

**DEPARTMENT OF MECHANICAL ENGINEERING**

**ACADEMIC YEAR 2023-24 (EVEN)**

Date : 11.03.2024

**CIRCULAR**

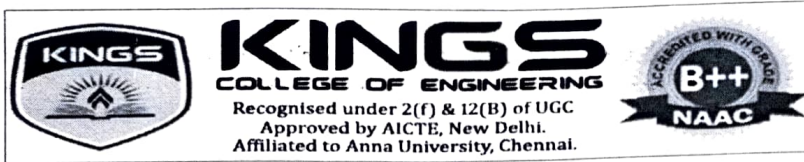
As a part of skill enhancement of student community, the Department of Mechanical Engineering has planned to conduct the "Certificate Course" (**Advanced Welding Technologies**) For second year students from 13.03.2024 at Mechanical ICT Class Room (207). Interested second year students are requested to register their name to Mr.R.Rajadurai, AP/MECH and Mr.S.Nelsonraja AP/MECH on or before 12.03.2024.

*S.R.*  
11/3/24  
*S.Nelsonraja*  
11/3/24  
**Coordinators**

(Mr.R.Rajadurai, AP/MECH &  
Mr. S.Nelsonraja , AP/MECH)

*T. R. Ramesh*  
11/3/24  
**HOD/MECH**  
**H.O.D.**

DEPARTMENT OF MECHANICAL ENGINEERING  
KINGS COLLEGE OF ENGINEERING  
PUNALKULAM



## Department of Mechanical Engineering

Academic year 2023-24 EVEN /Batch:2022-26

### **CERTIFICATE COURSE SYLLABUS (ADVANCED WELDING TECHNOLOGIES)**

#### **Course Objectives:**

- To learn various concepts related to welding, its application.
- To have practical purview of various welding process, welding standards, advanced welding process.
- Graduates will understand the importance of professional behavior and life-long learning, and will meet the challenges of continued technological growth within the field.

#### **UNIT I**

##### **INTRODUCTION TO WELDING AND JOINING PROCESSES:**

Introduction to consolidation processes, Classification of welding processes, some common concerns, types of fusion welds and types of joints, Design considerations, Heat effects, Weld ability and join ability. Welding terms and definitions, welding positions, elements of and construction of welding symbols.

#### **UNIT II**

##### **WELDING METALLURGY:**

Fundamentals of physical metallurgy: Need, phase diagrams: Fe-C, Al-Cu, Cu-Zn system, phase transformations in Fe-C system, TTT diagram, CCT diagram, carbon equivalent, Schaffer diagram, relevance of above in welding

#### **UNIT III**

##### **WELD JOINT PREPARATION AND TEMPERATURE CONTROL:**

Checks prior to weld joint preparation, joint preparation checks, preheating and interpass heating, post weld heating, heating processes, post heat treatments, insulation of heated joints.

#### **UNIT IV**

##### **RESISTANCE AND SOLID STATE WELDING PROCESSES:**

Theory of resistance welding: Heating, pressure, current and current control, power supply. Resistance welding processes: Resistance spot welding, resistance seam welding, Projection welding.

#### **UNIT V**

##### **WELDMENT INSPECTION AND TESTING:**

Codes governing welding inspection: Structural welding code; ASME boiler and pressure vessel code, spot examination of welded joints, duties of the inspector, ASTM standards, API standards b. Chemical, Metallurgical, and Mechanical testing of weldments: Comparison of destructive and non-destructive tests, chemical tests, forms of corrosion, testing for corrosion resistance, metallographic tests.

# Kings College of Engineering, Punaikulam

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## REFERENCES:

1. DeGarmo's Materials and processes in Manufacturing
2. Lancaster J F, "Metallurgy of welding", Allen and Unwin Co.
3. K Esterling, "Introduction to Physical Metallurgy"
4. "Welding Handbook", Volumes 1, 2 and 3, 9th edition, American Welding Society

## Course Outcomes:

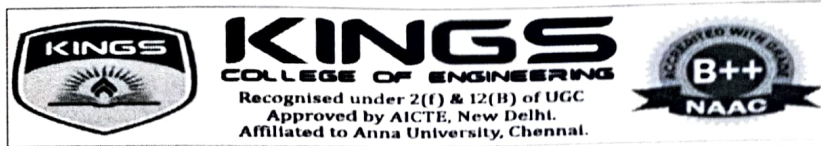
After learning the course the students should be able to:

- Students will understand the theoretical aspects of welding technology in depth.
- Students will be able to intelligently select the appropriate welding process for a particular application.
- Students will be able to describe the basic metallurgy of the melted and heat-affected zone of a metal or alloy.
- Students will be able to identify the cause of welding defects and avoid them.
- Students will be able to choose or adjust welding parameters and techniques to optimize the weldment properties.
- Students will demonstrate their ability to check the weldment quality using various inspection and testing methods.

*[Signature]*  
Course in charge

*T. P. [Signature]*  
HoD/Mechanical 13/13/24

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**DEPARTMENT OF MECHANICAL ENGINEERING**

**ACADEMIC YEAR 2023 - 24 (EVEN SEMESTER)**

**CERTIFICATE COURSE REPORT**

**Year / Sem : II-MECH / 04**

**Course Name: "Advanced Welding Technologies"**

**Venue : Mechanical Smart Class room.**

**Duration : March 2024 - May 2024**

**Objective of the certificate Course:**

- The objectives of a Basic Mechanical Engineering course are designed to provide students with a foundational understanding of fundamental principles and concepts in the field of welding technology.
- To Familiarize the students in significance of broader field of mechanical engineering.
- To know the properties and behaviour of the materials used in different temperature and different types welding.

**Methodology:**

- Action plan of the certificate course is prepared well in advance by the senior faculty and get it approved by Head of the Department.
- Handle the lecture class with multimedia presentations, visual aids, and demonstrations.
- Provide the opportunities to students to work with equipment, instruments, and tools commonly used in mechanical engineering.
- Use different evaluation methods such as quizzes, exams, assignments, and projects.

**Session Details:**

Dr.T.Pushparaj, HOD, Department of Mechanical Engineering delivered the welcome address for the "Certificate Course on **Advanced Welding Technologies**" for second year students. He highlighted the importance of Advanced Welding Technologies; outcome based education and shared his experience with the students.

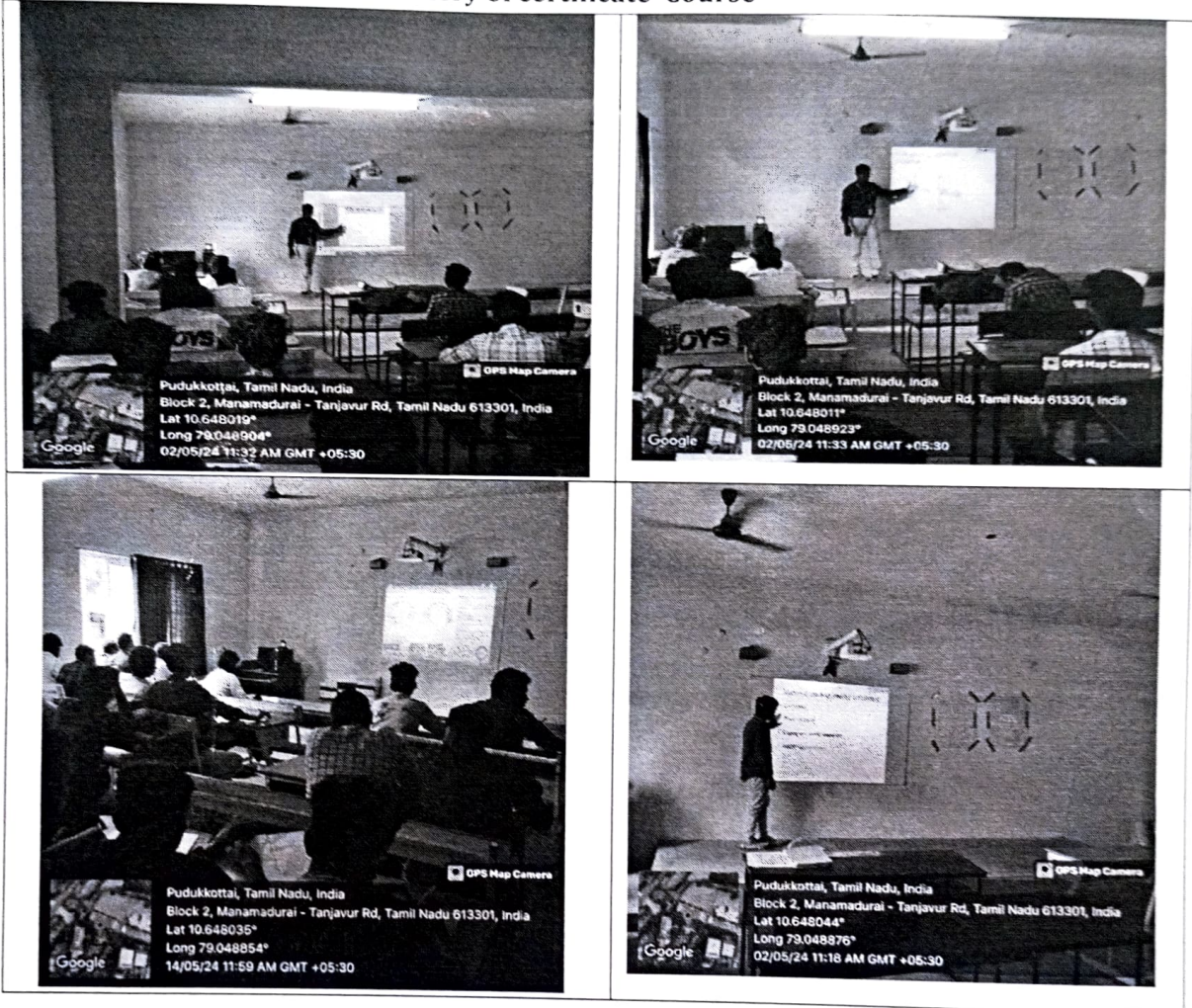
Mr.R.Rajadurai, Assistant Professor, Department of Mechanical Engineering enlightened second year students about the basics of welding technology compare with advanced technologies. He also explained the practical subjects to effectively handle sessions for a basic mechanical engineering course.

Mr.S.Nelsonraja, Assistant Professor, Department of Mechanical Engineering handled an activity based session for second year students on basics of mechanical



engineering and also comprehend foundational concepts. Share additional resources, recommended online materials for students and discuss the practical applications and relevance of the basics being covered.

### Photo Gallery of certificate Course



### Outcome of the certificate Course:

- Students understand the fundamentals of welding and their applications.
- Students are able to find the welding defects and its remedies.
- Gained the knowledge about ethical and professional responsibilities associated with mechanical engineering.

*Signature*  
*Signature*  
**Coordinators**

(Mr.R.Rajadurai, AP/MECH & Mr.S.Nelsonraja, AP/MECH)

*Signature*  
**HOD/Mech**

DEPARTMENT OF MECHANICAL ENGINEERING  
 SINGO'S COLLEGE OF ENGINEERING  
 PUNALKULAM

*Signature*  
 17/6/2024  
**Principal**