



**Gyanmanjari**  
Innovative University

Course Syllabus  
Gyanmanjari Diploma Engineering College  
Semester-5(Diploma)

**Subject:** Industrial Engineering and Management – DETME15218

**Type of course:** Professional Core

**Prerequisite:** Manufacturing Processes

**Rationale:** This course covers plant engineering, work study, production planning, quality control, and modern management to optimize industrial operations. It includes plant layout, maintenance, safety, industrial laws, work study techniques, production control, and Statistical Quality Control. Students also learn modern management practices like JIT, TQM, Six Sigma, PLM, and sustainable manufacturing, preparing them for careers in manufacturing and industrial engineering.

### Teaching and Examination Scheme:

Teaching Scheme			Credits	Examination Marks					Total Marks
CI	T	P		Theory Marks		Practical Marks		CA	
			C	ESE	MSE	V	P	ALA	
3	0	0	3	60	30	10	-	50	150

*Legends: CI-Classroom Instructions; T – Tutorial; P - Practical; C – Credit; ESE - End Semester Examination; MSE- Mid Semester Examination; V – Viva; CA - Continuous Assessment; ALA- Active Learning Activities.*



### Course Content:

Industrial Engineering and Management – DETME15218



Unit No	Course content	Hrs.	% Weightage
1	<b>Plant Engineering and Safety</b> <b>Plant Engineering:</b> Selection of site for an industry, Plant layout: Types and principles of good layout, Techniques to improve layout, Principles of material handling equipment, Plant maintenance: Breakdown, Preventive, and Scheduled maintenance <b>Plant Safety and Industrial Laws:</b> Importance of safety, causes and costs of accidents, Accident proneness and prevention, Industrial disputes: Causes and resolution (Collective bargaining, Conciliation, Mediation, Arbitration), Indian Factories Act, 1948 (Health, welfare, and safety provisions)	11	25
2	<b>Work Study and Productivity Improvement</b> <b>Work Study:</b> Definition, techniques, and role in productivity enhancement, Method study: Procedure, data recording (symbols, process charts, diagrams) Preparation of operation process chart and flow diagram for mechanical assemblies, Questioning techniques and method improvement, Principles of motion economy: (a) Use of human body, (b) Workstation layout, (c) Tools & equipment design <b>Work Measurement:</b> Basic procedure and time study equipment Job elements and their types, Time measurement methods (cumulative and flyback timing), Rating concepts, rating scale, calculation of basic and standard time, Allowances: Types, values, and applications, Work sampling/activity sampling	11	25
3	<b>Production Planning &amp; Quality Control:</b> <b>Production Planning and Control (PPC):</b> Introduction and major functions, Pre-planning, forecasting methods, Routing, scheduling, dispatching, and controlling, Types of production: Mass, Batch, and Job Order, Economic Batch Quantity (EBQ), Make or Buy decision (with numerical problems) <b>Quality Control &amp; Statistical Process Control:</b> Types of inspection: First piece, Floor, and Centralized (Pros & Cons), Statistical Quality Control (SQC), $\bar{X}$ & R charts, p & c charts (interpretation & examples), Operating Characteristics (O.C.) curve, Sampling Inspection (Single & Double sampling plans), ISO 9001:2008: Registration, certification process, and benefits, Software tools for SQC (Minitab, MS Excel)	13	30





4	<b>Modern Management Practices &amp; Recent Trends:</b> <b>Principles of Management:</b> Definition of Management, Administration, and Organization, Taylor's and Fayol's principles of management, Functions of a manager, Types of organization structures (Line, Staff, Functional, Line & Staff), Leadership, styles, and motivation (Positive & Negative) <b>Modern Management Techniques:</b> Just-In-Time (JIT) and Total Quality Management (TQM), Quality circle, zero defect, 5S concept, Personnel management: HRM roles, selection & training methods (On-the-job, Apprenticeship, Vestibule), Wage & Salary: Fixation, Halsey's, Rowan's, and Emerson's wage plans <b>Recent Trends:</b> Six Sigma: Concept & applications, Reliability, availability, maintainability: MTBF & MTTR calculations, Sustainable Manufacturing: Triple bottom line (Environmental, Economic, Social), Product Life Cycle (PLC) and Product Lifecycle Management (PLM): Implementation and benefits.	10	20
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### Continuous Assessment:

Sr. No	Active Learning Activities	Marks
1	<b>Plant Layout Design</b> Students will analyze a given factory setup and propose an improved plant layout using principles of efficiency, material handling, and safety. Prepare A sketch or design with justification and Upload on the GMIU web portal.	10
2	<b>Accident Cause &amp; Prevention Analysis</b> Students will analyze a past industrial accident and identify causes, cost of accidents, and preventive measures. Prepare A case study report with root cause analysis and safety recommendations. Upload report on the GMIU web portal.	10
3	<b>Presentation on Modern Management Practices</b> Faculty will assign a topic for presentation to promote independent learning and communication skills. Upload presentation on the GMIU web portal.	10
4	<b>Wage Plan Comparison (Numerical Problem-Solving)</b> Faculty will provide students with numerical problems on different wage plans and let them calculate earnings under different incentive schemes. Compare Halsey's, Rowan's, and Emerson's wage plans & prepare Report & Upload report on the GMIU web portal.	10
5	<b>Process Mapping (Hands-on Activity)</b> Students will observe a real-world process (e.g., cafeteria food serving, bicycle assembly) and create an operation process chart and flow diagram. Upload chart on the GMIU web portal.	10
Total		50





**Suggested Specification table with Marks (Theory):60**

<b>Distribution of Theory Marks</b> (Revised Bloom's Taxonomy)						
Level	Remembrance (R)	Understanding (U)	Application (A)	Analyze (N)	Evaluate (E)	Create (C)
Weightage	25 %	25%	30%	20%	-	-

**Course Outcome:**

After learning the course, the students should be able to:	
CO1	Apply plant engineering principles, safety measures, maintenance and industrial laws in manufacturing settings.
CO2	Utilize work study, motion economy and time measurement to improve productivity.
CO3	Implement production planning, quality control and statistical methods for process optimization.
CO4	Evaluate modern management practices, Six Sigma and sustainability to enhance industrial efficiency.

**Instructional Method:**

The course delivery method will depend upon the requirement of content and need of students. The teacher in addition to conventional teaching method by black board, may also use any of tools such as demonstration, role play, Quiz, brainstorming, MOOCs etc.

Students will use supplementary resources such as online videos, NPTEL/SWAYAM videos, e-courses, Virtual Laboratory

The internal evaluation will be done on the basis of Active Learning Assignment

Practical/Viva examination will be conducted at the end of semester for evaluation of performance of students in laboratory.

**Reference Books:**

- [1] Industrial Engineering and Management by O.P. Khanna, Dhanpat Rai Publications
- [2] Work Study and Ergonomics by S. Dalela & Sourabh, Standard Publishers Distributors
- [3] Maintenance Engineering and Management by R. C. Mishra & K. Pathak, Prentice Hall India
- [4] Quality Control and Industrial Statistics by A. J. Duncan, Irwin/McGraw-Hill

