

ADVANCE WELDING TECHNOLOGY
Semester II (Production Engineering) SUB CODE: MEPR202
Teaching Scheme (Credits and Hours)

Teaching Scheme				Total Credit	Evaluation Scheme					Total Marks
L	T	P	Total		THEORY		IE	CIA	PR. / VIVO	
Hrs	Hrs	Hrs	Hrs		Hrs	Marks	Marks	Marks	Marks	
3	0	2	5	4	3	70	30	20	30	150

LEARNING OBJECTIVES:

The objective of this course is

- To learn various concepts related to welding, its application
- To have practical purview of various welding process, welding standards, advanced welding process.

LESSON PLANNING

SR.NO	CHAPTER NO	DATE/WEEK	%WEIGTAGE
1	1,2	1 st 2 nd 3 rd	20
2	3,4	4 th 5 th 6 th	20
3	5	7 th 8 th 9 th	20
4	6	10 th 11 th 12 th	20
5	7,8	13 th 14 th 15 th	20

Total hours (Theory): 45, Total hours (Practical): 30, Total hours: 75

DETAILED SYLLABUS

Chap . No.	Topic
1	Physics of welding arc: characteristics of arc and mode of metal transfer, welding fluxes and coatings - type and classification; electrode codes and their critical evaluation
2	Welding machine characteristics - conventional and pulsed power sources, inverter type, power sources for resistance welding.
3	Weldability: weldability of cast iron, plain carbon and low alloy steels, stainless steels
4	Welding machine characteristics - conventional and pulsed power sources, Inverter type, power sources for resistance welding, weldability - weldability of cast iron, plain carbon and low alloy steels, stainless steels
5	Determiation of preheat temperature: use of Schaeffler's diagram, weldability tests, heat flow in welding - significance, theory of heat flow, cooling rate determination, selection of welding parameters based on heat flow analysis
6	Residual stress and distortion - theory of residual stresses and distortion calculation, welding codes, joint design, analysis of fracture and fatigue of welded joints - fracture, energy consideration, fracture toughness testing and its application to welded joints.

7	Automated welding systems: microprocessor control of arc welding and resistance welding, quality assurance in welding, welding fumes and their effect on the environment
8	Modern welding processes like: EBW, LBW, Under water Welding, Ultrasonic welding etc. welding of ceramics, plastics and composites

LIST OF PRACTICALS

Sr. No.	Practical Content
1	EFFECT OF VARIOUS WELDING PARAMETERS ON BEAD CHARACTERISTICS IN MMAW PROCESS
2	EFFECT OF VARIOUS WELDING PARAMETERS ON BEAD CHARACTERISTICS IN ARC WELDING.
3	DETERMINATION OF PREHEAT TEMPERATURE USING SCHAEFFLER'S DIAGRAM.
4	SELECTION OF WELDING PARAMETERS BASED ON HEAT FLOW ANALYSIS.
5	STUDY OF JOINT DESIGN BASED ON WELDABILITY
6	SELECTION OF WELDING PARAMETERS BASED ON HEAT FLOW ANALYSIS
7	ANALYSIS OF DISTORTION IN WELDED JOINT BASED ON RESIDUAL STRESSES
8	WELDABILITY ANALYSIS OF CAST IRON
9	WELDABILITY ANALYSIS OF PLAIN CARBON AND LOW ALLOY STEELS
10	WELDABILITY ANALYSIS OF STAINLESS STEELS

INSTRUCTIONAL METHOD AND PEDAGOGY (Continuous Internal Assessment (CIA) Scheme)

- At the start of course, the course delivery pattern, prerequisite of the subject will be discussed
- Lecture may be conducted with the aid of multi-media projector, black board, OHP etc. & equal weightage should be given to all units while conducting teaching & examination.
- Attendance is compulsory in lectures and Tutorial.
- Viva Voce will be conducted at the end of the semester of 30 Marks.
- One internal exam of 30 marks is conducted as a part of Mid semester evaluation.

STUDENTS LEARNING OUTCOMES:

At the end of the course

- The students will gain an experience in the implementation of welding techniques concepts which are applied in the field of production.

Reference Books:

1. Dr.R.S.Parmar “Welding processes and technology” Khanna Publishers
2. Welding technology, R. Bittle, TMH
3. American society for metals, metal hand book vol.6
4. Welding process technology-Houldcraft PT-cambridge univ.press