The LNMIIT, Jaipur Department of Electronics and Communication Engineering Design Lab 1 (ECE-218)	LNMIIT The LNM Institute of Information Technology

Programme: B. Tech. (ECE)	Course Title: Design Lab 1			Course Code: ECE218
Type of Course: Program Core	Prerequisites: Basic Electronics, Analog Electronics			Total Contact Hours: 30
Year/Semester: 2/Odd	Lecture Hrs/Week: 0	Tutorial Hrs/Week: 0	Practical Hrs/Week: 3	Credits: 2

Learning Objective:

A laboratory is the best place to teach and learn electronics. In this course, students will be given opportunities to think, discuss, and address real-world problems. Learning during a laboratory period is often accomplished through personal discovery, group discussion, and interaction with the instructor. A design based course more inclined towards real-time hardware design and real-time problem solving allows the student to think about how scientific knowledge is constructed and how new knowledge is related to what is already known. It is difficult to learn to do electronics or to learn about electronics, without participating in electronics. The purpose of this document is to offer ways to make the designed based course an enjoyable and successful setting in which students can build a habit to generate scientific inquiry and enhance scientific understanding. The following suggestions, thoughts, and ideas are intended to guide you in this pursuit.

Course outcomes (COs):

On completion of this course, the students will have the ability to:		Bloom's Level
CO-1	**Analyze** a given Analog or digital electronics circuit.	4
CO-2	**Categorize** and **choose** relevant components for **building** an analog circuit.	4, 5, 6
CO-3	**Select** appropriate debugging techniques to resolve issues with analog circuits.	5
CO-4	**Build** a system using Arduino and sensors.	6
CO-5	Adapt to the new challenges, **justify** decision making, teamwork, **generate** new ideas,	5, 6
CO-6	**Model** a new design, **build** a project and boost their creative and inductive thinking.	3, 6

Course Topics	Lab sessions	Hours
UNIT – I Introduction to tools	2	6
1.1 Basics of simulation using Multisim, Proteus, and Easy EDA	1	
1.2 Design a regulated DC power supply	1	
UNIT – II (Simulation and Debugging)	2	6
2.1 Circuit simulation debugging and calibration techniques using simulation software.	1	
2.2 Design of light-controlled switches using BJT and Comparator.	1	

UNIT – III (Arduino)	**2**	**6**
3.1 To get familiar with Arduino board and LED blinking	**1**	
3.2 Introduction to embedded system design using Arduino boards	**1**	
UNIT – III (Arduino and Sensors)	**2**	**6**
4.1 To get familiar with Analog and Digital sensors. (IR pair, Photodiode, LDR, Sonar)	**1**	
4.2 Coding basics and architecture of Arduino Uno boards and relevant sensors.	**1**	
UNIT – III (Arduino based final project)	**2**	**6**
5.1 Final project design using both analog electronics approach and microcontroller	**1**	
5.2 Final presentation and report submission.	**1**	

Textbook References:
Text Book:

1) **Horowitz, Paul, and Winfield Hill. *The art of electronics*. Cambridge [England]: Cambridge University Press. 1989.**
2) **Alan Trevennor, *Practical AVR Microcontrollers, Games, Gadgets, and Home Automation with the Microcontroller Used in the Arduino*. 2012.**

Reference books:

1) **Paul Scherz, Simon Monk. *Practical Electronics for Inventors*, 4th Edition.**

Evaluation Method*	
Regular Evaluation	20
Project 1	20
Project 2	20
Quizzes and Assignments	40

*Please note, as per the existing institute's attendance policy the student should have a minimum of 75% attendance. Students who fail to attend a minimum of 75% of lectures will be debarred from the End Term/Final/Comprehensive examination.

CO and PO Correlation Matrix

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	3	3	2	1	3				2	1		3	3	1	
CO2	3	3	2	2	3				2	1		3	3	1	
CO3	3	2	1	2	3				2	3		3	3	2	2
CO4	3	3	2	1	3				2	1		3	3	2	2
CO5	3	3	1	3	3				2	2		3	3	2	2
CO6	3	3	3	3	3				2	3		3	3	2	2

Last Updated On: 25th November 2020

Approved By: