NATIONAL INSTITUTE OF TECHNOLOGY, TIRUCHIRAPPALLI

DEPARTMENT OF INSTRUMENTATION AND CONTROL ENGINEERING

COURSE PLAN			
Course Title	Microprocessors and Microcontrollers Laboratory		
Course Code	ICLR15	**No. of Credits**	2
Department	ICE A & B	**Faculty**	Dr V. SRIDEVI Dr B VASUKI
Pre-requisites Course Code	-NIL-		
Course Coordinator(s) (if, applicable)	--		
Other Course Teacher(s)/Tutor(s) E-mail	sridevi@nitt.edu bvas@nitt.edu	**Telephone No.**	0431 250 3361
Course Type	☑ Core course ☐ Elective course		

COURSE OVERVIEW

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.

COURSE OBJECTIVES

1. To develop applications on ESP32 XTensa Processor
2. To teach the students on programing Arduino IDE to develop application.

COURSE OUTCOMES (CO)

Course Outcomes

After completing this laboratory course, the students will be able to design, fabricate, implement and test their own microcontroller-based systems.

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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

COURSE TEACHING AND LEARNING ACTIVITIES

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	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
9	Design the clock circuit for ATMEL16 processor and verify the execution	Practical analysis
10	Group Project using different processor boards	Practical analysis

COURSE ASSESSMENT METHODS

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
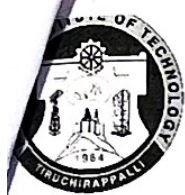
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time, in the prescribed format. For experimentation, the launch pad, peripheral boards, required sensors and actuators and components will be given to the students. The hardware connection and the application code and output will be verified.

S.No.	Mode of Assessment	Week/Date	Duration	% Weightage
1.	Experimentation and Documentation	August 2nd week to October 2nd week	--	40
2.	Written Test	3rd week of October	--	10
3.	Project/Presentation/ Test	4th week of October to last week of November	--	20
4.	End semester Examination	1st week of December, 2022	3 hrs	30

COURSE POLICY

MODE OF CORRESPONDENCE (email/ phone etc) -   Email

COMPENSATION ASSESSMENT POLICY

One Compensation Lab will be conducted on 11th week for students who miss lab session, provided they should get permission from the faculty by giving valid reason in written form

Grading Policy

- Relative grading will be used to decide the clusters (range) of the total marks scored. The passing minimum should be 35% or (Class average/2) whichever is greater.
- All the students are expected to finish all the 10 experiments. Students, who fail to complete at least 6 experiments, have to rejoin the course after a year along with next batch.

Reassessment Examination

- A student may be permitted to withdraw from appearing for the End Semester Examination for valid reasons on production of valid medical certificate and with the approval of Head of the Department. Withdrawal application shall be valid only if it is made before the commencement of the examination.
- For students who miss the final semester assessment, reassessment will be conducted for 30% mark and internal marks remain same.
- Those who failed in the laboratory course should register for reassesment examination which will be conducted for 100% mark (Absolute grading where passing minimum is 35).
- Grades for the students who have withdrawn from writing the end semester exam will be same as the regular assessment grades. For those who are failed or absent and appearing for reassessment, the maximum grade is restricted to 'E'.

- Reassessment exam will be conducted in the first week of the next semester or earlier during the vacation.
- Students who fail in reassessment exam have to register for formative assessment.

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

- At least 75% attendance in each course is mandatory.

- A maximum of 10% shall be allowed under On Duty (OD) category / valid reasons on production of valid medical certificate with the approval of Head of the Department.

- Students with less than 65% of attendance shall be prevented from writing the final assessment and shall be awarded 'V' grade.

ACADEMIC DISHONESTY & PLAGIARISM
- Talking to other students, copying from others during an assessment will be treated as punishable dishonesty.
- Zero mark to be awarded for the offenders. For copying from another student, both students get the same penalty of zero mark.
- The departmental disciplinary committee including the course faculty member, PAC chairperson and the HoD, as members shall verify the facts of the malpractice and award the punishment if the student is found guilty. The report shall be submitted to the Academic office.

The above policy against academic dishonesty shall be applicable for all the programmes.

FOR APPROVAL

Course Faculty _____   CC-Chairperson _____   (HOD _____

Dr V Sridevi   Dr. Geetha C   Dr. K. Dhanalakshmi