COURSE TITLE : INDUSTRIAL ENGINEERING
COURSE CODE : 5022
COURSE CATEGORY : A
PERIODS/ WEEK : 5
PERIODS/ SEMESTER : 75
CREDIT : 4

TIME SCHEDULE

MODULE	TOPIC	PERIODS
1	Production planning and control, Plant Engineering.	20
2	Work study -Method Study and Work measurement.	20
3	Quality Control & Inspection, Fundamentals of statistical concept. Control charts.	15
4	Acceptance Sampling & Fundamentals of Estimating and costing	20
TOTAL		75

COURSE OUTCOME :

sl.no.	sub	student will be able to
1	1	Understand the scope of Industrial engineering.
	2	Comprehend the procedure to implement, purchase, production, planning and control programme in industry.
	3	Appreciate the method study, work study, time study and work sampling
	4	Comprehend the importance of Quality control and inspection.
	5	Understand the fundamentals of statistical concept.
	6	Comprehend the Control Charts for variables and attributes.
	7	Understand the acceptance Sampling.
2	8	Understand the calculation of the selling price of a product.

SPECIFIC OUTCOME

MODULE I

1.1.0 Identify the scope of the subject Industrial Engineering

1.1.1 Explain the concept of industry, industrial Engg., Production and Productivity
1.1.2 Differentiate production and productivity with examples
1.1.3 Justify the importance of productivity
1.1.4 Mention the various methods of increasing productivity
1.1.5 Describe the procedure to implement production planning and control programme in industries
1.1.6 Categorize the types of production
1.1.7 List the characteristics of various types of production

1.2.0 State the concepts of P.P.C

1.2.1 Explain the benefits of P.P.C
1.2.2 Identify the various functions of P.P.C

1.2.3 Explain Pre -planning
1.2.4 List various activities of pre-planning
1.2.5 Describe Routing and Routing procedure
1.2.6 Illustrate scheduling
1.2.7 Identify the three types of schedule charts
1.2.8 Prepare master schedule, parts schedule and machine loading schedule in the form of Gantt chart
1.2.9 Define Dispatching
1.2.10 List various documents in dispatching
1.2.11 Explain value engineering
1.2.12 Explain Plant layout
1.2.13 Explain briefly the various factors to be considered in locating industrial plants
1.2.14 Illustrate the different types of plant layout adopted in modern industries
1.2.15 Explain briefly the various factors influencing the plant layout
1.2.16 Explain the types of maintenance
1.2.17 Describe Break down ,Scheduled , preventive and predictive maintenance
1.2.18 State the function and principle of material handling
1.2.19 List the types of material handling equipments
1.2.20 Explain the Factors affecting material handling

MODULE II

2.1.0 Explain work study
2.1.1 Illustrate the application of work study to increase productivity
2.1.2 Identify the objectives of method study
2.1.3 Describe the procedure for the conduct of method study
2.1.4 Draw the various process charts and diagrams
2.1.5 State the concepts of THERBLIGS
2.1.6 List the various THERBLIGS and its symbols
2.1.7 Draw SIMO chart
2.1.8 State the Principles of motion economy
2.1.9 Describe the procedures for calculating standard time
2.2.0 Explain the procedure for the conduct of stop watch time study
2.2.1 Determine the standard time (simple problem)
2.2.2 State the concept of production study
2.2.3 List the various steps to develop standard data
2.2.4 Define the concepts of analytical estimating
2.3.0 Define the term work sampling
2.3.1 State the Principles of work sampling
2.3.2 List the various steps required in making a work sampling study
2.3.3 State the application of work sampling

MODULE III

3.1.0 State the importance of quality control and inspection methods
3.1.1 Explain the concepts of 'Quality' and 'Quality Control'
3.1.2 List the objectives of Quality control

3.1.3 Mention the areas of application of Quality control programmes
3.1.4 Find the three components of Quality costs
3.1.5 Identify the benefits of Q.C. programme

3.2.0 Explain the concepts on Inspection

3.2.1 Describe the inspection of incoming materials
3.2.2 Compare floor inspection and centralized inspection
3.2.3 Explain the fundamentals of Statistical concepts
3.2.4 State the concept of variability in measurement
3.2.5 Explain the terms variable and attribute with example
3.2.6 Define the terms frequency, frequency distribution and frequency plot
3.2.7 i. Draw frequency plot and tally sheet.
ii Draw histogram and frequency polygon
3.2.8 Explain the terms mean, median ,mode and standard deviation.(Simple problems)
3.2.9 Illustrate and explain the significance of normal distribution curve.

3.3.0 Describe the Procedure of Constructing X and R Charts

3.3.1 Select the method of calculating mean and range
3.3.2 Find the points to be considered for making X -R chart
3.3.3 Illustrate X & R control charts data calculation sheet
3.3.4 List the steps in the calculation of control limits Plot the X & R chart

3.4.0 Define the defects and defectives

3.4.1 Identify the control chart for defective
3.4.2 Define fraction defective and percent defective
3.4.1 Estimate the average fraction defective
3.4.2 Find the control limits
3.4.5 Draw the P chart and'100P' chart

3.5.0 Explain the construction of 'C' Chart

3.5.1 Identify the characteristic of a 'C'; Chart
3.5.2 Estimate the average of defects
3.5.3 Find control limit for 'C' chart
3.5.4 Draw 'C' chart
3.5.5 State the advantages of 'C' chart

MODULE IV

4.1.0 **Acceptance sampling**.
4.1.1 Describe the concept of acceptance sampling
4.1.2 Describe the terms used in acceptance sampling
4.1.3 Explain single , double and multiple sampling plans.
4.1.4 Illustrate OC curve for an Ideal plan
4.1.5 Illustrate and explain OC curve for a general plan.

4.2.0 Estimating and costing .

4.2.1 Distinguish between estimating and costing
4.2.2 State the objectives of costing
4.2.3 Identify the elements of costing
4.2.4 Explain the classification of costs
4.2.5 Find the selling price of a product, give examples
4.2.6 Illustrate the various methods of allocation of over heads

4.2.7 Explain the term 'Depreciation'
4.2.8 List the various causes for depreciation
4.2.9 Describe the various methods of calculating depreciation
4.2.10 Estimate the depreciation in the given examples
4.2.11. Distinguish the need, scope and functions of estimating department in industry
4.2.12 State the objectives of estimate
4.2.13 Identify the principal constituents of estimating
4.2.14 Describe estimating procedures

CONTENT DETAILS

MODULE I

Industrial Engineering – Introduction- concepts of industry - production and productivity - difference - importance - methods for increasing productivity - expectations from productivity.

Production planning and control

Types of production system - job production ,batch production, mass production, flow production- one time large production - explanation of production planning control - benefits of PPC -functions of PPC
Pre-planning activities –forecasting, types of forecasting- plant location, product planning, design and development, material selection, process planning, determination of men, machines, material and tool requirements.
Process planning -break even analysis - process sheet -process planning procedure-–choice of machine in process planning
Routing - explain routing - routing procedure - route sheet - comparison of route sheet and process sheet **Scheduling** - factors affecting scheduling - types - master schedule , parts schedule, m/c loading schedule -preparation of schedule chart in Gantt chart form.
Dispatching - functions - work in dispatching - list various documents prepared in dispatching - Follow up and control
Value Engineering- Explain value engineering - applications of value engineering - advantages –
Plant location and layout- Factors to be considered in locating industrial plants - plant layout - types of layouts - compare the advantages and disadvantages of each type - factors influencing the plant layout .
plant maintenance - types of maintenance –their advantages and disadvantages-cost of maintenance -
Material handling -functions and principles of material handling - factors effecting material handling- types of material handling equipments.

MODULE II

Method study
Introduction to work study - advantages - application of work study to increase productivity- Introduction to method study - objectives of method study - method study procedure - process chart symbols - preparation of charts -Operation process chart, flow process chart (men material and equipment), - man-machine chart, right hand left hand chart-flow diagram - string diagram-compare macromotion study and micromotion study. state the work of Gilbreth and Lillian Gilbreth- Therbligs and their symbols -SIMO chart

Principles of motion economy - Rules concerning Human body, work place layout and Design of tools and equipments.

Work measurement

Objectives of work measurement –types of work measurement techniques-Stop watch time study-procedure of stop watch time study -Standard time calculation - production study-analytical estimating-synthesis from standard data-PMTS &MTM.

Work Sampling -Explain work sampling - applications - steps in work sampling-advantages and limitations over stop watch time study.

MODULE III

1.Quality control and Inspection

Concept of Quality and Quality control –Statistical quality control-objectives of quality control –applications- incoming material control-in process control –product control in manufacturing. - benefits of a quality control programme. State the components of qualities cost

Concepts of inspection - objectives - inspection of incoming materials - manufacturing inspection.Types of inspection - first piece inspection, operation inspection.-functional inspection.

Floor and rowing or patrolling inspection - centralized inspection - advantages and limitations

2.Fundamentals of statistical concepts

Explain the term variability in measurements - explain the terms variable, attribute, frequency, tally sheet and frequency distribution -frequency plot –histogram-frequency polygon-Ogives - explanation of the terms mean, median, mode , standard deviation and variance - calculation of mean, median, mode , standard deviation and variance - normal distribution curve-its salient features.

3.Control Charts – for Variables

Construction of X & R Chart

Explain mean (X) and Range (R)- preliminary consideration of making X and R charts -components of X & R charts - procedure for constructing X & R charts - plot X & R chart –conclusion of results-simple examples.

4.Control Chart for defectives

Defect and Defectives -Purpose of selection of P chart - determination of size and frequency of samples - construction of P chart and 100 P chart - analysis and interpret.

5.'C' Chart

C chart - characteristic - control limits – construction of C chart - advantages of C chart-analysis and interpret.

MODULE IV

Acceptance sampling.

concept of acceptance sampling - Terms used in acceptance sampling-lot-lot size –sample-sample size-acceptance No.-rejection No –LQ-LTPD-consumers risk and producers risk- Explain single, double and multiple sampling plans. Illustrate OC curve for an Ideal plan

Illustrate and explain OC curve for a general plan showing four parameters.

Estimating and Costing -comparison between estimating and costing - objectives of costing-- element of cost - material - labour - expenses - classification of costs- explanation of the terms prime costs – factory cost-office cost- total costs –overhead expenses- method of allocation of overhead expenses – simple problems--depreciation - list the various causes for depreciation – different methods of calculating depreciation - simple problems. Estimating department in industry – need – scope-

functions -objectives of job estimate- principal constituents of estimate-material labour and expenses - estimating procedures

TEXT BOOK

Industrial Engineering and Management- Dr. O.P. Khanna

Industrial Organisation and Engineering Economics - T.R. Banga & S.C. Sharma.

REFERENCE

Industrial Engineering and Production management - Martand Telsang

Industrial Engineering & Management - Dr. Balasundaram

Quality control - NITTTR

Mechanical Estimating and Costing - NITTTR

Mechanical Estimating and Costing - T.R. Banga & S.C. Sharma