

**GUJARAT TECHNOLOGICAL UNIVERSITY**  
**DIPLOMA IN MECHANICAL ENGINEERING**  
**SEMESTER- VI**

Subject Name: **Advance Manufacturing System (Elective-I)**

Subject Code: **2361909**

Sr. No.	Subject Content	Hrs.
1	<p><b>INTRODUCTION TO ADVANCE MANUFACTURING SYSTEM (AMS).</b></p> <p>1.1 Know the objectives of learning this subject.            1.2 Need, Scope &amp; importance of AMS in industries.            1.3 Need of attitude, knowledge &amp; skill required for application of AMS.            1.4 Recall evolution of transformation &amp; manufacturing systems.            1.5 Concept, components, working and features of Computer Numerical Control (CNC) machine.</p>	3
2	<p><b>GROUP TECHNOLOGY (GT).</b></p> <p>2.1 GT - concept, definition, need, scope, &amp; benefits.            2.2 GT- codification systems , types, importance, part families, part classification and coding systems, examples/case study.            2.3 GT Layout -concept, need, importance, comparison with conventional layout with examples/case study, benefits.            2.4 Computer Aided Process Planning (CAPP) - conventional process planning &amp; examples, CAPP- concept, types, features, methods and importance.</p> <p><b>Note :</b> Question/s to prepare features and coding of given component/s (application type) of 5-6 marks out of total 70.</p>	8
3	<p><b>CELLULER MANUFACTURING.</b></p> <p>3.1 Concept and definition, application and benefits.            3.2 Part family and cell formation.            3.3 Composite component and key machine concepts.            3.4 Cell layout and design.            3.5 Job and tool movement within cell.            3.6 Types of cell: manual and automatic cell, assembly cell, comparison of cell and Flexible Manufacturing Cell (FMC).</p> <p><b>Note :</b> Question/s to prepare cell layout from given data (application type) of 4-6 marks out of total 70.</p>	4

4	<p><b>JUST IN TIME (JIT).</b></p> <p>4.1 JIT concept, meaning, definition, need and reasons to include this concept in AMS.</p> <p>4.2 Unnecessary elements in conventional manufacturing system with reference to JIT with suitable engineering examples/ case study.</p> <p>4.3 JIT implementation requirement.</p> <p><b>Note :</b> Question/s to based on related short case (application type) of 3-4 marks out of total 70.</p>	3
5	<p><b>FLEXIBLE MANUFACTURING SYSTEM (FMS).</b></p> <p>5.1 Flexible Manufacturing Unit (FMU), turn-mill centres, multiple centres, advanced machining centres, etc.</p> <p>5.2 Transfer line- concept, meaning, features &amp; examples.</p> <p>5.3 Flexible Manufacturing System (FMS) -concept, meaning &amp; benefits, major elements and their role.</p> <p>5.4 FMS : layout concept, system, tool handling system, material handling principle and system.</p> <p>5.5 Automated Guided Vehicles (AGV) in FMS- concept, definition, types, functions.</p> <p>5.6 Signal flow diagram, line balancing, Automated Storage and Retrieval System (AS/RS), case examples of FMS for specific components/group of components.</p> <p><b>Note :</b> Question/s to prepare conceptual FMS layout of given components/groups (application type) of 8-10 marks out of total 70.</p>	9
6	<p><b>ROBOTICS.</b></p> <p>6.1 Introduction</p> <p>6.2 Robots-concept, definition, economic justification, benefits.</p> <p>6.3 Robots-types, classification, various terminology,specification criterion.</p> <p>6.4 Axes nomenclature, elements, control, for each type of robots.</p> <p>6.5 Sensors- types, classifications, working and applications.</p> <p><b>Note :</b> Question/s to select/justify sensors for given data (application type) of 3-4 marks out of total 70.</p>	6
7	<p><b>INTEGRATION OF COMPUTER AIDED DESIGN (CAD) WITH COMPUTER AIDED MANUFACTURING (CAM).</b></p> <p>7.1 Concept, meaning, importance and benefits.</p> <p>7.2 Activities involved in integration of CAD with CAM.</p> <p>7.3 Features and applications of software packages having CAD/CAM integration.</p> <p>7.4 Interfacing: types, standards, features &amp; applications.</p>	3

8	<b>COMPUTER INTEGRATED MANUFACTURING (CIM).</b>  8.1 Concept, definition, areas covered and benefits. 8.2 CIM: need, block diagram & explanations, importance & features of each terms involved. 8.3 Computer Aided Inspection- concept, benefit, types, working and examples, Coordinate Measuring Machine (CMM) - its working and applications. 8.4 Protocols in CIM- their features, functions and applications.	3
9	<b>CONCURRENT ENGINEERING (CE).</b>  9.1 Introduction 9.2 Concept, meaning, terminology, definitions and objective in CE. 9.3 Parallel processing & CE team. 9.4 Schemes, their definition and exemplification for CE.	3
<b>Total</b>		42

**Notes:**

**A. FOR STUDENTS.**

- a. It is advised that student download this copy of syllabus and plan to achieve the objectives of learning this subject.

**B. FOR PAPER SETTER/MODERATOR.**

- a. Refer GTU syllabus and do not take reference of previous TEB question papers.  
b. Ask the questions from each topic having marks weightage proportionate to hours allotted to that topic.  
c. Optional questions must be asked from the same topic. That is weightage of compulsory attendance part of questions will be equal to proportionate to hours allotted to each topic.  
d. Marks ratio of knowledge: comprehension: application types questions must be 30:30:40 respectively.  
e. Submit solution / answer keys along with distribution of marks in each question for the paper being submitted.

**Reference Books:**

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| 1. | CAD/CAM/CIM                                | P.Radha krishnan & S.subra narayan<br>(New Age Intentional)          |
| 2. | Computer Integrated Design & Manufacturing | Bedworth, Wolfe and Anderson (McGraw Hill International publication) |

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| 3. | Mechatronics                            | HMT   |
| 4. | Introduction to Robotics                | Arthur J. Critchlow (Mc Millan publication) |
| 5. | Robotics for engineers                  | Yorom Koran (Mc G.H. Publication)           |
| 6. | Computer aided manufacturing            | Rao, Tiwari & Kundra ( TMGH Publication)    |
| 7. | Computer aided design and manufacturing | Dr.Sadhusingh (KP)                          |

**Additional Reference Books:**

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| 1. | Computer Integrated Manufacturing                            | S.K.Vajpayee<br>(PHI Publication)                                   |
| 2. | Automation, Production and Computer integrated Manufacturing | Mikell P. Groover, (PHI publication)                                |
| 3. | Mechatronics   | Bradleg and Offers (Chapman and Hall publication)                   |
| 4. | Practical Robotics   | William C. Burns Jr. & Janet Evans<br>worthington (PHI publication) |
| 5. | Computer automated Manufacturing                             | John H. Powers Jr. (Mc GH Publication)                              |
| 6. | CAD/CAM/FOF,   | Vol I,II, & III Juneja, Pujara & Sagar TMGH)                        |
| 7. | Production and operations management                         | Chase/Aquilano (Irwin publication)                                  |