



Scheme – 2023

Department of Mechanical Engineering

**G. Pulla Reddy Engineering College
(Autonomous): Kurnool**

Accredited by NBA of AICTE and NAAC of UGC

Affiliated to JNTUA, Anantapuramu

Scheme and Syllabus for
Minor in Industrial Engineering
(For Non Mechanical Engineering students)

(With Effect from the Batch Admitted in 2023-24)

G. PULLA REDDY ENGINEERING COLLEGE (Autonomous): KURNOOL
DEPARTMENT OF MECHANICAL ENGINEERING
Minor in INDUSTRIAL ENGINEERING (For Non Mechanical Engineering students)

SCHEME OF INSTRUCTION AND EXAMINATION

S. No.	Course Code	Title	L	T	P	Credits
1	MIE01	Production Planning & Control	3	0	0	3
2	MIE02	Marketing Management	3	0	0	3
3	MIE03	Supply Chain Management	3	0	0	3
4	MIE04	Strategic Management for Competitive Advantage	3	0	0	3
5	MIE05	Six Sigma & Lean Manufacturing	3	0	0	3
6		Applied Project Work	0	0	6	3
Total			15	0	6	18

PRODUCTION PLANNING & CONTROL (PPC)								
Minor: Industrial Engineering					Scheme : 2023			
Course Code	Category	Hours/Week			Credits	Maximum Marks		
MIE01	PC	L	T	P	C	Continuous Internal Assessment	End Exam	TOTAL
		3	0	0	3	30	70	100
Sessional Exam Duration: 2 Hrs					End Exam Duration: 3 Hrs			
Course Outcomes: At the end of the course the student will be able to								
CO1:	Understand the concepts and functions of production planning							
CO2:	Apply the concepts of method study, time study and work sampling							
CO3:	Analyse the Pre requisite information needed for product and process planning							
CO4:	Understand the Scheduling techniques.							
CO5:	Analyse the inventory systems							
UNIT – I								
Introduction: Objectives and benefits of planning and Control-Functions of production Control-Types of production- job- batch and continuous-Product development and design-Marketing aspect - Functional aspects- Operational Aspect-Durability and dependability aspect aesthetic aspect. Profit consideration- Standardization, Simplification & specialization- Break even analysis								
UNIT – II								
Work Study: Method study, basic procedure-Selection-Recording of process - Critical analysis, Development - Implementation - Micro motion study – work measurement - Techniques of work measurement - Time study - Work sampling - Predetermined motion time standards.								
UNIT – III								
Product Planning And Process Planning: Product planning-Extending the original product information-Value Analysis-Problems in lack of product planning-Process planning and routing-Pre requisite information needed for process planning- Steps in process planning								
UNIT – IV								
Production Scheduling: Production Control Systems-Loading and scheduling-Master Scheduling-Scheduling rules-Gantt charts -Basic scheduling problems - Line of balance – Flow production scheduling- Batch production scheduling-Product sequencing – Production Control systems- Material requirement planning kanban – Dispatching-Progress reporting and expediting- Manufacturing lead time								
UNIT – V								
Inventory Control And Recent Trends In PPC: Inventory control-Purpose of holding stock-Effect of demand on inventories-Ordering procedures. Two bin system - Ordering cycle system-Determination of Economic order quantity and economic lot size- ABC analysis - elements of Just in Time Systems								
Text Books:								
1. James. B. Dilworth, Operations management – Design, Planning and Control for manufacturing and services McGraw Hill International edition 1992.								
2. Mart and Telsang, –Industrial Engineering and Production ManagementI, First edition, S. Chand and Company, 2000.								
Reference Books:								
1. Chary. S.N., –Theory and Problems in Production & Operations ManagementI, Tata McGraw Hill, 1995.								
Question Paper Pattern:								
Sessional Exam: The question paper for Sessional Examination shall be for 40 marks. The								

question paper shall consist of Four questions and all questions are compulsory. Question No.1 shall contain Five compulsory short answer questions for a total of Ten marks. Question No.2 to 4 shall be EITHER/OR Type for Ten marks each. Student shall Answer any one of them. Each of these questions may contain sub-questions.

End Examination: The question paper for End Examination shall be for 70 marks. The Question paper shall contain Six Questions and all questions are compulsory. Question No.1 shall contain Ten compulsory short answer questions for a total of Twenty marks (with Two short answer questions from each unit). Question No.2 to 6 shall be EITHER/OR Type for Ten marks each and shall cover one Unit of the Syllabus for each question. Student shall Answer any one of them. Each of these questions may contain sub-questions.

MARKETING MANAGEMENT (MM)								
Minor: Industrial Engineering					Scheme : 2023			
Course Code	Category	Hours/Week			Credits	Maximum Marks		
MIE02	PC	L	T	P	C	Continuous Internal Assessment	End Exam	TOTAL
		3	0	0	3	30	70	100
Sessional Exam Duration: 2 Hrs					End Exam Duration: 3 Hrs			
Course Outcomes: At the end of the course the student will be able to								
CO1:	Understand Marketing Functions							
CO2:	Understand the marketing strategy in various types of markets							
CO3:	Analyse new product development, market segmentation, sales promotion and pricing							
CO4:	Analyse the customer behavior and customer relationship management							
CO5:	Understand the research insights into marketing function and trends in marketing							
UNIT – I								
Introduction: Marketing – Definitions - Conceptual frame work – Marketing environment: Internal and External - Marketing interface with other functional areas – Production, Finance, Human Relations Management, Information System. Marketing in global environment – Prospects and Challenges.								
UNIT – II								
Marketing Strategy: Marketing strategy formulations – Key Drivers of Marketing Strategies - Strategies for Industrial Marketing – Consumer Marketing — Services marketing – Competitor analysis - Analysis of consumer and industrial markets – Strategic Marketing Mix components.								
UNIT – III								
Marketing Mix Decisions: Product planning and development – Product life cycle – New product Development and Management – Market Segmentation – Targeting and Positioning – Channel Management – Advertising and sales promotions – Pricing Objectives, Policies and methods.								
UNIT – IV								
Buyer Behaviour: Understanding industrial and individual buyer behaviour - Influencing factors – Buyer Behaviour Models – Online buyer behaviour - Building and measuring customer satisfaction – Customer relationships management – Customer acquisition, Retaining, Defection.								
UNIT – V								
Marketing Research & Trends In Marketing: Marketing Information System – Research Process – Concepts and applications: Product – Advertising – Promotion – Consumer Behaviour – Retail research – Customer driven organizations - Cause related marketing - Ethics in marketing –Online marketing trends.								
Text Books:								
1. Philip Kotler and Kevin Lane Keller, Marketing Management, PHI 14/e, 2012								
2. Paul Baines, Chris Fill and Kelly Page, Marketing, Oxford University Press, 2/e,2011.								
3. Kotler, Philip(2002) Marketing Management, Millennium Edition. Intl ed. US: Prentice Hall, 2002								
Reference Books:								
1. Philip Kotler and Kevin Lane Keller, Marketing Management, PHI 14th Edition, 2012								
2. KS Chandrasekar, —Marketing management-Text and Casesl, Tata McGraw Hill, First edition,2010								
3. Lamb, hair, Sharma, Mc Daniel– Marketing – An Innovative approach to learning and teaching-A south Asian perspective, Cengage Learning — 2012								

Online Learning Resources:

1. <https://nptel.ac.in/courses/110104068>

Question Paper Pattern:

Sessional Exam: The question paper for Sessional Examination shall be for 40 marks. The question paper shall consist of Four questions and all questions are compulsory. Question No.1 shall contain Five compulsory short answer questions for a total of Ten marks. Question No.2 to 4 shall be EITHER/OR Type for Ten marks each. Student shall Answer any one of them. Each of these questions may contain sub-questions.

End Examination: The question paper for End Examination shall be for 70 marks. The Question paper shall contain Six Questions and all questions are compulsory. Question No.1 shall contain Ten compulsory short answer questions for a total of Twenty marks (with Two short answer questions from each unit). Question No.2 to 6 shall be EITHER/OR Type for Ten marks each and shall cover one Unit of the Syllabus for each question. Student shall Answer any one of them. Each of these questions may contain sub-questions.

SUPPLY CHAIN MANAGEMENT (SCM)								
Minor: Industrial Engineering					Scheme: 2023			
Course Code	Category	Hours/Week			Credits	Maximum Marks		
MIE03	PC	L	T	P	C	Continuous Internal Assessment	End Exam	TOTAL
		3	0	0	3	30	70	100
Sessional Exam Duration : 2 Hrs					End Exam Duration: 3 Hrs			
Course Outcomes : At the end of the course the student will be able to								
CO1:	Understand the strategic role of supply chain management in the cost reduction and offering best services to the customer							
CO2:	Understand the design of transportation and distribution network							
CO3:	Understand the supplier and customer echelons of supply chain							
CO4:	Analyze the logistic systems							
CO5:	Evaluate Recent trends in supply chain management and e-commerce							
UNIT – I								
Introduction to Supply Chain Management: Supply chain - objectives - importance - decision phases - process view -competitive and supply chain strategies - achieving strategic fit – supply chain drivers - obstacles – framework - facilities -inventory-transportation-information-sourcing-pricing.								
UNIT – II								
Designing the Distribution Network: Role of distribution - factors influencing distribution - design options - e-business and its impact – distribution networks in practice –network design in the supply chain - role of network -factors affecting the network design decisions in modelling for supply chain. Role of transportation - modes and their performance - transportation infrastructure and policies - design options and their trade-offs tailored to transportation								
UNIT – III								
Supply Chain Analysis: Sourcing - In-house production or Outsourcing - 3rd and 4th PLs - supplier rating and assessment, supplier selection - design collaboration - Procurement process – Sourcing: planning and analysis. Pricing and revenue management for multiple customers, perishable products, seasonal demand, bulk and spot contracts.								
UNIT – IV								
Dimensions of Logistics: Macro and micro dimensions of logistics; interfaces with other areas - approach to analyzing logistics systems - logistics and systems analysis - techniques of logistics system analysis - factors affecting the cost and importance of logistics. Demand Management and Customer Service Outbound to customer logistics systems - Demand Management –Traditional Forecasting – Collaborative planning, forecasting and replenishment (CPFRP) - customer service - channels of distribution.								
UNIT – V								
Recent Trends in Supply Chain Management: Introduction, New Developments in Supply Chain Management, Outsourcing Supply Chain Operations, Co-Maker ship, The Role of E-Commerce in Supply Chain Management, Green Supply Chain Management, Distribution Resource Planning, World Class Supply Chain Management								
Text Books:								
1. Sunil Chopra and Peter Meindl, Supply Chain Management – —Strategy, Planning and Operationl, 3rd Edition, Pearson/PHI, 2007								
2. Supply Chain Management by Janat Shah Pearson Publication 2008								
Reference Books:								
1. A Logistic approach to Supply Chain Management – Coyle, Bardi, Longley, Cengage Learning, 1/e								

2. Donald J Bowersox, Dand J Closs, M Bixby Coluper, –Supply Chain Logistics Managementl, 2nd edition, TMH, 2008.
3. Wisner, Keong Leong and Keah-Choon Tan, –Principles of Supply Chain Management A Balanced Approachl, Cengage Learning, 1/e

Online Learning Resources:

1. <https://nptel.ac.in/courses/109105494>
2. <https://nptel.ac.in/courses/110108056>
3. <https://nptel.ac.in/courses/110106045>
4. <https://nptel.ac.in/courses/110105141>

Question Paper Pattern:

Sessional Exam: The question paper for Sessional Examination shall be for 40 marks. The question paper shall consist of Four questions and all questions are compulsory. Question No.1 shall contain Five compulsory short answer questions for a total of Ten marks. Question No.2 to 4 shall be EITHER/OR Type for Ten marks each. Student shall Answer any one of them. Each of these questions may contain sub-questions.

End Examination: The question paper for End Examination shall be for 70 marks. The Question paper shall contain Six Questions and all questions are compulsory. Question No.1 shall contain Ten compulsory short answer questions for a total of Twenty marks (with Two short answer questions from each unit). Question No.2 to 6 shall be EITHER/OR Type for Ten marks each and shall cover one Unit of the Syllabus for each question. Student shall Answer any one of them. Each of these questions may contain sub-questions.

STRATEGIC MANAGEMENT FOR COMPETITIVE ADVANTAGE (SMCA)								
Minor: Industrial Engineering					Scheme: 2023			
Course Code	Category	Hours/Week			Credits	Maximum Marks		
MIE04	PC	L	T	P	C	Continuous Internal Assessment	End Exam	TOTAL
		3	0	0	3	30	70	100
Sessional Exam Duration: 2 Hrs					End Exam Duration: 3 Hrs			
Course Outcomes: At the end of the course the student will be able to								
CO1:	Understand strategic management in various levels and in functional areas							
CO2:	Understand the formulation of different strategies and corporate portfolio analysis							
CO3:	Understand the strategy implementation and resource allocation							
CO4:	Evaluate the strategies and understand the corporate restructuring and renewal strategies							
CO5:	Understand issues related to make in india initiative and startups; Strategy enablers and Public-Private partnership							
UNIT – I								
Basic Concepts: Basic Concepts of Strategic Management, Strategic Management Process, Vision, Mission and Goals, Benefits and Risks of Strategic Management, Levels of Strategies Concepts of corporate strategy, Corporate, Business and Operational Level Strategy, Functional Strategies: Human Resource Strategy, Marketing Strategy, Financial Strategy, Operational Strategy Business Environment: Components of Environment Micro and Macro and Environmental Scanning. Competitive Analysis - Competition and Competitor Analysis, Porter Five Forces Model Internal Corporate analysis, Sustainability, Value Chain Analysis.								
UNIT – II								
Strategy Formulation: Strategic Choices and Importance, Formulation of Alternative Strategies: Generic Strategies, Grand Strategy, Diversification Mergers, Acquisitions, Takeovers, Joint Ventures, Diversification, Turnaround, Divestment and Liquidation. Strategic Analysis and Choice: Issues and Structures, Corporate Portfolio Analysis-SWOT Analysis, BCG Matrix, GE Nine Cell Matrix, Hofer's Matrix, ETOP-Environmental Threat and Opportunity Profile, Strategic Choice-Factors and Importance.								
UNIT – III								
Strategy Implementation: Strategy Implementation - Strategy and Structure Steps, Importance and Problems, Resource Allocation-Importance & Challenges Strategic 7S Framework; Management of Change Strategy Implementation - Organizational culture and Leadership; Functional Strategies.								
UNIT – IV								
Strategy Evaluation: Monitoring and Control - Strategic Controls; Balanced Scorecard; Strategy map Evaluation and Control; Importance, Limitations and Techniques Budgetary Control; Advantages, Limitations; Corporate Restructuring Strategies: Concept, Need and Forms, Corporate Renewal Strategies: Concept, Internal and External factors and Causes.								
UNIT – V								
Corporate Governance and Ethical Issues, Corporate Social Responsibility and sustainability, Strategic Enablers: Innovation and Entrepreneurship, Knowledge Management, Technology Management. Public Private Participation: Importance, Problems and Governing Strategies of PPP Model. Information technology Driven Strategies: Importance, Limitations and contribution of IT sector in Indian Business. Start-up Business Strategies and Make in India Model: Process of business startups and its Challenges, Growth Prospects and government initiatives in Make in India Model with reference to National manufacturing, Contribution of Make in India Policy in overcoming industrial sickness								

Text Books:	
1.	Strategic Management, A Dynamic Perspective-Concepts and Cases– Mason A. Carpenter, Wm. Gerard Sanders, Prashant Salwan, Published by Dorling Kindersley (India) Pvt Ltd, Licensees of Pearson Education in south Asia.
2.	Strategic Management and Competitive Advantage-Concepts Jay B. Barney, William S. Hesterly, Published by PHI Learning Private Limited, New Delhi.
3.	Strategic Management Formulation, Implementation and Control, Pearce & Robinson, McGraw-Hill Publications.
Reference Books:	
1.	Crafting and Executing Strategy – The Quest for Competitive Advantage, Thomson & Strickland, McGraw-Hill Publications, 21st edition.
2.	Exploring Strategy – Text and Cases, Gerry Johnson, Richard Whittington, Kevan Scholes, Duncan Angwin, and Patrick Regner, Pearson, 10th edition.
3.	Strategic Management - Planning for Domestic and Global Competition, John A. Pearce II, Richard B. Robinson, Amita Mital, McGraw Hill Education, 14th edition.
Online Learning Resources	
1.	https://nptel.ac.in/courses/110105161
2.	https://nptel.ac.in/courses/110108161
Question Paper Pattern:	
<p>Sessional Exam: The question paper for Sessional Examination shall be for 40 marks. The question paper shall consist of Four questions and all questions are compulsory. Question No.1 shall contain Five compulsory short answer questions for a total of Ten marks. Question No.2 to 4 shall be EITHER/OR Type for Ten marks each. Student shall Answer any one of them. Each of these questions may contain sub-questions.</p> <p>End Examination: The question paper for End Examination shall be for 70 marks. The Question paper shall contain Six Questions and all questions are compulsory. Question No.1 shall contain Ten compulsory short answer questions for a total of Twenty marks (with Two short answer questions from each unit). Question No.2 to 6 shall be EITHER/OR Type for Ten marks each and shall cover one Unit of the Syllabus for each question. Student shall Answer any one of them. Each of these questions may contain sub-questions.</p>	

SIX SIGMA & LEAN MANUFACTURING (SSLM)								
Minor: Industrial Engineering					Scheme: 2023			
Course Code	Category	Hours/Week			Credits	Maximum Marks		
MIE05	PC	L	T	P	C	Continuous Internal Assessment	End Exam	TOTAL
		3	0	0	3	30	70	100
Sessional Exam Duration: 2 Hrs					End Exam Duration: 3 Hrs			
Course Outcomes: At the end of the course the student will be able to								
CO1:	Understand the concepts of six-sigma and related terms							
CO2:	Understand the relationship between six-sigma, process capability (Cp) and the process capability index (Cpk)							
CO3:	Understand Lean manufacturing and its tools							
CO4:	Understand the concepts of cellular manufacturing, JIT and TPM							
CO5:	Understand 5s techniques, value stream mapping and their implementation							
UNIT – I								
Introduction to Six-Sigma: Probabilistic models-Six Sigma measures-Yield-DPMO-Quality level-Reliability function using Six Sigma- MTTF using Six Sigma-Maintenance free operating period- Availability using Six- Sigma -Point availability-Achieved availability-Operational Availability-Examples.								
UNIT – II								
The Elements of Six Sigma and their Determination: The Quality Measurement Techniques: SQC, Six Sigma, Cp and Cpk- The process capability index (Cp)Six sigma approach-Six sigma and the 1.5 σ shift-The Cpk Approach Versus Six Sigma-Cpk and process average shift- Negative Cpk-Choosing six sigma or Cpk-Setting the process capability index								
UNIT – III								
Introduction to Lean Manufacturing: Conventional Manufacturing versus Lean Manufacturing — Principles of Lean Manufacturing —Basic elements of lean manufacturing — Introduction to LM Tools.								
UNIT – IV								
Cellular Manufacturing, JIT, TPM: Cellular Manufacturing — Types of Layout, Principles of Cell layout, Implementation. JIT —Principles of JIT and Implementation of Kanban. TPM — Pillars of TPM, Principles and implementation of TPM.								
UNIT – V								
Set Up Time Reduction, TQM, 5S, VSM 10: Set up time reduction — Definition, philosophies and reduction approaches. TQM Principles and implementation. 5S Principles and implementation - Value stream mapping procedure and principles.								
Text Books:								
1. U Dinesh Kumar, Crocker, Chitra and Harithe Saranga, Reliability and Six Sigma, Springer Publishers.								
2. Sung H. Park, Six Sigma for Quality and Productivity Promotion, Asian Productivity Organization								
Reference Books:								
1. Sammy G. Shina, Six Sigma for Electronics Design and Manufacturing, McGraw-Hill.								
2. Design and Analysis of Lean Production Systems, Ronald G. Askin & Jeffrey B. Goldberg, John Wiley & Sons, 2003.								
3. Mikell P. Groover (2002) Automation, Production Systems and CIM								
Online Learning Resources:								
1. https://nptel.ac.in/courses/110105123								
2. https://nptel.ac.in/courses/110105039								

Question Paper Pattern:

Sessional Exam: The question paper for Sessional Examination shall be for 40 marks. The question paper shall consist of Four questions and all questions are compulsory. Question No.1 shall contain Five compulsory short answer questions for a total of Ten marks. Question No.2 to 4 shall be EITHER/OR Type for Ten marks each. Student shall Answer any one of them. Each of these questions may contain sub-questions.

End Examination: The question paper for End Examination shall be for 70 marks. The Question paper shall contain Six Questions and all questions are compulsory. Question No.1 shall contain Ten compulsory short answer questions for a total of Twenty marks (with Two short answer questions from each unit). Question No.2 to 6 shall be EITHER/OR Type for Ten marks each and shall cover one Unit of the Syllabus for each question. Student shall Answer any one of them. Each of these questions may contain sub-questions.