

# GUJARAT TECHNOLOGICAL UNIVERSITY

## MECHANICAL (INDUSTRIAL ENGINEERING) (46) ADVANCE PRODUCTION AND OPERATIONS MANAGEMENT SUBJECT CODE: 2714607 SEMESTER: I

**Type of course:** Major Elective I

**Prerequisite:** NA

**Rationale:** The aim of the course is to familiarize students with the basic approaches of Production and operations management for manufacture and non-manufacturing organizations. Introduce basic methods of production processes management, but also management of support and auxiliary processes. Also, the course aims to familiarize students with application of selected approaches and methods with focus on modern methods of production and operations management.

### Teaching and Examination Scheme:

Teaching Scheme			Credits C	Examination Marks						Total Marks
L	T	P		Theory Marks		Practical Marks				
			ESE (E)	PA (M)	PA (V)		PA (I)			
					ESE	OEP	PA	RP		
3	2	2	5	70	30	20	10	20	0	150

### Content:

Sr. No.	Content	Total Hrs	% Weightage
1	<b>Introduction:</b> Basic Concepts of Operations Management, Manufacturing Systems and their Characteristics, Operations in Service, Operations Strategy ( <i>In Manufacturing and Services</i> ), Operations Priorities.	3	8
2	<b>Product and Process Design (Manufacturing):</b> Product Life Cycle, Different Product Design Strategies, Process Selection and Design Alternatives, Technological Considerations.	6	10
3	<b>Production Scheduling:</b> 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),	12	32
4	<b>Service Operations Management:</b> Differences and similarities Between Manufacturing & Service, Operations Strategy in Service, Nature of Services, Contemporary View of Service Management, Operational Classification of Service, Service Design Alternatives, and Scheduling in Services.	8	20
5	<b>Just In Time (JIT):</b> Introduction to JIT Manufacturing Concept, Working of Kanban System, JIT Implementation Requirements, JIT Application in	3	7

	Different Environments, Push and Pull Manufacturing Comparison, JIT in Services.		
6	<b>Work Force Management:</b> Job Design Decisions, Specialization of Labor, Job Enlargement, Job Enrichment and Job Rotation, Performance Appraisal, Incentive Plans.	4	8
7	<b>Contemporary Production Management Concepts:</b> Business Process Reengineering, Lean, Agile and World Class Manufacturing (Basic Concept, Methodology, Characteristics, Applications), Operations Systems of the Future.	7	17

### 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: Policy, Practice, and Performance Improvement, Brown S., Blackmon K., Cousins P. and Maylor H., Butterworth-Heinemann, UK.
7. Operations Management, Dervitsiotis K. N., McGraw Hill International Book Co. Singapore.
8. Production & Operations Management Starr M. K., Thomson Business Information.

### Course Outcome:

After learning the course the students should be able to:

- 1) Demonstrate basic production and operation management concepts
- 2) Demonstrate product and process design application
- 3) Describe and solve problems with case study of production scheduling techniques
- 4) Demonstrate service operations management
- 5) Describe application of just in time concepts to Indian industry
- 6) Demonstrate work force management
- 7) Describe advance production and operation management system

### List of Experiments:

- 1) Exercise on product design
- 2) Exercise on process design
- 3) Problems and case study on production scheduling
- 4) Exercise on operation management
- 5) Exercise on Just in Time
- 6) Problems on work force management
- 7) Presentation on contemporary production management concepts

### Open Ended Problems:

1. Student can prepare small project on product design by visiting industry
2. Student can prepare JIT application of concern industry and prepare proposal for its implementation

### Major Equipments:

Case study (industry based) approach to solve problems related to above topics.