

IIPM SCHOOL OF ENGINEERIN AND TECHNOLOGY

**LESSON PLAN: 2022-23**

**Advance Manufacturing Process**

**Th- 04(b)**

**Branch : Mechanical Semester: 6th**

**Duration : 60**

**Faculty name : Saritprava Sahoo**

**SYLLABUS**

|  |  |
| --- | --- |
| **Unit – I** | **Modern Machining Processes:**  1.1 Introduction – comparison with traditional machining.  1.2 Ultrasonic Machining: principle, Description of equipment, applications.  1.3 Electric Discharge Machining: Principle, Description of equipment, Dielectric fluid, tools (electrodes), Process parameters, Output characteristics, applications.  1.4 Wire cut EDM: Principle, Description of equipment, controlling parameters; applications.  1.5 Abrasive Jet Machining: principle, description of equipment, Material removal rate, application.  1.5 Laser Beam Machining: principle, description of equipment, Material removal rate, application.  1.6 Electro Chemical Machining: principle, description of equipment, Material removal rate, application.  1.7 Plasma Arc Machining – principle, description of equipment, Material removal rate, Process parameters, performance characterization, Applications.  1.8 Electron Beam Machining - principle, description of equipment, Material removal rate,Process parameters, performance characterization, Applications.  **Self Study:** **Concepts to** |
| **Unit – II** | **Plastic Processing:**  2.1 Processing of plastics.  2.2 Moulding processes: Injection moulding, Compression moulding, Transfer moulding.  2.3 Extruding; Casting; Calendering.  2.4 Fabrication methods-Sheet forming, Blow moulding, Laminating plastics (sheets, rods & tubes), Reinforcing.  2.5 Applications of Plastics.  **Self Study:** Conversion from Automata to Grammar and vice versa |
| **Unit – III** | **Additive Manufacturing Process:**  3.1 Introduction, Need for Additive Manufacturing  3.2 Fundamentals of Additive Manufacturing, AM Process Chain  3.3 Advantages and Limitations of AM, Commonly used Terms  3.4 Classification of AM process, Fundamental Automated Processes, Distinction between AM and CNC, other related technologies.  3.5 Application –Application in Design, Aerospace Industry, Automotive Industry, Jewelry Industry, Arts and Architecture. RP Medical and Bioengineering Applications.  3.6 Web Based Rapid Prototyping Systems.  3.7 Concept of Flexible manufacturing process, concurrent engineering, production tools like capstan and turret lathes, rapid prototyping processes. |
| **Unit – IV** | **Special Purpose Machines (SPM):**  4.1 Concept, General elements of SPM, Productivity improvement by SPM, Principles of  SPM design. |
| **Unit – V** | **Maintenance of Machine Tools:**  5.1 Types of maintenance, Repair cycle analysis, Repair complexity, Maintenance manual,  Maintenance records, Housekeeping. Introduction to Total Productive Maintenance (TPM). |

**TEXT BOOKS& OTHER REFERENCES BOOKS**

|  |  |
| --- | --- |
| **Text Books** | |
| 1. | “Production technology –Vol-II”, O.P.KHANNA, Dhanpat Rai Publication. |
| 2. | “Workshop Technology, Vol – II”, B.S. Raghuwanshi, Dhanpat Rai. |
| **Suggested / Reference Books** | |
| **1.** | **“Production Technology” HMT, Bangalore, TMH.** |

**Objective :** to the field of production by advance nontraditional methods which give the conversion of raw materials into finished product.

**Learning Outcome :** Understanding effectiveness of

* Understand the working principle of modern machining processes.
* Understand the Plastic Processing
* Understand the additive manufacturing process
* Understand the Special Purpose Machines
* Understand the Maintenance of Machine Tools

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **Sl.No** | **Chapter** | **Proposed Week for Teaching** | **Period**  **No.** | **Subject Name** | **Important Teaching Points** | **Content Source** |
| 1 | **I** | 1st | 1 | **Modern Machining Processes** | * Introduction – comparison with traditional machining. | Production technology –Vol-II”, O.P.KHANNA, Dhanpat Rai Publication |
| 2 | 2 | * Ultrasonic Machining: principle, Description of equipment, applications. |
| 3 | 3 | * Electric Discharge Machining: Principle, Description of equipment, Dielectric fluid, tools (electrodes), Process parameters, Output characteristics, applications. |
| 4 | 4 | * Wire cut EDM: Principle, Description of equipment, controlling parameters; applications. |
| 5 | 2nd | 1 | * Abrasive Jet Machining: principle, description of equipment, Material removal rate, application. |
| 6 | 2 | * Laser Beam Machining: principle, description of equipment, Material removal rate, application. |
| 7 | 3 | * Electro Chemical Machining: principle, description of equipment, Material removal rate, application. |
| 8 | 4 | * Plasma Arc Machining – principle, description of equipment, Material removal rate, Process parameters, performance characterization, Applications. |
| 9 | 3rd | 1 | * Electron Beam Machining - principle, description of equipment, performance |
| 10 | 2 | * Material removal rate, Process parameters characterization, Applications. |
| 11 | **II** | 3 | **Plastic Processing** | * Processing of plastics. | Production technology –Vol-II”, O.P.KHANNA, Dhanpat Rai Publication |
| 12 | 4 | * Moulding processes: Injection moulding, Compression moulding, Transfer moulding. |
| 13 | 4th | 1 | * Extruding; Casting; Calendering. |
| 14 | 2 | * Fabrication methods-Sheet forming, Blow moulding, Laminating plastics (sheets, rods & tubes), Reinforcing. |
| 15 | 3 | * Applications of Plastics. |
| 16 | 4 | * ASSIGNMENT |
| 17 | 1 | * CLASS TEST |
| 18 | **III** | 6th | 2 | **Additive Manufacturing Process** | * Introduction, * Need for Additive Manufacturing | Production technology –Vol-II”, O.P.KHANNA, Dhanpat Rai Publication |
| 19 | 3 | * Fundamentals of Additive Manufacturing, AM Process Chain |
| 20 | 4 | * Advantages and Limitations of AM, Commonly used Terms |
| 21 | 1 | * Describe the functions of   Inventories. |
| 22 |  | 7th | 2 | * Classification of AM process, Fundamental Automated Processes, Distinction between AM and CNC, other related technologies. |
| 23 | 3 | * Application –Application in Design, Aerospace Industry, Automotive Industry, Jewelry Industry, Arts and Architecture. RP Medical and Bioengineering Applications.. |
| 24 | 4 | * Web Based Rapid Prototyping Systems l |
| 25 | 1 | * Concept of Flexible manufacturing process, concurrent engineering, production tools like capstan and turret lathes, rapid prototyping processes. |
| 26 | 2 | * ASSIGNMENT |
| 27 | 3 | * CLASS TEST |
| 28 | 10th | 4 | **Special Purpose Machines (SPM)** | * Concept, General elements of SPM, Productivity improvement by SPM, Principles of   SPM design. |
| 29 | 1 | * ASSIGNMENT |
| 30 | 2 | * CLASS TEST |
| 31 | **V** |  | 3 | **Maintenance of Machine Tools** | * Types of maintenance, Repair cycle analysis, Repair complexity, Maintenance manual, | Production technology –Vol-II”, O.P.KHANNA, Dhanpat Rai Publication |
| * Maintenance records, Housekeeping. Introduction to Total Productive Maintenance (TPM). |
| 32 | 4 | * ASSIGNMENT |
| 33 | 1 | * CLASS TEST |

Faculty Member HOD Principal/ Director