

**IIT Mandi**  
**Proposal for a New Course**

**Course number** : ME 212  
**Course Name** : Product Manufacturing Technology  
**Credit** : 3  
**Distribution** : 2-0-3-3  
**Intended for** : UG (Core for B.Tech Mechanical)  
**Prerequisite** : None  
**Mutual Exclusion** : *(courses with high similarity not allowed to credit by the students after or along with this course)*

---

**1. Preamble:**

Product Manufacturing Technology (PMT) combines market requirements, technological capabilities, and resources to define new products, their designs and the requisite manufacturing and field support processes. This course will cover product manufacturing technology related to metals, ceramics and polymers. Experiments will provide hands on experience w.r.t. various product manufacturing technologies.

**2. Course Modules with quantitative lecture hours:**

**Introduction:** Engineering materials, their classification, manufacturability and applications **(5 Hours)**

**PMT for Structural Applications (Metals & Alloys):** Casting (sand casting, permanent mold casting, investment casting), forming (Rolling, Forging, Extrusion, Sheet metal operations), machining (drilling, lathe, milling), joining of metals (welding, riveting, nut-bolt assembly etc) **(8 Hours)**

**PMT for Light weight applications (Polymers):** Classifications of plastics, blow molding, injection molding, extrusion, compression molding, vacuum forming, Additive manufacturing (3D printing and its types), laser machining, joining methods for plastics. **(6 Hours)**

**PMT for High Temperature Applications (Glasses and Ceramics):** Powder manufacturing, mixing and blending, compacting, Sintering (with SPS), hot iso-static pressing, glass blowing **(4 Hours)**

**PMT for High Performance Applications (Composites):** Compression molding of composites **(3 Hours)**

**Laboratory Modules:**

S.No.	Equipment	Experiment	Turns
1.	Lathe	Turning and grooving operations on mild steel rod	1
2.	Milling, shaper machine	Facing operations on mild steel block	1
3.	Compression molding	To demonstrate manufacturing of composites	1
4.	Fitting	To make fillet, chamfer, drilling and tapping on mild steel flat sample	1
5.	Welding	To perform arc welding, gas welding and spot welding and FSW	1
6.	Sheet metal	To perform shearing, bending and riveting of galvanised iron sheet	1
7.	Foundry	To sand cast an aluminium rod	1
8.	CNC lathe and milling	To machine objects using CNC machining processes	1
9.	Laser machining	To demonstrate laser machining of an acrylic sheet	1
10.	Glass blowing	To demonstrate blowing of glass	1
11.	Additive manufacturing	To create objects using 3D printing processes	1
12.	Injection molding	To understand the plastic injection molding process	1
			12

**3. Text books:**

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

**4. References:**

NA

**5. Similarity with the existing courses:**

**(Similarity content is declared as per the number of lecture hours on similar topics)**

S. No.		Course Code	Similarity Content	Approx. % of Content
1.		IC141	Entire	100%

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

The course code IC141 (2-0-3-4) has been discontinued. The same course with minor additions/ modifications is being proposed with the name PMT (ME212) which will be a ME core course having the credit structure 2-0-3-3.