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	Sixth

1. RATIONALE.

Technicians of mechanical engineering disciplines are expected to work during most of their career at middle level. They are also expected to deal with workforce and management problems. In the present era of competition, optimum utilization of the resources with achieving higher productivity is essential for any industry to survive. 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 applied to industries.

2. COMPETENCY.

The course content should be taught and implemented with the aim to develop required skills in the students so that they are able to acquire following competencies.

- **Recognize organization structure, human resource issues in industries and major provisions of factory acts.**
- **Plan, use, monitor and control resources optimally and economically.**

3. COURSE OUTCOMES (COs).

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				
				Theory Marks		Practical Marks		Total 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 CONTENT DETAILS.

Unit	Major Learning Outcomes (in cognitive domain)	Topics and Sub-topics
Unit – I. **Introduction.** .	1a. Describe the types of organization structure. 1b. Identify factors affecting moral. 1c. Explain important provisions of factory act and labour laws.	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 Programme 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.
Unit – IV **Production planning and Control (PPC).**	4a. Schedule the operations based on available data using PPC techniques. 4b. Schedule using critical ratio scheduling technique 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 Critical ratio scheduling-method and numeric examples.

Unit	Major Learning Outcomes (in cognitive domain)	Topics and Sub-topics
	affecting the bottlenecking. 4d. Schedule using Gantt chart with the help of Annexure-I for given data.	4.6 Scheduling using Gantt Chart (for 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), At least two examples. 4.7 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. Describe 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. 6.5 Supply chain management-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 Programme 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
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).

Notes:

a. 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.
b. 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.
c. 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 PRACTICAL/EXERCISE

…….Not Required…….

8. SUGGESTED LIST OF STUDENT ACTIVITIES.

Sr. No.	Activity
i.	Given the data, prepare the network diagram and determine critical path, EPO, LPO and floats.
ii.	Given the data, prepare the scheduling using Gantt chart.
iii.	Perform value analysis for given case.

9. SPECIAL INSTRUCTIONAL STRATEGIES (if any).

Sr. No.	Unit	Unit Name	Strategies
i.	I	Introduction.	Video movies.
ii.	II	Critical path method (CPM) and pre evaluation review technique (PERT).	Video movies, solving tutorials, real life industries situation, industrial visits.
iii.	III	Materials management.	Video movies, real life industries situation, industrial visits.
iv.	IV	Production planning and control (PPC).	Video movies, solving tutorials, real life industries situation, industrial visits.
v	V	Value analysis (VA) and cost control.	Analyzing real cases, video movies.
vi	VI	Recent trends in IM.	Industrial visits, movies.

10. SUGGESTED LEARNING RESOURCES.

A. List of Books:

S. No.	Title of Book	Author	Publication
i.	CPM & PERT principles and Applications.	L.S.Srinath.	
ii.	Modern Production Management.	Buffa.	
iii.	Materials Management.	N. Nair.	
iv.	Industrial Engineering & Management.	O. P. Khanna.	
v.	Value Analysis.	Mikes.	

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. www.youtube.com/watch?v=SF53ZZsP4ik
ii. www.youtube.com/watch?v=iPZlQ3Zx5zc
iii. web.stanford.edu/class/cee320/CEE320B/CPM.pdf
iv. www.criticaltools.com/**pert**chartex**pert**software.htm
v. en.wikipedia.org/wiki/Program_evaluation_and_review_technique
vi. www.netmba.com/operations/project/**pert**/

11. COURSE CURRICULUM DEVELOPMENT COMMITTEE

Faculty Members from Polytechnics.

- **Prof. A. M. Talsaniya**, Lecturer in Mechanical Engineering, Sir BPI, Bhavnagar.

Coordinator and Faculty Members from NITTTR Bhopal.

- **Dr. Vandna Somkuwar,** Associate Professor, Department of Mechanical Engineering,
- **Dr. A.K. Sarathe,** Associate Professor; Department of Mechanical Engineering.

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

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 AVALABLE PER MONTH

SUGGESTED QUESTION PAPER FORMAT

(This is for reference only and is in suggestive form. Paper setter may opt for other marks distribution pattern maintaining distribution of marks as per specification table)

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