**SRI VENKATEWARA COLLEGE OF ENGINEERING AND TECHNOLOGY**

**(AUTONOMOUS**)

**RVS NAGAR, CHITTOOR-517 127 (AP).**

**Department Of Mechanical Engineering**

**Lesson Plan for the Academic Year 2017-18**

**COURSE: IV B. Tech I-Semester (Mechanical Engineering)**

**SUBJECT: MODERN MANUFACTURING METHOS (14AME38)**

**Objectives:**

*To make the students learn about:*

1. The need of MMM and principles of various unconventional machining processes.
2. The principles and process parameters of electro – chemical machining.
3. The principle of electric discharge machining.
4. The principle of EBM,LBM and PAM with various applications.
5. The importance of rapid prototyping technologies.

**Out comes:**

*After completion of the course, the student will be able to:*

1. Summarize various unconventional machines utilized in a manufacturing industry.
2. Select the various processes like AJM, USM, EBM, EDM, ECM, LBM and others for solving machining processes with system approach.
3. Solve industry problems with advanced technologies and analyze the best method eco friendly minimum total cost.
4. Identify a manufacturing system with optimal recourse utilization to promote system integration
5. Formulate a project team with defined role play for customer satisfaction and industry growth.
6. Plan for continuous up dation of knowledge and skills in manufacturing processes to achieve long term goals

**Text Books:**

1. V.K. Jain, Advanced machining processes, Mumbai, 9th Edition, Allied publishers Pvt. Limited, 2014.
2. M.P. Groover, Fundamentals of Modern manufacturing, 4th Edition, John Wiley & sons Ltd, 2010.

**References:**

1. P.C. Pandey & H.S. Shah, Modern Machining Process, New Delhi, 2nd Edition, Tata McGraw Hill, 2008.
2. Kalpakjain, Manufacturing Technology, New Delhi, 3rd Edition, Pearson Publishers, 2012.
3. El-Hofy, Hassan Abdel-Gawad, “Advanced Machining Processes: Nontraditional And Hybrid Machining Processes”, McGraw-Hill, 2005.

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| **Sl.**  **No.** | **Unit**  **No.** | **Topic** | **No. of Hrs required** | | **cumulative Hrs** |
| 1 | **UNIT I** | Need of unconventional machining methods, advantages, Classification | 01 | | 01 |
| **ULTRASONIC MACHINING**: | | | |
| Introduction, Ultrasonic machining system, Mechanics of cutting, Process capabilities, applications. | 03 | | 04 |
| 2 | **ABRASIVEJET MACHINING:** | | | |
| Working principles, Equipments, process variables, process capabilities, application and limitations. | 03 | | 06 |
| 3 | **Water jet machining and abrasive water jet machine:** | | | |
| Working principles, Equipments, process variables, process capabilities, application and limitations. | 03 | | 10 |
|  | **UNIT II** | **ELECTRO–CHEMICAL MACHINING:** | | | |
| 4 | Introduction**,** ECM Machine Tool, Theory of ECM- Faraday's Laws of Electrolysis-Electrochemical Equivalent of Alloys | 03 | | 13 |
| 5 | Material removal rate, Inter-Electrode Gap | 01 | | 14 |
| 6 | Electrolyte conductivity,Advantages and Disadvantages, Applications, Mechanical Properties of ECM's Parts | 02 | | 16 |
| 7 | Electrochemical grinding**−**Introduction, ECG Machine tool, process characteristics, applications. | 02 | | 18 |
| 8 | Electro chemical honing and Deburring process**−** Basic working principle ─ Applications. | 01 | | 19 |
|  | **UNIT III** | **ELECTRIC DISCHARGE MACHINING:** | | | |
| 9 | Introduction, Working principle of EDM, | 01 | | 20 |
| 10 | RC Pulse generator, EDM Machine-power supply, | 02 | | 22 |
| 11 | Dielectric system, Electrodes, Servo system | 01 | | 23 |
| 12 | Electrode Refeeding | 01 | | 24 |
| 13 | CNC-EDM, Analysis, Process Variables, Process characteristics, Applications. | 02 | | 26 |
| 14 | Wire cut EDM ─ working principle, wire EDM machine | 01 | | 27 |
| 15 | process variables, Process characteristics, Applications | 02 | | 29 |
| 16 | Electric Discharge Grinding─ working principle, Applications. | 01 | | 30 |
| 17 | **UNIT-IV** | **ELECTRON BEAM MACHINING:** | | | |
| working principle, electron beam machining system, | 01 | | 31 |
| 18 | characteristics of the process, applications and limitations | 01 | | 32 |
| 19 | **LASER BEAM MACHINING:** |  | |  |
| Production of lasers, working principle of Laser Beam Machining, | 01 | | 33 |
| 20 | Types of lasers, process characteristics, applications, advantages and limitations. | 02 | | 35 |
| 21 | **PLASMA MACHINING:** | | | |
| working principle, plasma arc cutting system, | 01 | | 36 |
| 22 | Elements of plasma arc cutting system, process performance, applications. | 02 | | 38 |
| 23 | **UNIT-V** | **CHEMICAL MACHINING:** |  | |  |
| Fundamentals of chemical machining | 01 | | 39 |
| 24 | Principle- maskants–etchants-advantages and applications. | 02 | | 41 |
| 25 | **RAPID PROTOTYPING:** | | | |
| Need of prototypes, Steps involved in rapid prototyping, | 02 | | 43 |
| 26 | Major RP technology of Stereo lithography - Basic working principles, applications and Limitations. | 02 | | 45 |
| 27 | Selective Laser Sintering - Basic working principles, applications and Limitations. | 02 | | 47 |
| 28 | Laminated Object Manufacturing - Basic working principles, applications and Limitations. | 03 | | 50 |
| 29 | Fused Deposition Modeling, Basic working principles, applications and Limitations. | 03 | | 53 |
| 30 |  | 3D printing. | 02 | | 55 |
| **TOTAL NO.OF CLASSES** | | | | | **55** |
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