

VISVESVARAYA TECHNOLOGICAL UNIVERSITY, BELAGAVI

CHOICE BASED CREDIT SYSTEM (CBCS)

SCHEME OF TEACHING AND EXAMINATION FOR 2016 - 17

M.TECH.-PRODUCTION MANAGEMENT (MPM)**III Semester: INTERNSHIP**

Subject Code	Name of the Subject	Teaching hours / week		Duration of Exam in Hrs	Marks for		Total Marks	Credits
		Lecture	Practical / Field work / Assignment / Tutorials		I.A	Exam		
16MPM31	Seminar / Presentation on Internship (After 8 weeks from the date of commencement)	-	-	-	25	-	25	20
16MPM32	Report on Internship	-	-	-	50	-	50	
16MPM33	Evaluation and Viva-voce of Internship	-	-	-	-	75	75	
16MPM34	Evaluation of Project phase -1	-	-	-	25	-	25	1
Total		-	-	-	100	75	175	21

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M.TECH.-PRODUCTION MANAGEMENT (MPM)

IV Semester:

Subject Code	Name of the Subject	Teaching hours / week		Duration of Exam in Hrs	Marks for		Total Marks	Credits
		Lecture	Practical / Field work / Assignment / Tutorials		I.A	Exam		
16MPM41	Human Resource Management	4	-	3	20	80	100	4
16MPM42X	Elective-III	3	-	3	20	80	100	3
16MPM43	Evaluation of Project Phase-II	-	-	-	50	-	50	3
16MPM44	Evaluation of Project Work & Viva-voce	-	-	3	-	100+100	200	10
Total		-	-	9	90	360	450	20
Grand Total (I to IV Sem.) : 2025 Marks; 85 Credits								

Elective – III	
16MPM421	Industrial Design & Ergonomics
16MPM422	Advanced Joining Process
16MPM423	Advanced Fluid Power Systems
16MPM424	Project Management
16MPM425	Nano Technology

HUMAN RESOURCE MANAGEMENT
[As per Choice Based Credit System (CBCS) scheme]
SEMESTER – IV

Note:

- 1. Project Phase-1:** 6-week duration shall be carried out between 2nd and 3rd Semester vacation. Candidates in consultation with the guide shall carry out literature survey/ visit industries to finalize the topic of Project.
- 2. Project Phase-2:** 16-week duration during 4th 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 4th semester. Project work evaluation and Viva-Voce examination shall be conducted
- 4. Project evaluation:**
 - 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.

Subject Code	16MPM41	IA Marks	20
Number of Lecture Hours/Week	04	Exam Marks	80
Total Number of Lecture Hours	50	Exam Hours	03
<p>Course Objectives: The student will learn to</p> <ol style="list-style-type: none"> 1. Develop the knowledge, skills and concepts needed to resolve actual human resource management problems or issues. 2. Assess training requirements and design a successful orientation and training program. 3. Synthesize information regarding the effectiveness of recruiting methods and the validity of selection procedures and make appropriate staffing decisions. 4. Obtain the practical skills required by managers actively engaged in the career development of people within organizations. 5. Gain proficiency in communication skills, independent action and team working. 			
Modules			Teaching Hours
Module- 1			
<p>HRM in perspective: Competitive challenges and human resources management, Demographics and employee concerns, social issues, diversity in HRM. Job requirements: Job Analysis, Job Description, Job Design, Flexible work schedules, Industrial engineering and ergonomic considerations.</p>			10 Hours
Module- 2			
<p>HRM functions: Human Resource Planning and its importance, elements of Effective HRP, Recruiting from inside and outside the organization, and Recruiting protected class, and Recruitment of older people. Selection, Matching people and job: Sources of information about job candidate, Polygraph test, honesty and integrity test, graphology, Medical examination, Drug test. Employment tests, classification of employment tests.</p>			10 Hours
Module- 3			

<p>Employment Interview: Employment Interview methods, Guidelines for employment interviewers, Reaching a selection decision.</p> <p>Training: Four phases of System approach to training, Principles of Learning, Characteristics of trainees, Apprenticeship training, Training methods for Management Development, Benchmarking.</p>	10 Hours
Module- 4	
<p>Carrier Opportunities in HR:Identifying career opportunity and requirements, gauging employee potential.</p> <p>Career development: 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</p>	12 Hours
Module- 5	
<p>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.</p>	08 Hours
<p>Course Outcomes: On completion of the course the student will be able to</p> <ol style="list-style-type: none"> 1. Understand the Competitive challenges, key terms, theories/concepts and practices within the field of human resource management. 2. Identify and analyze problems in the field of recruitment and be able to provide innovative solutions. 3. Know the selection process and employment interview methods in industries. 4. Learn how to measure the employee potential and behavior in industries. 	
<p>Question paper pattern:</p> <ol style="list-style-type: none"> 1. The question paper will have ten questions. 2. Each full question consists of 16 marks. 3. There will be 2 full questions (with a maximum of four sub questions) from each module. 4. The students will have to answer 5 full questions, selecting one full question from each module. 	
<p>Text Books:</p> <ol style="list-style-type: none"> 1. Managing Human Resources - George Bohlander and Scot Snell - Thompson South western. 2. Human Resource Management - BiswajeetPattanayak - Prentice Hall of India Pvt. Ltd. 3. Human Resource Management - K. Ashwathappa 	

Reference Books:

1. **Personnel Management** - C.B. Memoria - Himalaya Publishing.
2. **Managing Human Resources** - Wayne F Cascio - Tata McGraw Hill, New Delhi

INDUSTRIAL DESIGN AND ERGONOMICS [As per Choice Based Credit System (CBCS) scheme] SEMESTER – IV			
Subject Code	16MPM421	IA Marks	20
Number of Lecture Hours/Week	03	Exam Marks	80
Total Number of Lecture Hours	40	Exam Hours	03
Course Objective: The student will learn the <ol style="list-style-type: none"> 1. Role of ergonomics in industry 2. Design of work place based on ergonomics 3. Industrial aesthetics benefits. 4. Industrial design fundamentals and concepts 			
Modules		Teaching Hours	
Module- 1			
Introduction: An approach to industrial design - elements of design structure for industrial design in engineering application in modern manufacturing systems. Ergonomics and Industrial Design: Introduction - general approach to the man-machine relationship-workstation design-working position.		06 Hours	
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. 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.		08 Hours	
Module- 3			
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 -		08 Hours	

colour on engineering equipments.	
Module- 4	
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.	08 Hours
Module- 5	
Industrial Design in Practice: General design - specifying design equipments - rating the importance of industrial design – industrial design in the design process.	10 Hours
<p>Course Outcomes: On completion of the course the student will :</p> <ol style="list-style-type: none"> 1. Able to understand the role of ergonomics in industrial design. 2. Understand the role of ergonomics in Production. 3. Design the work place for the comfort of the workers. 	
<p>Question paper pattern:</p> <ol style="list-style-type: none"> 5. The question paper will have ten questions. 6. Each full question consists of 16 marks. 7. There will be 2 full questions (with a maximum of four sub questions) from each module. 8. The students will have to answer 5 full questions, selecting one full question from each module. 	
<p>Text Books:</p> <ol style="list-style-type: none"> 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. 	
<p>Reference Books:</p> <ol style="list-style-type: none"> 1. Fundamentals of Industrial Ergonomics, Babur Mustafa Pulat, Waveland Press, 01-Jan-1997, ISBN 0881339490, 9780881339499 2. Industrial ergonomics: a practitioner's guide, David C. Alexander, Babur Mustafa Pulat, Industrial Engineering & Management Press, Institute of Industrial Engineers, 1985, 28 Nov 2007, ISBN 0898060737, 9780898060737 	

ADVANCED JOINING PROCESSES [As per Choice Based Credit System (CBCS) scheme] SEMESTER – IV			
Subject Code	16MPM422	IA Marks	20
Number of Lecture Hours/Week	03	Exam Marks	80
Total Number of Lecture Hours	40	Exam Hours	03
Course Objectives: The student will learn to 5. Impart knowledge regarding various advanced welding practices in industries. 6. Understand the various parameters and requirements for welding processes. 7. Understand the various methods of welding inspection. 8. Know the comparative merits and demerits of various welding processes. 9. Understand the right kind of welding technique suitable for various joints. 10. Learn the joint designs adopted in different types of welding techniques			
Modules		Teaching Hours	
Module- 1			
Welding Distortion: Introduction, Distortion and residual stresses, concept of distortion, types of distortion, Control of welding distortion, minimizing distortion in repair work, Effect of metal properties on welding distortion, Calculation of shrinkage. Welding processes: Electro Slag Welding, Electron Beam Welding, Plasma arc Welding, Laser Beam Welding, Explosion Welding, Diffusion Welding, Ultrasonic Welding, Friction welding and Thermit welding.		09 Hours	
Module- 2			

<p>Welding of Dissimilar Metals: Introduction, Concept and metallurgical problems in dissimilar metals welding, techniques for welding dissimilar metals, welding various dissimilar metals combination.</p> <p>Welding of Plastics: Introduction, Principle of welding plastics, common weldable plastics, weld joint design, surface preparation, Plastics welding processes such as Heated tool welding, Hot gas welding, High frequency welding, Ultrasonic welding and Friction welding with their principle of operation, Equipment required, Advantages, Disadvantages and Application.</p>	09 Hours
Module- 3	
<p>Welding Symbols: Need for, representing the welds, Basic weld symbols, Location of Weld, Supplementary symbols, Dimensions of welds, Examples</p> <p>Welding Design: Introduction, Principles of sound welding design, Welding joint design Welding positions, Allowable strengths of welds, under steady loads. Allowable fatigue strength of weld. Design of weld subjected to combined stresses. Weld throat thickness, solved and Unsolved Examples</p>	09 Hours
Module- 4	
<p>Inspection of Welds: Destructive techniques like Tensile, Bend, and Nick break, Impact & Hardness. Non-Destructive techniques like 'X' rays, Ultrasonic, Magnetic particle, Dye Penetrate, Gamma ray inspection.</p> <p>Quality Control in Welding: Introduction, Quality assurance v/s Quality control, Weld quality, Discontinuities in welds, their causes and remedies and Quality conflicts.</p>	07 Hours
Module- 5	
<p>Computer-Aided Welding Design: Introduction, welding analysis, Engineering design v/s welding design, perspectives in welding design, solution to the welding design problems.</p> <p>Computer-Aided Welding Analysis: Computer-aided welding analysis, computer-aided welding design, use of interactive computer graphics, cautions and conclusions.</p>	06 Hours
<p>Course Outcomes: On completion of the course the student will be able to</p>	

1. Introduce the various advanced welding techniques which make them interested to choose a career in the field of welding.
2. Understand the advanced welding practices in Industries and their comparative merits and demerits.
3. Select the right kind of welding techniques for joining raw materials of various thicknesses.
4. Select appropriate welding technique suitable for joining various types of metals.

Question paper pattern:

9. The question paper will have ten questions.
10. Each full question consists of 16 marks.
11. There will be 2 full questions (with a maximum of four sub questions) from each module.
12. The students will have to answer 5 full questions, selecting one full question from each module.

Reference Books:

1. **Welding Technology** - O.P. Khanna
2. **Welding Engineering** - Rossi - McGraw Hill.
3. **Advanced Welding processes** - Nikodaco&Shansky - MIR Publications.
4. **Welding Engineering Handbook** - A.W.S.
5. **Welding for Engineers** - Udin, Funk &Wulf

ADVANCED FLUID POWER SYSTEMS
[As per Choice Based Credit System (CBCS) scheme]
SEMESTER – IV

Subject Code	16MPM423	IA Marks	20
Number of Lecture Hours/Week	03	Exam Marks	80
Total Number of Lecture Hours	40	Exam Hours	03
<p>Course Objective: The course objective is to make students to familiarize:</p> <p>11. The advantages and applications of Fluid Power Engineering and Power Transmission System.</p> <p>12. The Applications of Fluid Power System in automation of Machine Tools and others Equipments.</p>			
MODULES		Teaching Hours	
MODULE- 1			
<p>FLUID POWER SYSTEMS AND FUNDAMENTALS: Introduction to fluid power system Review of Pascal's law and its applications in Fluid Power Systems, Structure of Hydraulic control system, Advantages and disadvantages of fluid power & its applications.</p> <p>The Source of Hydraulic Power: Hydraulic Pumps, pumping theory, pump classification, Gear pumps, Vane pumps, piston pumps, variable displacement pumps, pump performance and pump selection.</p>		08 Hours	
MODULE- 2			
<p>Hydraulic Actuators: Linear Hydraulic Actuators (cylinder), Cylinder mountings, Cylinder Force, Velocity and Power, Cylinder loading through mechanical linkages, Hydraulic Cylinder cushions, hydraulic Rotary Actuators, Gear motors, vane motors, piston motors, Hydraulic theoretical torque, power and flow rate, Hydraulic motor performance.</p> <p>Control components in Hydraulic Systems:</p> <p>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.</p> <p>ii) Pressure Control Valves: Classification, opening & Closing Pressure</p>		08 Hours	

<p>difference, Cracking Pressure, Pressure Relief Valve – Simple & Compound type, Pressure reducing valve, sequence, unloading & Counter balance valve, Pressure switches.</p> <p>iii) Flow Control valves – Fixed throttle, Variable throttle, Pressure Compensation principles, pressure compensated Flow control valve – Reducing & Relief type.</p> <p>iv) Check valve, Pilot operated check valve.</p>	
MODULE- 3	
<p>Hydraulic Circuit Design & Analysis: Control of single and double –acting hydraulic cylinder, regenerative circuit , pump unloading circuit, Double pump hydraulic system, Counter Balance valve application, Hydraulic cylinder sequencing circuits. Locked cylinder using pilot check valve, Cylinder synchronizing circuits, Speed control of hydraulic cylinder, Speed control of hydraulic motors, Accumulators and accumulator circuits.</p>	08 Hours
MODULE- 4	
<p>Introduction to Pneumatic Control: Production of compressed air-Compressors, Preparation of compressed air –Driers, Filters, Regulators, Lubricators. Structure of Pneumatic control system. Pneumatic Actuators: Linear cylinders-types, end position cushioning, Rod-less cylinders, working advantages. Cylinder performance.Rotary actuator types, construction and application.</p> <p>Pneumatic Valve: Directional control valves, impulse valve, Quick exhaust valve, shuttle valve, Twin pressure valve, Time delay valve.</p>	08 Hours
MODULE- 5	
<p>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 kannoughveitch map for pneumatic circuit design.</p>	08 Hours

Course Outcomes:**After studying this course students will be able to:**

1. Explain the working principle and performance parameters of various hydraulic and pneumatic components and systems.
2. Design hydraulic and pneumatic circuits for mechanical engineering applications.
3. Analyze performance evaluation of fluid power systems and propose improvements.

Question paper pattern:

13. The question paper will have ten questions.
14. Each full question consists of 16 marks.
15. There will be 2 full questions (with a maximum of four sub questions) from each module.
16. The students will have to answer 5 full questions, selecting one full question from each module.

Text Books:

1. Fluid power with applications, Anthony Esposito, Seventh edition, Pearson education, Inc, 2008.
2. Pneumatic systems, S.R.Majumadar, Tata McGraw Hill Publishing Co., 2001.

Reference Books:

1. Oil Hydraulic systems – principles and maintenance, S.R. Majumdar, Tata McGraw Hill publishing company Ltd., 2003.
2. Pneumatics and Hydraulics, Andrew Parr. Jaico publishing Co., 2006.
3. **Components & Application** - Bosch Rexroth didactic - Hydraulics Trainer - Vol 1. Publication.
4. **Pneumatics: Theory and Applications** - Bosch Rexroth didactic – Publication.
5. **Electro Pneumatics** - Bosch Rexroth didactic - Vol. 2, Publication.

<p style="text-align: center;">PROJECT MANAGEMENT [As per Choice Based Credit System (CBCS) scheme] SEMESTER – IV</p>			
Subject Code	16MPM424	IA Marks	20
Number of Lecture Hours/Week	03	Exam Marks	80
Total Number of Lecture Hours	40	Exam Hours	03
<p>Course Objective: The student will learn</p> <ol style="list-style-type: none"> 4. Fundamentals of project management 5. Management of the finances of industrial and infrastructure projects. 6. Manpower planning. 7. Concepts of PERT and CPM techniques 			
Modules		Teaching Hours	
Module- 1			
<p>Introduction: Identification of Investment Opportunities, Market and Demand Analysis – Technical Analysis - Investment Outlay.</p>		06 Hours	
Module- 2			
<p>Means of Financing -Profitability and Breakeven Analysis -Cash Flows of Projects -Tax factor in investment Analysis -Interest Compounding and Discounting.</p>		08 Hours	
Module- 3			
<p>Appraisal Criteria and Selection of Investment -cost of capital analysis of Risk -Financial Projection, social Cost Benefit Analysis</p>		08 Hours	
Module- 4			
<p>Manpower Management in Projects -Functional Approach to Manpower Management, - the Element of decision Process Project Team Concepts - Field Autonomy- Policies Governing Projects.</p>		08 Hours	
Module- 5			

Networks Techniques in Project Management -PERT/CPM Analysis - Administrative aspects of Capital Investment.	10 Hours
Course Outcomes: On completion of the course the student will: <ol style="list-style-type: none"> 1. Understand the market dynamics. 2. Understand the role finances in the industry. 3. Capital management. 4. Manpower handling and network techniques. 	
Question paper pattern: <ol style="list-style-type: none"> 17. The question paper will have ten questions. 18. Each full question consists of 16 marks. 19. There will be 2 full questions (with a maximum of four sub questions) from each module. 20. The students will have to answer 5 full questions, selecting one full question from each module. 	
Text Books: <ol style="list-style-type: none"> 1. Projects - appraisal, preparation, budgeting and implementation – Prasannachandra - Tata McGraw Hill. 	
Reference Books: <ol style="list-style-type: none"> 1. Handbook of Project Management - Dennis lock. 2. Project Management - Dennis lock - Gower Publishing Ltd - 8th Revised edition. 	

<p style="text-align: center;">NANO TECHNOLOGY [As per Choice Based Credit System (CBCS) scheme] SEMESTER – IV</p>			
Subject Code	16MPM425	IA Marks	20
Number of Lecture Hours/Week	03	Exam Marks	80
Total Number of Lecture Hours	40	Exam Hours	03
<p>Course Objective: The student will learn</p> <ol style="list-style-type: none"> 1. To acquaint themselves with the excited subject though they are novice, whereas advanced learners will equip themselves to solve the complicated issues further. 2. To know the importance of the synthesis method addressed in the material properties and gives practical experience of nanomaterials synthesis/properties and characterization; investigations into the various factors influence the properties of nanomaterials, optimizing the procedures, and implementations to the new designs. 3. To provide a sound understanding of the various concepts involved in fabrication of device architectures' and able to evaluate them in advance. 			
Modules			Teaching Hours
Module- 1			
<p>METAL BASED NANOCOMPOSITES - Metal-Oxide or Metal-Ceramic composites, Different aspects of their preparation techniques and their final properties and functionality. Metal-metal nanocomposites, some simple preparation techniques and their new electrical and magnetic properties.</p>			08 Hours
Module- 2			
<p>DESIGN OF SUPER HARD MATERIALS- Super hard nanocomposites, its designing and improvements of mechanical properties.</p>			06 Hours
Module- 3			
<p>MECHANICS OF POLYMER NANOCOMPOSITES- Interfacial adhesion and characterization, factors influencing the performance of nanocomposites, physical and functional properties.</p>			08 Hours
Module- 4			
<p>POLYMER-CARBON NANOTUBES BASED COMPOSITES- Processing methods and characterization using SEM, XRD, TEM.</p>			08 Hours

Module- 5	
<p>CHARACTERIZATION OF POLYMER NANOTUBES BASED COMPOSITES -Mechanical, Electrical and Thermal Properties and their applications - Polymer / nanofillers (metallic nanopowders) systems, Rheological measurements, processing characteristics</p> <p>TESTING OF NANOCOMPOSITES- Thermal analysis such as TGA, TMA, DSC, DMTA</p> <p>Biggest Obstacle to Business Breakthrough, Integration of Ideas.</p>	10 Hours
<p>Course Outcomes: On completion of the course the student will be able to</p> <ol style="list-style-type: none"> 1. Explain the history, background and the nature of the Nano science and technology as well as the quantum and Nano sized scale effects at Nano scale level. 2. Define the different type of nanostructures, top down and bottom up approach for Nano scale device preparation. 3. Elucidate different properties of nanomaterials such as optical, mechanical, electrical, magnetically etc. 4. Explain the functionality of nanostructures and their characteristic, evaluation, self-assembly and its application towards controlling the structure. 5. Recognize the surface modification of nanoparticles by surface modification and their application. 	
<p>Question paper pattern:</p> <ol style="list-style-type: none"> 21. The question paper will have ten questions. 22. Each full question consists of 16 marks. 23. There will be 2 full questions (with a maximum of four sub questions) from each module. 24. The students will have to answer 5 full questions, selecting one full question from each module. 	
<p>Text Books:</p> <ol style="list-style-type: none"> 1. Edward L. Wolf, "Nanophysics and Nanotechnology -An Introduction to Modern Concepts in Nano science" Second Edition, John Wiley & Sons, 2006. 2. K.W. Kolasinski, Surface Science: Foundations of Catalysis and Nano science , Wiley, 2002. 3. G.A Ozin and A.C. Arsenault Nano chemistry: A chemical approach to nanomaterials , Royal Society of Chemistry, 2005. 4. Nanostructures and Nanomaterials synthesis, properties and applications, G. Cao, Imperial college press 2004. 	

Reference Books:

1. Vladimir P. Torchilin (2006) Nanoparticulates as Drug Carriers, Imperial College Press.
2. M Reza Mozafari (2007) Nanomaterials and Nano systems for Biomedical Applications, Springer.
3. Nanotechnology–Basic Science & Emerging Technologies, Chapman & Hall/CRC 2002
4. Nanomaterials /Nanotechnologies and Design: An introduction for engineers and architects, Michele F. Ashby, P.J. Ferreria, D.L.Schodek.