



## NATIONAL INSTITUTE OF TECHNOLOGY, TIRUCHIRAPPALLI

### DEPARTMENT OF INSTRUMENTATION AND CONTROL ENGINEERING

COURSE PLAN			
<b>Course Title</b>	<b>Microprocessors and Microcontrollers Laboratory</b>		
<b>Course Code</b>	ICLR15	<b>No. of Credits</b>	2
<b>Session</b>	July 2023		
<b>Department</b>	<b>ICE A &amp; B</b>	<b>Faculty</b>	Dr V. SRIDEVI Dr P A Karthick
<b>Pre-requisites Course Code</b>	-NIL-		
<b>Course Coordinator(s) (if, applicable)</b>	--		
<b>Other Course Teacher(s)/Tutor(s) E-mail</b>	<a href="mailto:sridevi@nitt.edu">sridevi@nitt.edu</a> <a href="mailto:pakarthick@nitt.edu">pakarthick@nitt.edu</a>	<b>Telephone No.</b>	0431 250 3361
<b>Course Type</b>	<input checked="" type="checkbox"/> <b>Core course</b> <input type="checkbox"/> <b>Elective course</b>		
<b>COURSE OVERVIEW</b>			
<p>This lab course exposes students to the field of instrumentation system design using processors. The aim is to teach the students about the design and development of embedded system using ESP32 32-bit dual core processor (XTensa LX6 microprocessor). This laboratory course will provide the practical experience on design and application development with dual processor and developing applications with Arduino IDE.</p>			
<b>COURSE OBJECTIVES</b>			
<ol style="list-style-type: none"><li>1. To develop applications on ESP32 XTensa Processor</li><li>2. To teach the students on programming Arduino IDE to develop application.</li></ol>			
<b>COURSE OUTCOMES (CO)</b>			
<b>Course Outcomes</b>			
<p>After completing this laboratory course, the students will be able to design, fabricate, implement and test their own microcontroller-based systems.</p>			



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Course Outcomes		Aligned Programme Outcomes (PO)
The students are able to, 1. Develop applications code in C language using Arduino Integrated Development Environment (IDE)  2. Design, and develop applications / Networked applications using ESP32.		1,2,3,4  4, 7,10,12
<b>COURSE TEACHING AND LEARNING ACTIVITIES</b>		
S.No.	List of Experiments	Mode of Delivery
1	Familiarization of architecture of the ESP Wireless Microcontroller launch Pad.	Theoretical and practical analysis
2	Configuration and Programming GPIOs	Practical analysis
3	Key pad interfacing	Practical analysis
4	I2C interfacing	Practical analysis
5	SPI interfacing	Practical analysis
6	UART interfacing	Practical analysis
7	ADC interfacing	Practical analysis
8	DAC interfacing	Practical analysis
9	Design the clock circuit to ESP processor and write an application code and program the processor using USB to UART converter and verify the execution	Practical analysis
10	Group Project using different processor boards	Practical analysis
<b>COURSE ASSESSMENT METHODS</b>		
Record mark will be provided based on the laboratory reports (pre and post lab) and on lab performance. After completing each experiment, the Laboratory reports must be submitted on time, in the prescribed format. The hardware connection and the application code and output will be verified.		



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S.No.	Mode of Assessment	Week/Date	Duration	% Weightage
1.	Experimentation and Documentation	August 2 <sup>nd</sup> week to October 2 <sup>nd</sup> week	--	45
2.	Project	4 <sup>th</sup> week of October to last week of November	--	25
3.	End semester Examination	1 <sup>st</sup> week of December, 2023	3 hrs	30

### COURSE POLICY

**MODE OF CORRESPONDENCE (email/ phone etc) -** Email

### COMPENSATION ASSESSMENT POLICY

One Compensation Lab will be conducted for students who missed the lab session, provided they should get prior permission from the faculty by giving valid reason in written form.

### **Grading Policy**

The students will be graded relatively with all the four assessment marks put together with the passing minimum shall be 35% or Class Average/2, whichever is maximum. Those who have obtained F grade should appear for supplementary examination, that will be conducted during the first week of next semester. If the student get F grade in the supplementary examination will have to reappear till the student passes the course.

### ATTENDANCE POLICY (A uniform attendance policy as specified below shall be followed)


It is mandatory to maintain 75% attendance to appear for end semester examination. The students having less than 75% of attendance will not be allowed to write the end semester examination. The student he/she having less than 75% of attendance has to redo the course in the forth coming semester.

### ACADEMIC DISHONESTY & PLAGIARISM


The students have the freedom to do their work meanwhile; they have to obey the institute academic rules. The students will not be involved plagiarizing other student's assignment work, peer's examination answer sheet and any mode of copying other's work.

The students involved in these activities are penalized and their name list will be sent to the office of Dean (Academic) for legal action.

### FOR APPROVAL

  
Course Faculty \_\_\_\_\_  
P. A. Karthick

CC-Chairperson  \_\_\_\_\_

HOD  \_\_\_\_\_

