

COLLEGE OF ENGINEERING ROORKEE
SYLLABUS FOR
VALUE ADDED PROGRAM (VAP)



DEPARTMENT OF ELECTRONICS &
TELECOMMUNICATION ENGINEERING

Approved by:

HOD

Dean Academics

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ODD SEMESTER	1st SEM
Computer H/W, S/W & Network Troubleshooting	

S No	Heading	Sub Heading	Hours
1.	Experimental and hands on training	Identifying Computer Hardware Devices	2
2.		Identifying Computer Assembly	2
3.		Identifying external ports and interfacing	2
4.		PC Identifying Problems & Troubleshooting	2
5.		Operating System Installation	2
6.		Printer – Installation / Troubleshooting	2
7.		Introduction to LAN	2
8.		Introduction to LAPTOPS	2
9.		Hands on Training on PC Trainer KIT	2
10.		Hands on Training on LAN Trainer KIT	2
11.		Hands on Training on UPS Trainer KIT	2
12.		Hands on Training on Monitor Trainer KIT	2
13.		Preventive maintenance of a PC	2
14.		Understanding CMOS	2
15.		Working with Backups and Archival utilities	2
Total Contact Hours			30 Hours

S. NO.	Name of Projects/Experiments
1.	Identifying Computer Hardware Devices
2.	Identifying Computer Assembly
3.	Identifying external ports and interfacing
4.	PC Identifying Problems & Troubleshooting
5.	Operating System Installation
6.	Printer – Installation / Troubleshooting
7.	Introduction to LAN
8.	Introduction to LAPTOPS
9.	Hands on Training on PC Trainer KIT
10.	Hands on Training on LAN Trainer KIT

EVEN SEMESTER	2nd SEM
Digital Integrated Circuit Simulation	

MODULE	CONTENT	SUB-CONTENT	DURATION
MODULE-1	Available Components	Introduction of Digital Electronic components like Logic Gates, Switches ,Clock ,Push button etcIntroduction to Object Categories & Object Type.	04hrs
MODULE-2	Running the Simulation	Placing components in the schematic, Leveling components, creating new components, checking the propagation delay, Tool Bar.	06hrs
MODULE-3	Logic and Colors in Logically Custom Integrated Circuits	High State (true), Low State (Low), High Impedance State (Hi-Z), Error State,The Pull Up and Pull Down components,A Toggle Switch or Push Button.	05hrs
MODULE-4	Digital Integrated Circuits	Introduction, Designing Steps & Verification.	07hrs
MODULE-5	Programs(Designing & Simulation)	Simulation of 7 segment LED, Home security System, Parity bit Checker circuit, Magnitude Comparator, Square sequence generator, Counters etc.	08 hrs
		Total Contact Hours	30 hours

S. NO.	Name of Projects/Experiments
1.	Verification of all the logic gates.
2.	Design & simulation of Adder circuits.
3.	Design & simulation of Square of a number.
4.	Design & simulation of counter.
5.	Design & simulation parity checker circuit.
6.	Design & simulation of a comparator.
7.	Design & simulation of fire alarm circuit.
8.	Design & simulation of car head light automatic turn off circuit.

ODD SEMESTER	3rd SEM
Programmable logic Controllers (PLCs)	

Module	Content	Duration
1.	Programmable Logic Controllers - Allen Bradley & Siemens Allen Bradley SLC 5/03 on RS Logix& Siemens S7 300 on Simantic S7 Manager	4
2.	Introduction to PLC hardware and role in automation -Architectural Evolution of PLC, Introduction to the field devices attached to PLC	2
3.	PLC Fundamentals - (Block diagram of PLC's) -Detail information about PLC components ,Power supply, CPU, I/Os, Communication bus,Various ranges available in PLC's	3
4.	Types of Inputs & outputs- Source Sink Concepts ,Wiring of the I/O devices, Concept of flags	3
5.	Installing and to starting the programming terminals -Introduction to PLC programming software, Addressing concepts	5
6.	Introduction to bit, byte & word concepts -Programming instructions arithmetic and logical ,Load /and /or/out / and Read / Write ,Compare / Add / Sub /And /Or – Blocks, Leading edge / trailing edge instructions, MOVE block application, Timer and Counter Blocks programming, Advanced instructions, File handling, Comment functions, Master control /set /reset function, Upload, download, Monitoring of programs, Monitoring / Modifying data table values Standard procedure to be followed in wiring / writing ladder etc	8
7.	Troubleshooting and fault diagnostics of PLC Documenting the project Troubleshooting -Identifying the status of PLC and communication bus, Fault detection and error handling, Forcing of the I/O's, Back up of the programs and reloading, CPU, I/O module replacements	5
	Total Contact Hours	30

S. NO.	Name of Projects/Experiments
1.	Practical Exposure on 6 PLC Allen Bradley / Siemens / Modicon / Mitsubishi / Omron / GE Fanuc PLC
2.	Introduction to PLC programming software
3.	Addressing concepts
4.	Introduction to bit, byte & word concept
5.	Programming instructions arithmetic and logical
6.	Load /and /or/out / and Read / Write
7.	Compare / Add / Sub /And /Or – Blocks
8.	Leading edge / trailing edge instructions
9.	MOVE block application
10.	Timer Blocks programming
11.	Counter Block programming
12.	Advanced instructions
13.	File handling

14.	Comment functions
15.	Master control /set /reset function
16.	Upload, download, Monitoring of programs
17.	Forcing I/P & O/P
18.	Monitoring / Modifying data table values
19.	Standard procedure to be followed in wiring / writing ladder etc
20.	Hands on experience on writing programs
21.	Case studies for conveyer, motors control, timer & counter applications etc.

EVEN SEMESTER	4th SEM
Circuit design on PCB & Fabrication	

MODULE	CONTENT	SUB-CONTENT	DURATION
MODULE-1	Introduction to circuit design on PCB	Introduction of Electronic components like Resistor, Capacitors, Inductors, Diode, BJT, FET, OP-AMP, IC, Sensors, Relays etc. How to select components on the basis of physical dimensions.	6hrs
MODULE-2	Express SCH	Placing components in the schematic, Leveling components, creating new components, checking the schematic for error.	6hrs
MODULE-3	Express PCB	Placing components in the layout, creating new components, linking the schematic and PCB.	6hrs
MODULE-4	PCB Printing, Etching, Drilling and Soldering	Placing the circuit on Copper clad followed by etching, drilling and soldering of components.	6hrs
MODULE-5	Testing of assembled PCB, troubleshooting and familiarization of other tools for PCB design	Fault detection by using various equipments like CRO, Multimeter, Function generator	6hrs
Total Contact Hours			30

S. NO.	Name of Projects/Experiments
1.	Design a circuit of anti-theft security for car audios on PCB
2.	Design a circuit of automatic emergency Light.
3.	Design a circuit of Automatic heat detector.
4.	Design a circuit of low cost hearing aid.
5.	Design a circuit of DTMF Rx IF MT8870 tester.
6.	Design a circuit of current sensor.
7.	Design a circuit of speed controller of fans & coolers.
8.	Design a circuit of LED based Musical display.

ODD SEMESTER	5th SEM
Advance Industrial Automation Technologies-I	

Module	Contents	Duration
1.	Introduction to PLC Software Siemens TIA Portal, Proface, IPS7 Overview of Software at a glance, Hardware Configuration Communication Settings for PLC, Procedure to build project.	6 Hr
2.	Introduction to Sensorics: Classification of Sensors and different type of sensors preferred in Automation.	6 Hr
3.	Characteristics of various proximity sensors like inductive, capacitive, magnetic, photoelectric and ultrasonic.	6 Hr
4.	Understanding various terms related to sensors: <ul style="list-style-type: none"> o Reduction factor o Switching Frequency o Response Curve p Detection range / Operating Range 	6 Hr
5.	Comparison of Sensors and Application of Proximity Sensors.	6 Hr
	Total Contact Hours	30 Hr.

Project . No.	Name of Projects/Experiments
1.	Inductive Sensor - Behavior of inductive sensor
2.	Capacitive Sensor - Behavior of the capacitive sensor
3.	Magnetic Sensor - Behavior of magnetic sensors
4.	Photo Electric Sensor - Behavior of the direct detection sensor
5.	Photo Electric Sensor - Behavior of through beam sensors
6.	Photo Electric Sensor - Behavior of the reflex photoelectric sensor
7.	Ultrasonic Sensor - Behavior of an ultrasonic sensor
8.	Inductive Sensor - Operating range and hysteresis of the inductive sensor
9.	Capacitive Sensor - Switching frequency of the capacitive sensor
10.	Magnetic Sensor - Reduction factor of the magnetic sensor

EVEN SEMESTER	6thSEM
Advance Industrial Automation Technologies-II	

Module	Contents	Duration
1.	<p>Introduction: Hydraulics, Important basic terms, Industrial Hydraulics, Basic physical properties, Comparisons of Drives (Hydraulics Vs. Pneumatics, Electrical/Electronics & Mechanical), Applications of Hydraulics</p> <p>Graphical Symbols and Hydraulic circuit Diagrams: Basic elements, commonly used symbols, Circuit symbols.</p> <p>Functionality and Design of a Hydraulic System: Principle of Energy Conversion, Functional Groups in a Hydraulic System, Functionality of a Hydraulic System control, Meter-out flow control.</p>	10 Hr.
2.	<p>Hydraulic Fluids: Main functions of Hydraulic fluids, Requirements of Hydraulic fluids, Types of Hydraulic Fluids, Selection of Hydraulic fluid for an applications.</p> <p>Hydraulic pumps: Functions and Operating principle Different types of Hydraulic pumps and its selection.</p> <p>Hydraulic Cylinder: Design and operation, Types of cylinder</p>	8 hr.
3.	<p>Pressure control valves: Design and function, pressure relief valve, pressure reducing valve,</p> <p>Directional Control Valves: Operation and Function, Types of directional control valves, Spool positions, Designation of Directional control valves.</p> <p>Flow Control Valves: Design and Function, Throttle valves, throttle check valve, Meter-in flow.</p>	6 Hr.
4.	<p>Accessories: Accumulator, Filter</p> <p>Introduction to Electro – Hydraulics: Solenoids, Function and operating principle of a relay, Relay as a logical switch, Symbols of most important switching elements (NO and NC), Signal storage concept, Electrical interlocking concept, Electrical ladder diagram, Momentary-contact limit switches</p>	6 Hr.
Total Contact Hours		30 Hr.

S. NO.	Name of Projects/Experiments
1.	Hydraulic pump characteristic Curve
2.	Single rod cylinder pressure intensification (Meter-in and meter out Circuits)
3.	4/3 directional valve application
4.	Hydraulic Accumulator
5.	Extension of a cylinder upon operation of a push button
6.	Signal Storage by means of electrical self-locking
7.	Signal storage by means of electrical self-locking resetting by means of a proximity switch

ODD SEMESTER	7th SEM
VHDL	

Module	Contents	Duration
1.	Introduction to VHDL.Behavior, structure, terms.	5Hr
2.	Entity Declaration.Architecture Declaration.	5Hr
3.	Behavioral Model, signal declaration.	5Hr
4.	Component declaration. Expression & operators	5Hr
5.	If statement, case statement. Lopp statement, signal Assignment. Process & wait statement.	5Hr
6.	Subprograms & Packages	5 Hr.
	Total Contact Hours	30 Hr.

S. NO.	Name of Projects/Experiments
1.	Implementation of Parallel Adder.
2.	Implementation of Parallel Subtractor.
3.	Implementation of Various Flip Flops.
4.	Implementation of unidirectional & Bidirectional Shift Registers.
5.	Implementation of up and down counters.
6.	Implementation of Frequency Synthesizers.
7.	Design & implementation of Traffic Light Controller.
8.	Design & Implementation of Electronic Voting Machine.

EVEN SEMESTER	8th SEM
OCEANSTOR	

Module	Content	Duration
1.	Introduction to Oceanstor	3 Hr.
2.	Evolution of PSTN.	3 Hr.
3.	Architecture of e NSP.	3 Hr.
4.	IMS, Cloud Computing.	3 Hr.
5.	WLAN. IPTV.	3 Hr.
6.	GSM.	3 Hr.
7.	SDH network.	3 Hr.
8.	OSI reference model.	3 Hr.
9.	PCP/IP protocol.	3 Hr.
10.	Server	3 Hr.
Total Contact Hours		30

S. NO.	Name of Projects/Experiments
1.	Simulations of LAN, MAN & WAN.
2.	Wireless LAN control network.
3.	L7 based traffic simulation tool.
4.	GUI based configuration conversion tool.
5.	Implement a FTP server for web security appliances.
6.	Development of a framework for Huawei security automation.
7.	IPv6 enhancement.
8.	Project management & security System.