

GOVT. POLYTECHNIC, PANCHKULA

**DEPARTMENT OF ELECTRONICS AND
COMMUNICATION ENGINEERING**

LESSON PLANS

(August-November 2026)

Subject: PLCs & SCADA

Name of the Faculty: Ms. Divya Chopra Discipline: ECE Subject: PLCs & SCADA							
Semester: 5th							
Lesson Plan Duration: 15-16 weeks							
Work Load (Lectures/ Practical) per week (in hours): 02 hours (Theory)/ 04 hours (Practical)							
Week	Theory		Practical	Week	Theory		Practical
	Lecture	Topic (including assignment/ test)	Topic		Lecture	Topic (including assignment/ test)	Topic
1 st	1	UNIT-1 Introduction of PLC, limitations of relays and advantages of PLCs over electromagnetic relays.	Show PLC modules and components in lab/industry or through online videos	9 th	17	Counter Instructions, Data handling instructions	Write a ladder diagram program for bottling plant
	2	PLC Operation or working. PLC Architecture and building blocks, Functions of various block			18	Comparison Instructions, Sequencer instructions	
2 nd	3	Different programming languages	Demonstration of ladder diagram programming using NO, NC and OTE instructions.	10 th	19	Assignment No. 2	Write a ladder diagram program for drink dispenser.
	4	PLC applications and manufacturers PLC selection criteria.			20	Revision for 2 nd sessional test	
				11 th	21	2 nd sessional test	
					22	Evaluation and Discussion	
3 rd	5	UNIT -2 Number systems and conversions	Write a ladder diagram program for switching ON-OFF light.	12 th	23	UNIT-5 Introduction of SCADA, Project and Tag creation	Write a ladder diagram program for traffic light control.
	6	Binary arithmetic, Binary codes, Boolean algebra, logic gates			24	Visibility and text animation, Numeric display and Numeric input	
4 th	7	Introduction to Ladder logic, Basic components and their symbols	Write a ladder diagram program for liquid level control	13 th	25	Vertical slider, horizontal slider, Creation of various animations like color	Write a ladder diagram program for temperature control
	8	Fundamental of ladder diagrams, Ladder logic functions			26	Fill horizontal position	
5 th	9	Boolean logic and relay logic	Write a ladder diagram program for industry process control	14 th	27	Vertical position, height Width and touch	Show online videos to demonstrate the creation and animation of graphics for various applications using SCADA.
	10	Assignment No.1			28	Alarming and Data Logging.	

6 th	11	1 st Sessional Test	VIVA-VOCE	15 th	29	Revision for 3 rd sessional test	Industrial visit to monitor the actual working of PLC and SCADA
	12	Evaluation and Discussion					
7 th	13	Unit-3 Introduction, Input and output data files, status file	Write a ladder diagram program for main door control cell		30	3 rd sessional test	
	14	Bit data file, Timer data file Counter data file.					
8 th	15	Control Data File,Integer data file and Float data file	Write a ladder diagram program for vehicle parking control.	16 th	31	Revision of short answer questions	Viva-Voice
	16	UNIT-4 Introduction, Bit instructions, Timer Instructions, Reset instruction			32	Revision of long answer questions	

Subject: OPTICAL FIBRE COMMUNICATION

Name of the Faculty: Ms. Sonia Ohlayan Discipline: ECE Subject: Optical Fibre Communication							
Semester: 5th							
Lesson Plan Duration: 15-16 weeks							
Work Load (Lectures/ Practical) per week (in hours): 03 hours (Theory)/ 04 hours (Practical)							
Week	Theory		Practical	Week	Theory		Practical
	Lecture day	Topic (including assignment/ test)	Topic		Lecture day	Topic (including assignment/ test)	Topic
1 st	1	Unit-1 Historical perspective, basic communication systems	To identify and use various components and tools used in optical fiber communication.	8 th	22	Comparison of LED and ILD	VIVA-VOICE
	2	Optical communication, Electromagnetic spectrum			23	Unit-4 Characteristics of photo detectors used in optical communication	
	3	Optical fibre communication and its Advantages, disadvantages			24	Working of PIN diode	
2 nd	4	Optical fibre communication Applications	To set up fiber analog link	9 th	25	Assignment No. 2	To measure and calculate numerical aperture of optical fiber
	5	Principle of light penetration			26	Working of avalanche photo diode (APD), Noise in detectors	
	6	Reflection, critical angle.			27	2nd sessional test	
3 rd	7	Unit-2 Constructional details of various optical fibers, multimode and mono-mode fibers	VIVA-VOICE	10 th	28	Unit-5 Types of optical amplifiers	To observe characteristics of optical source
	8	Step index and graded index fibers, acceptance angle			29	Semiconductor & fiber optical amplifiers	
	9	Types of optical fiber cables.			30	Principle and operation of SOA	
4 th	10	Optical Fibers cable connectors	To set up optic digital link	11 th	31	Types of SOA	To observe characteristics of optical detector
	11	Splicing techniques (Mechanical, fusion)			32	EDFA	
	12	Absorption Losses: Scattering Losses, Radiation losses			33	Raman amplifiers.	
5 th	13	Connector losses, Bending losses.	To measure bending losses in optical fibers	12 th	34	Comparison of SOA, EDFA and Raman Amplifiers	To splice the available optical fiber
	14	Dispersion: Types and its effect on data rate			35	Assignment No. 3	
	15	Assignment No. 1			36	Revision for 3 rd sessional test	

6th	16	Revision for 1 st sessional test	VIVA-VOICE	13th	37	3rd sessional test	To connect a fiber with
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	17	1st sessional test			38	Revision of very short answer questions	connector at both ends
	18	Unit-3 Principle and Characteristics of LED			39	Revision of short answer questions	
7th	19	Principle and Characteristics of LASER	To observe and measure the splice or connector loss	14th	40	Revision of long answer questions	VIVA-VOICE
	20	Different types of LED structures			41	Revision	
	21	Principle and operation of different injection laser diodes			42	Revision	

Subject: **WIRELESS & MOBILE COMMUNICATION**

Name of the Faculty: Ms. Sujata Kundu Discipline: ECE Subject: Wireless & Mobile Communication	Semester: 5th
Lesson Plan Duration: 15-16 weeks Work Load (Lectures/ Practical) per week (in hours): 02 hours (Theory)/ 04 hours (Practical)	

Week	Theory		Practical	
	Lect. Day	Topic	Practical Week	Topic
1st	1	Basics of Wireless Communication	1st	Introduction to wireless & Mobile Communication and systems
	2	Advantages of wireless communication		
2nd	3	Electro-magnetic waves, Frequency Spectrum used	2nd	Study the features, specification and working of cellular mobile
	4	Cellular Network Systems		
3rd	5	Propagation considerations, range, fading	3rd	Measurement of signal strength at various points from a transmitting antenna
	6	Cellular concept, Introduction to 1G and 2G		
4th	7	Cell area, cell site structure, capacity of cells	4th	Demonstration of Base Trans Receiver (BTS) with nearby cellular tower
	8	Frequency reuse concept		
5th	9	Interference, Co -Channel Interference Adjacent-Channel Interference	5th	Revision and internal viva
	10	Power Control for Reducing interference I		
6th	11	Improving Coverage and Capacity in Cellular System	6th	Observing call processing of GSM trainer Kit
	12	Cell splitting and sectoring		
7th	13	Multiple Access Techniques Communication, Introduction to Multiple Access.	7th	Visit of a Mobile Switching Centre (MSC)
	14	Frequency Division Multiple Access (FDMA		
8th	15	Time Division Multiple Access (TDMA)	8th	Troubleshooting of GSM Mobile Phone
	16	Code division multiple access (CDMA), its features		
9th	17	WCDMA	9th	Revision and internal viva
	18	Introduction to OFDMA		

10th	19	Working, Features and Characteristics of OFDMA	10th	Data transfer using Bluetooth and Wi-Fi
	20	Introduction of Global system for mobile communication (GSM)		
11th	21	GSM System Architecture	11th	Study and demonstration of AT Commands of GSM System using trainer kit
	22	Introduction to GPRS		
12th	23	Introduction to EDGE	12th	Study and demonstration of AT Commands of LTE using trainer kit
	24	Introduction to Bluetooth		
13th	25	Introduction to Wi-fi	13th	Study of LTE mobile communication using trainer kit
	26	Introduction to architecture and features of UMTS		
14th	27	Architecture of LTE	14 th	Value added experiments such as GPS and GPRS
	28	Introduction to 5G		
15th	29	Concept of New Radio Technology	15 th	Revision and internal viva
	30	Comparison of 4G with 5G		

Subject: **INSTRUMENTATION**

Name of the Faculty: Ms. Sujata Kundu Discipline: ECE Subject: Instrumentation	Semester: 5th
Lesson Plan Duration: 15-16 weeks Work Load (Lectures/ Practical) per week (in hours): 03 hours (Theory)/ 04 hours (Practical)	

Week	Theory		Practical
	Lecture day	Topic (including assignment/ test)	Topic
1st	1	Introduction about subject	Introduction about Practical
	2	Measurements: Importance of measurement, basic measuring systems	
	3	advantages and limitations of each measuring systems	
2nd	4	display devices	Draw the characteristics of a potentiometer
	5	Theory of Transducers: construction and use of various Transducers	
	6	Different types of transducers	
3rd	7	Resistive transducers and wire wound potentiometer	Use of variable capacitive transducer.
	8	capacitive transducers	
	9	Inductive transducers	
4th	10	Electromagnetic transducers	To measure linear displacement using LVDT
	11	Piezo electric type transducers	
	12	Measurement of Displacement and Strain: LVDT and RVDT transducers	
5th	13	First Sessional Test	To study the use of electrical strain gauge
	14	Strain gauges and Gauge factor	
	15	Gauge materials and their selections.	
6th	16	Use of electrical strain gauges their different types such as inductance type resistive type, wire and foil type etc.	To study weighing machine using load cell
	17	Strain gauge bridges and amplifiers.	
	18	Force Measurement: Different types of force measuring devices and their principles	
7th	19	Load cells	To measure the speed of a motor.
	20	load measurements by using elastic transducers and electrical strain gauges	

	21	Torque Measurement: Different types of torque measurement methods	
8th	22	Measurements of torque by brake and dynamometer	Use of different proximity Switches.
	23	Speed measurements; different methods and devices.	
	24	Speed measurements; different methods and devices.	
9th	25	Pressure Measurement	Use of magnetic and ultrasonic flow meters.
	26	Bourdon pressure gauges	
	27	electrical pressure pickups and their principle construction and applications	
10th	28	Low pressure measurements	Revision
	29	Use of pressure cells.	
	30	Second Sessional Test	
11th	31	Flow Measurement: Different type of flow meters	Use of thermistor as ON/OFF switch
	32	Basic principles of magnetic flow meters	
	33	Ultrasonic flow meters	
12th	34	Measurement of Temperature: Bimetallic thermometer	To measure temperature using RTD.
	35	Resistance thermometers	
	36	Thermistors	
13th	37	Thermocouple	To measure temperature using a thermo-couple
	38	Pyrometer	
	39	Temperature recorders	
14th	40	Measurement of other non -electrical quantities such as humidity measurements	To measure pH value of given solution.
	41	Different Hygrometers	
	42	pH value measurements	
15th	43	Level measurements	To measure level of water in a tank using any sensor
	44	Vibrations measurements	
	45	Third Sessional Test	
16th	46	Revision	Internal practical

Subject: MOOC

Name of the Faculty: Ms. Divya Chopra Discipline: ECE Subject: MOOC	Semester: 5th
Lesson Plan Duration: 15-16 weeks Work Load (Lectures) per week (in hours): 02 hours (Theory)	

Week	Theory	
	Lecture Day	Topic (Including Assignment/ Test)
1st	1	Introduction to Embedded Systems: Definition, characteristics, applications,
	2	History and evolution of embedded systems, examples of embedded products (mobile phones, washing machines, automobiles, medical devices).
2nd	1	Embedded System Architecture: Basic building blocks of embedded systems, hardware and software components.
	2	Processor, memory, input/output devices, sensors and actuators.
3rd	1	Microcontrollers in Embedded Systems: Introduction to microcontrollers, microprocessor vs microcontroller.
	2	Features of 8051/AVR/ARM-based controllers, applications of microcontrollers.
4th	1	Assignment and discussion on MCQs.
	2	Evaluation of students by taking Class test.
5th	1	1st Sessional Tests (Tentative)
	2	Discussion on the sessional paper and important points to be considered during the attempt.
6th	1	Embedded System Development Process: Design flow, requirement analysis, hardware design,
	2	Software development, testing and debugging, tools used in embedded design.
7th	1	Embedded Programming Fundamentals: Introduction to Embedded C, programming structure, data types.
	2	Operators, loops, functions, bit manipulation, programming microcontrollers
8th	1	Memory and Storage in Embedded Systems: RAM, ROM.
	2	Flash memory, EEPROM, memory mapping, boot process, firmware concepts.
9th	1	2nd Sessional Tests (Tentative)
	2	Discussion on the sessional paper and important points to be considered during the attempt.
10 th	1	Input and Output Interfacing: Digital and analog I/O, interfacing LEDs
	2	Interfacing switches, buzzers, relays, and displays.

11 th	1	Sensors and Actuators in Embedded Systems: Types of sensors (temperature, light, pressure, motion)
	2	Signal conditioning, ADC/DAC, actuator interfacing.
12 th	1	Discussion various MCQs related to topics.
	2	Revision/Assignments
13 th	1	Discussion of problems related to the topics.
	2	Evaluation of students by taking Class test.
14 th	1	3rd Sessional Test (Tentative)
	2	Discussion on the sessional paper and important points to be considered during the attempt.
15 th	1	Revision and Practice.