Metal Joining Processes

(MT410701)

Program: B.Tech.	Branch: Metallurgical Engineering
Subject: Metal Joining Processes	Semester: VII
Subject Code: MT410701	

Teaching Scheme				Examination Scheme			
Class Room Contact Hrs	Practical	Activity Based Learning	Credits	University Examination	Mid Sem Examination	Continuous Evaluation	Total Marks
3	0	0	3	60	25	15	100

2. CONTENTS

Unit-1

Introduction: History, Importance of metal joining processes, Classification of metal joining processes - Classification based on application of filler material & without filler material, source of energy, fusion and pressure welding processes, joint design and edge preparation, physics of arc, characteristic of arc. Welding positions

Soldering and brazing: Difference between both the processes, consumables used, methods of brazing, fluxes used, and their purpose and flux residue treatment, comparison with welding process

Unit-II

Metal transfer, forces acting on the arc, different modes of metal transfer, heat flow in metals, prediction of heating and cooling rates. Manual metal arc(MMA) or shielded metal arc (SMA) welding, Submerged arc welding (SAW), Gas metal arc welding (GMAW) or MIG/MAG welding, TIG welding, Plasma Arc welding: Principle, Equipment requirement, electrodes for welding of structural steels, electrode coating classification, process description, shielding gases, advantages and disadvantages, application of processes.

Unit – III

Resistance welding: General principle of heat generation in resistance welding, application of resistance welding processes. Process details and working principle of spot, seam, and

projection welding, electrode materials, shapes of electrodes, electrode cooling, selection of welding currents, voltages.

Unit –IV

Other welding processes like Electron beam welding, Laser beam welding, Friction welding, Friction Stir Welding explosive welding, ultrasonic welding, diffusion welding, Electroslag and Electro gas welding etc.

Weldability and defects: introduction, Weldability test, Weldability of ferrous and non ferrous materials, joining metallurgy of the dissimilar metals, clad metals etc., Welding defects.

3. TEXT BOOK(S)

1. The Metallurgy of Welding, Brazing and Soldering – J.F. Lancaster, George Alien and Unwin Ltd., London.
2. Introduction to Welding and Brazing – D.R. Milner & R.L. Apps. Pergamon Press, London.

4. REFERENCE BOOKS

1. Manufacturing Technology (Foundry, Forming and Welding)-P.N.Rao, Tata Mc- Graw Hill.
2. The Physics of Welding- L.F.Lancaster, Pergamon Press.
3. Principles of Welding- R.S. Parmar.
4. Welding Technology- O.P. Khanna, Khanna Pub.
5. ASM Handbook Vol – 6
6. AWS (American Welding Society)