SILVER OAK UNIVERSITY

College of Technology (01)

Diploma in Mechanical Engineering
Subject Name: Industrial Engineering
Subject Code: 1010122236
Semester: 4th

Prerequisite: None

Objective:

1. To study about basic concepts of industrial engineering.
2. To study different work measurement techniques.
3. To study the different types of plant layout and effective quality control techniques..

Teaching and Examination Scheme:

Teaching Scheme					Evaluation Scheme				Total Marks
					Theory		Practical		
L	T	P	Contact Hours	Credit	CIE (TH)	ESE (TH)	CIE (PR)	ESE (PR)	
3	0	0	3	3	40	60	0	0	100

Content:

Unit No.	Contents	Teaching Hours	Weightage %
1	**Introduction to Industrial Engineering:** Industrial engineering-definition, objectives and techniques, scope, importance and applications of industrial engineering. Methodology and approach of Industrial engineering, Productivity – concept, definition, importance and ways to enhance it, numeric examples, Introduction to statistical quality control (SQC).	5	15
2	**Work Study, Method Study and Work Measurement:** **Work Study:** Productivity, Standard of living, method of improving productivity, Importance of good working conditions. **Method Study:** Definition, Objectives, Selection of a job for method study, Basic procedure for conduct of method study, Operation process chart, Flow process chart, two handed process chart, Man machine chart, String diagram and flow diagram. **Work Measurement:** Definition, Basic procedure in making a time study, Employees rating factor, Application of time allowances, Rest, Personal, Process, Special and Policy allowances, Calculation of standard time, Problems, Basic concept of production study, Techniques of work measurement-Ratio delay study, Synthesis from standard data, analytical estimating and Pre-determined Motion Time System (PMTS).	10	20

3	**Quality Assurance:** Definition of quality, quality control (QC), quality assurance (QA), statistical quality control (SQC) and reliability, Importance of quality, Difference between reliability and quality control, Factors affecting and improving reliability, QA tools, Concept of total quality cycle, quality of design, quality of performance, quality of conformity and total quality, Difference between inspection and quality control, Fundamentals of statistics-types of variations, frequency, class boundary and midpoint, frequency distribution, frequency histogram, frequency bar chart and polygon chart, Frequency distribution curve, central tendency, spread or dispersion and range, mode, median and mean, standard deviation and variance with numeric examples, Concept of probability and normal distribution, Area under normal distribution and examples on normal distribution, Introduction to binomial and Poisson distribution.	10	20
4	**Statistical Quality Control (SQC):** Concept of variability, SQC tools and statistical fundamentals, Concept and differences between variables and attributes, Control charts for variable quality types, objectives, calculations of control limits and range/mean, methods to plot and interpretations (X bar-R chart) and examples, Control charts for attribute quality types, objectives, applications, calculations of control limits and range/mean, methods to plot and interpretations (p, np, 100p and c chart) and examples **Acceptance sampling:** i. Quality control of incoming raw material and components. ii. Concepts of random sampling. iii. Sampling plans: definition, terminology, types (Single, double and multiple), implementing plans based on given input. iv. OC curve-concept, need, types and importance, interpretation of given OC curve.	8	20
5	**Plant Location and Layout:** Definition, factors affecting the site selection of plant Factor affecting plant layout Types of layout - process, product, combination and fixed position layout Techniques in making layout-Flow diagram, templates, distance volume matrix, travel chart Line balancing, workstation	5	10
6	**Material Handling:** Principles of economic material handling Hoisting equipment - forklift truck, Cranes- mobile motor cranes, overhead cranes, travelling bridges crane. Derrick crane. Whiler crane Conveying equipment - Package conveyors, gravity roller conveyors, screw conveyors, flight or scraper conveyors, bucket conveyors, bucket elevators, belt conveyors, pneumatic conveyors.	6	15

Course Outcome:

Sr. No.	CO statement	Unit No
CO-1	Improve productivity using work study, method study techniques and work measurement	1,2
CO-2	Analyze work content and calculate standard time in a given situation.	2
CO-3	Apply Statistical Quality Control tools in a given situation.	3,4
CO-4	Select material handling equipment.	6
CO-5	Apply Ergonomics for human comfort at work place.	5

Teaching & Learning Methodology:

The various methods or tools follows by the faculties to teach the above subject are:

1. Chock and Board
2. PPT
3. Flip Class Room
4. Industrial Visit

Books Recommended:

1. Industrial Engineering (IE) and Management, C.Natha Muni Reddy, New age international Publishers.
2. Industrial Engineering and Management, O.P. Khanna, Revised Edition Publications (P) Ltd – 2004
3. Handbook of IE: Technology and operations management, Gavriel Salvendy, Institute of Industrial Engineers.
4. Comprehensive Industrial Engineering, M. J Manek, Laxmi Publications (P) Ltd., New Delhi.
5. Industrial Engineering and Production Management Martand Telsang S Chand & company.
6. Industrial Engineering and Production Management by Banga and Sharma, Khanna Publishers.
7. Industrial Engineering and Management by Dr. B. Kumar, Khanna Publishers

List of Open Source Software/learning website:

1. https://nptel.ac.in/courses/112/107/112107142/