

# GUJARAT TECHNOLOGICAL UNIVERSITY

## MECHANICAL (ADVANCE MANUFACTURING SYSTEM) (50)

PRODUCTION AND OPERATIONS MANAGEMENT

**SUBJECT CODE: 2715005**

SEMESTER: I

**Type of course:** Engineering Science

**Prerequisite:** None

**Rationale:** The aim of the course is to familiarize students with the basic approaches of operations management for manufacture and non-manufacturing organisations. 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 inventory 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	10	10	150

### Content:

Sr. No.	Content	Total Hrs	% Weightage
1	<b>Introduction:</b> Objectives to production and operations, Objectives to development of production and operations strategies.	2	5
2	<b>Sales Forecasting:</b> Advanced forecasting Methods, Forecasting Errors, Sensitivity Analysis, Box zerkins method, Problem solving by using Software	6	10
3	<b>Capacity Management and facilities arrangement:</b> Capacity planning, facility planning work system design, managing information for production system.	6	10
4	<b>Queuing Theory:</b> Open and close channel queuing networks, Application of Queuing in production system.	6	15
5	<b>Project Management:</b> Alternatives to PERT - Chance constrained programming (CCP) & Simulation, Resource Allocation/Leveling, Project Scheduling	6	15
6	<b>Production planning and scheduling:</b> Aggregate production planning, JIT, Scheduling and sequencing, Assignment models, replacement and maintenance techniques, Line of balancing, Assembly line balancing, Computer added process planning.	8	20
7	<b>Material Planning:</b> MRP systems – Master production schedule –	6	15

	MRP concepts – terminology - MRP II – embedding JIT into MRP – advanced MRP systems – example on MRP.		
8	<b>Emerging areas in POM:</b> Decision Support System, Application Packages in POM, Enterprise Recourse Planning. Group Technology	4	10

### Reference Books:

1. POM by Adam and Ebert
2. Modern production management by Buffa
3. Operation research, Analysis and Application by Wilkes Michael (McGraw Hill Publication)
4. Production and Operations Management by Martinich (Wiley Publication)
5. Production and Operations Management by Ray Wild (Cassell Publication)
6. Production and Operations Management – Rogerto Russel, Taylor – Prentice Hall,
7. Production Systems by J.L. Riggs (John Willey & Sons)
8. Operation Research by Lieberman & Hiller
9. Production and Operations Management – James Dilworth – Pearson International

### Course Outcome:

After learning the course the students should be able to:

1. The student will be able to identify and describe the basic concepts and relations of production, support and auxiliary processes in practical cases.
2. Students will get a guide about the basic documents that provide the necessary information to manage production systems.
3. They learn to calculate and quantify standards of material consumption and capacity of work and production.
4. They will be able to apply basic selected analytical methods to manage operational processes, product portfolios and quality.
5. They will understand the concepts of modern methods of production and inventory management.

### List of Experiments:

#### Students can be asked to preform experiments based on:

- Development of computer program for various forecasting techniques using C/C++.
- Application of software packages like MS project for critical path analysis and project scheduling problems.
- Solution of given MRP problem using Excel worksheet.

### Open ended problems:

1. Prepare a sales forecasting report on any industrial firm.
  - a. Prepare a report on history of industry
  - b. Prepare a sales report for specified industry for last 1 to 5 years depending on the literature data.
  - c. Selection of the forecasting technique.
  - d. Analyze the results and determine the best technique.
2. Try to automate the procedure of generating an MRP sheet when a user provides different inputs to the MRP. A software like Microsoft excel may be used to develop a MACRO for this.
3. Select assembly line balancing problem of any nearby industry.
  - a. Formulate the problems and apply algorithms and methods as needed.
  - b. Solve the problem at satisfactory level and report it.