VISVESVARAYA TECHNOLOGICAL UNIVERSITY, BELGAUM

SCHEME OF TEACHING AND EXAMINATION FOR

M.TECH.-PRODUCTION ENGINEERING & SYSTEM TECHNOLOGY (MPT)

III Semester: INTERNSHIP **CREDIT BASED**

Course Code	Subject	No. of Hrs./Week		Duration of the Exam in Hours	Marks for		Total Marks	CREDITS
		Lecture	Practical / Field Work		I.A.	Exam		
16MPT31	Seminar / Presentation on Internship (After 8 weeks from the date of commencement)	-	-	-	25	-	25	20
16MPT 32	Report on Internship	-	-	-	25	-	25	
16MPT 33	Evaluation and Viva-voce of Internship	-	-	-	–	50	50	
16MPT34	Evaluation of Project Phase 1				50	-	50	1
	Total	**-**	**-**	**-**	**100**	**50**	**150**	**21**

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M.TECH.-PRODUCTION ENGINEERING & SYSTEM TECHNOLOGY (MPT)

IV Semester **CREDIT BASED**

Subject Code	Subject	No. of Hrs./Week		Duration of Exam in Hours	Marks for		Total Marks	CREDITS
		Lecture	Field Work / Assignment / Tutorials		I.A.	Exam		
16MPT41	Advanced Manufacturing Practices	4	--	3	20	80	100	4
16MPT42X	Elective-III	3	-	3	20	80	100	3
16MPT43	Evaluation of Project Phase-II	-	-	-	50	-	50	3
16MPT44	Evaluation of Project Work and Viva-voce	–	-	-	-	100+100	200	10
Total		**7**	**--**	**06**	**90**	**360**	**450**	**20**

Elective – III	
Sub. Code	**Name of the Subject**
16 MPT 421	Industrial Design & Ergonomics
16 MPT 422	Human Resource Management
16 MPT 423	Advanced Fluid Power Systems
16 MPT 424	Project Management

Note:

1) Project Phase – I : 6 weeks duration shall be carried out between II and III Semesters. Candidates in consultation with the guides shall carryout literature survey / visit to Industries to finalise the topic of dissertation. .
2) Project Phase – II : 16 weeks duration during 4 semester. Evaluation shall be done by the committee constituted comprising of HOD as Chairman, Guide and senior faculty of the Department.
3) Project Evaluation: Evaluation shall be taken up at the end of 4 semester. Project work and evaluation and Viva Voce examination shall be conducted.

    a. Internal Examiner shall carry out the evaluation for 100 marks
    b. External Examiner shall carry out the evaluation for 100 marks.
    c. The average of marks allotted by the internal and external examiner shall be the final marks of the project evaluation.
    d. Viva-Voce examination of project work shall be conducted jointly by Internal and External examiner for 100 marks

ADVANCED MANUFACTURING PRACTICES

Sub Code	**: 16 MPT 41**	IA Marks	: 20
No. of Lecture Hrs/week	: 04	Exam Hours	: 03
Total Lecture Hrs	: 50	Exam Marks	: 80

MODULE 1

Need of CPC for a company, what CPC can do, CPC-getting the right tool.

JIT – Introduction – The spread of JIT Movement, some definitions of JIT, core Japanese practices of JIT, Creating continuous Flow Manufacture, Enabling JIT to occur, Basic elements of JIT, Benefits of JIT.

Just in Time Production – Primary purpose, profit through cost reduction, Elimination of over production, Quality control, Quality Assurance, Respect for Humanity, Flexible work Force, JIT Production Adapting to changing production Quantities, process layout for shortened lead Times, Standardization of operation, Automation.

Sequence and scheduling used by suppliers: Monthly and daily Information. Sequenced withdrawal system by sequenced schedule table, problems and counter measures in applying the Kanban system to sub contractors.

MODULE 2

Toyota Production System-The philosophy of TPS, Basic Frame work of TPS, Kanbans.

Determining the Number of Kanbans in Toyota Production System.

a) Kanban Number under Constant Quantity Withdrawal System.
b) Constant Cycle, Non-constant Quantity Withdrawal System.

Supplier Kanban and the Sequence Schedule for Use by Suppliers.

a) Later Replenishment System by Kanban.
a) Sequenced Withdrawal System.
b) Circulation of the Supplier Kanban within Toyota.

Production Smoothing in TPS
Production Planning
Production Smoothing
Adaptability to Demand Fluctuations
Sequencing Method for the Mixed Model Assembly Line to Realize Smoothed Production of Goal.

MODULE 3

Just-in-Time Production with Total Quality Control just in time concept, cutting lot sizes, cutting set-up times, cutting purchase order costs, the JIT cause-Effect chain, Scrap/Quality Improvements, Motivational effects, Responsibility effects, small Group improvement Activities, withdrawal of Buffer Inventory, the total Quality Control Concept.

MODULE 4

Total Quality Control-Introduction-Total Quality Control concepts, responsibility, learning from the west, TQC concepts categorized, Goals, Habit of improvement, perfection, Basics, process control, Easy to see Quality control as facilitator, small lot sizes, Housekeeping, Less than full capacity scheduling, Daily machine checking, Techniques and Aids, Exposure of problems, Fool proof Devices, Tools of Analysis, QC Circles, TQC in Japanese-owned US Electronics plant, TQC in Japanese-owned Automotive plants.

MODULE 5

Plant Configurations: Introduction-ultimate lant configuration, job shop Fabrication, Frame Welding, Forming Frame parts from Tubing, Dedicated production lines, overlapped production, the daily schedule, Forward Linkage by means of Kanban, physical merger of processes, Adjacency, mixed Models, Automated production Lines, Pseudo Robots, Robots, CAD and Manufacturing, Conveyors and stacker Cranes, Automatic Quality Monitoring.

TEXT BOOKS:

1. **Japanese Manufacturing Techniques** - Richard Schonberger - Pearson Higher Education - ISBN: 0029291003 1982
2. **Just In Time Manufacturing** – Kargoanker (manual).
3. **Wind-chill** reference manual.

REFERENCE BOOKS:

1. **An Integrated Approach To Just In Time** - Yasuhiro Monden - Toyota Production system.
2. **Lean Thinking** - James Womack - Simon & Schuster Adult - ISBN: 0743249275, 2003.
3. **The machine that changed the World** - James P. Womack, Daniel T Jones, and Daniel Roos - The story of Lean production – by– Harper Perennial edition published -1991.

ELECTIVE III

INDUSTRIAL DESIGN AND ERGONOMICS

Sub Code	**: 16 MPT 421**	IA Marks	: 20
No. of Lecture Hrs/week	: 03	Exam Hours	: 03
Total Lecture Hrs	: 40	Exam Marks	: 80

MODULE 1

Introduction: An approach to industrial design - elements of design structure for industrial design in engineering application in modem manufacturing systems.

Ergonomics and Industrial Design: Introduction - general approach to the man-machine relationship-workstation design-working position.

MODULE 2

Control and Displays: shapes and sizes of various controls and displays-multiple displays and control situations - design of major controls in automobiles, machine tools etc., - design of furniture design of instruments.

MODULE 3

Ergonomics and Production: Ergonomics and product design ergonomics in automated systems-expert systems for ergonomic design, Anthropomorphic data and its applications in ergonomic design limitations of anthropomorphic data - use of computerized database.

MODULE 4

Visual Effects of Line and Form: The mechanics of seeing psychology of seeing, general influences of lined and form.

Colour: colour and light - colour and objects - colour and the eye colour consistency - colour terms - reactions to colour and colour continuation - colour on engineering equipments.

MODULE 5

Aesthetic Concepts: Concept of unity - concept of order with variety - concept of purpose style and environment - Aesthetic expressions. Style-components of style - house style, observations style in capital goods.

Industrial Design in Practice: General design - specifying design equipments - rating the importance of industrial design – industrial design in the design process.

TEXT BOOKS:

1. **Industrial design for Engineers** - Mayall W.H. - London Cliffee Books Ltd. - 1988.
2. **Applied Ergonomics Hand Book** - Brien Shakel (Edited) - Butterworth Scientific, London – 1988.

HUMAN RESOURCE MANAGEMENT

(Common to 10 MSE 322 / 10 MPT 322 / 10 MPE 322 / 10 MPT 322 / 10 MPY 322)

Sub Code	**: 16 MPT 422**	IA Marks	: 20
No. of Lecture Hrs/week	: 03	Exam Hours	: 03
Total Lecture Hrs	: 40	Exam Marks	: 80

MODULE 1

HRM in perspective, competitive challenges, uses of HR information, Demographics and employee concerns, social issues, diversity in. HRM,

Relationship of Job Requirements and HRM functions, Job Analysis, Job Description, Job Design, Designing work for groups, flexible work schedules, Industrial engineering and ergonomic consideration, HR Planning, Effective HRP, Forecasting and balancing supply and demand of HR, recruiting from inside and outside, Recruiting protected class, Recruiting older people.

MODULE 2

Selection, Matching people and job, sources of information about job candidate, The US Employee Polygraph Protection Act, graphology, Medical examination, Drug test, Interview methods Guidelines for interviewers, appropriate and inappropriate interview questions, selection decision.

MODULE 3

Developing effectiveness in HR, Investment in Training, System approach, Conducting the .needs assessment, designing training programs, trainee readiness and motivation, principles of learning, characteristics of trainees, training methods for non-managerial employees, OJT, Technology for training, training methods for MDP, Evaluating, benchmarking HR training. .

MODULE 4

Career development and Appraisal, identifying career opportunity and requirements, gauging employee potential, career development initiative, Mentor check list, career development for women and minorities, dual career couples, personal career development, Behavioral methods of appraisal, balanced score card, personal score card appraisal interviews; performance diagnosis

MODULE 5

International HRM, Managing across borders, International staffing, Skills of a global manager, content of training program. Non-verbal communications, developing local resources, compensation of host country employees, managers and expatriate managers.

Case studies on appraisal system, developing a training session, evaluating a given training program. preparation of structured and unstructured interviews

REFERENCE BOOKS:

1. **Managing Human Resources** - Wayne F Cascio - Tata McGraw Hill, New Delhi .
2. **Managing Human Resources** - George Bohlander and Scot Snell - Thompson South western.
3. **Human Resource Management** - Biswajeet Pattanayak - Prentice Hall of India Pvt. Ltd.
4. **Human Resource Management** - K. Ashwathappa,
5. **Personnel Management** - C.B.Memoria - Himalaya Publishing.

ADVANCED FLUID POWER SYSTEMS

Sub Code	**: 16 MPT 423**	IA Marks	: 20
No. of Lecture Hrs/week	: 03	Exam Hours	: 03
Total Lecture Hrs	: 40	Exam Marks	: 80

MODULE 1

Introduction: Pascal Law, Advantages of Fluid Power, Applications of Fluid Power, Components of a Fluid Power.

Hydraulic Power Unit: Introduction, Pumping Theory, Pump Classification, Gear Pumps, (Vane Pumps- simple, balanced & pressure compensated vane pump, Vane design) Piston Pumps- Radial, Axial (Bent axis & Swash plate), Pump Performance, Pump Noise, Ripple in pumps.

Hydraulic Actuators: Linear actuator- cylinders, Mechanics of Hydraulic cylinder loading, limited rotation hydraulic actuator, cylinder cushioning, Gear, Vane & Piston motor, Motor performance, Hydrostatic transmission

MODULE 2

Power Controlling Elements – Valves :

i) Directional Control Valves – Classification, 2/2, 3/2,4/2 & 4/3 ways Dcv's, Different Centre configurations in 4/3 way valves, actuation of DCV's, Indirect actuation, Valve Lap – Lap during Stationary and during switching.

ii) Pressure Control Valves: Classification, opening & Closing Pressure difference, Cracking Pressure, Pressure Relief Valve – Simple & Compound type, Pressure reducing valve, sequence, unloading & Counter balance valve, Pressure switches.

iii) Flow Control valves – Fixed throttle, Variable throttle, Pressure Compensation principles, pressure compensated Flow control valve – Reducing & Relief type.

iv) Check valve, Pilot operated check valve.

MODULE 3

Hydraulic Circuit Design & Analysis: Control of Single & double acting cylinder, Regeneration circuit, cylinder sequencing & Synchronizing circuit. Speed control of cylinder & Motors, Analysis of Hydraulic system with frictional losses, Accumulators &accumulator circuits.

Pneumatic System: Introduction, – Generation of compressed air, air receiver, servicing FRL unit, Air filter, pressure regulation, lubricator, Pneumatic cylinder & air motor – different types of cylinder, cushion assembly. Cylinder performance.

Pneumatic Valve: Directional control valves, impulse valve, Quick exhaust valve, shuttle valve, Twin pressure valve, Time delay valve,

MODULE 4

Pneumatic Circuit & Logic Circuits:- Control of single and double acting cylinder, impulse operation, speed control, sequencing, Pneumatic Vacuum system AND,OR, NOT, NAND, NOR, YES Function, Logic circuits design using shuttle valve & twin pressure valve, Binary Arithmetic, logic & Boolean Algebra, use of kannaugh veitch map for pneumatic circuit design.

MODULE 5

Electrical Control in Fluid Power: Contactors, & Switches, Relays, Limit switch, Electro hydraulic & Electro Pneumatic Circuits, Simple Cylinder reciprocation, interlocking using relays, Proximity switches, application of proximity switches, Time dependent will dependent and travel dependent circuits.

REFERENCE BOOKS:

1. **Fluid Power with Application** - Anthony Esposito - Peason Education - 5th edition.

2. **Oil hydraulics -Principles & maintenance** - S.R. Majumdar - Tata M C Graw Hill
3. **Components & Application** - Bosch Rexroth didactic - Hydraulics Trainer - vol 1. Publication
4. **Pneumatic System, Principles and Maintenance** - S.R. Majumdar - Tata M C Graw Hill Publication.
5. **Pneumatics: Theory and Applications** - Bosch Rexroth didactic - Publication
6. **Electro Pneumatics** - Bosch Rexroth didactic - Vol. 2, Publication.

PROJECT MANAGEMENT

Sub Code	**: 16 MPT 424**	IA Marks	: 20
No. of Lecture Hrs/week	: 03	Exam Hours	: 03
Total Lecture Hrs	: 40	Exam Marks	: 80

MODULE 1

Introduction: Identification of Investment Opportunities, Market and Demand Analysis – Technical Analysis - Investment Outlay.

MODULE 2

Means of Financing -Profitability and Breakeven Analysis -Cash Flows of Projects -Tax factor in investment Analysis -Interest Compounding and Discounting.

MODULE 4

Appraisal Criteria and Selection of Investment -cost of capital analysis of Risk -Financial Projection, social Cost Benefit Analysis

MODULE 4

Manpower Management in Projects -Functional Approach to Manpower Management, - the Element of decision Process Project Team Concepts - Field Autonomy- Policies Governing Projects.

MODULE 5

Networks Techniques in Project Management -*PERT/CPM* Analysis - Administrative aspects of Capital Investment.

REFERENCE BOOKS:

1. **Projects - appraisal, preparation, budgeting and implementation** – Prasannachandra - Tata MCgraw hill.
2. **Handbook of Project Management** - Dennis lock.
3. **Project Management** - Dennis lock - Gower Publishing Ltd - 8th Revised edition.