B.E Semester: 8 Automobile Engineering Subject Name: Computer Aided Production And Operation Management (MA803-N-A) [Dept. Elect.-5]

A. Course Objective:

• To present a problem oriented in depth knowledge of Computer Aided Production And Operation Management.

• To address the underlying concepts and methods and application of different Concepts of Computer Aided Production And Operation Management.

B. Teaching / Examination Scheme:

| Teaching Scheme | | | | Evaluation Scheme | | | | | | |
|-----------------|-----|-----|-------|-------------------|-----|-------|--------------------|-------|--------|-------|
| L | Т | Р | Total | Total Credit | The | eory | Mid Sem Exam | CIA | Pract. | Total |
| Hrs | Hrs | Hrs | Hrs | | Hrs | Marks | Marks | Marks | Marks | Marks |
| 3 | 0 | 2 | 5 | 4 | 3 | 70 | 30 | 20 | 30 | 150 |

C. Detailed Syllabus:

| Unit No. | Details |
|-------------|---|
| 1 | Computer Integrated Manufacturing:- Introduction, Evaluation of CIM, Scope of CIM, Objectives, Difference between CAD/CAM and CIM, Components of CIM, CIM Wheel, CIM hardware CIM Software, Development of CIM, CIM Product Cycle, Benefits of CIM |
| 2 | NC/CNC/DNC Machine Tools: NC Machine Tools, Components of NC Machine Tools Systems, Classification of NC Machine Tools System, Advantage, Limitation and Application of NC Machine Tools, CNC Machine Tools, Components of CNC Machine Tools Systems, Classification of CNC Machine Tools System, Advantage, Limitation and Application of CNC Machine Tools. General Constituents of NC/CNC Machine Tools, Difference between NC and CNC Machine Tools Systems, DNC Machine Tools, Basic Components of DNC Machine Tools, Function of DNC Machine Tools, Advantage, Limitation and Application of DNC Machine Tools, Function of DNC Machine Tools, Advantage, Limitation and Application of DNC Machine Tools, Adaptive Control System and its Advantages. Part Programming: Introduction, N Code, G Code, Coordinate Functions, Feed Functions, Spindle Speed Functions, Tool Functions, M Codes, Formats of Manual Part Programming, Different types of Formats, Manual Part Programming for Turning Centres and Milling Machining Centre, Axes Designation, Zero Points, Cutting Process Parameters Selection, Programming Types, Subprogram, Macros, Canned Cycles, Tool Compensation, Computer Assisted Part Programming, Types and Components of Computer Assisted Part Programming, Automatically Programmed Tools, Introduction about PLC. |
| 3 | Group Technology:- Objectives, Part Families, Similarities, Design and Manufacturing Attributes, Two Hurdles in implementing G. T., Classification Methods- Visual Inspection, Product Flow Analysis and Coding, Need and Types of Structure, Opitz, MICLASS and CODE |

| | coding systems, G.T. Machine Cells and Types, Concept of Composite Part, Benefits and | | | | | | |
|---|---|--|--|--|--|--|--|
| | Limitations. | | | | | | |
| | Flexible Manufacturing Systems:- | | | | | | |
| | Introduction, Objectives, Needs, Classification and Components of FMS, Flexibilities in FMS, | | | | | | |
| | Types of FMS, Advantages, Limitations and Applications of FMS, Comparison of Types of | | | | | | |
| | Manufacturing Systems, Automated Material Handling Systems, Automated Guided Vehicles, | | | | | | |
| | Automated Storage and Retrieval Systems | | | | | | |
| | Computer Aided Process Planning:- Types of CAPP - Variant Generative and Hybrid CAPP, | | | | | | |
| | Benefits, Comparison Between Variant and Generative CAPP System, Advantages of CAPP | | | | | | |
| | Introduction of Production & Operation Management: | | | | | | |
| | System and function view of organizations, scope, Evolution and future of production and | | | | | | |
| | operation management. | | | | | | |
| 4 | Process design-different types of process with its. Merits and demerits, process classification | | | | | | |
| | based on order, process selection, different type of manufacturing process, process performance | | | | | | |
| | and evaluation etc. | | | | | | |
| | Product design; types of products and designing, evaluation of design | | | | | | |
| | Facility location; | | | | | | |
| | Plant Layout: Different types of layout | | | | | | |
| | Aggregate Production Planning (APP): | | | | | | |
| 5 | Objective, strategies and cost of APP, master production schedule, Rough cut capacity planning | | | | | | |
| | etc. | | | | | | |
| | Material Requirement Planning (MRP) | | | | | | |
| | Inventory Management | | | | | | |
| 6 | Operations scheduling: | | | | | | |
| | Definition, Objectives, Types Sequencing (n-jobs on m machine) (theory and numerical), | | | | | | |
| | Queuing systems (Waiting Line Analysis) (theory and numerical), Line Balancing (theoretical | | | | | | |
| | concept only), Project management | | | | | | |

| Total hours (Theory):48 | |
|----------------------------|--|
| Total hours (Practical):32 | |
| Total hours:80 | |

D. Lesson Planning:

| Sr. No. | Date/Week | Unit | Weight age | Topic No |
|---------|--|--------|------------|----------|
| 1 | 1 st ,2 nd ,3 rd ,4 th | Unit 1 | 30% | 1,2 |
| 2 | $5^{\text{th}}, 6^{\text{th}}7^{\text{th}}$ | Unit 2 | 20% | 3 |
| 3 | 8 th ,9 th 10 th | Unit 3 | 20% | 4 |
| 4 | $11^{\text{th}} \cdot 12^{\text{th}} 13^{\text{th}}$ | Unit 4 | 15% | 5 |
| 5 | 14 th ,15 th ,16 th | Unit 5 | 15% | 6 |

E. Instructional Method & Pedagogy

| 1 | At the start of course, the course delivery pattern , prerequisite of the subject will be discussed |
|---|---|
| | Lecture may be conducted with the aid of multi-media projector, black board, OHP etc. & equal |
| 2 | Weight age should be given to all topics while teaching and conduction of all examinations. |
| | Attendance is compulsory in lectures and laboratory, which may carries five marks in overall |
| 3 | evaluation. |
| 4 | One/Two internal exams may be conducted and total/average/best of the same may be converted |

| | to equivalent of 30 marks as a part of internal theory evaluation. |
|---|---|
| | Assignment based on course content will be given to the student for each unit/topic and will be |
| | evaluated at regular interval. It may carry an importance of ten marks in the overall internal |
| 5 | evaluation. |
| | Surprise tests/Quizzes/Seminar/Tutorial may be conducted and having share of five marks in the |
| 6 | overall internal evaluation. |
| | The course includes a laboratory, where students have an opportunity to build an appreciation for |
| 7 | the concept being taught in lectures. Suggested list of experiment is given below |

F. List of Experiments :

| | Study of Computer Integrated System: Basics, Types of Manufacturing, role of management and |
|---|---|
| 1 | CIM wheel. |
| | NC/CNC technology: Definition, Classification, Specification, Construction details, Sensors and |
| 2 | Actuators, and different controllers. |
| 3 | CNC part Programming: Lathe and Milling jobs. |
| 4 | Problems on GT and Industrial case problems on coding. |
| 5 | Problems on CAPP and Industrial case problems. |
| 6 | Study of Flexible Manufacturing system. |
| 7 | Problems on MRP-I, MRP-II. |
| 8 | Case study: Factory Layout. |
| 9 | Problems on Scheduling. |

G. Students Learning Outcomes:

| | • |
|---|---|
| | The student can identify different areas of Computer Aided Production And Operation |
| 1 | Management. |
| 2 | Can find the applications of all the areas in day to day life. |

H. Text Books & Reference Books:

| 1 | Numerical Control & Computer Aided Manufacturing-T. K. Kundra & P.N. Rao |
|----|---|
| 2 | CAD,CAM,CIM- P. Radhakrishnan & S.Subranarayan- New Age International |
| 3 | CAD, CAM, CIM- Mikell P. Groover & EN. Zimmers- Prentic Hall |
| 4 | Computer Aided Production Management-P.B. Mahapatra |
| 5 | CAD / CAM and Automation by Farazdak Haideri, Nirali Prakashan |
| 6 | Chase R. B., Jacobs, F. R., Aquilano, N. J. and Agarwal N. K., Operations Management for Competitive Advantage, TMH |
| 7 | Kanishka Bedi, Production and Operation Managemen, Oxford |
| 8 | Arun Kumar, N. Meenakshi P, Production and Operation Management, Cengage |
| 9 | S. A. Chunawala, Dr. R. Patel, Production and Operations Management, Himalaya |
| 10 | David A. Collier, James R. Evans and Kunal Ganguly, Operation Management, Cengage |