## DEPARTMENT OF METALLURGICAL AND MATERIALS ENGINEERING

### NATIONAL INSTITUTE OF TECHNOLOGY, TIRUCHIRAPPALLI

<b>COURSE OUTLINE</b>			
Course Title and Code	MT606 Welding Pr	rocesses II	
Programme	M. Tech.	Semester	II
Specialization	Welding	No. of Credits	3
	Engineering		
Department	MME	Faculty	Dr S. Muthukumaran
Pre-requisites	NIL		
Course Code			
Class Committee	Dr. S. Kumaran		
Chairman			
Other Course		Telephone No.	9442069381
Teacher(s)/Tutor(s)			Intercom : 3468
E-mail			
Course Type	Core course		

#### **COURSE OVERVIEW**

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

Explosive, diffusion and ultrasonic welding, principles of operation, process characteristics and applications

EBW: Concepts, types and applications. LBW: Physics of lasers, types of lasers, operation of laser welding setup, advantages and limitations, applications

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

Cladding, Surfacing and Cutting

#### **COURSE OBJECTIVES**

- 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)	
	Aligned Programme
Course Outcomes	<b>Outcomes (PO)</b>
• Explain the principle of friction welding and its	1 & 3
variants.	

• Explain the process, advantages, limitations and practical applications of explosive welding, electron beam welding and laser welding.	1 & 3
<ul> <li>Explain the concepts, various operating procedures and applications of soldering and brazing</li> </ul>	1 & 3
<ul> <li>Explain the concepts and applications of various types of cladding, surfacing and cutting.</li> </ul>	1,3 & 10

# COURSE TEACHING AND LEARNING ACTIVITIES

S.No.	Week	Торіс	Mode of Delivery
		*	
1	1	Introduction 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	Claddin	g types and applicat	ions	Power Point, Chalk and Board
13	13	Surfacir	ng and emerging tren	nds	Power Point, Chalk and Board
14	14	Types of cutting and industrial appleiations		Power Point, Chalk and Board	
COUR	SE ASS	ESSMEN	TMETHODS		
S.No.	M Ass	lode of sessment	Week/Date	Duration (min.)	% Weightage
1	Cycle	Test-1	Feburary	60	20
2	Cycle	Test -2	March Second	60	20
3	Cycle	Test-3	April Firs Week	60	20
4	Semin Assing	ar/ gment	April First Week		10
5	End Se	emester	April Second/Third	180	50
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