Course Syllabi: UTA002 Manufacturing Processes (L : T : P :: 2 : 0 : 3)

1. **Course number and name**: UTA002; Manufacturing Processes

2. **Credits and contact hours**: Credits: 3.5; Hours: 5

3. **Text book, title, author, and year**

   - *Degarmo, E. P., Kohser, Ronald A. and Black, J. T., Materials and Processes in Manufacturing, Prentice Hall of India (2008) 8thed.*
   - *Kalpakjian, S. and Schmid, S. R., Manufacturing Processes for Engineering Materials, Dorling Kingsley (2006) 4thed.*
   - *Martin, S.I., Chapman, W.A.J. , Workshop Technology, Vol.1 & II, Viva Books (2006) 4th ed.*
   - *Zimmer, E.W. and Groover, M.P., CAD/CAM - Computer Aided Designing and Manufacturing, Dorling Kingsley (2008).*
   - *Pandey, P.C. and Shan, H. S., Modern Machining Processes, Tata McGraw Hill (2008).*
   - *Mishra, P. K., Non-Conventional Machining, Narosa Publications (2006).*
   - *Campbell, J.S., Principles of Manufacturing, Materials and Processes, Tata McGraw Hill Company (1999).*
   - *Lindberg, Roy A., Processes and Materials of Manufacture, Prentice Hall of India (2008) 4thed.*

   a. Other supplemental materials
      - Nil

4. **Specific course information**
   a. Brief description of the content of the course (catalog description)

   Introduction: Common Engineering Materials and Their Important Mechanical and Manufacturing Properties. General Classification of Manufacturing Processes.
   Metal Casting: Principles of Metal Casting, Patterns, Their Functions, Types, Materials and Pattern Allowances, Characteristics of Molding Sand, Types of Cores, Chaplets and Chills; Their Materials and Functions. Moulds and Their Types. Requisites of a Sound Casting. Introduction to Die Casting.
   Metal Forming and Shearing: Forging, Rolling, Drawing, Extrusion, Bending, Spinning, Stretching, Embossing and Coining. Die and Punch Operation in Press Work, Shearing, Piercing and Blanking, Notching, and Lancing.
   Machining Processes: Principles of Metal Cutting, Cutting Tools, Their Materials and Applications, Geometry of Single Point Cutting Tool. Cutting Fluids and Their Functions, Basic Machine Tools and Their Applications. Introduction to Non-Traditional Machining Processes (EDM, USM, CHM, ECM, and LBM).
   Joining Processes: Electric Arc, Gas, Resistance and Thermit Welding, Soldering, Brazing and Braze Welding, Adhesive Bonding, Mechanical Fastening (Riveting, Screwing, Metal Stitching, Crimping Etc.)
   Plastic Processing: Plastics, Their Types and Manufacturing Properties, Compression Molding, Injection Molding and Blow Molding.
   Modern Trends in Manufacturing: Introduction to Numerical Control (NC) and Computerized Numerical Control (CNC) Machines, Programmable Automation (FMS, CIM, Etc.)

Laboratory Work: Relevant Shop Floor Exercises Involving Practice in Pattern Making, Sand Casting, Machining, Welding, Sheet Metal Fabrication Techniques, Fitting Work, and Surface Treatment of Metals. Demonstration of Forge Welding, TIG/MIG/GAS/Spot/Flash Butt Welding, Demonstration on Shaper, Planer, and Milling Machine.

5. **Specific goals for the course**

   After the completion of the course, the students will be able to:

   - Identify and understand the basic manufacturing processes like single and multipoint machining, forming, welding, casting etc.
   - Acquire basic operational skills in different manufacturing processes like machining, forming, welding, casting, sheet metal operations, pattern making etc.

6. **Brief list of topics to be covered**

   - Metal casting
   - Metal forming and shearing
   - Machining process
   - Joining process
   - Plastic processing