# CHHATISGARH INSTITUTE OF TECHNOLOGY JASHPUR

(छत्तीसगढ़ इंस्टीटयूट ऑफ टेक्नोलॉजी जशपुर)

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## LESSON PLAN SESSION JAN – JUL 2026

SUBJECT: **Industrial Engineering & Production Management** SEMESTER: **6th** BRANCH: - **MECHANICAL ENGINEERING**

**SUBJECT CODE- 2037671(037)**

| UNIT NUMBER | NAME OF THE TOPIC | NO OF CLASS REQUIRED | REMARK |
|---|---|---|---|
| **UNIT 01:**<br><br>**Productivity and Work Study** | **1.1&1.2** Introduction to Industry and Industrial Engineering.<br>Scope and role of industrial engineering, fields of application. | 01 | |
| | **1.3&1.4** Production and productivity, Production systems and their impact on productivity, significance and benefits of higher productivity.<br>Long term and short term factors affecting productivity, Productivity cycle. | 02 | |
| | **1.5** Objectives and application of work study, Basic procedure and techniques of work study, Human factors in work study. | 02 | |
| **Unit 02:**<br><br>**Method Study and Time Study** | **2.1 & 2.2** Definition, objectives of method study<br>Basic procedures and Recording techniques of method study. | 01 | |
| | **2.3** Operation process chart, flow process chart, man machine chart, Flow diagrams, String Diagrams, two hand process charts | 03 | |
| | **2.4&2.5** Motion economy principles, Therbligs, cycle graph and chronocycle graph. Work Measurement.<br>Time Study: selection and timing the job, rating, allowances, Numerical on Normal and standard time calculation. | 02 | |
| **Unit 03:**<br><br>**Reliability and Maintainability** | **3.1&3.2** Need for Maintainability Maintenance and Reliability<br>Reliability, availability and maintainability terms and definitions | 01 | |
| | **3.3 & 3.4** Reliability: The reliability function, mean time to failure, Hazard rate function, bath tub curve, conditional reliability.<br>Reliability Model: constant failure rate model, Time dependent failures model, Weibull Distribution, normal distribution | 02 | |
| | **3.5&3.6** Reliability system: Serial configuration, parallel configuration, Combined series –parallel configuration system.<br>Reliability Evaluation Tools: Failure Modes and Effect Analysis (FMEA), Network Reduction | 02 | |
| | **3.7, 3.8&3.9** Maintainability Analysis of downtime The Repair time distribution, Maintainability Function for Exponential Distribution, Rayleigh Distribution, and Weibull Distribution.<br>Maintainability Design Considerations, Fault Tree Analysis, Cause and Effect Diagram, Failure Modes Effect and Critically Analysis (FMECA)<br>Preventive maintenance and replacement, total productive maintenance, Corrective Maintenance – concept and applications, examples. | 03 | |
| **Unit 04:**<br><br>**Material Handling and Plant Layout** | **4.1** Importance and its effect on productivity, Requirements of good material handling system, Classification and selection of material handling equipment. | 01 | |
| | **4.2** Principles of economic material handling Hoisting equipment - forklift truck, Cranes- mobile motor cranes, overhead cranes, travelling bridges crane. Derrick crane. Whirler crane Conveying equipment – Package conveyors, gravity roller conveyors, screw conveyors, flight or scraper conveyors, bucket conveyors, bucket elevators, belt conveyors, and Pneumatic conveyors. | 03 | |
| | **4.3** Requirements of good layout, effect of bad layout, Factors affecting plant layout, Types of layout, Advantages and limitations of each type of layout, Selection of layout, factors affecting the plant location. | 03 | |

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| **Unit 05:**<br><br>**Production Planning and Control** | **5.1** Production system, concept of planning, meaning of PPC,Classification and characteristics of each type, Function of and place of PPC in an organization, Production and consumption rate | 01 | |
| | **5.2&5.3** Job, Batch and Mass production, Batch size, Buffer stock, Production cost components, Concept of production scheduling. Difference between Loading and Scheduling,<br>Gantt chart scheduling, advantages and preparation of GANTT chart. | 02 | |
| | **5.4&5.5** Definition of quality and total quality, Three stages of quality, quality control and SQC,<br>Difference between inspection and Quality control, Concept of variability natural variation, its importance to quality<br>control, classification of quality characteristics, | 02 | |
| | **5.6** Basic tools of S.Q.C. and their applications, Frequency distribution, measures of central tendency and dispersion, their need and calculations | 01 | |
| | **5.7** Normal curve: Definition, characteristics, calculation of area under normal curve and its applications. | 01 | |
| | **5.8** Statistical basic for control charts for variables, Construction of X and R charts- their interpretation, Use of X and R chart in establishment of<br>process capability, Limitation of X and R charts, | 03 | |
| | **5.9&5.10** Meaning, use and advantages of attributes, Calculation, Construction, interpretation and application of P, C charts,<br>Need of calculating the revised values of mean, and control Limits and their calculation. | 01 | |
| **Unit 06:**<br><br>**Material management and project planning** | **6.1** Nature, Purpose and objectives of basic functions of management, Authority and Responsibility, social responsibility of Manager, ethics and management. | 01 | |
| | **6.2** Function of Material Management purchase system, Inventory, need And advantages of Inventory control, Different techniques of Inventory control -A.B.C. analysis, FIFO, LIFO, Just In Time, Perpetual Inventory Management. | 01 | |
| | **6.3&6.4** Correlation, stock turn over, order quantity, Lead time purchase cycle,<br>Economic order Quantity, simple numerical problems, Safety stock | 02 | |
| | **6.5** Stores Management-Definition and importance, Storing Procedure and store records. | 01 | |
| | **6.6** Network –meaning and objectives, Network formation, representation of activities and event on network, rules for drawing network diagram, Fulkerson's rule | 02 | |
| | **6.7** Different techniques- PERT and CPM, Dependency of activities, Dummy activities,. | 02 | |
| | **6.8** Different Time estimates- Optimistic, Pessimistic and Most likely Time, ET, LT, EST, LST, LCT, ECT, Floats and Slacks and Network<br>analysis on tabular form, Man power loading and calculation on load Smoothing. | 02 | |
| | Total Class Required | 48 | |

Lecturer Name & Sign: -