

**B.E. Mechanical Engineering 7<sup>th</sup> Semester Examination to be held in the Year  
December 2021,2022,2023,2024**

**B.E. Mechanical Engineering 7<sup>th</sup> Semester**

**Contact Hours: 26 hours/week**

COURSE CODE	COURSE TYPE	COURSE TITLE	LOAD ALLOCATIONS			MARKS DISTRIBUTION		TOTAL MARKS	CREDITS	% CHANGE
			L	T	P	INTERNAL	EXTERNAL			
<b>PME-701</b>	Professional Elective Course	A) Computer Aided Design and Manufacturing B) Robotics C) Computer Integrated Manufacturing Systems	3	1	0	50	100	150	<b>4</b>	100%
<b>PME-702</b>	Professional Elective Course	A) Plant Layout and Material Handling B) Production Planning & Control C) Total Quality Management	3	0	0	50	100	150	<b>3</b>	100%
<b>PME-703</b>	Professional Elective Course	A) Energy Resources and Utilization B) Advance Machining Processes C) Refrigeration and Air conditioning	3	0	0	50	100	150	<b>3</b>	100%
<b>PME-714</b>	Professional Core Course	Refrigeration and Air conditioning Lab	0	0	4	75	-	75	<b>2</b>	100%
<b>HMC-702</b>	Humanities Elective Course	A) Industrial Management B) Organizational Behavior	2	2	0	50	100	150	<b>4</b>	100%
<b>PME-715</b>	Professional Core Course	Computer Aided Design and Manufacturing Lab	0	0	4	75	-	75	<b>2</b>	100%
<b>SEM-705</b>	Seminar	Seminar	0	0	2	50	-	50	<b>1</b>	100%
<b>SII-705</b>	Summer Industry Internship	Industry Training- II	0	0	0	50	-	50	<b>1</b>	100%
<b>ECO-711</b>	Open Elective Lab	Matlab Programming	0	0	2	50	-	50	<b>1</b>	100%
<b>EEO-712</b>		Instrumentation & Non-Conventional Energy Resources Lab								
<b>CSO-713</b>		Programming Lab								
<b>ITO-714</b>		Linux Shell Programming								
<b>CEO-716</b>		Basic civil testing lab								
<b>TOTAL</b>			<b>11</b>	<b>3</b>	<b>12</b>	<b>500</b>	<b>400</b>	<b>900</b>	<b>21</b>	

**B.E. Mechanical Engineering 7th Semester Examination to be held in the Year December 2021,2022,2023,2024**

**CLASS: B.E. 7<sup>th</sup> SEMESTER**

**BRANCH: MECHANICAL ENGINEERING**

**COURSE TITLE: COMPUTER AIDED DESIGN AND MANUFACTURING**

**COURSE NO.: PME-701-A**

**DURATION OF EXAMINATION: 3 HOURS**

**CREDITS: 4**

L	T	P	Marks	
			Theory	Sessional
3	1	0	100	50

<b>COURSE OUTCOMES</b>	
<b>At the end of the course student will be able to:</b>	
<b>CO701-A.1:</b>	Apply/develop solutions or to do research in the area of design and simulation in mechanical engineering.
<b>CO701-A.2:</b>	Have abilities and capabilities in developing and applying computer software and hardware to mechanical design and manufacturing fields.
<b>CO701-A.3:</b>	Review and document the knowledge developed by scholarly predecessors and critically assess the relevant technological issues.
<b>CO701-A.4:</b>	Formulate relevant research problems; conduct experimental and/or analytical study and analyzing results with modern mathematical/scientific methods and use of software tools.
<b>CO701-A.5:</b>	Design and validate technological solutions to defined problems and communicate clearly and effectively for the practical applications of their work.

**Detailed Syllabus**

**SECTION – A**

CAD: Introduction, Organization of computer CAD work station. System configuration computer memory input output device and display device, VDU-DVST, DBRT, Raster and Digital display. Windowing clipping & zooming 2D&3D transformation, Translation, Scaling, Rotating Mirroring and Inversing. Modeling wire frame, Surface and solid Shading model; Diffused and specular reflection coloring models RGB, CMV, HIS. **[18Hours]**

**SECTION - B**

Automaton in manufacturing basic concepts of numerical control system and machine CNC and DNC, advantages of NC system. Fundamental of numerical control Co-ordinate system and motion control system ATC. NC part programming manual part programming G&M codes F,S,T. symbol in programming datum in NC machine tools offsets radius compensation examples of manual part programming. **[19 Hours]**

**RECOMMENDED BOOKS:**

1. Numerical control and CAM : T.K. kundra P.N Rao & N.K. Tiwari
2. CAD/CAM : M.Grover & J.P.A. Zimmerman (PHI)

**NOTE:**

1. Question paper will be of 3 Hours' duration
2. There will be 8 questions in all, four from **Section- A** (each of 20 marks) and four from **Section – B** (each of 20 marks).
3. Students are required to attempt five questions in all, at least two question from each section
4. Use of scientific calculator will be allowed in the examination hall.

*Paulson*

CLASS: B.E. 7<sup>th</sup> SEMESTER

BRANCH: MECHANICAL ENGINEERING

COURSE TITLE: ROBOTICS

COURSE NO.: PME-701-B

DURATION OF EXAMINATION: 3 HOURS.

CREDITS: 4

			Marks	
L	T	P	Theory	Sessional
3	1	0	100	50

COURSE OUTCOMES	
<b>At the end of the course student will be able to:</b>	
<b>CO701-B.1:</b>	Classify robots based on joints and arm configurations.
<b>CO701-B.2:</b>	Design application specific End Effectors for robots.
<b>CO701-B.3:</b>	Compute forward and inverse kinematics of robots and determine trajectory plan.
<b>CO701-B.4:</b>	Understand different controls of robots.
<b>CO701-B.5:</b>	Design and select robots for Industrial and Non-Industrial applications.

**Detailed Syllabus**

**SECTION – A**

Automation and Robotics, An Overview of Robotics- Present and future applications. Classification and structure of robots, robotic system configuration fundamental motion. Components of industrial robotics: common types of arms. Components, Architecture, number of degrees of freedom, Requirements and challenges of end effectors, Design of end effectors.. End effectors, application of robotics. Grippers- different methods of gripping. Sensors in robot- Touch sensors, tactile sensors, Proximity and range sensors, Robotic vision sensor, Force sensor, Light sensors, Pressure sensors.

**[20 Hours]**

**SECTION – B**

Matrix representation, Forward and Reverse Kinematics of Three degree of Freedom, Homogeneous Transformations, Inverse kinematics of Robot, Robot arm dynamics, D-H representation of robots, Basics of Trajectory Planning. Robot controls- Point to point control, Continuous path control, Intelligent robot, Control system for robot joint, Control actions, Feedback devices, Encoder, Resolver.

**[20 Hours]**

**RECOMMENDED BOOKS:**

1. Introduction to Robotics :James Rehg
2. Industrial Robotics, 'Technology Programming and Applications' : Mikell P Groover

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4. Use of scientific calculator will be allowed in the examination hall.

*Paulan*

7<sup>th</sup> Semester Examination to be held in the Year December 2021,2022,2023,2024

CLASS: B.E. 7<sup>th</sup> SEMESTER

BRANCH: MECHANICAL ENGINEERING

COURSE TITLE: COMPUTER INTEGRATED MANUFACTURING SYSTEMS

COURSE NO.: PME-701-C

DURATION OF EXAMINATION: 3 HOURS

CREDITS: 4

					Marks	
L	T	P	Theory	Sessional		
3	1	0	100	50		

**COURSE OUTCOMES**

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

<b>CO701-C.1:</b>	Understand the effect of manufacturing automation strategies and derive production metrics.
<b>CO701-C.2:</b>	Analyze automated flow lines and assembly systems, and balance the line.
<b>CO701-C.3:</b>	Design automated material handling and storage systems for a typical production system.
<b>CO701-C.4:</b>	Design a manufacturing cell and cellular manufacturing system.
<b>CO701-C.5:</b>	Develop CAPP systems for rotational and prismatic parts.

**Detailed Syllabus**

**SECTION – A**

Introduction- Production System Facilities, Automation in Production System, Manual labour in Production systems, Automation Principles and strategies; Manufacturing operations. Production concepts and Mathematical models, Cost of manufacturing operations. Group technology and Cellular manufacturing, Parts classification and Coding, Production Flow analysis, cellular manufacturing.

**[20 Hours]**

**SECTION - B**

Definition and Broad Characteristics of Flexible Manufacturing cells, Systems, Flexible Transfer Lines, Place of Flexible Manufacturing systems in CIM, Economics and Technological Justification for FMS, Design and Planning, Role of Associated Technologies such as GT, JIT and Simulation, Operation and Evaluation, Scheduling Problems, FMS Hardware, Control Aspects of FMS, Flexible Machining Cells.

**[19 Hours]**

**RECOMMENDED BOOKS:**

- |  |                        |
|--|------------------------|
| 1. Automation Production Systems and Computer Integrated Manufacturing | Groover, M.P, Pearson  |
| 2. CAD/CAM- Theory and Practice  | Zeid,I., McGraw Hill   |
| 3. CAD/CAM   | Rao, P.N., McGraw Hill |
| 4. Computer Integrated Manufacture                                     | Ranky, P.G, Prentice   |

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**B.E. Mechanical Engineering 7th Semester Examination to be held in the Year December 2021,2022,2023,2024**

**CLASS: B.E. 7<sup>th</sup> SEMESTER**

**BRANCH: MECHANICAL ENGINEERING**

**CREDITS: 3**

**COURSE TITLE: PLANT LAYOUT AND MATERIAL HANDLING**

**COURSE NO.: PME-702-A**

**DURATION OF EXAMINATION: 3 HOURS**

					Marks	
L	T	P	Theory	Sessional		
3	0	0	100	50		

<b>COURSE OUTCOMES</b>	
<b>At the end of the course student will be able to:</b>	
<b>CO702-A.1:</b>	Identify the rule that each department plays in achieving the goal of an organization.
<b>CO702-A.2:</b>	Explain the problems in organizing, planning and controlling the use of man, money, material and machines for industrial production.
<b>CO702-A.3:</b>	Apply industrial engineering principles to solve the problems in organizing, planning and controlling the use of man, money, material and machines for industrial production.
<b>CO702-A.4:</b>	Design material handling system for a variety of scenarios pertaining to manufacture and service industry.
<b>CO702-A.5:</b>	Develop and analyze plant layouts using manuals and computers aided software methodologies.

**Detailed Syllabus**

**SECTION – A**

**Plant Layout:** objective and criteria for facilities planning and industrial plant design.

**Site Selection:** Factors affecting site selection, Application of transportation problem. Decision matrix.

**Types of Production Activities:** Job Shop, Batch. Mass and continuous flow production.

**Types of Layout:** Similar products, Special Product, Fixed Process and product type. Layout and their combinations.

**Layout Planning:** Factor influencing plant layout. Design considerations. Cross-chart technique to plant layout problems. Analytical evaluation of plant layout. **[20 Hours]**

**SECTION - B**

**Material Handling:** Role application study of problem. Calculation of handling costs interplant transporting facilities and handling equipment, Factors in Equipment selection, Types of material handling equipment Hoisting appliance cranes and elevators integration of material handling equipment. **[10 Hours]**

**Conveyors:** General theory of conveyed machines components part. Belt conveyors, Bucket and swing conveyors. Screw conveyors, Roller conveyors, Oscillating conveyors and Vibratory conveyors, Hydraulic and Pneumatic conveyors. **[10 Hours]**

**RECOMMENDED BOOKS:**

1. Plant layout and Material Handling : Apple -Ronald
2. Plant layout and Design : Moore G.F -McGraw Hill
3. Material Handling Equipment :Rudenko- Peace Publications Moscow.
4. Practical Plant Layout: :Muther- McGraw Hill
5. Material Handling Handbook : Bolz and Hugeman –Ronaldo

**NOTE:**

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*Paulan*

**CLASS: B.E. 7<sup>th</sup> SEMESTER**

**BRANCH: MECHANICAL ENGINEERING**

**COURSE TITLE: PRODUCTION, PLANNING AND CONTROL**

**COURSE NO.: PME-702-B**

**DURATION OF EXAMINATION: 3 HOURS**

**CREDITS: 3**

		Marks		
L	T	P	Theory	Sessional
3	0	0	100	50

<b>COURSE OUTCOMES</b>	
<b>At the end of the course student will be able to:</b>	
<b>CO702-B.1:</b>	Apply the system concept of design of production and service systems.
<b>CO702-B.2:</b>	Make forecast in the manufacturing and service sector using selective quantitative and qualitative techniques.
<b>CO702-B.3:</b>	Apply the principles and techniques for planning and control of the production and service system to optimize /make best use of resources.
<b>CO702-B.4:</b>	Understand the importance and the function of inventory and to be able to apply selected techniques for its control and management under dependent and independent circumstances.
<b>CO702-B.5:</b>	Apply the principles and techniques for planning and control of the production and service system to optimise /make best use of resources.

**Detailed Syllabus**

**SECTION – A**

Introduction: Objectives and Function of PPC. Types of Production: Job, Batch & Continuous. Product development and its design:- Marketing aspects, Functional aspects and Operational aspects. Forecasting, Methods of forecasting and its advantages, Break even analysis-Economics of a new design. Material Selection:- Procedure & methods in material selection. Concept of Routing, Scheduling and Dispatching in manufacturing. **[10 Hours]**

Materials planning and Control: Need and its advantages in manufacturing, Inventories: Types and Classification. Inventory Control:- Effect of demand on inventory and purpose of holding stock. Introduction to computer integrated production planning systems. **[09 Hours]**

**SECTION - B**

Project management: concepts of project planning, monitoring and control. Introduction to network analysis: PERT and CPM, Benefits of critical path analysis. Method Study:- General procedure, Selection of process. Micro motion and memo motion study – work measurement – Techniques of work measurement. Introduction to Linear Programming: Problem Formulation, Simplex method, Transportation models and advantages of linear programming in production. Early start and finish time. **[18 Hours]**

**RECOMMENDED BOOKS:**

- |   |  |
|---|--|
| 1. Elements of Production Planning:                         | Eilon-McMillan & Control                   |
| 2. Production and Operations Management:                    | Raymond R. Meyer- McGraw Hill              |
| 3. Material Management:                                     | A.K Dutta Prentice Hall India.             |
| 4. Operations Management:                                   | Buffn-John Wiley.                          |
| 5. Production Management:                                   | Hedge- John Wiley.                         |
| 6. Scientific Inventory:                                    | Bachan & Kesnigsberg- Prentice Hall India. |
| 7. Principles & Design of Production<br>Planning & Control: | Westerman & Wimmest- Prentice Hall         |

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*Paulson*

CLASS: B.E. 7<sup>th</sup> SEMESTER

BRANCH: MECHANICAL ENGINEERING

COURSE TITLE: TOTAL QUALITY MANAGEMENT

COURSE NO.: PME-702-C

DURATION OF EXAMINATION: 3 HOURS

CREDITS: 3

Marks				
L	T	P	Theory	Sessional
3	0	0	100	50

COURSE OUTCOMES	
At the end of the course student will be able to:	
CO702-C.1:	To use the tools and techniques of TQM in manufacturing and service sectors.
CO702-C.2:	Outlines the dimensions and barriers regarding the quality.
CO702-C.3:	Illustrate the TQM principles.
CO702-C.4:	Demonstrate the tools utilization for quality improvement.
CO702-C.5:	Explain the various types of techniques used to measure the quality.

### Detailed Syllabus

#### SECTION – A

Introduction, need for quality, evolution of quality; Definitions of quality, product quality and service quality; Basic concepts of TQM, TQM framework, contributions of Deming, Juran and Crosby. Barriers to TQM; Quality statements, customer focus, customer orientation & satisfaction, customer complaints, customer retention; costs to quality.

**[08 Hours]**

TQM principles; leadership, strategic quality planning; Quality councils- employee involvement, motivation; Empowerment; Team and Teamwork; Quality circles, recognition and reward, performance appraisal; Continuous process improvement; PDCA cycle, 5S, Kaizen; Supplier partnership, Partnering, Supplier rating & selection.

**[12 Hours]**

#### SECTION - B

The seven traditional tools of quality; New management tools; Six sigma- concepts, methodology, applications to manufacturing, service sector including IT, Bench marking process; FMEA- stages, types. TQM tools and techniques, control charts, process capability, concepts of six sigma, Taguchi quality loss function; TPM- concepts, improvement needs, performance measures.

**[10 Hours]**

Quality systems, need for ISO 9000, ISO 9001-9008; Quality system- elements, documentation,; Quality auditing, QS 9000, ISO 14000- concepts, requirements and benefits; TQM implementation in manufacturing and service sectors.

**[09 Hours]**

#### **RECOMMENDED BOOKS:**

1. Besterfield D.H. et al., Total quality Management, 3rd ed., Pearson Education Asia, 2006.
2. Evans J.R. and Lindsay W.M., The management and Control of Quality, 8th ed., first Indian edition, Cengage Learning, 2012.
3. Janakiraman B. and Gopal R.K., Total Quality Management, Prentice Hall India, 2006.
4. Suganthi L. and Samuel A., Total Quality Management, Prentice Hall India, 2006.

#### **NOTE:**

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2. There will be 8 questions in all, four from **Section- A** (each of 20 marks) and four from **Section – B** (each of 20 marks).
3. Students are required to attempt five questions in all, at least two question from each section
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*Paavan*

**B.E. Mechanical Engineering 7th Semester Examination to be held in the Year December 2021,2022,2023,2024**

**CLASS: B.E. 7<sup>th</sup> SEMESTER**

**BRANCH: MECHANICAL ENGINEERING**

**CREDITS: 3**

**COURSE TITLE: ENERGY RESOURCES & UTILISATION**

**COURSE NO.: PME-703-A**

**DURATION OF EXAMINATION: 3 HOURS**

Marks				
L	T	P	Theory	Sessional
3	0	0	100	50

COURSE OUTCOMES	
<b>At the end of the course student will be able to:</b>	
<b>CO703-A.1:</b>	Select the suitability of site for a power plant.
<b>CO703-A.2:</b>	Calculate performance of thermal power plant.
<b>CO703-A.3:</b>	Explain the major type of hydro power and wind power turbines and estimate power generation potential.
<b>CO703-A.4:</b>	Explain working principle of different type of nuclear power plant.
<b>CO703-A.5:</b>	Calculate load factor, capacity Factor, average load and peak load on a power plant.

**Detailed Syllabus**

**SECTION – A**

Conventional energy resources, Types of power plants, Selection of site for steam, Hydro, Nuclear and standby power plants. Special features of modern steam boilers, circulation principle, Steam separation and purification, Economizer and air pre-heaters and super heat control, Fuel preparation and burning, Furnaces and combustion equipment, Water treatment plant, Condensers and air pumps, Performance estimation, Spray ponds and cooling tower.

**[20 Hours]**

**SECTION - B**

Components of nuclear power plant & solar power plants, moderators, coolants, reflectors and other components, control of nuclear plants, Different kinds of nuclear reactors, Disposal of radioactive waste. Economic of power generation, operational and maintenance various power plants. Non-conventional energy sources Biomass, Solar, Wind, Tidal, Geothermal and MHD.

**[19 Hours]**

**RECOMMENDED BOOKS:**

1. Power Plant Engineering : Morse
2. Power Plant Technology : E.lwakil
3. Power station engineering economy : VopatSkotzki
4. Power station engineering economy : John F lee
5. Nuclear power plant : Robert loftness
6. Modern power plant engineering : Weisman eskarf

**NOTE:**

1. Question paper will be of 3 Hours' duration
2. There will be 8 questions in all, four from **Section- A** (each of 20 marks) and four from **Section – B** (each of 20 marks).
3. Students are required to attempt five questions in all, at least two question from each section
4. Use of scientific calculator will be allowed in the examination hall.



**B.E. Mechanical Engineering 7th Semester Examination to be held in the Year December 2021,2022,2023,2024**

**CLASS: B.E. 7<sup>th</sup> SEMESTER**

**BRANCH: MECHANICAL ENGINEERING**

**COURSE TITLE: ADVANCE MACHINING PROCESS**

**COURSE NO.: PME-703-B**

**DURATION OF EXAMINATION: 3 HOURS**

**CREDITS: 3**

					Marks	
L	T	P	Theory	Sessional		
3	0	0	100	50		

<b>COURSE OUTCOMES</b>	
<b>At the end of the course student will be able to:</b>	
<b>CO703-B.1:</b>	Understand the fundamentals of non - conventional machining processes.
<b>CO703-B.2:</b>	Understand the working and uses of various mechanical machining processes such as AJM, USM etc.
<b>CO703-B.3:</b>	Understand the purpose of chemical and electrochemical machining.
<b>CO703-B.4:</b>	Understand the purpose of electric discharge machining.
<b>CO703-B.5:</b>	Understand the fundamentals of electron beam and laser beam machining.

**Detailed Syllabus**

**SECTION – A**

Introduction to Advanced Manufacturing Processes, Mechanical Processes, Abrasive Jet Technology, Ultrasonic Machining, Water Jet Machining. Fundamental principles, processes parameters, characteristics, Tool design, Metal removal rate-analysis, Part design, Analysis of the processes. Chemical and Electro-chemical machining:- Introduction, Principles & Scheme, Process parameters, Material removal rate, dynamic and hydro-dynamic & hydro-optimization, electrolytes.

**[19 Hours]**

**SECTION - B**

EDM:-Introduction, basic principles & scheme, circuitry controls, material removal rate, machining accuracy, optimization, selection of tool material and tool design, Di-electric, analysis. Laser Beam Machining & Electron beam machining background, production of laser, machining by Laser and other applications, Electron beam action, Dimensionless analysis to establish correlation behavior EBM parameters.

High Velocity forming of metals, explosive forming principles and applications, Electro-hydraulic and other applications, Analysis of the process.

**[20 Hours]**

**RECOMMENDED BOOKS:**

1. Non-traditional machining methods: ASME.
2. New Technology by Bhattayacharya; I.E. (India)
3. Ultrasonic cutting by Rozenberg; Consultants Bureau; N.Y.

**NOTE:**

1. Question paper will be of 3 Hours' duration
2. There will be 8 questions in all, four from **Section- A** (each of 20 marks) and four from **Section – B** (each of 20 marks).
3. Students are required to attempt five questions in all, at least two question from each section
4. Use of scientific calculator will be allowed in the examination hall.

**CLASS: B.E. 7<sup>th</sup> SEMESTER**

**BRANCH: MECHANICAL ENGINEERING**

**CREDITS: 3**

**COURSE TITLE: REFRIGERATION & AIR CONDITIONING**

**COURSE NO.: PME-703-C**

**DURATION OF EXAMINATION: 3 HOURS**

		Marks		
L	T	P	Theory	Sessional
3	0	0	100	50

<b>COURSE OUTCOMES</b>	
<b>At the end of the course student will be able to:</b>	
<b>CO703-C.1:</b>	Differentiate between vapour compression and vapour absorption cycles.
<b>CO703-C.2:</b>	Analyze thermodynamically, vapour compression systems.
<b>CO703-C.3:</b>	Understand the purpose of condensers, compressors, expansion devices etc.
<b>CO703-C.4:</b>	Recall and differentiate various refrigerants.
<b>CO703-C.5:</b>	Do psychometric analysis.

**Detailed Syllabus**

**SECTION – A**

**Refrigeration:** Principle, Heat pump and refrigeration machine, Vapour compression system, Vapour Absorption system, Air cycle refrigeration, Steam jet refrigeration, solar refrigeration, thermo-electric refrigeration. COP and power requirement calculations for different systems. Thermodynamic analysis of vapor compression system. Actual cycle, Effects of operating variables on the performance of vapour compression system, Compound systems with inter-cooling for single and multiple evaporators, Cascading. **[20 Hours]**

**SECTION – B**

**Refrigerants:** Designation and selection of a refrigerant, thermodynamic chemical and physical requirements, secondary refrigerants and alternative refrigerants. **[10 Hours]**

**Air conditioning-** Psychometric of Air-conditioning process, Mixing process, Basic processes in conditioning of air, air-conditioning load calculation and applied psychometrics. Summer and winter air-conditioning. **[10 Hours]**

**RECOMMENDED BOOKS:**

- |                                       |                                 |
|---------------------------------------|---------------------------------|
| 1. Refrigeration and Air-conditioning | : C.P Arora -Tata McGraw Hill   |
| 2. Refrigeration and Air-conditioning | : Manohar Prasad -Wiley Eastern |
| 3. Refrigeration and Air-conditioning | : Jennings and Rogers           |
| 4. Refrigeration and Air-conditioning | : Stoccker - McGraw Hill        |

**NOTE:**

1. Question paper will be of 3 Hours' duration
2. There will be 8 questions in all, four from **Section- A** (each of 20 marks) and four from **Section – B** (each of 20 marks).
3. Students are required to attempt five questions in all, at least two questions from each section
4. Use of scientific calculator will be allowed in the examination hall.

*Paulan*

**B.E. Mechanical Engineering 7th Semester Examination to be held in the Year December 2021,2022,2023,2024**

**CLASS: B.E. 7<sup>th</sup> SEMESTER**

**BRANCH: MECHANICAL ENGINEERING**

**COURSE TITLE: REFRIGERATION AND AIR CONDITIONING LAB**

**COURSE NO.: PME-714**

**DURATION OF EXAMINATION: 3 HOURS.**

**CREDITS: 2**

<b>L</b>	<b>T</b>	<b>P</b>	<b>Marks Practical</b>
<b>0</b>	<b>0</b>	<b>4</b>	<b>75</b>

<b>COURSE OUTCOMES</b>	
<b>At the end of the course student will be able to:</b>	
<b>CO704.1:</b>	Understand the principles and applications of refrigeration systems
<b>CO704.2:</b>	Evaluate performance of Vapour compression refrigeration system.
<b>CO704.3:</b>	Apply working principle of VAR/VCR system to solve numerical based on VCR and VAR system.
<b>CO704.4:</b>	Understand basics of psychrometry, air conditioning processes and different air conditioning systems.
<b>CO704.5:</b>	Analyze different psychrometric processes on general cycle air conditioning trainer.

**LIST OF EXPERIMENTS:**

1. Study of Simple Vapor compression Refrigeration System and its components.
2. Performance test on General cycle refrigeration trainer.
3. Study of Cascade Refrigeration system for producing low temperature.
4. Study of Vapor Absorption refrigeration system.
5. Study of different psychrometric terms and processes.
6. Performance Test on General Cycle air-conditioning trainer.
7. Study and Design of Air Conditioning System and load calculation for residential and commercial buildings.

**NOTE:**

1. Additional lab/ experiment will be performed based on course content requirement.

*Paulson*

**B.E. Mechanical Engineering 7th Semester Examination to be held in the Year December 2021,2022,2023,2024**

**CLASS: B.E. 7<sup>th</sup> SEMESTER**

**BRANCH: MECHANICAL ENGINEERING**

**COURSE TITLE: INDUSTRIAL MANAGEMENT**

**COURSE NO.: HMC – 702-A**

**DURATION OF EXAMINATION: 3 HOURS.**

**CREDITS: 4**

		Marks		
L	T	P	Theory	Sessional
2	2	0	100	50

**COURSE OUTCOMES**

**At the end of the course student will be able to:**

<b>CO701-A.1:</b>	Acquire qualities of a good entrepreneur and opt entrepreneurship as a career option and shall be able to start his own business venture.
<b>CO701-A.2:</b>	Work as a sole proprietor, in partnership and in joint stock companies
<b>CO701-A.3:</b>	Know about industrial policies, various concepts of industrial relations and shall be able to resolve conflicts emerging while working in groups within the organizations
<b>CO701-A.4:</b>	Work as a good manager in companies, and shall become a good decision maker.
<b>CO701-A.5:</b>	Analyze about the concept of HRM, Wage Payment and Job evaluation.

**Detailed Syllabus**

**SECTION-A**

**Unit-1: Entrepreneurship:** Definition and types, Difference Between Intrapreneur & Entrepreneur, Qualities of good Entrepreneurs -Role of Entrepreneurs in the economic development of a country, Functions of entrepreneur, Factors affecting entrepreneurship, Entrepreneurship as a career option for technocrats in India, Schemes and policies for entrepreneurship development. Women Entrepreneur: Classification of Women Entrepreneur in India, Problems of Women Entrepreneur, Steps for promoting women entrepreneurship. **(6hrs)**

**Unit-2: Legal Forms of Industrial Ownership:** Sole Proprietorship, Partnership and Joint Stock Company (Features, merits & demerits). **(4hrs)**

**Unit-3: Industrial Development in India after Independence:** Industrial Policy of the Five-Year Plans - Industrial Policy (1956, 1977, 1991), Need for Economic Reforms and their Assessment, Industrial policy 2004-Jammu & Kashmir , Industrial policy 2021-30 ,Jammu & Kashmir , Multi-National Corporations (MNCs) - Concept, Merits & Demerits of MNCs. **(5hrs)**

**Unit-4: Industrial Relations:** Workers participation in management: Meaning, Objectives & Forms, Trade Union: Objectives, Functions, Present Position and Weaknesses. Industrial Conflict: Sources and managing conflict, Arbitration-a conflict resolution mechanism, Collective Bargaining: Meaning, Process, Essential conditions for effective bargaining. **(6hrs)**

**SECTION-B**

**Unit-5: Management:** Meaning, Characteristics, Objectives and Functions of management. Classical Theory of Management: Henry Fayol's Administrative Management Theory & Taylor's Scientific Management Theory. Elton Mayo's Neo-Classical Theory of Human Relations Prospective. **MBO**– Definition, Features, Process, Advantages & Limitations of MBO. **(6hrs)**

*Paulson*

**Unit-6 : Departmentation & Delegation of Authority:** Meaning, Importance, Basis or pattern of Departmentation, **Delegation of Authority:** Meaning, Characteristics, Importance, Process, Obstacles/ Barriers to effective delegation of authority, **Authority Relationships** - Line Organization, Line & Staff Organization, Functional Organization.  
**(6hrs)**

**Unit 7: Personnel Management & Decision Making:** Meaning, Objectives, Characteristics, Principles & Functions of Personal department. **Decision making-** Meaning, Importance & Steps in Decision Making.  
**(4hrs)**

**Unit 8: Wage Administration & Job Analysis:** Concept of Wages, Characteristics of good wage, Factors affecting wages, Methods of wage payments. **Job Evaluation-**Objectives, Principles & Methods of job evaluation.  
**(5hrs)**

**BOOKS RECOMMENDED :**

1. George Terry & Stephen G. Franklin – Principles of Management.
2. Harold Koontz & Heinz – Essentials of Management
3. S.A .Sherlekar – Principles of Business Management
4. M. Mahajan – Industrial Engineering & Production Management
5. Dr. Neeru Vasisth -- Principles of Management
6. Dr. B. P. Singh & Dr. T. N. Chhabra – Business Organisation & Management

NOTE: There shall be total eight questions, four from each section. Each question carries 20 marks. Five questions will have to be attempted, selecting at least two from each section. Use of calculator is allowed

*Paulson*

**B.E. Mechanical Engineering 7th Semester Examination to be held in the Year December 2021,2022,2023,2024**

**CLASS: B.E. 7<sup>th</sup> SEMESTER**

**BRANCH: MECHANICAL ENGINEERING**

**COURSE TITLE: ORGANIZATIONAL BEHAVIOUR**

**COURSE NO.: HMC-702-B**

**DURATION OF EXAMINATION: 3 HOURS.**

**CREDITS: 4**

					Marks	
L	T	P	Theory	Sessional		
2	2	0	100	50		

**COURSE OUTCOMES**

**At the end of the course student will be able to:**

<b>CO701-B.1:</b>	Understand how to work in organizations by acquiring proper knowledge about organizational behaviour and detail knowledge about personality, perception etc.
<b>CO701-B.2:</b>	Apply and transmit their ideas, facts, thoughts, feelings, and values effectively.
<b>CO701-B.3:</b>	Bring change in organizations, learn to work in groups and shall also be able to resolve organizational conflicts.
<b>CO701-B.4:</b>	Be a good team leader and have effective motivation skills.
<b>CO701-B.5:</b>	Mitigate their stress and will also have good tactics of organizational culture.

**Detailed Syllabus**

**SECTION – A**

**Unit 1: Basic concept of organizational behavior** -Concept, Meaning, Nature and Scope of organizational behavior, Models of organizational behavior, Individual Difference: Meaning, Factors & implications of individual differences.

**[5Hours]**

**Unit 2: Personality and Perception:-** Personality: - Meaning , Characteristics, Determinants , Development of personality and Theories of personality (Behavioral , Self - concept theory) Perception-Meaning, Definition, Perceptual Process, internal & external factors in perceptual selectivity.

**[6 Hours]**

**Unit 3: Values and Attitudes:** Concept, features, importance, sources and types of Values: Terminal values and Instrumental Values, Attitude-Features, Components, functions, sources, Formation of Attitudes and job related attitudes.

**[5 Hours]**

**Unit 4: Learning:** Definition, Theories of learning- Classical Conditioning, Operant Conditioning, Observational learning, Reinforcement- Concept, Types, and Importance.

**[5 Hours]**

**SECTION – B**

**Unit 5: Organizational development:** Concept, Characteristics & Objectives of Organization Development, Organization Development Process. Organizational Change: Nature of Organizational Change, Forces to Change, Causes of Resistance to Change, Techniques of overcoming Resistance to Change, Response & Reactions to Change.

**[6 Hours]**

**Unit 6: Leadership and Motivation :-** Leadership-Characteristics and Functions of Leader, Qualities of a good Leader, Importance of leadership, Styles of Leadership; **Motivation:** Concept & importance, theories of motivation Maslow's Need Hierarchy Theory and Herzberg's Motivation Hygiene Theory, McClelland's need theory. **[5 Hours]**

**Unit 7: Group Behaviour and conflicts::** Concept of group, Definition, Types of groups, Five stage model of group development, Teams- Concept, Importance, Difference between Groups and Teams, Dynamics of conflicts: Nature of Conflict, Types of Conflict, Stages in conflict, Resolution of conflicts. **[5Hours]**

**Unit 8: Organizational culture:** Meaning, definition, Elements& Characteristics of organizational culture, Functions of Culture in Management. **Stress management-** Individual and Organizational factors to stress Prevention and Management of stress **[5 Hours]**

**BOOKS RECOMMENDED:**

- |   |                                |
|---|--------------------------------|
| 1. Organizational Behavior (Human Behavior at work) | John W. Newstrom & Keith Davis |
| 2. Organizational Behavior                          | Stephen p. Robbins             |
| 3. Principles of Management                         | Dr. Neeru Vaisisth             |
| 4. Management                                       | G. S. Sudha                    |
| 5. Organizational Theory & Behavior                 | T.N. Chabbra, B.P Singh        |
| 6. Organizational Behaviour                         | L.M.Prasad                     |

**NOTE:** There shall be total eight questions, four from each section. Five questions have to be attempted selecting at least two questions from each section. Use of calculator is allowed.

**B.E. Mechanical Engineering 7th Semester Examination to be held in the Year December 2021,2022,2023,2024**

**CLASS: B.E. 7<sup>th</sup> SEMESTER**

**BRANCH: MECHANICAL ENGINEERING**

**COURSE TITLE: CAD-CAM LAB**

**COURSE NO.: PME-715**

**DURATION OF EXAMINATION: 3 HOURS.**

**CREDITS: 2**

<b>L</b>	<b>T</b>	<b>P</b>	<b>Marks Practical</b>
<b>0</b>	<b>0</b>	<b>4</b>	<b>75</b>

<b>COURSE OUTCOMES</b>	
<b>At the end of the course student will be able to:</b>	
<b>CO705.1:</b>	Analyse the input and output devices of workstation.
<b>CO705.2:</b>	Demonstrate the knowledge on basic drafting software tools and ability to use them accordingly.
<b>CO705.3:</b>	Approach a design problem successfully, taking decisions when to use a specific tool.
<b>CO705.4:</b>	Be proficient in the use of part programming in NC/CNC lathe, drilling and milling.
<b>CO705.5:</b>	Understand the working mechanism of AUTOMAT.

**LIST OF EXPERIMENTS:**

1. Study of the CAD workstation on various components including the various types of input and output devices.
2. Study of the drafting using latest drafting softwares.
3. Simple exercises of drawing through the same packages-two dimensional drafting and three dimensional modeling.
4. Working mechanism of NC machine tools, Part programming for a job on NC/CNC lathe, drilling and milling machine.
5. Working mechanism of an Automat.
6. Exercise on manual part-programming for CNC machines like turning center and the end mill Cutter, Use of various codes.
7. Simulation of the cutting process and determination of the Tool-path graphics using simulation packages for the above cutting processes.

**NOTE:**

1. Additional lab/ experiment will be performed based on course content requirement.
2. Simulation/ virtual labs are used to enhance the practical ability of students.

**B.E. Mechanical Engineering 7th Semester Examination to be held in the Year December 2021,2022,2023,2024**

**CLASS: B.E. 7<sup>th</sup> SEMESTER**

**BRANCH: MECHANICAL ENGINEERING**

**COURSE TITLE: SEMINAR**

**COURSE NO.: SEM-705**

**DURATION OF EXAMINATION: 3 HOURS.**

**CREDITS: 1**

L	T	P	Marks Practical
0	0	2	50

**COURSE OUTCOMES**

**At the end of the course student will be able to:**

<b>CO705.1:</b>	Identify and compare technical and practical issues related to the area of program specialization.
<b>CO705.2:</b>	Outline annotated bibliography of research demonstrating scholarly skills.
<b>CO705.3:</b>	Prepare a well-organized report employing elements of technical writing and critical thinking
<b>CO705.4:</b>	Demonstrate the ability to describe, interpret and analyze technical issues and develop competence in presenting.
<b>CO705.5:</b>	Understand the need to be knowledgeable of contemporary issues.

This will involve a detailed study of a topic of interest reproduced in the candidate's own style. For this, a student has to prepare a seminar by doing proper survey of literature, compilation of information so gathered and then presentation of the same followed by question-answer session.

The report of which has to be submitted by the student well before the conduct of seminar. The handout submitted by the student will be in accordance with the standards of technical papers.

**Guidelines and evaluation of Seminar in 7th semester:**

The topic of the Seminar is to be finalized and approved by the departmental committee by the end of 6th Semester. The committee shall have a convener and atleast two members.

**Distribution of Marks:**

Total Marks for Seminar Evaluation = 50 marks

- 1) Project Report = 15 marks
- 2) Presentation = 25 marks
- 3) Attendance = 10 marks.

**Award of Marks:**

- Marks Under (1) will be awarded by the Seminar Incharge.
- Marks Under (2) and (3) will be awarded by the Departmental committee constituted for the purpose.



**B.E. Mechanical Engineering 7<sup>th</sup> Semester Examination to be held in the Year December 2021,2022,2023,2024**

**CLASS: B.E. 7<sup>th</sup> SEMESTER**

**BRANCH: MECHANICAL ENGINEERING**

**COURSE TITLE: INDUSTRIAL TRAINING - II**

**COURSE NO.: SII-705**

**DURATION OF EXAMINATION: 3 HOURS.**

**CREDITS: 1**

L	T	P	Marks Practical
0	0	0	50

**COURSE OUTCOMES**

**At the end of the course student will be able to:**

<b>CO.1:</b>	Students should be able to work in industry with any hesitation.
<b>CO.2:</b>	Apply ethical principles and commit to responsibilities and norms of engineering practice.
<b>CO.3:</b>	Recognition of the need for, and an ability to engage in life-long learning.
<b>CO.4:</b>	To use the techniques, skills, and modern engineering tools necessary for engineering practice.
<b>CO.5:</b>	To identify, formulate, and solve engineering problems.

Students are required to undertake 4 to 6 weeks Practical Training during the summer vacations in the field of Mechanical Engineering in Govt./Semi-Govt./Private sector. Thereafter, each student shall be required to submit a report on the practical training to the concern HOD for evaluation.

**Guidelines for evaluation of Practical Training:**

The evaluation shall be done by the departmental committee by the end of 7<sup>th</sup> semester. The committee shall have a convener and at least two members.

**Distribution of Marks as per the University statutes:**

Total Marks for Evaluation	= 50 marks		
i) Report	= 20	40%	
ii) Viva-Voce	= 15	30%	
iii) Miscellaneous Marks	= 15	30%	

Due weightage will be given to those who have opted Industrial Training outside the State as well as keeping in view the profile of that Industry.

**Award of the Marks:**

Marks under (i), (ii) & (iii) will be awarded by the departmental committee constituted for the purpose.

## OPEN ELECTIVE LAB

B.E. Mechanical Engineering 7th Semester Examination to be held in the Year December 2021,2022,2023,2024

CLASS: B.E. 7<sup>th</sup> SEMESTER

BRANCH: Electrical/Computers/Mechanical/IT/Civil

COURSE NO.: ECO-711

COURSE TITLE: MATLAB PROGRAMMING

CREDIT: 1

Hours/ Week

L T P

0 0 2

Marks Distribution

Practical

50

### COURSE OUTCOMES

At the end of the course the student will be able to: -	
CO1	Perform various arithmetic calculations.
CO2	Find importance of this software for generating equations of vectors and other mathematical expressions.
CO3	Articulate importance of software's in creating and printing simple,2D &3D plots and execution functions
CO4	Do various library blocks and their interconnections

### LIST OF EXPERIMENTS:

Experiment 1	1. Study of arithmetic, exponential, Logarithmic, Trigonometric, complex number calculation.
Experiment 2	2. To generate equation of straight line, Geometric series, points on circle, multiply, divide and exponential vectors.
Experiment 3	3. To create and print simple plots and execution of functions.
Experiment 4	4. To generate matrices and vectors, array operations, inline functions anonymous functions etc.
Experiment 5	5. To generate functions like execution a function, global variable, structures.
Experiment 6	6. To generate 2D, 3D plots.
Experiment 7	7. Study of various library blocks and their interconnections.

**NOTE:** Each student has to perform all the aforementioned Practical / Experiments. Additional Practical / Experiments will be performed based on the course content requirements.

OPEN ELECTIVE LAB

B.E. Mechanical Engineering 7th Semester Examination to be held in the Year December 2021,2022,2023,2024

CLASS: B.E. 7<sup>TH</sup> SEMESTER

BRANCH: E&C/Computers/Mechanical/IT/Civil

COURSE CODE: EEO-712

TITLE: NON-CONVENTIONAL ENERGY RESOURCES AND INSTRUMENTATION and LAB

CREDITS: 1

MARKS

L	T	P	PRACTICAL
0	0	2	50

Course Outcomes: Student will be able to	
CO1	Measure phase and frequency using CRO and Multimeter
CO2	Students will be able to understand Solar Radiation ,distillation
CO3	To study Solar Energy solar cooker ,street light and its applications
CO4	To study Fuel Cells

LIST OF PRACTICALS:

1. To study the extension of Ammeter and voltmeter ranges.
2. To Study Block Wise Construction of Multi meters & Frequency Counter
3. To Study Block Wise Construction of Analog Oscilloscope & Function Generator.
4. To study the connection of solar panels.
5. To study overall efficiency of solar PV and battery integrated system
6. To Study of Solar Radiation by using Pyranometer.
7. To Study of Solar Distillation or Solar Still.
8. To study the constructional details of a box type solar cooker.
9. To Study of Solar Street Lighting and Lanterns.
10. To Study of Fuel cells.

## OPEN ELECTIVE LAB

B.E. Mechanical Engineering 7th Semester Examination to be held in the Year December 2021,2022,2023,2024

CLASS: B.E. 7<sup>th</sup> SEMESTER

BRANCH: E&C/Electrical/Mechanical/IT/Civil

COURSE NO.: CSO-713

COURSE TITLE: PROGRAMMING LAB

CREDIT: 1

Hours/ Week

Marks Distribution

L T P Practical

0 0 2 50

### LABORATORY OUTCOMES

After Completion of this course the student will be able to: -

<b>CO1</b>	Remember the role of languages like C++/ Java/Python/HTML & DHTML/Android
<b>CO2</b>	Understand the syntax and Develop the programs on specific language.
<b>CO3</b>	Implement various programs using C++/Java/Python/HTML.

### Lab Experiments:

Experiment 1	WAP To use different arithmetic operation in java/C++/Python or use different tags in HTML.
Experiment 2	WAP to perform manipulation on strings in java / C++ / Python.
Experiment 3	WAP to demonstrate Exception handling in java / C++.
Experiment 4	Program to create frame and table using HTML
Experiment 5	Design a website on your own using HTML and CSS
Experiment 6	Develop an application representing a simple calculator
Experiment 7	Develop an application for working with notification
Experiment 8	Develop an application for connecting to internet and sending e-mail.
Experiment 9	Develop an application for working with device camera

**NOTE: Additional Lab experiments/practical will be performed based on the course requirements.**

## OPEN ELECTIVE LAB

B.E. Mechanical Engineering 7th Semester Examination to be held in the Year December 2021,2022,2023,2024

CLASS: B.E. 7<sup>th</sup> SEMESTER

BRANCH: E&C/Electrical/Computers/Mechanical/Civil

COURSE NO.: ITO-714

COURSE TITLE: LINUX SHELL PROGRAMMING

CREDIT: 1

Hours/ Week

Marks Distribution

L T P Practical

0 0 2 50

### COURSE OUTCOMES

At the end of the course the student will be able to: -	
<b>CO1</b>	Understand Linux commands to manage files and file systems
<b>CO2</b>	Write a shell programs to solve a given problems
<b>CO3</b>	Write Regular expressions for pattern matching and apply them to various filters for a specific task.
<b>CO4</b>	Analyze a given problem and apply requisite facets of SHELL programming in order to devise a SHELL script to solve the problem

### LIST OF EXPERIMENTS:

1. Implement the Linux Shell Commands: ls, mkdir, rmdir, cd, cat, banner, touch, file, wc, sort, cut, grep, dd, dfspace, du, ulimit , Commands related to inode, I/O redirection, piping, process control commands, mails, manage the password, Vi editors, wild card characters used in Linux.
2. Write a shell programs to perform operations using case statement such as  
1)Addition 2)subtraction 3)multiplication 4)Division
- 3 Write a shell scripts to see current date,time username and directory
- 4 Write a shell programs to find maximum of three number
- 5 Write a script to check whether the given no. is even/odd
- 6 Write a script to calculate the average of n numbers
- 7 Write a script to check whether the given number is prime or not
- 8 Write a script to calculate the factorial of a given number
- 9 Write a script to calculate the sum of digits of the given number
- 10 Write a shell script to print file names in directory showing date of creation & serial no. of file.

**OPEN ELECTIVE LAB**

**B.E. Mechanical Engineering 7th Semester Examination to be held in the Year December 2021,2022,2023,2024**

<b>CLASS</b>	<b>7<sup>th</sup> SEMESTER</b>					
<b>BRANCH</b>	<b>E&amp;C/Electrical/Computers/Mechanical/IT</b>				<b>CREDITS: 1</b>	
<b>COURSE TITLE</b>	<b>BASIC CIVIL TESTING LAB</b>					
<b>COURSE NO.</b>	<b>CE0- 716</b>	<b>L</b>	<b>T</b>	<b>P</b>	<b>Marks</b>	
		<b>0</b>	<b>0</b>	<b>2</b>	<b>Internal</b>	<b>External</b>
					<b>50</b>	<b>00</b>

<b>COURSE OUTCOMES</b> : On completion of the course the students will be able to:	
<b>CO1</b>	Perform tests on bricks and aggregates
<b>CO2</b>	Determine the physical properties of cement.
<b>CO3</b>	Determine the Workability and Compressive strength of concrete..
<b>CO4</b>	Determine the Specific gravity, Atterberg limits, Compaction characteristics of Soil

1. To determine water absorption and compressive strength of bricks
2. To determine the consistency and initial and final setting time of a given sample of cement by using Vicat's apparatus.
3. To determine the Soundness and Compressive strength of cement.
4. To determine the fineness modulus and bulk density of fine and coarse aggregates.
5. To determine flakiness index and Impact value of coarse aggregates.
6. To determine Workability and Compressive strength of concrete
7. To determine the tensile strength of the steel.
8. To determine the Specific gravity and Atterberg limits of Soil.
9. To determine the compaction characteristics of soil by proctor's test.
10. To determine  $C_d$  for Venturimeter
11. To determine  $C_d$  for Orificemeter
12. To determine  $C_d$  for a Notch.

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**B.E. Mechanical Engineering 8<sup>th</sup> Semester Examination to be held in the Year  
May 2022,2023,2024,2025**

**SCHEME A**

**B.E. Mechanical Engineering 8<sup>th</sup> Semester**

**Contact Hours: 22 hours/week**

COURSE CODE	COURSE TYPE	COURSE TITLE	LOAD ALLOCATIONS			MARKS DISTRIBUTION		TOTAL MARKS	CREDITS	% CHANGE
			L	T	P	INTERNAL	EXTERNAL			
<b>PME-801</b>	Professional Elective Course	A) Optimization Techniques B) Jigs and Fixtures C) Tribology	3	0	0	50	100	150	<b>3</b>	100%
<b>ECO-801</b>	Open Elective Course	The Embedded System.	3	0	0	50	100	150	<b>3</b>	100%
<b>EEO -802</b>		Non Conventional Energy resources and Instrumentation								
<b>CSO -803</b>		Web Technology								
<b>ITO-804</b>		Python Programming								
<b>CEO-806</b>		Essentials of Civil Engineering								
<b>HOE-806</b>		International Economics								
<b>PRJ-805</b>	PROJECT	Project	0	0	16	150	100	250	<b>8</b>	100%
<b>MOC-805</b>	Massive Open Online Course	SWAYAM/ NPTEL/Any other MOOC platform	2	0	0	50	0	50	<b>2</b>	100%
<b>NCC-806</b>	Non-Credit Course	Disaster Management & Mitigation	2	0	0	-	-	-	-	100%
<b>TOTAL</b>			<b>10</b>	<b>0</b>	<b>16</b>	<b>300</b>	<b>300</b>	<b>600</b>	<b>16</b>	

**SCHEME B**

**B.E. Mechanical Engineering 8<sup>th</sup> Semester**

Course Code	Course Type	Course Title	Load Allocations			Marks Distribution		Total Marks	Credits	% Change
			L	T	P	Internal	External			
P1I-805	Professional Industry course	Industry Internship	0	0	0	350	200	550	14	100%
MOC-805	Massive Open Online Course	SWAYAM/ NPTEL/Any other MOOC platform	2	0	0	50	0	50	2	100%
<b>TOTAL</b>			<b>3</b>	<b>0</b>	<b>0</b>	<b>400</b>	<b>200</b>	<b>600</b>	<b>16</b>	

**B.E. Mechanical Engineering 8th Semester Examination to be held in the Year May 2022,2023,2024,2025**

**CLASS: B.E. 8<sup>th</sup> SEMESTER**

**BRANCH: MECHANICAL ENGINEERING**

**COURSE TITLE: OPTIMISATION TECHNIQUES**

**COURSE NO.: PME-801-A**

**DURATION OF EXAMINATION: 3 HOURS.**

**CREDITS: 3**

			Marks	
L	T	P	Theory	Sessional
3	0	0	100	50

**COURSE OUTCOMES**

**At the end of the course student will be able to:**

<b>CO801-A.1:</b>	Identify necessity and development of mathematical models for various industries.
<b>CO801-A.2:</b>	Describe basic optimization and simulation techniques applied to various industries.
<b>CO801-A.3:</b>	Recall investment analysis and game theory.
<b>CO801-A.4:</b>	Predict the industrial systems under the conditions of certainty, uncertainty and risk.
<b>CO801-A.5:</b>	Propose a queuing model based upon given data.

**Detailed Syllabus**

**SECTION – A**

**Introduction to Optimization:** Nature and Historical Development of Optimization sciences, Types of Optimization problems. Project Scheduling: Planning and Scheduling with the basic network models incorporation probabilities and costs, PERT and CPM, Network crashing. **Linear Distribution:** Linear Programming Optimization models. Problem formulation, Geometric solution in two and three dimensional space, Simplex algorithm Solution. **[19 Hours]**

**SECTION – B**

**Optimization Models:** Transportation models, Variations and selected applications, Assignment models, Waiting Line models: Queuing System, Features of queuing process, Classification of models and their solution, M/M/I and M/M/C Models. **[18 Hours]**

**RECOMMENDED BOOKS:**

1. Operation Research : Hamdy H Taha- McMillan pub. Co.
2. Industrial Engineering & Management : O.P. Khanna.
3. Fundamental of Operation Research : R.L.Ackoff & M.W.Sasieni-Wiley Eastern
4. Theory and Problem of Operation Research : R.Bronson –Schaums Outline Series

**NOTE:**

1. Question paper will be of 3 Hours' duration
2. There will be 8 questions in all, four from **Section- A** (each of 20 marks) and four from **Section – B** (each of 20 marks).
3. Students are required to attempt five questions in all, at least two questions from each section
4. Use of scientific calculator will be allowed in the examination hall.



**B.E. Mechanical Engineering 8th Semester Examination to be held in the Year May 2022,2023,2024,2025**

**CLASS: B.E. 8<sup>th</sup> SEMESTER**

**BRANCH: MECHANICAL ENGINEERING**

**COURSE TITLE: JIGS AND FIXTURES**

**COURSE NO.: PME-801-B**

**DURATION OF EXAMINATION: 3 HOURS.**

**CREDITS: 3**

L	T	P	Marks	
			Theory	Sessional
3	0	0	100	50

**COURSE OUTCOMES**

**At the end of the course student will be able to:**

<b>CO801-B.1:</b>	To understand fundamental principles and applications of Jigs and fixtures in industry.
<b>CO801-B.2:</b>	To study the importance of workplace location and degrees of freedom.
<b>CO801-B.3:</b>	To understand the requirements and types of clamping.
<b>CO801-B.4:</b>	To study the guiding elements of jigs.
<b>CO801-B.5:</b>	To understand Jigs and Fixtures and its types.

**Detailed Syllabus**

**SECTION – A**

Jigs and Fixtures:- Elements of jigs and fixtures, costs calculations. Locating element, clamping elements, procedure in designing Jig and fixtures, Fits and tolerances analysis. Non-Standard clamping devices, centralizers, equalizers, actuators (Pneumatic, hydraulic, electric and electronic) Automatic loading and unloading devices. Types of Fixtures: Single, double and multi-axis, and indexers. **[20 Hours]**

**SECTION – B**

Transfer line jigs & fixtures for the operation of Multi-drilling, boring, milling, and grinding. Assembly line fixtures, Universal Jigs and Fixtures. Transfer-devices, transfer machine, modulation-design concept, in process gauging. Design of Dies: Elements of Dies and Punch. Types and design procedure, progressive dies, drawing die, bending die etc. Analysis **[20 Hours]**

**RECOMMENDED BOOKS:**

1. Jigs and Fixtures Design by Franklin-D-Jones.
2. Jigs and Fixtures by Colovin; F.H. and Massachusettes Institute of Technology.
3. Jigs and Fixtures Design by Hardy; H.W.
4. Jigs and Fixtures Design by Haughton; P.S.
5. Jigs and Fixtures by Parson.

**NOTE:**

1. Question paper will be of 3 Hours' duration
2. There will be 8 questions in all, four from **Section- A** (each of 20 marks) and four from **Section – B** (each of 20 marks).
3. Students are required to attempt five questions in all, at least two questions from each section
4. Use of scientific calculator will be allowed in the examination hall.

**B.E. Mechanical Engineering 8th Semester Examination to be held in the Year May 2022,2023,2024,2025**

**CLASS: B.E. 8<sup>th</sup> SEMESTER**  
**BRANCH: MECHANICAL ENGINEERING**  
**COURSE TITLE: TRIBOLOGY**  
**COURSE NO.: PME-801-C**  
**DURATION OF EXAMINATION: 3 HOURS.**

**CREDITS: 3**

					Marks	
L	T	P	Theory	Sessional		
3	0	0	100	50		

COURSE OUTCOMES	
<b>At the end of the course student will be able to:</b>	
<b>CO801-C.1:</b>	Understand the mechanism of friction, wear and lubrication and can develop analytical relation between the variables
<b>CO801-C.2:</b>	Understand hydrodynamic and hydrostatic lubrication
<b>CO801-C.3:</b>	Illustrate the behavior of tribological components subjected to different working conditions and describe different tribological measures.
<b>CO801-C.4:</b>	Understand the concept of types of wear and their measurement under different environments.
<b>CO801-C.5:</b>	Understand the mechanism of lubrication, their performance w.r.t. different variables. Role of lubricants and their applications.

**Detailed Syllabus**

**SECTION – A**

Introduction to tribology and its main elements, i.e., Friction, wear and lubrication. Conformal and non-conformal contacts. Types of motion; rubbing sliding, oscillating and rolling. Surface interactions: elastic and plastic deformations. Properties of materials and their relevance in tribology. Surface energy and flash temperature theory. Friction: Laws of sliding friction, concept of adhesion, rolling friction, measurement of friction. Wear: Laws of wear. Types of wear such as adhesive, delamination, abrasive, fatigue, corrosive, fretting, erosive, and oxidative. **[21 Hours]**

**SECTION – B**

Prevention and control of wear and friction in machines, wear of cutting tools and dies, study of abrasion in grinding, lapping and honing. Lubrication: Types of Lubrication, Mechanisms of lubrication, Boundary. Squeeze film hydrodynamic, elasto hydro-dynamic and hydro static lubrications, and plasto hydrodynamic lubrication. Solid lubricants types and applications. **[20 Hours]**

**RECOMMENDED BOOKS:**

1. Sharma Aggarwal, A Text Book, Kataria
2. Main Engg. Hand Book, A M/c Design.', McGraw Hill.
3. Industrial Tribology, Tribology failures and their analysis, Dr. B.S. Prabhu

**NOTE:**

1. Question paper will be of 3 Hours' duration
2. There will be 8 questions in all, four from **Section- A** (each of 20 marks) and four from **Section – B** (each of 20 marks).
3. Students are required to attempt five questions in all, at least two questions from each section
4. Use of scientific calculator will be allowed in the examination hall.

## OPEN ELECTIVE COURSE

B.E. Mechanical Engineering 8th Semester Examination to be held in the Year May 2022,2023,2024,2025

CLASS: B.E. 8<sup>th</sup> SEMESTER

CREDITS: 3

BRANCH: Electrical/Computers/Mechanical/IT/Civil

COURSE NO: ECO-801

COURSE TITLE: EMBEDDED SYSTEM

DURATION OF EXAM: 3 HOURS

Hours/ Week			Marks Distribution	
L	T	P	Theory	Sessional
2	1	0	100	50

### COURSE OUTCOMES

At the end of the course the student will be able to: -

<b>CO1</b>	Understand the concept of Microcontroller 8051, learn to write simple programs.
<b>CO2</b>	Understand the concept and applications of DC motor and indicators and use in project work.
<b>CO3</b>	Understand the concept of hardware details of ARM7.
<b>CO4</b>	Write the algorithm and design a system based on 8051.

### Detailed Syllabus

#### SECTION–A

**Definition of Embedded system, macro and micro embedded systems:** Architecture of 8031/8051/8751. Comparison of Microprocessors and Microcontroller Data types and Directives. Pin description of 8051, I/O port functions, Time Delay Generation and calculation. Addressing modes, Logic instructions and programs, single bit instructions and programs, Programming using 8051 timers, counter programming, simplex, half duplex, full duplex transmission, synchronous and asynchronous communication. **[16 Hours]**

#### SECTION–B

**Architecture:** Block Diagram and Pin Diagram of ARM7, Instruction Set, Addressing Modes ARM Processor. System Design based on 8051/ARM Processor. Peripheral Interfaces: LCD, Seven Segment Display, Sensor: IR, temperature. Relays, analog to digital converter, digital to analog converter interfaces with 8051 and ARM7. **[14 Hours]**

<b>BOOKS RECOMMENDED:</b>		
1.	The 8051 Microcontroller (architecture, Programming and Applications )	Kenneth J. Ayala -----Penram International
2.	The 8051 Microcontroller and Embedded Systems	Muhammed Ali Mazidi & Janice Gillispie Mazdi
3.	ARM system development guide	Andrew-n-sloss& Dominic Symes Publisher –Morgan Aausamann.

**NOTE:** There will be eight questions of 20 marks each, four from each section. Students are required to attempt five questions selecting at least two questions from each section. Use of Calculator is allowed.

*Pawan*

## OPEN ELECTIVE COURSE

B.E. Mechanical Engineering 8th Semester Examination to be held in the Year May 2022,2023,2024,2025

CLASS: B.E. 8<sup>TH</sup> SEMESTER

CREDITS: 3

BRANCH: E&C/Computers/Mechanical/IT/Civil

MARKS

COURSE CODE: EEO-802

TITLE: NON-CONVENTIONAL ENERGY SOURCES AND INSTRUMENTATION

L	T	P	THEORY	SESSIONAL
3	0	0	100	50

DURATION OF EXAM: 3 HOURS

Course Outcomes: Student will be able to	
CO1	Understand the need of energy , Various types of energy and scenario
CO2	Identify non-conventional energy as alternate form of energy and to know how it can be tapped.
CO3	Understanding various methods of measurement and instrumentation
CO4	Understanding about illumination and other lighting schemes.

### SECTION-A

**Module 1: Introduction:** Limitations of conventional energy sources need & growth of alternate energy sources, basic schemes and applications of direct energy conversion. Photovoltaic effect, characteristics of photovoltaic cells, conversion efficiency, solar batteries and applications. Solar energy in India, solar collectors, solar furnaces & applications. Geothermal system, Characteristics of geothermal resources, choice of generators, electric equipment and precautions. Low head hydro plants, definition of low head hydro power, choice of site and turbines. Tidal energy, idea of tidal energy, Tidal electric generator, limitations. [8 Hours]

**Module 2: Wind Energy & MHD Generators:** History of wind power, wind generators, theory of wind power, characteristics of suitable wind power sites, scope in India. Basic Principles and Half effect, generator and motor effect, different types of MHD generators, conversion effectiveness. Practical MHD generators, applications and economic aspects. [5 Hours]

**Module 3: Fuel Cells & Thermo-electric, Generators:** Principle of action, Gibbs free energy, general description of fuel cells, types, Construction, operational characteristics and applications. Seebeck effect, peltier effect, Thomson effect, thermoelectric convertors, brief description of the construction of thermoelectric generators, applications & economic aspects. [5 Hours]

### SECTION-B

**Module4: MEASURING INSTRUMENTS:** Classification, effects utilized in measuring instruments. Indicating instruments: Deflection, controlling and damping forces, various dampings. Measurement of low resistance: - Potentiometer method, Kelvin double bridge. Ammeters and Voltmeters: Moving coil, moving iron ammeter and voltmeters, Errors in Ammeters and Voltmeters. [7 Hours]

**Module 5: MEASUREMENT OF POWER:** Wattmeter measurement in single phase A.C. circuits, Wattmeter errors. Measurement of three phase power by two wattmeter methods. Energy meters for A.C. circuits, Theory of Induction type meters. [5 Hours]

**Module 6: Illumination:** Nature and production of light. Photometric definitions. Incandescent lamps, arc and discharge lamps. Design of illumination schemes for indoor and outdoor uses. Flood lighting. [4 Hours]

#### RECOMMENDED BOOKS:

Non-conventional Energy Resources	D.S. Chauhan
Conventional energy sources	G.D. Rai
Non-Conventional energy sources	B.H. Khan
Solar Energy Fundamentals and Applications	H.P. Garg and Jai Prakash
A course in Electrical and Electronics Measurement & instrumentation	A.K. Sawhney

**NOTE:** There shall be total eight questions; five questions have to be attempted selecting at least two questions from each section.

## OPEN ELECTIVE COURSE

B.E. Mechanical Engineering 8th Semester Examination to be held in the Year May 2022,2023,2024,2025

CLASS: B.E. 8<sup>th</sup> SEMESTER

CREDITS: 3

BRANCH: E&C/Electrical/Mechanical/IT/Civil

COURSE NO: CSO-803

COURSE TITLE: WEB TECHNOLOGY

DURATION OF EXAM: 3 HOURS

Hours/ Week			Marks Distribution	
L	T	P	Theory	Sessional
2	1	0	100	50

COURSE OUTCOMES	
At the end of the course the student will be able to: -	
CO1	Remember the role of languages like HTML, DHTML, CSS and android
CO2	Analyze a web page and identify its elements and attributes.
CO3	Implement web pages using HTML, DHTML and Cascading Style Sheets.
CO4	Develop Web applications using HTML/CSS/Javascript.

### Detailed Syllabus

#### Section- A

**Introduction to WWW** :- Protocols and programs, Secure connections, Application and development tools, The web browser, What is server, Choices, Dynamic IP.

Web Design: Web site design principles, Planning the site and navigation.

[6 Hours]

**Introduction to HTML**:- The development process, HTML tags and simple HTML forms, Web site structure. Introduction to XHTML: XML, Move to XHTML, Meta tags, Character entities, Frames and frame sets, Inside browser. [7 Hours]

**Style Sheets**:- Need for CSS, Introduction to CSS, Basic syntax and structure, Using CSS, Background images, Colors and properties, Manipulating texts, Using fonts, Borders and boxes, Margins, Padding lists, Positioning using CSS, CSS2.

[7 Hours]

**Javascript**:-Client side scripting, What is Javascript, How to develop Javascript, Simple Javascript, variables, Functions, Conditions, Loops and repetition.

[3 Hours]

#### Section- B

**Advance script**: Javascript and objects, Javascript own objects, The DOM and web browser environments, forms and validations.

**DHTML**: Combining HTML, CSS and Javascript, events and buttons, controlling your browser, Ajax: Introduction, advantages &disadvantages ,Purpose of it ,ajax based web application, alternatives of ajax. **XML**: Introduction to XML, uses of XML, simple XML, XML key components, DTD and schemas, Well formed, using XML with application XML, XSL and XSLT, Introduction to XSL, XML transformed simple example, XSL elements, Transforming with XSLT. [7 Hours]

**PHP**:- Starting to script on server side, Arrays, Function and forms, Advance PHP.

**Databases**:- Basic command with PHP examples, Connection to server, Creating database, Selecting a database, Listing database, Listing table names, Creating a table, Inserting data, Altering tables, Queries, Deleting database, Deleting data and tables, PHP myadmin and database bugs.

[10 Hours]

BOOKS RECOMMENDED:		
1.	"HTML Black Book"	Steven Holzner, Dremtech press.
2.	Web Technologies, Black Book.	Dreamtech Press
3.	Web Applications: Concepts and Real-World Design	Knuckles, Wiley-India
4.	Internet and World Wide Web How to program	P.J. Deitel & H.M. Deitel Pearson.

**NOTE: There will be eight questions of 20 marks each, four from each section. Students are required to attempt five questions selecting at least two questions from each section. Use of Calculator is allowed.**

## OPEN ELECTIVE COURSE

B.E. Mechanical Engineering 8th Semester Examination to be held in the Year May 2022,2023,2024,2025

CLASS: B.E. 8<sup>th</sup> SEMESTER

CREDITS: 3

BRANCH: E&C/Electrical/Computers/Mechanical/Civil

COURSE NO: ITO-804

COURSE TITLE: Python Programming

DURATION OF EXAM: 3 HOURS

Hours/ Week			Marks Distribution	
L	T	P	Theory	Sessional
2	1	0	100	50

COURSE OUTCOMES	
At the end of the course the student will be able to: -	
CO1	To Understand basics of python.
CO2	To develop console application in python
CO3	To develop database application in python
CO4	Apply the concept of file handling in python and basic machine learning application

### Detailed Syllabus

#### Section- A

**Introduction to Python Programming Language:** -Introduction to Python Language, Strengths and Weaknesses, IDLE, Dynamic Types, Naming Conventions, String Values, string Operations, String Slices, String Operators, Numeric Data Types, Built In Functions. **[10 Hours]**

**Data Collections and Language Component:** -Introduction, Control Flow and Syntax, Indenting, The if Statement, Relational Operators, Logical, Operators, True or False, Bit Wise Operators, The while Loop, break and continue, The for Loop, Lists, Tuples, Sets, Dictionaries, Sorting Dictionaries, Copying Collections. **[5 Hours]**

**Functions and Modules :-** Introduction Defining Your Own Functions Parameters Function Documentation Keyword and Optional Parameters Passing Collections to a Function Variable Number of Arguments Scope Functions - "First Class Citizens" Passing Functions to a Function Mapping Functions in a Dictionary Lambda Modules Standard Modules – sys Standard Modules – math Standard Modules – time The dir Function **[6 Hours]**

#### SECTION- B

**Object and Classes:** -Classes in Python, Principles of Object Orientation, Creating Classes, Instance Methods Special Methods Class Variables, Inheritance, Polymorphism. **[6 Hours]**

**I/O and Error Handling InPython:** Introduction, Data Streams, Creating Your Own Data Streams, Access Modes, Writing Data to a File, Reading Data From a File, Additional File Methods, Handling IO Exceptions, Working with Directories, Errors, Run Time Errors, The Exception Model, Exception Hierarchy, Handling Multiple Exceptions. **[10 Hours]**

#### **Text Book:**

1. Think Python, by Allen B. Downey ,second edition ,O'Reilly, Sebastopol, California.
  2. Online Version [www.greenteapress.com/thinkpython2.pdf](http://www.greenteapress.com/thinkpython2.pdf).
  3. How to think like a computer Scientist, by Brad Miller and David Ranum.
  4. Python Programming: An Introduction to Computer Science, by John Zelle.
- Online Version:[www.interactivepython.org/runstone/static/thinkscpy/index.html](http://www.interactivepython.org/runstone/static/thinkscpy/index.html).

**NOTE:** There will be eight questions of 20 marks each, four from each section. Students are required to attempt five questions selecting at least two questions from each section. **Use of Calculator is allowed.**

*Paulson*

## OPEN ELECTIVE COURSE

B.E. Mechanical Engineering 8th Semester Examination to be held in the Year May 2022,2023,2024,2025

CLASS	8 <sup>th</sup> SEMESTER						
BRANCH	E&C/Electrical/Computers/Mechanical/IT					CREDITS: 3	
COURSE TITLE	ESSENTIALS OF CIVIL ENGINEERING						
COURSE NO.	CEO- 806	L	T	P		Marks	
DURATION OF EXAM	3 HOURS	3	0	0	Theory	Sessional	
					100	50	

<b>COURSE OUTCOMES :</b> On completion of the course the students will be able to:	
<b>CO1</b>	Able to identify the properties of building materials.
<b>CO2</b>	Acquaint with the masonry construction and finishes
<b>CO3</b>	Carry out surveying in the field for engineering projects.
<b>CO4</b>	Plan and schedule the Project by various network techniques of construction planning

### MODULE –I

**Brick:** Classification of bricks, constituents of good brick earth, harmful ingredients, manufacturing of bricks, testing of bricks.

**Timber:** Classification of timber, structure of timber, seasoning of timber, defects in timber and prevention of timber.

**Aggregates:** Classification of aggregates and various tests conducted on aggregates [9 Hours]

### MODULE -II

**Masonry Construction Introduction:** various terms used, stone masonry-Dressing of stones, Classifications of stone masonry, safe permissible loads, Brick masonry-bonds in brick work, laying brick work, Defects in brick masonry, composite stone and brick masonry.

**Foundations:** Purpose, site exploration, Methods of Testing Bearing Capacity of Soils, Types of Foundations, Combined Footing and Raft Foundation. Pile Foundation and its types, Pile Driving, Cofferdams. [9 Hours]

### Module -III

Introduction to surveying, Principles of surveying, Measurement of distance. Chain Surveying, Field Equipment, Methods of Chain Surveying, Plotting from the Field Books and Degree of Accuracy, Tape corrections.

**Levelling:** Instruments used and field book recording, Methods of Levelling, height of Instrument method and Rise and Fall method, Temporary and permanent adjustments in levels. [9 Hours]

### Module -IV

#### Network techniques in construction management

Bar Charts and Mile stone charts, Elements of network, Development of network, Network rules, Network techniques CPM and PERT, Network analysis, Time estimates, Time computations, classification of activities, Determination of Slack and float, Critical Path. [9 Hours]

### BOOKS RECOMMENDED:

1. BUILDING MATERIAL & CONSTRUCTION BY SUSHIL KUMAR
2. BUILDING MATERIAL BY PRABIN SINGH
3. SURVEYING VOL.- I BY B.C PUNMIA.
4. PERT & CPM - Principles & Applications BY L SRINATH

**NOTE:** There shall be total eight questions of 20 marks each, two from each module. Five questions have to be attempted selecting at least one from each module. Use of Calculator is allowed.



OPEN ELECTIVE COURSE

B.E. Mechanical Engineering 8th Semester Examination to be held in the Year May 2022,2023,2024,2025

Class: B.E. 8<sup>th</sup> semester

Branch: E&C/Electrical/Computers/Mechanical/IT/Civil

Course No.: HOE-806

Course title: International Economics

Duration: 3 hours

CREDIT: 3

L	T	P
2	1	0

Marks

Theory	Sessional
100	50

At the end of the course, Students shall be able to:

CO1	Understand the concept of international trade in general as well as with the classical and modern theories.
CO2	Analyze the concept of foreign exchange and foreign trade multiplier in detail and hence shall be able to understand the international market conditions.
CO3	Compete in international corporate world by understanding the various concepts of terms of trade like tariffs, quotas, balance of payment and international organisations, etc.

SECTION A

**UNIT - I:** Concept of International Trade

Meaning, Significance and scope of International Economics, concepts of internal, interregional and international trade and their comparison, Theories of international trade: Absolute Cost Advantage, Comparative Cost Advantage, Opportunity cost theory (features, assumptions and limitations) **(6 hours)**

**UNIT - II:** Theories of International Trade

Modern Theories of International Trade: General equilibrium theory, Heckscher- Ohilin Theory, Rybznski Theorem, The Stolper – Samuelson Theorem, Factor Price-Equalization Theorem. **(5 hours)**

**UNIT- III:** Foreign Exchange and Foreign Trade Multiplier.

Foreign Exchange: Meaning and problems of foreign exchange, Methods of foreign payment, Demand and Supply of foreign currency, Foreign Trade-Multiplier, Exchange control (concept, features, objectives, and methods). **(7 hours)**

SECTION B

**Unit- IV:** Terms of trade

Meaning, Different Terms of Trade Indexes (Net Barter, Gross Barter, Income, Single and Double Factoral), Factors influencing Terms of Trade; Prebisch-Singer Thesis; Doctrine of reciprocal demand-importance and limitations. **(6 hours)**

**Unit- V:** Trade barriers

Tariffs and Quotas (Meaning, classifications and their impact), theory of optimum tariff, devaluation (concept, merits, demerit and limitations) **(5 hours)**

**Unit VI:** Balance of payment and International organisations

Concept and components of balance of trade and balance of payment, equilibrium and disequilibrium in BOP, consequences of disequilibrium in BOP, Various measures to correct deficit in BOP. International organisations: IMF, World bank, World Trade organisations- objectives, functions. **(7 hours)**

**Suggested Readings**

International Economics	-H.G Mannur
International Economics	-Paul R. Krugman and Maurice Obstfeld
International Economics	- Dominick Salvatore
International Economics	- Sodersten Bo
International Economics	- Os Shrivastva

**NOTE:** There will be eight questions of 20 marks each, four from each section. Students are required to attempt five questions selecting at least two questions from each section. Use of calculator is allowed.



**B.E. Mechanical Engineering 8th Semester Examination to be held in the Year May 2022,2023,2024,2025**

**CLASS: B.E. 8<sup>th</sup> SEMESTER**

**BRANCH: MECHANICAL ENGINEERING**

**COURSE TITLE: PROJECT**

**COURSE NO.: PRJ-805**

**DURATION OF EXAMINATION: 3 HOURS.**

**CREDITS: 8**

Marks				
L	T	P	Internal	External
0	0	16	150	100

COURSE OUTCOMES	
<b>At the end of the course student will be able to:</b>	
<b>CO805.1:</b>	Identify methods and materials to carry out experiments/develop code.
<b>CO805.2:</b>	Reorganize the procedures with a concern for society, environment and ethics.
<b>CO805.3:</b>	Analyze and discuss the results to draw valid conclusions.
<b>CO805.4:</b>	Prepare a report as per recommended format and defend the work.
<b>CO805.5:</b>	Explore the possibility of publishing papers in peer reviewed journals/conference proceedings.

The project will be assigned to the students towards the end of 7<sup>th</sup> semester and will start working on those projects at the commencement of their 8<sup>th</sup> semester. The topic of the project will be decided as per the developments taking place in the field of Mechanical Engineering. The Project involves innovation, fabrication, design, case study in any relevant field of Engineering. It must comprise up of name of Project, Introduction, methodology, literature survey, problem formulation, experimentation work (if any), conclusion, future scope of work, reference.

**Guidelines for evaluation of Project Work in 8<sup>th</sup> semester:**

There shall be a mid-semester evaluation, followed by an End Semester (Final) Evaluation

**Sub-distribution of marks:**

- For External Examiner : 100
- For Internal Examiner : 150

**Sub-distribution of Internal Marks:**

- Out of the total 150 marks for internal evaluation, 50 marks are for mid-semester evaluation and 100 marks are for final internal evaluation
- Mark distribution of internal Project work as per the University statutes shall be based on:

	Distribution	Mid-Semester		Internal Final	
<b>a.</b>	Viva-Voce	15	30%	30	30%
<b>b.</b>	Presentation	15	30%	30	30%
<b>c.</b>	Report	20	40%	40	40%
		<b>50</b>		<b>100</b>	
	<b>Total Internal</b>	<b>150</b>			

**NOTE:** The students will submit a detailed project report individually to the Head of the department and a copy of the certificate if awarded should also be appended to the report.

**B.E. Mechanical Engineering 8th Semester Examination to be held in the Year May 2022,2023,2024,2025**

**CLASS: B.E. 8<sup>th</sup> SEMESTER**

**BRANCH: MECHANICAL ENGINEERING**

**COURSE TITLE: SWAYAM/NPTEL/ANY OTHER MOOC PLATFORM**

**COURSE NO.: MOC-805**

**CREDITS: 2**

			Marks	
L	T	P	Internal	External
2	0	0	50	0

The Students shall select a MOOC available at the time on any reputed platform and shall pursue the same after due approval of the same from the departmental Committee. However he selected MOOC course should not be similar to the regular courses offered as a part of the department curriculum.

The overall monitoring of the OOC course will be under the supervision of the teacher Incharge of the department The Departmental Academic Committee shall assess the student work based on a presentation of the Course undertaken/Project completed along with a relevant course completion certificate.

*Paulson*

**B.E. Mechanical Engineering 8th Semester Examination to be held in the Year May 2022,2023,2024,2025**

**CLASS: B.E. 8<sup>th</sup> SEMESTER**  
**BRANCH: MECHANICAL ENGINEERING**  
**COURSE TITLE: Industry Internship**  
**COURSE NO.: PII-805**

**CREDITS: 14**

Marks				
L	T	P	Internal	External
0	0	0	350	200

<b>COURSE OBJECTIVES</b>	
<b>CO805.1:</b>	Practical implementation of theoretical knowledge gained during study
<b>CO805.2:</b>	Implement ideas/real time industrial problem/ current application
<b>CO805.3:</b>	Evaluate better solution for selected problem using state of the art topics in a broad area of his/her specialization.
<b>CO805.4:</b>	Internship helps students to build confidence in handling and finding feasible solution of a real time industrial problem

The project will be assigned to the students towards the end of 7<sup>th</sup> semester and they will start working on those projects at the commencement of their 8<sup>th</sup> semester.

The students will submit the details of the company / industry where they intend to do their project work along with company's consent letter in the 7<sup>th</sup> semester. The Departmental Academic Committee will finalize and approve the projects. However, an internal guide will be allotted to each project who shall periodically evaluate the student's performance during the project.

The topic of the project will be decided as per the developments taking place in the field of Mechanical Engineering. This may require complete literature survey, design, manufacturing, simulation of some models and/or some preliminary lab experiments etc.

The students will have to submit a detailed project report individually to their internal guide and a copy of the certificate if awarded should also be appended to the report. They should also submit a monthly progress of their project duly signed by the concerned authority via mail to their respective guide.

**NOTE: Students are also allowed to start their start up, provided they submit a DPR with a detailed proposal of their start up that would define their action plan and idea to the start-up cell. Only after the submitted proposal has been approved by the start-up cell will the students be allowed to work on their project.**

**Total Internal Marks = 350**

Mark distribution of Industry internship (internal) as per the University statutes shall be based on:

	<b>Distribution</b>	<b>Mid-Semester</b>		<b>Internal Final</b>	
a.	Viva-Voce	30	30%	75	30%
b.	Presentation	30	30%	75	30%
c.	Report	40	40%	100	40%
		<b>100</b>		<b>250</b>	
	<b>Total Internal</b>	<b>350</b>			

**B.E. Mechanical Engineering 8th Semester Examination to be held in the Year May 2022,2023,2024,2025**

**CLASS: B.E. 8<sup>th</sup> SEMESTER**

**BRANCH: MECHANICAL ENGINEERING**

**COURSE TITLE: SWAYAM/NPTEL/ANY OTHER MOOC PLATFORM**

**COURSE NO.: MOC-805**

**CREDITS: 2**

<b>L</b>	<b>T</b>	<b>P</b>	<b>Marks</b>	
			<b>Internal</b>	<b>External</b>
<b>2</b>	<b>0</b>	<b>0</b>	<b>50</b>	<b>0</b>

The Students shall select a MOOC available at the time on any reputed platform and shall pursue the same after due approval of the same from the departmental Committee. However he selected MOOC course should not be similar to the regular courses offered as a part of the department curriculum.

The overall monitoring of the OOC course will be under the supervision of the teacher Incharge of the department The Departmental Academic Committee shall assess the student work based on a presentation of the Course undertaken/Project completed along with a relevant course completion certificate.

*Pawan*

**B.E. Mechanical Engineering 8th Semester Examination to be held in the Year May 2022,2023,2024,2025**

<b>CLASS</b>	<b>8<sup>th</sup> SEMESTER</b>				
<b>BRANCH</b>	<b>MECHANICAL ENGINEERING</b>	<b>CREDITS: 0</b>			
<b>COURSE TITLE</b>	<b>DISASTER MANAGEMENT &amp; MITIGATIONS</b>	<b>CATEGORY: NCC</b>			
<b>COURSE NO.</b>	<b>NCC-806</b>	<b>L</b>	<b>T</b>	<b>P</b>	<b>Marks</b>
		<b>2</b>	<b>0</b>	<b>0</b>	<b>Satisfactory/Unsatisfactory</b>

<b>COURSE OUTCOMES</b> : On completion of the course the students will be able to:	
CO1	Identify various types of disasters, their causes and Impacts
CO2	To understand the disaster management principles, objectives and approaches
CO3	To understand various various elements of disaster management.
CO4	To study the modern techniques used in disaster mitigation and management.

**Module I**

**Introduction to Disaster Management:** Define and describe disaster, hazard, emergency, vulnerability, risk and disaster dimensions. Important phases of Disaster Management Cycle.

**Disasters classification-** Natural disaster (floods, draught, cyclones, volcanoes, earthquakes, tsunami, landslides, coastal erosion, soil erosion, forest fires etc.); manmade disasters (industrial pollution, artificial flooding in urban areas, nuclear radiation, chemical spills, transportation accidents, terrorist strikes, etc.)

**Module II**

**Disaster Management:** Principles, objectives, and approaches. Element of disaster management; role of NGOs, community – based organizations and media; central, and state.

**Disaster Mitigation:** Hazard assessment, Vulnerability assessment, and Risk assessment. Emergency Management Systems (EMS): Emergency medical and essential public health services, response and recovery operations, reconstruction and rehabilitation.

**BOOKS RECOMMENDED:**

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|--|------------------|
| 1. Disaster Management                           | BY Harsh K Gupta |
| 2. Disaster Management Techniques and Guidelines | BY B K Singh     |
| 3. Disaster Risk Reduction in South Asia         | BY Pradeep Sahni |
| 4. Disaster management, A P H Publishers         | BY Sharma.S.R    |

**NOTE:** Evaluation of the course. There will be internal evaluation based on two internal sessional tests of 30 marks each

*Pawan*