



MANUFACTURING PROCESSES - CASTING AND JOINING

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TYPE OF COURSE : New | Core | UG

COURSE DURATION : 4 Weeks (18 Jan' 21 - 12 Feb' 21)

EXAM DATE : 21 Mar 2021

PRE-REQUISITES : None

INTENDED AUDIENCE : UG students; practicing engineers

INDUSTRIES APPLICABLE TO : Machine Tool industries; Automobile manufacturing industries; Foundry industries.

COURSE OUTLINE :

This course is intended to introduce the characteristic features of casting and welding processes. Process characteristics, analysis, and design criteria of various casting and welding processes will be discussed in detail with examples and video clips from industries. Typical numerical examples will be discussed to help the students understand the theory in a better way. The course is designed for undergraduate engineering students as a part of the core course on Manufacturing Technology as well as for practicing engineers.

ABOUT INSTRUCTOR :

The Instructor has completed his Ph.D. in Mechanical Engineering from Moscow, Russia in 1985 followed by post-doctoral at the same university till 1986. From 1986 he is involved in teaching and research in the Mechanical Engineering Department of Indian Institute of Technology Kanpur. His areas of specialization are conventional and non-conventional machining, automatic control, hydraulic control, machine tools and manufacturing automation.

COURSE PLAN :

- Week 1:** Casting: Introduction; Classification of casting processes; Advantages and drawbacks; Historical background; Foundry practice on video
- Week 2:** Solidification of pure metal and alloy; Solidification time: Chvorinovs rule; Categories of metal casting processes; Steps in sand casting
- Week 3:** Joining Processes: Preamble, classification of joining processes; Welding: advantages and limitations; Joints in welding; Fusion welding processes
- Week 4:** Ultrasonic welding: process characteristics and applications; Electron beam welding; Laser beam welding; Plasma arc welding; Arc welding