

DEPARTMENT OF METALLURGICAL AND MATERIALS ENGINEERING

NATIONAL INSTITUTE OF TECHNOLOGY, TIRUCHIRAPPALLI

COURSE OUTLINE			
Course Title and Code	MT606 Welding Processes II		
Programme	M. Tech.	Semester	II
Specialization	Welding Engineering	No. of Credits	3
Department	MME	Faculty	Dr S. Muthukumaran
Pre-requisites Course Code	NIL		
Class Committee Chairman	Dr. S. Kumaran		
Other Course Teacher(s)/Tutor(s) E-mail	--	Telephone No.	9442069381 Intercom : 3468
Course Type	Core course		
COURSE OVERVIEW			
<p>Friction welding: Concepts, types and applications. Friction stir welding: Metal flow phenomena, tools, process variables and applications and induction pressure welding: Process characteristics and applications</p> <p>Explosive, diffusion and ultrasonic welding, principles of operation, process characteristics and applications</p> <p>EBW: Concepts, types and applications. LBW: Physics of lasers, types of lasers, operation of laser welding setup, advantages and limitations, applications</p> <p>Soldering: Techniques of soldering, solders, phase diagram, composition, applications Brazing: Wetting and spreading characteristics, surface tension and contact angle concepts, brazing fillers, role of flux and characteristics, atmospheres for brazing, adhesive bonding</p> <p>Cladding, Surfacing and Cutting</p>			
COURSE OBJECTIVES			
<ul style="list-style-type: none"> • Understand the various manual and automated welding processes available. • Gain knowledge of the concepts, operating procedures, applications, advantages and limitations of various welding processes 			
COURSE OUTCOMES (CO)			
Course Outcomes	Aligned Programme Outcomes (PO)		
<ul style="list-style-type: none"> • Explain the principle of friction welding and its variants. 	1 & 3		

<ul style="list-style-type: none"> • Explain the process, advantages, limitations and practical applications of explosive welding, electron beam welding and laser welding. • Explain the concepts, various operating procedures and applications of soldering and brazing. • Explain the concepts and applications of various types of cladding, surfacing and cutting. 	<p style="text-align: center;">1 & 3</p> <p style="text-align: center;">1 & 3</p> <p style="text-align: center;">1,3 & 10</p>
---	--

COURSE TEACHING AND LEARNING ACTIVITIES

S.No.	Week	Topic	Mode of Delivery
1	1	Introdcution to solid state welding	Chalk and Board
2	2	Friction welding: Concepts, types and applications	Chalk and Board
3	3	Friction stir welding: Metal flow phenomena, tools, process variables and applications induction pressure welding	Chalk and Board and Power point
4	4	Explosive principles of operation, process characteristics and applications	Chalk and Board
5	5	Diffusion and ultrasonic welding, principles of operation, process characteristics and applications	Power Point, Chalk and Board
6	6	EBW: Concepts, types and applications.	Chalk and Board
7	7	LBW: Physics of lasers, types of lasers, operation of laser welding setup, advantages and limitations, applications	Power Point, Chalk and Board
8	8	Soldering: Techniques of soldering, solders, phase diagram, composition, applications	Power Point, Chalk and Board
9	9	Brazing: Wetting and spreading characteristics, surface tension and contact angle concepts, brazing fillers, role of flux and characteristics, atmospheres for brazing,	Power Point, Chalk and Board
10	10	Advancements in brazing and applications	Power Point, Chalk and Board
11	11	Adhesive bonding and applications	Power Point, Chalk and Board

12	12	Cladding types and applications	Power Point, Chalk and Board
13	13	Surfacing and emerging trends	Power Point, Chalk and Board
14	14	Types of cutting and industrial applications	Power Point, Chalk and Board

COURSE ASSESSMENT METHODS

S.No.	Mode of Assessment	Week/Date	Duration (min.)	% Weightage
1	Cycle Test-1	February Second Week	60	20
2	Cycle Test -2	March Second week	60	20
3	Cycle Test-3	April First Week	60	20
4	Seminar/ Assingment	April First Week		10
5	End Semester	April Second/Third Week	180	50

Note: Best two cycle tests mark scored by the student will be considered for calculating internal marks

ESSENTIAL READINGS : Textbooks, reference books Website addresses, journals, etc

1. Schwartz M., 'Materials and Applications - Metal Joining Manual', McGraw-Hill, 1979
2. Nadkarni S.V., 'Modern Arc Welding Technology', Oxford IBH Publishers, 1996
3. Christopher Davis, 'Laser Welding - A Practical Guide', Jaico Publishing House, 1994
4. Parmar R S, Welding Engineering and Technology, Khanna Publishers, 1997
5. Mishra. R.S and Mahoney. M.W, Friction Stir Welding and Processing, ASM,2007

COURSE EXIT SURVEY (mention the ways in which the feedback about the course is assessed and indicate the attainment also)

1. Whether prescribed syllabus is completed?
2. Whether the teacher clarifies the doubts of the students?
3. Whether the teacher is impartial in assessing the students?
4. Whether sufficient study materials are given to the students?

COURSE POLICY (including plagiarism, academic honesty, attendance, etc.)

Minimum 75 % Attendance is mandatory

Grading is as per Institute norms.

ADDITIONAL COURSE INFORMATION

Industrial visits will be arranged relevant to the subject

FOR SENATE'S CONSIDERATION

Course Faculty

S. Mune

CC-Chairperson

[Signature]

HOD

[Signature]