

GUJARAT TECHNOLOGICAL UNIVERSITY, AHMEDABAD, GUJARAT

**COURSE CURRICULUM
COURSE TITLE: INDUSTRIAL MANAGEMENT
(COURSE CODE: 3361903)**

| | |
|--|----------------------------------|
| Diploma Programme in which this course is offered | Semester in which offered |
| MECHANICAL ENGINEERING/ PLASTIC ENGINEERING | SIXTH |

1. RATIONALE.

Technicians of mechanical engineering disciplines are expected to work most of at middle level. They are also expected to deal with work force and management problems. In the present era, optimum utilization of the resources with achieving higher productivity is essential. Quality and cost controls are also other important factors which contribute to the day to day supervision issues. This course aims to deal effectively with such issues along with familiarization of acts and laws prevailing at industry place.

2. COMPETENCY.

The course content should be taught and implemented with the aim to develop different types of skills so that students are able: to acquire following competencies.

- Recognize organization structure, culture and climate.
- Plan, use, monitor and control resources optimally and economically.
- Familiarize major provisions of factory acts.

3. COURSE OUTCOMES.

The theory should be taught and practical should be carried out in such a manner that students are able to acquire different learning outcomes in cognitive, psychomotor and affective domain to demonstrate following course outcomes.

- i. Interpret given organization structure, culture, climate and major provisions of factory acts and laws.
- ii. Explain material requirement planning and store keeping procedure.
- iii. Plot and analyze inventory control models and techniques.
- iv. Prepare and analyze CPM and PERT for given activities.
- v. List and explain PPC functions.

4. TEACHING AND EXAMINATION SCHEME.

| Teaching Scheme (In Hours) | | | Total Credits (L+T+P) | Examination Scheme | | | | Total Marks |
|-------------------------------|---|---|--------------------------|--------------------|----|-----------------|----|-------------|
| | | | | Theory Marks | | Practical Marks | | |
| L | T | P | C | ESE | PA | ESE | PA | 100 |
| 3 | 0 | 0 | 3 | 70 | 30 | 0 | 0 | |

Legends: L-Lecture; T – Tutorial/Teacher Guided Theory Practice; P -Practical; C – Credit, ESE -End Semester Examination; PA - Progressive Assessment.

5. COURSE DETAILS.

| Unit | Major Learning Outcomes (in cognitive domain) | Topics and Sub-topics |
|--|---|---|
| Unit – I. Introduction. | 1a. Familiarize with types of organization structure. 1b. Identify factors affecting moral. 1c. Know important provisions of factory act. | 1.1 System- concept, definition, types, parameters, variables and behavior. 1.2 Management – definition and functions. 1.3 Organization structure: i. Definition. ii. Goals. iii. Factors considered in formulating structure. iv. Types. v. Advantages and disadvantages. vi. Applications. 1.4 Concept, meaning and importance of division of labor, scalar & functional processes, span of control, delegation of authority, centralization and decentralization in industrial management. 1.5 Organizational culture and climate – meaning, differences and factors affecting them. 1.6 Moral-factors affecting moral. 1.7 Relationship between moral and productivity. 1.8 Job satisfaction- factors influencing job satisfaction. 1.9 Important provisions of factory act and labor laws. |
| Unit – II Critical path method (CPM) and pre evaluation review technique (PERT). | 2a. Draw CPM and PERT diagrams based on given conditions and data. 2b. Determine critical path on CPM and PERT. 2c. Calculate floats on CPM and PERT. | 2.1 CPM & PERT-meaning, features, difference, applications. 2.2 Understand different terms used in network diagram. 2.3 Draw network diagram for a real life project containing 10-15 activities, computation of LPO and EPO.(Take minimum three examples). 2.4 Determination of critical path on network. 2.5 Floats, its types and determination of floats. 2.6 Crashing of network, updating and its applications. |

| Unit | Major Learning Outcomes (in cognitive domain) | Topics and Sub-topics |
|--|--|--|
| Unit – III Materials management. | 3a. Apply the procedure for purchase. 3b. Practice the store keeping procedures. 3c. Interpret given inventory model. 3d. Derive Economic Order Quantity for given data. 3e. Identify applications of Material Requirement Planning (MRP). | 3.1 Material management-definition, functions, importance, relationship with other departments. 3.2 Purchase - objectives, purchasing systems, purchase procedure, terms and forms used in purchase department. 3.3 Storekeeping- functions, classification of stores as centralized and decentralized with their advantages, disadvantages and application in actual practice. 3.4 Functions of store, types of records maintained by store, various types and applications of storage equipment, need and general methods for codification of stores. 3.5 Inventory control: i. Definition. ii. Objectives. iii. Derivation for expression for Economic Order Quantity (EOQ) and numeric examples. iv. ABC analysis and other modern methods of analysis. v. Various types of inventory models such as Wilson's inventory model, replenishment model and two bin model. (Only sketch and understanding, no derivation.). 3.6 Material Requirement Planning (MRP)-concept, applications and brief details about software packages available in market. 3.7 |
| Unit – IV Production planning and control (PPC). | 4a. Use PPC techniques to schedule the operations based on available data. 4b. Use critical ratio scheduling technique for scheduling. 4c. Identify the factors and resources | 4.1 Types and examples of production. 4.2 PPC : i. Need and importance. ii. Functions. iii. Forms used and their importance. iv. General approach for each type of production. 4.3 Scheduling- meaning and need for productivity and utilisation. 4.4 Gantt chart- Format and method to prepare. 4.5 Scheduling techniques: i. Critical ratio scheduling. ii. E |

| Unit | Major Learning Outcomes (in cognitive domain) | Topics and Sub-topics |
|--|---|--|
| | affecting the bottlenecking. | 4.6 Given the data (Take at least 5-7 components having 5-6 machining operations, with processes, setting and operation time for each component and process, resources available, quantity and other necessary data), prepare scheduling using Gantt chart. Suggested format is given in Annexure – I. Take at least two examples. 4.7 Numerical examples on critical ratio scheduling. 4.8 Bottlenecking- meaning, effect and ways to reduce. |
| Unit – V Value analysis (VA) and cost control. | 5a. Apply value analysis and cost control techniques for given case. | 5.1 VA-definition, terms used, process and importance. 5.2 VA flow diagram. 5.3 DARSIRI method of VA. 5.4 Case study of VA-at least two. 5.5 Waste-types, sources and ways to reduce them. 5.6 Cost control-methods and important guide lines. |
| Unit – VI Recent trends in IM. | 6a. Familiarize with recent practices being adopted in industrial management. | 6.1 ERP (Enterprise resource planning) - concept, features and applications. 6.2 Important features of MS Project. 6.3 Logistics-concept need and benefits. 6.4 Just in Time (JIT)-concept and benefits. |

6. SUGGESTED SPECIFICATION TABLE WITH HOURS AND MARKS (THEORY).

| Unit No. | Unit Title | Teaching Hours | Distribution of Theory Marks | | | |
|----------|--|----------------|------------------------------|---------|---------|-------------|
| | | | R Level | U Level | A Level | Total Marks |
| I | Introduction. | 6 | 6 | 4 | 0 | 10 |
| II | Critical path method (CPM) and pre evaluation review technique (PERT). | 10 | 4 | 6 | 7 | 17 |
| III | Materials management. | 8 | 6 | 4 | 4 | 14 |
| IV | Production planning and control (PPC). | 10 | 6 | 4 | 7 | 17 |

| Unit No. | Unit Title | Teaching Hours | Distribution of Theory Marks | | | |
|----------|---------------------------------------|----------------|------------------------------|---------|---------|-------------|
| | | | R Level | U Level | A Level | Total Marks |
| V | Value analysis (VA) and cost control. | 4 | 4 | 2 | 0 | 6 |
| VI | Recent trends in IM. | 4 | 6 | 0 | 0 | 6 |
| | Total | 42 | 32 | 20 | 18 | 70 |

Legends: R = Remember U= Understand; A= Apply and above levels (Bloom's revised taxonomy).

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.

General Notes:

- If mid-sem test is part of continuous evaluation, unit numbers I, II (Up to 2.4 only) and IV (Up to 4.7 only) are to be considered.
- Ask the questions from each topic as per marks weight age. Numerical questions are to be asked only if it is specified. Optional questions must be asked from the same topic.

7. SUGGESTED LIST OF STUDENT ACTIVITIES.

| SR.NO. | ACTIVITY |
|--------|---|
| 1 | Given the data, prepare the network diagram and determine critical path, EPO, LPO and floats. |
| 2 | Given the data, prepare the scheduling using Gantt chart. |
| 3 | Perform value analysis for given case. |

8. SPECIAL INSTRUCTIONAL STRATEGIES (if any).

| Sr. No. | Unit | Unit Name | Strategies |
|---------|------|--|---|
| 1 | I | Introduction. | Video movies. |
| 2 | II | Critical path method (CPM) and pre evaluation review technique (PERT). | Video movies, solving tutorials, real life industries situation, industrial visits. |
| 3 | III | Materials management. | Video movies, real life industries situation, industrial visits. |
| 4 | IV | Production planning and control (PPC). | Video movies, solving tutorials, real life industries situation, industrial visits. |
| 5 | V | Value analysis (VA) and cost control. | Analyzing real cases, video movies. |
| 6 | VI | Recent trends in IM. | Industrial visits, movies. |

9. SUGGESTED LEARNING RESOURCES.

A. List of Books:

| S. No. | Title of Book | Author | Publication |
|--------|---------------|--------|-------------|
| | | | |

| | | | |
|---|---|---------------|--|
| 1 | CPM & PERT principles and Applications. | L.S.Srinath. | |
| 2 | Modern Production Management. | Buffa. | |
| 3 | Materials Management. | N. Nair. | |
| 4 | Industrial Engineering & Management. | O. P. Khanna. | |
| 5 | Value Analysis. | Mikes. | |
| 6 | | | |
| 7 | | | |
| 8 | | | |

B) List of Major Equipment/ Instrument with Broad Specifications:

| Sr. No. | Resource with brief specification. |
|---------|-------------------------------------|
| 1 | Necessary freeware-other softwares. |

C. List of Software/Learning Websites.

- i. <http://www>.

11. COURSE CURRICULUM DEVELOPMENT COMMITTEE

Faculty Members from Polytechnics.

- A.M.TALSANIYA, Lecturer in Mechanical Engineering, Sir BPI, Bhavnagar.
-

Coordinator and Faculty Members from NITTTR Bhopal.

ANNEXURE – I

A. GIVE DETAILS OF EACH PART IN FOLLOWING FORMAT.

| PART NUMBER | | PART NAME | | |
|-------------|---------|-----------------------------|-------------------------|---------|
| MATERIAL | | BATCH QUANTITY | | |
| OP.NO. | PROCESS | SETTING TIME / BATCH (MIN). | OP. TIME / PIECE (MIN). | MACHINE |
| | | | | |
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B. RESOURCE DETAILS:

| NAME OF MACHINE | NUMBER OF MACHINES | MACHINE AVAILABLE FOR NUMBER OF HOURS / DAY (TOTAL FOR ALL SHIFTS). | NUMBER OF WORKING DAYS / MONTH. | TOTAL HOURS AVAILABLE PER MONTH |
|-----------------|--------------------|---|---------------------------------|---------------------------------|
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SUGGESTED QUESTION PAPER FORMAT

| Q.NO. | SUB Q.NO. | QUESTION | MARKS DISTRIBUTION | | | UNIT |
|-------|-----------|--|--------------------|---|---|------|
| | | | R | U | A | |
| 1 | | Answer ANY seven from following. | | | | 14 |
| | i. | | 2 | | | I |
| | ii. | | 2 | | | I |
| | iii. | | 2 | | | II |
| | iv. | | 2 | | | II |
| | v. | | 2 | | | III |
| | vi. | | 2 | | | III |
| | vii. | | 2 | | | IV |
| | viii. | | 2 | | | IV |
| | ix. | | | 2 | | V |
| | x. | | 2 | | | VI |
| 2 | a. | | 4 | | | I |
| | | OR | | | | |
| | a. | | 4 | | | I |
| | b. | | | 4 | | I |
| | | OR | | | | |
| | b. | | | 4 | | I |
| | c. | | | 3 | | II |
| | | OR | | | | |
| | c. | | | 3 | | II |
| | d. | | | 3 | | II |
| | | OR | | | | |
| | d. | | | 3 | | II |
| 3 | a. | | 4 | | | III |
| | | OR | | | | |
| | a. | | 4 | | | III |
| | b. | | | | 4 | III |
| | | OR | | | | |
| | b. | | | | 4 | III |
| | c. | | 3 | | | IV |
| | | OR | | | | |
| | c. | | 3 | | | IV |
| | d. | | 3 | | | VI |
| | | OR | | | | |
| | d. | | 3 | | | VI |
| 4 | a. | Given the data, prepare network diagram and determine critical path. Number of events should not be more than 7. | | | 7 | II |
| | | OR | | | | |
| | a. | Given the data, prepare network diagram. Calculate EPO and LPO at each node. Number of events should not be more than 7. | | | 7 | II |
| | b. | | | 4 | | III |
| | c. | | | 3 | | IV |
| 5 | a. | Given the data, prepare the scheduling using Gantt chart. Number of the components should not be more than 4. | | | 7 | IV |
| | b. | | 4 | | | V |
| | c. | | 3 | | | VI |