IIT Mandi
Proposal for a New Course

Course number : ME-215
Course Name : **Manufacturing Engineering-1**
Credit : **3-0-0-3**
Distribution : ***L-T-P-C***
Intended for : **UG**
Prerequisite : **None**
Mutual Exclusion: *courses with high similarity not allowed to credit by the students after or along with this course*

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1. Preamble:

This course will cover fundamentals of manufacturing engineering with respect to casting processes, forming, machining processes, advanced machining processes, joining processes, and finishing processes.

2. Course Modules with quantitative lecture hours:

- **Casting Processes and Foundry:** Sand casting processes, sand testing, molding processes, gating systems, cooling and solidification phenomena, special casting processes, casting defects and remedies, riser design, calculation of solidification times, inspection of casting. **(7 Hours)**
- **Forming Processes:** Plastic deformation and yield criteria, relationship between tensile and yield criteria, mechanics of forming processes, various forming processes, hot and cold forming, friction and lubrication in metal forming, defects in metal forming. **(6 Hours)**
- **Machining Processes:** Single point and multipoint cutting tools, chip formation mechanism, cutting tool geometry, orthogonal and oblique machining, Merchant's circle, force, velocity, shear angle and power consumption, tool wear, machinability and its measure, cutting tool materials, economics of machining. **(10 Hours)**
- **Advanced Machining Processes:** Process principle, equipment, analysis and application of advanced machining processes- abrasive Jet Machining, ultrasonic machining, water jet machining, electro chemical machining, chemical machining, electro discharge machining, electron beam machining, laser beam machining, microwave machining. **(7 Hours)**

- **Joining Processes:** Introduction, principle of fusion welding, heat flow characteristics, gas metal reactions, cooling of fusion weld, principles of solid phase welding, various joining processes-arc welding, GTAW, GMAW, FCAW, SAW, EBW, TW, soldering and brazing, adhesive bonding, mechanical assembly methods, weld defects and inspection. **(7 Hours).**
- **Finishing Processes:** Principle and applications of grinding, nomenclature of grinding wheel, honing, superfinishing, lapping, polishing, buffing, peening and burnishing, economics of finishing processes. **(5 Hours)**

Laboratory/practical/tutorial Modules: None

3. Text books:

- Groover, M.P., 2020. Fundamentals of modern manufacturing: materials, processes, and systems. John Wiley & Sons.
- Kalpakjian, S. and Schmid, S.R., 2018. Manufacturing engineering and technology, 2001. New Jersey: Prentice Hall

4. References: None

5. **Similarity with the existing courses: None**
(Similarity content is declared as per the number of lecture hours on similar topics)

S. No.		Course Code	Similarity Content	Approx. % of Content
1.				

6. **Justification of new course proposal if cumulative similarity content is >30%:**