

4337 - WELDING IN SHIP CONSTRUCTION - II										
Teaching Schedule Per Week			Progressive Assessment		Examination Schedule (Marks)					
Lectures	Practical	Credits			Theory		Practical Ex.		Total	
3	2	5	25	25	3 Hrs	100	-	-	150	
Pre-requisite		Source	Semester		Theory	Test	Total	TW	PR	Gr Total
4332		SHB			75	25	100	25	-	125

Rationale: -Here we lay more stress on description of equipment used for welding, special applications and types of welding processes, estimation and costing of welding. Due importance has been given to the health and safety of welders.

COURSE CONTENTS		Hrs	Mks
1. INTRODUCTION		4	8
Special welding processes- TIG Welding (Equipment and details), MIG Welding (Equipment and details), Submerged Arc Welding (Equipment and details).			
2. WELDING PROCEDURES AND TECHNIQUES		4	10
Different welding procedures- Preheat treatment and post heat treatments of welds, weld tacking, Jigs and fixtures. Welders procedure qualification and welders performance qualification.			
3. WELDING OF VARIOUS METALS		10	17
Mild steel, High carbon steel, Low alloy steel, Stainless steel, High tensile steel, Cast Iron, Aluminium and Copper. Welding of dissimilar metals – Concept and problems faced in dissimilar metals.			

4. WELDMENT EVALUATION	6	18
Weld reliability, welding code, weld testing, destructive testing- tensile test, bend test, impact test, hardness test. Non- destructive testing- Visual Inspection, leak test, X-ray & radiographic test. Magnetic Particle Inspection. Liquid (DYE) Penetrant Test. Fluorescent dye penetrant test. Ultrasonic test.		
5. WELD DESIGN	6	12
Different welding positions, types of welds, welding symbols, weld joint design and simple problems connected with it, classification society - requirements for welding.		
6. WELDING ESTIMATION AND COSTING	5	10
Classification of costs, factors affecting welding costs, costing procedure for gas and arc welding, Simple problems on the above.		
7. SPECIAL APPLICATIONS OF WELDING	2	5
Slot welding, use of bimetallic strips, single sided welding and under water welding.		
8. MAINTENANCE WELDING	8	12
Reconditioning of machine parts, cladding of shafts, metal spraying, hard-facing.		
9. SAFETY IN WELDING	3	8
Health and safety of the worker. Safe welding practices		
Total	48	100

PRACTICALS

JOB NO 1: Stringer bead in overhead position

JOB NO 2: Butt joint involving 1G, 2G, 3G and 4G position and pipe welding

JOB NO 3: Demonstration of one job in- TIG Welding, MIG Welding, SAW Welding, Flux cored arc welding, Metal spraying

REFERENCE BOOKS

1. Welding Technology by O. P. Khanna.

2. Modern welding practice by J. A. Oates.

3. Welding principles & practices by Raymond Sacks.

4. Modern Arc Welding by S. V. Nadkarni

5. Welding handbook by American Welding Society (AWS)

6. Welding Engineers Hand-Book by J. A. Oates.

