierarchy of computer control - Supervisory computer.

UNIT 4

COMPUTER SOFTWARE, SIMULATION AND DATABASE of FMS: System issues- Types of software - specification and selection - Trends – Application simulation - software - Manufacturing data systems - data flow - CAD/CAM considerations - Planning FMS database.

UNIT 5

JUST IN TIME: Characteristics of JIT - Pull method - quality -small lot sizes - work station loads - close supplier ties - flexible work force - line flow strat."b'Y' - preventive maintenance - Karban system - strategic implications -implementation issues -ARD liT – Lean manufacture.

Reference Books:

1. Groover MP., II Automation, Production System", un" Computer Integrated Manufacturing ", Prentice-Hall of India Pvt. Ltd., New Delhi, 1996
2. .fha, N.K. "Handbook of Flexible Manufacturing; Systems ", Academic Press Inc., 1991
3. Kalpakjian, "Manufacturing Engineering and technology ", Addison-Wesley Publishing Co. 1995.
4. Taiichi Ohno, Toyota, "Production System beyond Large-Scale production ", Productivity Press (India) Pvt. Ltd. , 1992.

Seal

AISECT UNIVERSITY, Bhopal, (M.P.)

Scheme of Examination

Department: Mechanical Engineering

Subject Code	Subject Name	Credits	Maximum marks Allotted					Duration of Exam.		
			Theory			Practical		Total	Theory	Practical
			End Sem	Mid Sem	Assig n.	End sem	Term work			
TMPS - 302(B)	Total Quality Management	4(3-1)	70	20	10	-	-	100	3 hr	-

SYLLABUS

UNIT 1

Introduction: Principles of Quality Management - Pioneers of TQM - Quality costs - Quality system Customer Orientation - Benchmarking - Re-engineering – Concurrent Engineering.

UNIT 2

Practices of TQM: Leadership - Organisational Structure - Team Building – Information Systems and Documentation - Quality Auditing - ISO 9000 - QS 9000.

UNIT 3

Techniques of TQM: Single Vendor Concept - J.I.T. - Quality Function deployment - Quality Circles - KAIZEN - SGA - POKA - YOKE - Taguchi Methods.

UNIT 4

Statistical quality control: Methods and Philosophy of Statistical Process Control - Control Charts for Variables and Attributes - Cumulative sum and Exponentially weighted moving average control charts - Others SPC Techniques - Process Capability Analysis - Six sigma accuracy.

UNIT 5

Acceptance sampling: Acceptance Sampling Problem - Single Sampling Plans for attributes - double, multiple and sequential sampling, Military standards - The Dodge – Roming sampling plans.

Reference Books:

1. Mohamed Zairi, ff Total Quality Management for Engineers ff. Woodhead Publishing Limited 1991.
2. Harvid Noori and Russel, ff Production Lind operation management - Total Quality and Responsiveness ff, McGraw-Hill Inc, 1995.
3. Suresh Dalela and Saurabh, ISO 9000 ff A Manual for Total Quality Management S. Chand and Company Ltd., 1997.
4. John Bank, ff The Essence of Total Quality Management ", Prentice Hall of 1f,Jia Pvt. Ltd. 1995.
5. Douglus C. Montgomery. ff Introduction to Statistical Quality C'ontrol ff, 2nd Edition, John Wiley and Sons. 1991.
6. Grant E.L and Leavensworth, ff Statistical Quality C'ontrol ff, McGraw-Hill, 1984.

(Board of studies)

(Academic Council)

(Registrar)

Seal

AISECT UNIVERSITY, Bhopal, (M.P.)

Scheme of Examination

Department: Mechanical Engineering

Subject Code	Subject Name	Credits	Maximum marks Allotted					Duration of Exam.		
			Theory			Practical		Total	Theory	Practical
			End Sem	Mid Sem	Assig n.	End sem	Term work			
TMPS - 302(C)	CI process inventory system	4(3-1)	70	20	10	-	-	100	3 hr	-

SYLLABUS

UNIT 1

Demand forecasting: Characteristics and Principles, Methods, Qualitative Methods - Delphi technique, Market Research, Intrinsic method-time-series analysis, moving averages, exponential smoothing - The Bon Jenkins method, Extrinsic methods - Regression models, measurement of forecast errors. Characteristics and Principles, Methods, Qualitative Methods - Delphi technique, Market Research, Intrinsic methods - time-series analysis, moving averages, exponential smoothing - The Bon Jenkins method, Extrinsic methods - Regression models, measurement of forecast errors.

UNIT2

Inventory management: Functions of inventory - Objectives - Inventory systems - Inventory models - Basic and advanced inventory models. Functions of inventory - Objectives - Inventory systems - Inventory models - Basic and advanced inventory models.

UNIT 3

Production planning: Purpose, Characteristics - Aggregate Planning - methods - Master Production Scheduling - functions - Time buckets - time fences - Orders - Reports. Purpose, Characteristics - Aggregate Planning - Methods - Master Production scheduling - functions - Time buckets -time fences - Orders - Reports.

UNIT 4

MATERIALS, REQUIREMENT PLANNING AND CAPACITY PLANNING: purpose of MRP - Inputs to MRP - MRP LOGIC - Planning Factors - Outputs from MRP – Resource Planning -Capacity Planning. Purpose of MRP - Inputs to MRP - MRP LOGIC - Planning factors - Outputs from MRP - resource Planning - Capacity Planning

UNIT 5

Current trends JIT Supply chain Management concurrent engineering MRP II ERP

Reference Books:

1. L.J. Krajewski, L.P. Ritzman, Operations Mgt Strategy and Analysis, Addison Wesley
2. S'pencer B.Smith, "Computer Based Production and Inventory Control", PHI
3. Joseph S.Martinkh, "Production and Operations Management ", John wiley & sons
4. Joseph Monks, Operation Management, Theory and Practice, TMH
5. Nanu Singh, "Systems approach to computer-integrated design and Manufacturing ", John Wiley & Sons, 1996.

(Board of studies)

(Academic Council)

(Registrar)

Seal

AISECT UNIVERSITY, Bhopal, (M.P.)

Semester –IV				End sem		Assignment		
Subject Code	Subject Name	Credits	Total	Max	Min	Max	Min	Aggregate

			Marks	Marks	Marks	Marks	Marks	Pass Marks
TMPS-401	Dissertation Part-II	20	500	300	150	200	100	250
	TOTAL	20	500	300	150	200	100	250

Scheme of Examination

(Board of studies)

(Academic Council)

(Registrar)

Seal