



**MECHANICAL
ENGINEERING**

WELDABILITY OF METALS: MECHANISMS- WELD DEFECTS & PREVENTION



PROF. D.K. DWIVEDI

Dept. of Mechanical and Industrial Engineering
IIT Roorkee

TYPE OF COURSE : New | Elective | PG
INTENDED AUDIENCE : UG and PG Students, Research Scholar & Practicing Engineers
COURSE DURATION : 8 weeks (25 Feb'19 - 19 Apr'19)
EXAM DATE : 27 April 2019

INDUSTRIES APPLICABLE TO : Manufacturing industry

COURSE OUTLINE :

The course content is designed to have systematic and comprehensive understanding on various aspects related with weldability of various metal systems of commercial importance. It is proposed to include weldability, factors affecting weldability of metals, weldability of plain carbon steel, alloy steel, and stainless steels. Presentations will be supported with case studies for effective communication of concepts and procedures. Case studies will be taken up regarding dis-continuities in metal systems like ferrous and non-ferrous metals.

ABOUT INSTRUCTOR :

D K Dwivedi obtained BE (Mechanical Engineering), in 1993 from GEC Rewa, ME (welding engineering) from Univ. of Roorkee in 1997 and PhD in Met. Engineering from MNIT, Jaipur in 2003. He has about 9 years teaching experience at NIT Hamirpur and 14 years at IIT Roorkee in subjects related with manufacturing at UG level and welding engineering related subjects at PG level. He has undertaken work of failure investigation valves, penstocks, bridges for many private and public sector industries especially in hydropower sector.

COURSE PLAN :

- Week 01** : Understanding Weldability: Introduction I, II, Metal Properties & Weldability I, II, Weldability of Work Hardenable Metals
- Week 02** : Weldability of Work Hardenable & Precipitation Strengthened Metals, Weldability of Precipitation Strengthened Metals, Weldability of Metals Strengthened by Grain Refinement, dispersion Hardening and Transformation Hardening, Weldability of Transformation Hardening Metals, Weldability of Metals: Combination of Strengthening Mechanisms
- Week 03** : Weldability Consideration, Weldability of Carbon and Alloy Steel – I, II, III, Weldability of Low Carbon Steel and Mild Steel
- Week 04** : Weldability of Medium Carbon Steel and High Carbon Steel, Weldability of Carbon and Welding Processes- I, II, III, Weldability of Carbon Steel and Radiation Welding and Thermal Cutting
- Week 05** : Weldability of High Strength Low Alloy Steels, Weldability of Q & T Steels- I, II, III, IV
- Week 06** : Weldability of HTLA Steel- I, II, Weldability of Cr-Mo steel I, II, III
- Week 07** : Weldability of Pre-Coated Steel- I, II, Weldability of Stainless Steel- I, II, Weldability of Martensitic Stainless Steel I
- Week 08** : Weldability of Martensitic Stainless Steel- II, Weldability of Ferritic Stainless Steel, Weldability of Austenitic Stainless Steel -I, II, Weldability of PH Stainless Steel