C. U. SHAH UNIVERSITY
Wadhwan City

FACULTY OF: - Technology & Engineering
DEPARTMENT OF: - Mechanical Engineering
SEMESTER: - VII
CODE: - 4TE07AWT1
NAME – Advanced Welding Technology

Teaching & Evaluation Scheme:-

Subject Code	Name of the Subject	Teaching Scheme (Hours)				Credits	Evaluation Scheme							
							Theory				Practical (Marks)			Total
		Th	Tu	Pr	Total		Sessional Exam		University Exam		Internal		University	
							Marks	Hrs	Marks	Hrs	Pr/Viva	TW	Pr	
4TE07AWT1	Advanced Welding Technology	3	0	2	5	4	30	1.5	70	3	---	20	30	**150**

Objectives:-

1. To give the complete knowledge about manufacturing, this includes not only design but also includes the different processes how to join the materials which are cost effective.
2. This subject definitely will enhance the manufacturing concepts, those are happening in the industries now a day.

Prerequisites: - Basic Knowledge of Welding Process and Equipment, Material Science.

Course outline:-

Sr. No.	Course Contents	Hours
1	**Introduction**: Classification & overview of welding & Allied joining processes, Advance welding processes, such as Laser Beam Welding, Electron Beam Welding, Ultrasonic Welding etc., classification of electrodes, Coding of electrodes, Electrode efficiency.	05
2	**Physical & metallurgical aspects of welding:** Emission and Ionization of electric arc, arc structure, arc characteristics & Power, arc stability, arc blow, Thermal aspects of welding. Metallurgical effects of welding, weld metal solidification, Iron-carbon diagram, Time Temperature Transformation Curve, Continuous Cooling Transformation Curve.	10
3	**Weld joint design** : Weld design for static loading-arc welded joints-stress calculation for welds-design for different types of loading-weld design for fatigue loading-fatigue strength of weld joint life of joint under fatigue.	06
4	**Weld symbols** : Basic symbols, Need for representing weld.	03

5	**Estimation of welding cost** : Factors, costing procedures, cost components.	**02**
6	**Welding defects :** Cracks, distribution, inclusions, porosity, blow holes, poor fusion etc., causes and remedies	**03**
7	**Weld inspection & testing :** **Destructive test**: Tensile, bend, impact, nickbreak, hardness, etching etc. **Nondestructive test**: Visual inspection, leak test, stethoscopic test, X -ray and gamma ray radiography, magnetic particle test, liquid dye penetration, ultrasonic etc.	**08**
8	**Residual welding stresses :** Concept, types of residual stresses, control of residual stresses and measurement of residual stresses, causes of residual stress-measurement and calculation of residual stresses -residual stresses in different joints-methods of relieve stress-distortion types-distortion measurement-distortion control & correction of distorted weld metals.	**04**
9	**Safety in welding** : Personal protective equipments, physical hazards, radiation, neat, toxic hazards, noise, fire.	**02**
10	**Automation in Welding:** Introduction, Automatic welding, welding mechanization, flexible automated welding, Robotic welding,	**02**

Learning Outcomes: Students will be able to…

1. Apply the fundamentals of welding processes.
2. Apply the principles of metallurgy during the welding process.
3. Read and interpret basic blueprints and welding symbols to fabricate components.
4. Follow industry safety practices.
5. Reach their full potential in the welding field
6. Explain the physical aspect of different metals

Text Books:

1. Welding Technology by **Little R.L.,** Tata McGraw Hill, New Delhi, 1994.
2. Welding Processes and Technology by **Dr. R. S. Parmar**, Khanna Publishers.
3. Welding Engineering and Technology by **Dr. R. S. Parmar**, Khanna Publishers.
4. Manufacturing Technology by **Rao P. N**., Tata McGraw Hill , 1990.
5. The Science and Practice of Welding by **Davies A.C**, Cambridge University, New York, 1989.

References Books:

1. Health and Safety in Welding and Allied Processes by **Balchin N.C** , Jaico Publishing House, Mumbai, 1989.
2. Fundamental of Metal Casting Technology by **Mukharjee P. C** , Tata McGraw Hill, 1970.
3. Welding Principles and Applications by **Jeffus Larry** , Delmar Publishers, 1999.
4. Manufacturing Science by **Ghosh A. and Mallik A.K.,** East West Press, 1985