



# GUJARAT TECHNOLOGICAL UNIVERSITY

## Syllabus for Bachelor of Vocation (B.Voc.), 5<sup>th</sup> Semester

**Branch: Production Technology**

**Subject Name: Industrial Engineering**

**Subject Code: 21150303**

**Type of course:** Core

**Prerequisite:** Zeal to learn the subject

**Rationale:** Industrial Engineering course is to prepare students to understand different aspects like: Plant location and its selection, Plant layout within the plant. Study of productivity and Work-study are important tools, after studying it student are able to apply it in the industry for productivity improvement

### Teaching and Examination Scheme:

Teaching Scheme			Credits	Examination Marks				Total Marks
L	T	P		C	Theory Marks		Practical	
			ESE (E)		PA(M)	ESE (V)	PA (I)	
3	0	0	3	50	0	0	0	50

L- Lectures; T- Tutorial/Teacher Guided Student Activity; P- Practical; C- Credit; ESE- End Semester Examination; PA- Progressive Assessment

### Contents:

Sr. No.	Content	Total Hrs.	Module % Weightage
01	<p><b>Productivity and Work Study</b></p> <p>Introduction to Productivity: Definition and significance of productivity. Factors influencing productivity. Measurement of Productivity</p> <p>Work Study: Basic Concept, Steps Involved in Work Study, Concept of Work Content, Techniques of Work Study, Human Aspects of Work Study.</p> <p>Method Study: Basic Concept, Steps Involved in Method Study, Recording Techniques, Operation Process Charts, Flow Process Charts, Two-Handed-Process Charts, Multiple Activity Charts, Flow Diagrams. String Diagrams.</p> <p>Work Measurement: Basic Concept, Techniques of Work Measurement, Steps Involved in Time Study, Time Study Equipment, and Performance Rating. Performance Rating: Examples, Allowances, Computation of Standard Time, Numerical on Computation of Standard Time.</p>	8	20
2	<p><b>Facility Layout and Location Strategy</b></p> <p>Types of layout, Design of Layout, Factors affecting location decision, Computerized handling of layout algorithms; Algorithms for computerized Layout Planning, Construction and Development</p>	8	20



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	type of computerized Layout Planning Techniques i.e. CRAFT, ALDEP, CORELAP etc.		
03	<b>Inventory Control and Management</b>  Introduction, Inventory classification, Different cost associated to Inventory, Economic order quantity, Inventory models with deterministic demands, ABC analysis	8	20
04	<b>MRP, MRP-II and ERP</b>  Definition and overview of MRP, MRP-II, and ERP Material Requirements Planning (MRP): Key components and inputs of MRP systems, Bill of Materials (BOM) and its significance in MRP, MRP calculations and logic Benefits and challenges of implementing MRP systems  Manufacturing Resource Planning (MRP-II): Overview of MRP-II and its relationship to MRP, Extended functionalities and scope of MRP-II systems, Capacity planning and management in MRP-II. Characteristics and advantages of MRP-II implementation  Enterprise Resource Planning (ERP): Introduction to ERP systems, Features of ERP, Benefits of ERP.	10	20
05	<b>Material Handling Systems</b>  Introduction, Relationship between Material Handling and Plant Layout, Functions of Material Handling Systems, Objectives of Material Handling Systems, Principles of Material Handling Systems, Types of Material Handling Equipment.	8	20
<b>Total</b>		<b>42</b>	<b>100</b>

### Suggested Specification table with Marks (Theory):

Distribution of Theory Marks					
R Level	U Level	A Level	N Level	E Level	C Level
10	20	20	-	-	-

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

### Course Outcomes:

Sr. No.	CO Statement	Marks % Weightage
CO 1	Develop the ability to measure productivity, conduct work study techniques, apply work measurement methods, and optimize work processes to enhance productivity in industrial settings.	20
CO 2	Acquire the skills to analyze, design, and optimize layouts, and effectively utilize computerized layout planning techniques.	20



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CO 3	To understand the concept of inventory control and management.	20
CO 4	Develop aggregate MRP and ERP in operation environments.	20
CO 5	To understand product handling considering various kinds of product features.	20

#### Reference Books:

- 1) Industrial Engineering and Production Management Martand Telsang S Chand & company.
- 2) Industrial Engineering and Production Management by Banga and Sharma, Khanna Publishers.
- 3) Industrial Engineering and Management by Dr. B. Kumar Khanna Publishers

#### List of Open Source Software/learning website:

[www.nptel.ac.in](http://www.nptel.ac.in)