ME361A Manufacturing Science and Technology

Credits: 3L-0T-1P-0A (10 Credits)

Lecture contents:
Introduction to manufacturing processes and system concept and its evolution; Metal casting: Solidification Mechanism, Gating and Riser Design, Defects and Product Design; Metal Forming: Fundamentals of Plasticity, Force Equilibrium Method, Forging/upsetting, Drawing, Extrusion, Deep Drawing and Bending, Defects; Machining: Tool Specifications, Orthogonal and Oblique cutting, Tool wear and Tool Life, Economics of Machining; Shaping processes for Plastics and Tool Design; Joining Processes; Un-Conventional Material Removal Processes: ECM, EDM, LBM and Jet Machining; Rapid Prototyping and Tooling; Micro-fabrication technologies; Metrology and Selection of Manufacturing Processes.

Laboratory sessions:
1. Machining: Force measurement in turning
2. Machining: Force measurement in Grinding
3. Forming: Load prediction and measurement and their comparison for Extrusion and/or Deep Drawing
4. Electrical discharge machining
5. Metrology: CMM and Other measuring Instruments
6. Micro-fabrication technologies

References:

- Ghosh, A., Mallik, A.K., Manufacturing Science (2nd edition), EastWest Press, 2010.
- Lal, G.K., Introduction to Machining Science (2nd edition), New Age International publishers, 2009.
- Groover, M.P, Fundamentals of Modern Manufacturing (2nd edition), John Wiley.
- Kalpakjian, S., Schmid, S.C., Manufacturing Engineering and Technology, Pearson Education.
- Galyer, J.F.W., Shotbolt, C.R., Metrology for Engineers, ELBS.