



GUJARAT TECHNOLOGICAL UNIVERSITY

Bachelor of Engineering

Subject Code: 3152511

Semester – V

Subject Name: Production and Operation Management

Type of course:NA

Prerequisite:

Rationale:

Production and operations management involves the integration of numerous activities and processes to produce products and services in a highly competitive global environment. Many companies have experienced a decline in market share as a result of their inability to compete on the basis of product design, cost or quality. This course considers the operations from a managerial perspective. At the end of the course students will have a fair understanding of the role Production and Operations Management plays in business processes. Emphasis is given both to familiarization of various production processes and service systems, and to quantitative analysis of problems arising in the management of operations.

Teaching and Examination Scheme:

Teaching Scheme			Credits C	Examination Marks				Total Marks
L	T	P		Theory Marks		Practical Marks		
			ESE (E)	PA (M)	ESE (V)	PA (I)		
4	0	2	5	70	30	30	20	150

Content:

Sr. No.	Content	Total Hrs
1	Operation Management: Definition of Operations Management: An Outline of Operations Strategy; Factors Affecting Operations Management; Objectives of Operations Management; Functions and Scope of Operations Management: Planning, Organizing, Controlling, Manufacturing and Non-Manufacturing Operations and their Classifications, Productivity, Factors affecting Productivity.	06
2	Product and Process Design (Manufacturing): Product Life Cycle, Different Product Design Strategies, Process Selection and Design Alternatives, Technological Considerations. Process Design: Meaning, Need, Factors and Types: Framework for Process Design, Process Planning Procedure, Relationship between Process Planning and other POM Activities, Type of Process Designs.	08
3	Materials Planning and Control: Aggregate Planning Strategies and Methods, Forecasting: Types of Forecasting Methods, Factors affecting forecasting, Use of forecasting in different functional areas of management, Demand patterns and selection of forecasting techniques, Master Production Schedule (MPS), Materials Requirement Planning (MRP) Concept, Product Structure and Bill of Material, Lot sizing in MRP Systems – Minimum Cost per Period Method, Period	10



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	Order Quantity Method, Least Unit Cost Method, Part Period Balancing Method, Evolution from MRP to Manufacturing Resource Planning (MRP II).	
4	Production Scheduling: Single Machine Scheduling (Conditions/Assumptions of single machine scheduling, Definitions of Processing time, Ready Time, Due date, Completion time, Flow time, Lateness, Tardiness, Mean flow time, Mean tardiness, Shortest Processing Time (SPT) Rule to minimize mean flow rate, Weighted Mean flow rate, Earliest Due Date (EDD) Rule to minimize maximum lateness), Flow Shop Scheduling (Conditions/Assumptions of flow-shop scheduling, Johnson's Algorithm for 2 machines n jobs problems), Job Shop Scheduling (Introduction, Graphical solution of 2 jobs and M machines). Assembly Line Balancing: Assembly lines, Assembly line balancing, Splitting tasks, Flexible and U-shaped line layouts, Mixed model line balancing, Current thoughts on assembly lines, Computerized assembly line balancing.	14
5	Inventory and Shop Floor Control: Independent and Dependant Demands, Purchase Model with Instantaneous Replenishment (Without and Without Shortages), Manufacturing Model (With and Without shortages), Quantity Discounts, Fixed Order Quantity System, Periodic Review System, ABC, XYZ, VED, FSN and SDE Analysis, Shop-Floor Control (Tools of Shop-Floor Control, Gantt charts), Improving Shop Performance.	08
6	Supply Chain Management : Definitions of Supply Chain Management (SCM): Evolution, Nature, Concept and Relevance of SCM, Functions and Contributions of Supply Chain Management, Objectives of SCM; Value Chain: Supply Alliances, Purchasing, Logistics, Warehousing; Introduction of Information Technology in Supply Chain: E-Commerce, Electronic Data Interchange (EDI), Data Warehousing (DW), Radio Frequency Identification (RFID)	06
7	Contemporary Production Management Concepts: Business Process Reengineering, Lean, Agile and World Class Manufacturing (Basic Concept, Methodology, Characteristics, Applications), Operations Systems of the Future. Introduction to JIT Manufacturing Concept, Working of Kanban System, JIT Implementation Requirements, JIT Application in Different Environments, Push and Pull Manufacturing Comparison, JIT in Services.	08
		60

Suggested Specification table with Marks (Theory): (For BE only)

Distribution of Theory Marks					
R Level	U Level	A Level	N Level	E Level	C Level
10	10	25	25	30	--

Legends: R: Remembrance; U: Understanding; A: Application, N: Analyze and E: Evaluate C: Create and above Levels (Revised Bloom's Taxonomy)



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Note: This specification table shall be treated as a general guideline for students and teachers. The actual distribution of marks in the question paper may vary slightly from above table.

Reference Books:

1. Production and Operations Management – Manufacturing and Services, Richard B. Chase, Nicholas J. Aquilano, F. Robert Jacobs, Tata McGraw- Hill Publishing Company Limited.
2. Production and Operations Management by R. Panneerselvam, Prentice – Hall of India Private Limited, New Delhi.
3. Operations Management – Strategy and Analysis, Lee J. Krajewski and Larry P. Ritzman, Pearson Education Asia (Addison-Wesley).
4. Modern Production/Operations Management, Elwood S. Buffa and Rakesh K. Sarin, Wiley Student Edition.
5. Production Operations Management, Adam E. Jr. and Ebert R. E., Edition, Pearson Education India.
6. Operations Management, Dervitsiotis K. N., McGraw Hill International Book Co. Singapore.
7. Production & Operations Management Starr M. K., Thomson Business Information.

Course Outcomes:

Sr. No.	CO statement	Marks % weightage
CO-1	Describe Operation management and Product Processing	20
CO-2	Demonstrate Materials Planning and Control.	25
CO-3	Illustrate Production scheduling processes	25
CO-4	Evaluate Inventory and shop floor control of manufacturing product.	20
CO-5	Make use of supply chain and contemporary production Management concepts.	10

Term Work:

The term work shall be based on the topics mentioned above.

List of Open Source Software/learning website: NPTEL notes and videos