

## LESSON PLAN

Name of Faculty: SAWAN  
 Discipline: Electronics & Communication Engineering  
 Semester: 6<sup>th</sup>  
 Subject: Microcontroller and Embedded Systems (ECE+EE)  
 Lesson Plan Duration: 15 weeks (Jan 2018 to April 2018)

Work Load (Lecture / Practical) per week (in hours) Lectures-03, Pracicals-06

Week	Theory		Practical	
	Lecture Day	Topic (including assignment / test)	Practical Day	Topic
1 <sup>st</sup>	1 <sup>st</sup>	Difference between microprocessors and microcontrollers and different types of microcontrollers	1 <sup>st</sup>	Write an Assembly language Programme (ALP) to generate 10 kHz square wave.
	2 <sup>nd</sup>	Embedded microcontrollers, External memory microcontrollers	2 <sup>nd</sup>	-----do-----
	3 <sup>rd</sup>	Processor Architectures Harvard V/S Princeton	3 <sup>rd</sup>	-----do-----
2 <sup>nd</sup>	1 <sup>st</sup>	CISC V/S RISC	1 <sup>st</sup>	To study implementation & interfacing of Display devices Like LCD, LED Bar graph & seven segment display with Microcontroller 8051/AT89C51
	2 <sup>nd</sup>	Microcontrollers features : clocking	2 <sup>nd</sup>	-----do-----
	3 <sup>rd</sup>	i/o pins, interrupts	3 <sup>rd</sup>	-----do-----
3 <sup>rd</sup>	1 <sup>st</sup>	Continue..	1 <sup>st</sup>	Revision
	2 <sup>nd</sup>	Discussion on Assignment.	2 <sup>nd</sup>	-----do-----
	3 <sup>rd</sup>	Class Test	3 <sup>rd</sup>	-----do-----
4 <sup>th</sup>	1 <sup>st</sup>	Microcontroller 8051- Architecture	1 <sup>st</sup>	Write an ALP for temperature & pressure measurement.
	2 <sup>nd</sup>	Pin Diagram of 8051	2 <sup>nd</sup>	-----do-----
	3 <sup>rd</sup>	I/O Ports of 8051	3 <sup>rd</sup>	-----do-----
5 <sup>th</sup>	1 <sup>st</sup>	Internal RAM and Registers, Memory Organization and external addressing	1 <sup>st</sup>	Write a program to interface a graphical LCD with 89C51.
	2 <sup>nd</sup>	Interrupts, Addressing Modes of 8051	2 <sup>nd</sup>	-----do-----
	3 <sup>rd</sup>	Instruction Set of 8051	3 <sup>rd</sup>	-----do-----
6 <sup>th</sup>	1 <sup>st</sup>	Instruction Set of 8051 cntd..	1 <sup>st</sup>	Revision 1
	2 <sup>nd</sup>	Assembly Language Programming Examples	2 <sup>nd</sup>	-----do-----
	3 <sup>rd</sup>	Assembly Language Programming Examples cntd..	3 <sup>rd</sup>	-----do-----
7 <sup>th</sup>	1 <sup>st</sup>	Interfacing of LCD with 8051	1 <sup>st</sup>	To study Programming and Transmission & reception of data through Serial port & study of

				Parallel printer port.
	2 <sup>nd</sup>	Interfacing of ADC & DAC with 8051	2 <sup>nd</sup>	-----do-----
	3 <sup>rd</sup>	Interfacing of stepper motor with 8051	3 <sup>rd</sup>	-----do-----
8 <sup>th</sup>	1 <sup>st</sup>	Interfacing of Key board and sensors with 8051.	1 <sup>st</sup>	Repeat previous
	2 <sup>nd</sup>	Discussion on Assignment	2 <sup>nd</sup>	-----do-----
	3 <sup>rd</sup>	Introduction to PIC microcontrollers,	3 <sup>rd</sup>	-----do-----
9 <sup>th</sup>	1 <sup>st</sup>	Architecture and pipelining in PIC	1 <sup>st</sup>	To interface PWM based voltage regulator using PIC Microcontroller .
	2 <sup>nd</sup>	Architecture and pipelining in PIC cntd..	2 <sup>nd</sup>	-----do-----
	3 <sup>rd</sup>	program memory considerations in PIC	3 <sup>rd</sup>	-----do-----
10 <sup>th</sup>	1 <sup>st</sup>	Addressing modes, CPU registers in PIC	1 <sup>st</sup>	Repeat previous
	2 <sup>nd</sup>	Instruction set of PIC	2 <sup>nd</sup>	-----do-----
	3 <sup>rd</sup>	Simple operations using PIC Instructions	3 <sup>rd</sup>	-----do-----
11 <sup>th</sup>	1 <sup>st</sup>	Simple operations using PIC Instructions	1 <sup>st</sup>	Revision 2
	2 <sup>nd</sup>	Class Test	2 <sup>nd</sup>	Revision 2
	3 <sup>rd</sup>	Embedded Systems-Introduction	3 <sup>rd</sup>	Revision 2
12 <sup>th</sup>	1 <sup>st</sup>	Detailed classification of embedded systems.	1 <sup>st</sup>	Study and analysis of interfacing of Graphical LCD using PIC controller
	2 <sup>nd</sup>	Different type of processors used in embedded systems	2 <sup>nd</sup>	-----do-----
	3 <sup>rd</sup>	Hardware Units, SoftwareEmbedded into System,	3 <sup>rd</sup>	-----do-----
13 <sup>th</sup>	1 <sup>st</sup>	Applications and Products of Embedded Systems	1 <sup>st</sup>	Study and interfacing of IR (RC5 protocol) and RF Communication using PIC controller
	2 <sup>nd</sup>	Structural Units inProcessor,	2 <sup>nd</sup>	-----do-----
	3 <sup>rd</sup>	Memory Devices, I/O Devices	3 <sup>rd</sup>	-----do-----
14 <sup>th</sup>	1 <sup>st</sup>	Different types of Buses	1 <sup>st</sup>	Study of SD/MMC card Interface using 18F4550
	2 <sup>nd</sup>	Interfacing of Processor Memory and I/O Devices,	2 <sup>nd</sup>	-----do-----
	3 <sup>rd</sup>	Interfacing of Processor Memory and I/O Devicescntd..	3 <sup>rd</sup>	-----do-----
15 <sup>th</sup>	1 <sup>st</sup>	Case Study of an Embedded System for a Smart Card.	1 <sup>st</sup>	Revision 2
	2 <sup>nd</sup>	Class Test	2 <sup>nd</sup>	Revision 2
	3 <sup>rd</sup>	Programming Problems	3 <sup>rd</sup>	Revision 2

Name of Faculty : NEHA GUPTA  
 Discipline : ECE  
 Semester : 6<sup>th</sup> Sem  
 Subject : Digital System Design, Digital System Design Lab  
 Lesson Plan Duration : 15 weeks (From Jan 2018 to April, 2018)

Work Load (Lecture / Practical) per week (in hours) Lectures-03, Pracicals-06

Week	Theory		Practical	
	Lecture Day	Topic (including assignment / test)	Practical Day	Topic
1 <sup>st</sup>	1 <sup>st</sup>	Introduction to Computer-aided design tools for digital systems, Hardware description languages	1 <sup>st</sup>	Familiar With EDA tool
	2 <sup>nd</sup>	Introduction to VHDL data objects	2 <sup>nd</sup>	.....Do.....
	3 <sup>rd</sup>	Classes and data type	3 <sup>rd</sup>	.....Do.....
2 <sup>nd</sup>	1 <sup>st</sup>	Classes and data type (Continues...)	1 <sup>st</sup>	Design all gates using VHDL.
	2 <sup>nd</sup>	Operators, Overloading	2 <sup>nd</sup>	.....Do.....
	3 <sup>rd</sup>	Logical operators, Types of delays	3 <sup>rd</sup>	.....Do.....
3 <sup>rd</sup>	1 <sup>st</sup>	Entity and Architecture declaration	1 <sup>st</sup>	Problem with experiments
	2 <sup>nd</sup>	Class Test	2 <sup>nd</sup>	.....Do.....
	3 <sup>rd</sup>	Assignment statements, sequential statements and process	3 <sup>rd</sup>	.....Do.....
4 <sup>th</sup>	1 <sup>st</sup>	Conditional statements, case statement, Array	1 <sup>st</sup>	Write VHDL programs for the following circuits, check the wave forms and the hardware generated a. half adder b. full adder
	2 <sup>nd</sup>	Loops, resolution functions	2 <sup>nd</sup>	.....Do.....
	3 <sup>rd</sup>	Packages and Libraries	3 <sup>rd</sup>	.....Do.....
5 <sup>th</sup>	1 <sup>st</sup>	Concurrent statements. Subprograms	1 <sup>st</sup>	Write VHDL programs for the following circuits, check the wave forms and the hardware generated a. multiplexer b. demultiplexer
	2 <sup>nd</sup>	Application of Functions and Procedures	2 <sup>nd</sup>	.....Do.....
	3 <sup>rd</sup>	Structural Modeling, component declaration	3 <sup>rd</sup>	.....Do.....
6 <sup>th</sup>	1 <sup>st</sup>	Structural layout and generics	1 <sup>st</sup>	Write VHDL programs for the following circuits, check the wave forms and the

				hardware generated a. decoder b. encoder
	2 <sup>nd</sup>	Discussion - Coding based Problem	2 <sup>nd</sup>	.....Do.....
	3 <sup>rd</sup>	Discussion - Coding based Problem	3 <sup>rd</sup>	.....Do.....
7 <sup>th</sup>	1 <sup>st</sup>	Multiplexers, Demultiplexers	1 <sup>st</sup>	Write a VHDL program for a comparator and check the wave forms and the hardware generated
	2 <sup>nd</sup>	Model of encoders, decoders	2 <sup>nd</sup>	.....Do.....
	3 <sup>rd</sup>	Coding based Problem	3 <sup>rd</sup>	.....Do.....
8 <sup>th</sup>	1 <sup>st</sup>	Coding based Problem	1 <sup>st</sup>	Write a VHDL program for a code converter and check the wave forms and the hardware generated
	2 <sup>nd</sup>	Model of code converters	2 <sup>nd</sup>	.....Do.....
	3 <sup>rd</sup>	Coding based Problem	3 <sup>rd</sup>	.....Do.....
9 <sup>th</sup>	1 <sup>st</sup>	Model of Comparators, implementation of Boolean functions etc.	1 <sup>st</sup>	Write a VHDL program for a FLIP-FLOP and check the wave forms and the hardware generated
	2 <sup>nd</sup>	Coding based Problem	2 <sup>nd</sup>	.....Do.....
	3 <sup>rd</sup>	Model of Shift Registers	3 <sup>rd</sup>	.....Do.....
10 <sup>th</sup>	1 <sup>st</sup>	Coding based Problem	1 <sup>st</sup>	Write a VHDL program for a counter and check the wave forms and the hardware generated
	2 <sup>nd</sup>	Model of Counters	2 <sup>nd</sup>	.....Do.....
	3 <sup>rd</sup>	Coding based Problem	3 <sup>rd</sup>	.....Do.....
11 <sup>th</sup>	1 <sup>st</sup>	Model of Counters	1 <sup>st</sup>	Write VHDL programs for the following circuits, check the wave forms and the hardware generated a. register
	2 <sup>nd</sup>	Coding based Problem	2 <sup>nd</sup>	.....Do..... .....
	3 <sup>rd</sup>	Assignment --- Designing of a simple microcomputer system using VHDL , FPGA and CPLD	3 <sup>rd</sup>	.....Do..... .....
12 <sup>th</sup>	1 <sup>st</sup>	Basic components of a computer, specifications	1 <sup>st</sup>	Problem with experiments
	2 <sup>nd</sup>	Architecture of a simple microcomputer system	2 <sup>nd</sup>	.....Do.....
	3 <sup>rd</sup>	Implementation of a simple microcomputer system using VHDL	3 <sup>rd</sup>	.....Do.....

13 <sup>th</sup>	1 <sup>st</sup>	Introduction of Programmable logic device	1 <sup>st</sup>	Write VHDL programs for the following circuits, check the wave forms and the hardware generated b. Shift register
	2 <sup>nd</sup>	ROM , PLAs	2 <sup>nd</sup>	.....Do.....
	3 <sup>rd</sup>	PAL ,GAL and PEEL	3 <sup>rd</sup>	.....Do.....
14 <sup>th</sup>	1 <sup>st</sup>	Designing Problem with ROM,PLA,PLA	1 <sup>st</sup>	Design a 3: 8 decoder
	2 <sup>nd</sup>	Designing Problem with ROM,PLA,PLA	2 <sup>nd</sup>	.....Do.....
	3 <sup>rd</sup>	CPLDs and FPGA	3 <sup>rd</sup>	.....Do.....
15 <sup>th</sup>	1 <sup>st</sup>	Design implementation using CPLDs and FPGAs	1 <sup>st</sup>	Internal Vice Voce
	2 <sup>nd</sup>	Design implementation using CPLDs and FPGAs (Continues...)	2 <sup>nd</sup>	Internal Vice Voce
	3 <sup>rd</sup>	Class Test	3 <sup>rd</sup>	Internal Vice Voce

Name of Faculty : ABHIMANYU  
 Discipline : ECE  
 Semester : 6<sup>th</sup> Sem  
 Subject : Microwave Radar Engineering, Microwave Radar  
 Engineering Lab

Lesson Plan Duration : 15 weeks (From Jan 2018 to April, 2018)

Work Load (Lecture / Practical) per week (in hours) Lectures-03, Pracicals-06

Week	Theory		Practical	
	Lecture Day	Topic (including assignment / test)	Practical Day	Topic
1 <sup>st</sup>	1 <sup>st</sup>	RADAR: Block Diagram and operation	1 <sup>st</sup>	Study of wave guide components.
	2 <sup>nd</sup>	Radar Frequencies	2 <sup>nd</sup>	-----do-----
	3 <sup>rd</sup>	<ul style="list-style-type: none"> <li>• Simple form of Radar equation</li> <li>• Test 3</li> </ul>	3 <sup>rd</sup>	-----do-----
2 <sup>nd</sup>	1 <sup>st</sup>	<ul style="list-style-type: none"> <li>• Prediction of Range</li> </ul>	1 <sup>st</sup>	To measure frequency of microwave source and demonstrate relationship among guide dimensions, free space wave length and guide wavelength.
	2 <sup>nd</sup>	<ul style="list-style-type: none"> <li>• Performance, Pulse Repetition frequency</li> </ul>	2 <sup>nd</sup>	-----do-----
	3 <sup>rd</sup>	<ul style="list-style-type: none"> <li>• Range Ambiguities</li> <li>• Blind speed</li> <li>• Assignment 3</li> </ul>	3 <sup>rd</sup>	-----do-----
3 <sup>rd</sup>	1 <sup>st</sup>	<ul style="list-style-type: none"> <li>• Applications of Radar</li> </ul>	1 <sup>st</sup>	To measure VSWR of unknown load and determine its impedance using a smith chart.
	2 <sup>nd</sup>	<ul style="list-style-type: none"> <li>• Types of Radar</li> </ul>	2 <sup>nd</sup>	-----do-----
	3 <sup>rd</sup>	Microwave Solid State Devices & Measurements: Varactor diode Tunnel diode	3 <sup>rd</sup>	-----do-----
4 <sup>th</sup>	1 <sup>st</sup>	<ul style="list-style-type: none"> <li>• Schottky diode</li> </ul>	1 <sup>st</sup>	Assessment-1
	2 <sup>nd</sup>	<ul style="list-style-type: none"> <li>• GUNN diode</li> </ul>	2 <sup>nd</sup>	-----do-----
	3 <sup>rd</sup>	<ul style="list-style-type: none"> <li>• IMPATT</li> <li>• TRAPATT</li> </ul>	3 <sup>rd</sup>	-----do-----
5 <sup>th</sup>	1 <sup>st</sup>	<ul style="list-style-type: none"> <li>• PIN diodes.</li> </ul>	1 <sup>st</sup>	Study of insulation & coupling coefficient of a magic T & coupling coefficient and directivity of a directional coupler
	2 <sup>nd</sup>	<ul style="list-style-type: none"> <li>• MASER, parametric amplifiers</li> </ul>	2 <sup>nd</sup>	-----do-----
	3 <sup>rd</sup>	<ul style="list-style-type: none"> <li>• Power measurement using calorimeter</li> </ul>	3 <sup>rd</sup>	-----do-----

		& bolometers		
6 <sup>th</sup>	1 <sup>st</sup>	<ul style="list-style-type: none"> <li>• Measurement of SWR</li> <li>• Assignment 2</li> </ul>	1 <sup>st</sup>	Measurement of attenuation of a attenuator and isolation, insertion loss, cross coupling of a circulator
	2 <sup>nd</sup>	• Measurement of : frequency & wavelength	2 <sup>nd</sup>	-----do-----
	3 <sup>rd</sup>	• Measurement of impedance	3 <sup>rd</sup>	-----do-----
7 <sup>th</sup>	1 <sup>st</sup>	• Microwave bridges	1 <sup>st</sup>	Study of waveguide horn and its radiation pattern and determination of the beam width.
	2 <sup>nd</sup>	• Directional couplers,	2 <sup>nd</sup>	-----do-----
	3 <sup>rd</sup>	• Tees (H Plane Tee)	3 <sup>rd</sup>	-----do-----
8 <sup>th</sup>	1 <sup>st</sup>	• Tees (E Plane Tee)	1 <sup>st</sup>	Assessment- 2
	2 <sup>nd</sup>	• Hybrid ring	2 <sup>nd</sup>	-----do-----
	3 <sup>rd</sup>	• S-parameters	3 <sup>rd</sup>	-----do-----
9 <sup>th</sup>	1 <sup>st</sup>	<ul style="list-style-type: none"> <li>• Attenuators, cavity resonators</li> <li>• Assignment 1</li> </ul>	1 <sup>st</sup>	To study Measurement of Guide wavelength ( $\lambda_g$ ), Free Space wavelength ( $\lambda$ ). & Concept of reduction of wavelength due to substrate material
	2 <sup>nd</sup>	• Mixers & detectors, matched Load,	2 <sup>nd</sup>	-----do-----
	3 <sup>rd</sup>	• Phase shifter, wave meter,	3 <sup>rd</sup>	-----do-----
10 <sup>th</sup>	1 <sup>st</sup>	Ferrite devices: Isolators	1 <sup>st</sup>	Measurement of SWR in a Microwave transmission line.
	2 <sup>nd</sup>	• Ferrite devices: circulators	2 <sup>nd</sup>	-----do-----
	3 <sup>rd</sup>	• Limitation of conventional tubes	3 <sup>rd</sup>	-----do-----
11 <sup>th</sup>	1 <sup>st</sup>	• Construction, operation and properties of Klystron amplifier	1 <sup>st</sup>	To study working of MIC
	2 <sup>nd</sup>	• Reflex Klystron	2 <sup>nd</sup>	-----do-----
	3 <sup>rd</sup>	• Magnetron • Test 2	3 <sup>rd</sup>	-----do-----
12 <sup>th</sup>	1 <sup>st</sup>	TWT	1 <sup>st</sup>	Components like Power Divider , Ring resonator, Filters & Microwave Amplifier
	2 <sup>nd</sup>	? BWO ?	2 <sup>nd</sup>	-----do-----
	3 <sup>rd</sup>	? Crossed field amplifiers	3 <sup>rd</sup>	-----do-----

13 <sup>th</sup>	1 <sup>st</sup>	WAVEGUIDES: Introduction	1 <sup>st</sup>	Assessment-3
	2 <sup>nd</sup>	Comparison with transmission lines	2 <sup>nd</sup>	Assessment-3
	3 <sup>rd</sup>	Propagation in TE mode	3 <sup>rd</sup>	Assessment-3
14 <sup>th</sup>	1 <sup>st</sup>	<ul style="list-style-type: none"> <li>• Propagation in TM mode</li> </ul>	1 <sup>st</sup>	Study of data communication over Microwave bench.
	2 <sup>nd</sup>	<ul style="list-style-type: none"> <li>• rectangular wave guide</li> </ul>	2 <sup>nd</sup>	-----do-----
	3 <sup>rd</sup>	<ul style="list-style-type: none"> <li>• TEM mode in rectangular wave guide</li> </ul>	3 <sup>rd</sup>	-----do-----
15 <sup>th</sup>	1 <sup>st</sup>	<ul style="list-style-type: none"> <li>• characteristic impedance</li> </ul>	1 <sup>st</sup>	Assessment- 4
	2 <sup>nd</sup>	<ul style="list-style-type: none"> <li>• Introduction to circular waveguides</li> <li>• Test 1</li> </ul>	2 <sup>nd</sup>	Assessment- 4
	3 <sup>rd</sup>	<ul style="list-style-type: none"> <li>• Planar transmission lines</li> </ul>	3 <sup>rd</sup>	Assessment- 4



Name of Faculty : SAWAN  
 Discipline : ECE  
 Semester : 6<sup>th</sup> Sem  
 Subject : VLSI Design  
 Lesson Plan Duration : 15 weeks (From Jan 2018 to April, 2018)

Work Load (Lecture / Practical) per week (in hours) Lectures-03

Week	Theory	
	Lecture Day	Topic (including assignment / test)
1 <sup>st</sup>	1 <sup>st</sup>	Enhancement mode & Depletion mode
	2 <sup>nd</sup>	Fabrication NMOS and PMOS technology
	3 <sup>rd</sup>	Fabrication NMOS and PMOS technology (Continues...)
2 <sup>nd</sup>	1 <sup>st</sup>	Fabrication CMOS and BIMOS technology (Continues...)
	2 <sup>nd</sup>	Fabrication CMOS and BIMOS technology (Continues...)
	3 <sup>rd</sup>	Class Test
3 <sup>rd</sup>	1 <sup>st</sup>	NMOS transistor current equation
	2 <sup>nd</sup>	Second order affects – MOS Transistor Model.
	3 <sup>rd</sup>	NMOS & CMOS inverter
4 <sup>th</sup>	1 <sup>st</sup>	Determination of pull up / pull down ratios
	2 <sup>nd</sup>	Stick diagram – Lamda based rules
	3 <sup>rd</sup>	Stick diagram – Lamda based rules (Continues...)
5 <sup>th</sup>	1 <sup>st</sup>	Super buffers – BiCMOS & steering logic.
	2 <sup>nd</sup>	Structured design of combinational circuits
	3 <sup>rd</sup>	Dynamic CMOS & clocking
6 <sup>th</sup>	1 <sup>st</sup>	Tally circuits, NAND-NAND
	2 <sup>nd</sup>	Tally circuits, NAND-NAND (Continues...)
	3 <sup>rd</sup>	NOR-NOR, AOI logic
7 <sup>th</sup>	1 <sup>st</sup>	EXOR structure
	2 <sup>nd</sup>	Multiplexer structures
	3 <sup>rd</sup>	Barrel shifter
8 <sup>th</sup>	1 <sup>st</sup>	Class Test
	2 <sup>nd</sup>	NMOS PLA
	3 <sup>rd</sup>	NMOS PLA (Continues...)
9 <sup>th</sup>	1 <sup>st</sup>	NMOS PLA (Continues...)
	2 <sup>nd</sup>	NMOS PLA (Continues...)

	3 <sup>rd</sup>	Finite State Machine PLA
10 <sup>th</sup>	1 <sup>st</sup>	Finite State Machine PLA (Continues...)
	2 <sup>nd</sup>	Finite State Machine PLA (Continues...)
	3 <sup>rd</sup>	Finite State Machine PLA (Continues...)
11 <sup>th</sup>	1 <sup>st</sup>	A – Introduction to FPGA
	2 <sup>nd</sup>	Class Test
	3 <sup>rd</sup>	Assignment --- Designing of a simple microcomputer system using VHDL , FPGA and CPLD
12 <sup>th</sup>	1 <sup>st</sup>	RTL Design – Combinational logic
	2 <sup>nd</sup>	Data Types
	3 <sup>rd</sup>	Data Types (Continues...)
13 <sup>th</sup>	1 <sup>st</sup>	Operators – Packages
	2 <sup>nd</sup>	Sequential circuit, introduction of test benches
	3 <sup>rd</sup>	test bench for adder
14 <sup>th</sup>	1 <sup>st</sup>	test bench for counter
	2 <sup>nd</sup>	test bench for Flip flop
	3 <sup>rd</sup>	test bench for multiplexer
15 <sup>th</sup>	1 <sup>st</sup>	test bench for FSM
	2 <sup>nd</sup>	Class Test
	3 <sup>rd</sup>	Revision of whole syllabus