

## **HONOUR ELECTIVE**

### **PPD5D001                      ADVANCED CASTING & WELDING**

#### **MODULE- I (12 hours)**

MELTING AND POURING: Principles of melting practice-fluxing- Degasification and inoculation- types of furnaces- Crucibles, Cupola, Oil fired furnaces – Electric arc and induction furnaces –Melting practice of cast iron, SG iron, steel, aluminium and copper alloys.

CASTING DESIGN: Solidification of pure metals and alloys-shrinkage in cast metals-design of sprue, runner, gate and risers-problems in design and manufacture of thin and unequal sections designing for directional solidification, minimum distortion and for overall economy - design problems of L, T, V, X and Y junctions.

#### **Module II (08 hours)**

WELD DESIGN AND WELDING METALLURGY: Design of welded components-symbolic representation of welds on drawings- welding classes-residual stresses in welds-weld distortions-design consideration-strength consideration of welded joints-analysis of statistically loaded welded joints-welded structures subjected to fatigue loads.

#### **MODULE III (08 hours)**

SPECIAL CASTING AND WELDING PROCESSES: Evaporative pattern casting-ceramic mould casting –electro magnetic moulding-squeeze casting –investment casting-shell moulding- PAW-electron beam welding-laser beam welding- friction welding-ultrasonic welding – diffusion welding-high velocity oxy fuel processes

#### **MODULE IV (08 hours)**

QUALITY CONTROL AND AUTOMATION : Cleaning and inspection of castings – Casting defect and remedies – foundry automations-moulding machines-Automation of sand plant, moulding and fettling sections of foundry-Dust and fume control-Welding defects – causes and remedies – Non Destructive tests – arc welding using robots-weld positioner and manipulators –weld seam tracking-vision system-arc sensing welding

#### **TEXT BOOKS**

1. PARMAR, R.S., Welding Processes and Technology, Khanna Publishers, 1997.
2. JAIN, P.L., Principles of Foundry Technology, Tata McGraw Hill, 2003.

#### **REFERENCES**

1. A.S.M Hand book, vol 15, casting, ASM international, 1988
2. KLAS WEMAN, welding processes hand book, CRC press, 2003
3. CARY and HOWARD,B., Modern Welding Technology, Prentice-Hall, 1989.
4. HEINE, R.W., LOPER.L.R., and ROSENTHAL,C, Principles of Metal Casting, TMH
5. MINKOFF,J., solidification and cast structure,wiley.1986
6. DAVIES, A.C., Welding (10th Edition), Cambridge University Press, 1996.