Engineering Program

Specialization Production and Computer Aided Manufacturing Technology
Course Number **020202211**
Course Title Welding Technology
Credit Hours (2)
Theoretical Hours (2)
Practical Hours (0)

Brief Course Description:

This course introduces the student to the different systems of welding to acquire the necessary skills to be a welding supervisor. It also familiarizes the student with the most important procedures for welding inspection.

Course Objectives:

At the end of this course student will be able to:
1. Be familiar with Welding Technology fundamentals
2. Distinguish between different welding techniques (principle and procedure, equipment and tools, and advantages and disadvantages) and hence to select welding technology suitable for application
3. Adjust welding parameters (voltage, flow …)
4. Performing various welding processes (arc welding, Tungsten-Inert Gas (TIG) welding, Metal-Active Gas (MAG) welding and spot welding)
5. Inspect welding defects.
6. Apply the safety precautions during the execution of welding processes
7. Make projects by welding and assembly of specific parts

Detailed Course Description:

Number	Title	Content	Time
	Welding principles and safety precautions	Different welding techniques Welding methods (manual, mechanical, automated)	
	Types of Welding Processes		
	Fusion Welding	Arc welding (AW): General Technology Consumable Electrodes Processes Nonconsumable Electrodes Processes Analysis Electrical arc Electro-magnetic phenomenon Welding factors and parameters Tungsten-Inert Gas (TIG) welding Metal-Active Gas (MAG) welding	
		Oxyfuel gas welding (OFW): Oxyacetylene Welding Oxyfuel Welding Alternative Gases Other Fusion-Welding Processes	
	Solid-State Welding	Solid-State Welding Considerations Solid State-Welding Processes: Diffusion welding (DFW) Friction welding (FRW) Ultrasonic Welding (USW)	
	Resistance-Welding	Power Source in Resistance Welding Resistance-Welding Processes	
	Inspection of Weld defects	Weldability Weld Quality and welding defects:	

		Incomplete penetration Porosity and cracks Inspection of surface defects Inspection of internal defects Welding testing:	
	Design Considerations in Welding		
	The commercial importance of welding		
	Safety considerations		
	Automation in Welding	Machine welding, robotic	
	The Weld Joint	Types of Joints Types of Welds	
		Physics of Welding: Power Density Heat Balance in Fusion Welding,	
		Features of a Fusion-Welded Joint	

Evaluation Strategies:

Evaluation		**Percentage**	**Date**
Exams	Midterm	40%	
	Final Exam	50%	
Projects and Laboratory Assignments		10%	

Teaching Methodology:

- Lecturing

Text Books & References:

Text Books:

- Groover, Fundamentals of Modern Manufacturing, 4th Ed
- Kalpakjian, Manufacturing Engineering and Technology, 6th Edition in Si Units

References:

- Welding skills", Miller, R. T.
- "Welding skills: workbook to accompany Miller", Gosse.