Shri G. S. Institute of Technology and Science, Indore (MP)
(Government Aided Autonomous Institute Established 1952)
Affiliated to Rajiv Gandhi Proudyogiki Vishwavidyalaya, Bhopal

Department of Electronics and Instrumentation Engineering

LECTURE PLAN

(Jan-June-2024)

Subject Name & Subject Code: EI27501-ANALOG ELECTRONICS

S. No.	Unit No	Topic Covered	Lecture no.	Remark
1	I	Introduction to Coupling/ cascading, types and advantages	1	
2		Low frequency analysis of RC coupled amplifiers, effect of coupling and bypass	2	
3		Amplifier at high frequencies, Hybrid-π model equivalent circuit in CE configuration, parameter,	3,4	
4		High frequency response of single/two stage amplifiers, Calculation of Gain, band width and Gain BW product	5,6	
5		Effect of cascading on gain & bandwidth, Transformer coupled and Direct coupled amplifier	7,8	
6	II	General feedback theory, characteristics of negative feedback amplifiers, Effect of negative feedback Oscillators: Principle of oscillation, Barkhausen stability criterion	9,10	
7		Audio frequency oscillator: Phase shift & Wien bridge oscillators, RF Oscillator: Colpitts& Hartley, Crystal Oscillator	11,12,13	
8	III	Introduction to op-amp. Block diagram and differential amplifier configurations. current source and current mirror circuit	14	
9		Equivalent circuit of Op-amp, IC 741 pin out, Characteristics (CMRR, slew Rate etc)of op-amp. Virtual ground, Offset error in voltages & currents & their temperature drift,	15	
10		Linear and non-linear application of Op-amp, Inverting and non inverting configuration	16	
11		Integrator; derivation of frequency	17	
12		Differentiator; derivation of frequency	18	
13		comparators, Schmitt trigger , Sample & hold circuit,	19	
14		Instrumentation amplifiers.	20	
15	IV	Introduction to Tuned RF voltage amplifiers: Single and double tuned amplifiers,	21	
16		Gain and bandwidth calculations,	22	

17		frequency response of under coupled, critically and over coupled circuits,	23	
18		Review of regulators using Zener diodes, series and shunt regulators,	24	
19		Over current protection using current limiting fold back and crowbar protection, Regulators using Ics	25	
20		Multivibrators circuit using BJT -Astable and Monostable	26,27	
21		555 – Timer IC, pin out, pin description working as Astable	28,29	
22	**V**	Square wave and Triangular wave and Sawtooth wave generators,	30,31	
23		Linear Wave shaping circuits, RC high pass & low pass circuit,	32,33	
24		Passive integrator and differentiator	34	
25		Effect of Tilt or sage.	35	

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LECTURE PLAN (Jan-June-2024)

Subject Name & Subject Code: Sensors & Transducers (EI-27551)

Sr. No	Unit No	Topics to be covered	Lecture No	Remarks
1	1	Role of transducers in instrumentation Transducers construction, classification and characteristics.	1	Done
2	1	Principles of operation and characteristics, interfacing of transducers and signal conditioning	2	Done
3	2	Transducers for measurement of displacement, strain, velocity, acceleration etc.	3	Done
4	2	Transducers for measurement of Potentiometer	4	Done
5	2	Transducers for measurement of LVDT	5	Done
6	2	Transducers for measurement of Strain gauge	6	Done
7	2	Transducers for measurement of capacitance gauge.	7	Done
8	2	Measurement of piezo electric transducers	8	Done
9	2	Measurement of accelerometers	9	Done
10	3	Basic methods of force measurement (Spring, beam, diaphragm)	10	Done
11	3	Strain gauge: basic principal, gauge factor, types of strain gauge, materials and their properties, bonding material compensation techniques, bridge configuration.	11	Done
12	3	**Positive Pressure Sensors: Manometers** – u tube Well type, inclined tube, Ring balance, Micro manometer, use of seal pots, range of measurement	12	Done
13	3	**Elastic –** Bourdon, Diaphragm, Bellows and their types, materials and their properties, range of measurement	13	Done
14	3	**High Pressure Measurement –** Bulk modulus cell, Bridgeman type Differential Pressure Measurement : Force balance.	14	Done
15	3	**Vacuum measurement:** Mc Leod gauge, Thermal Conductivity (Pirani, Thermo couple),	15	Done
16	3	Hot cathode ionization gauge, Molecular momentum (Knudsen) gauge, Cold Cathode ionization (Penning) gauge.	16	Done
17	3	Calibrating Instruments – Dead Weight Tester (Pressure, Vacuum).	17	Done
18	4	**Temperature measurement**: Temperature Scales ,Standards and Unit sand relations	18	Done
19	4	Classification of temperature sensors.	19	Done
20	4	**Mechanical:** Bimetallic Thermometer – Working Principle, Various types, Filled system	20	Done
21	4	Thermometers – SAMA classifications, Sources of errors and their remedies, Dip effect.	21	Done
22	4	**Electrical:** Resistance Temperature Detectors – Principle, materials and their properties, Types and ranges, different sources of errors and compensations.etc,	22	Done
23	4	**Thermistor :** Types(NTC,PTC),Measuring Circuits	23	Done

24	**4**	Classification of temperature sensors.	**24**	**Done**
25	**4**	**Thermocouple:** Terminology, Types (B,E,J,K,R,S,T), determination of polarity, Characteristics,	**25**	**Done**
26	**4**	Laws of thermoelectricity, Study of thermocouple tables(calculation of intermediate temperature and voltage),	**26**	**Done**
27	**4**	**Non- contact Types:** Pyrometers: Total Optical, Infrared.	**27**	**Done**
28	**5**	Transducers for measurement of flow and level	**28**	**Done**
29	**5**	Electromagnetic and other flow meters.	**29**	**To be covered**
30	**5**	Various methods of level measurements, Ultrasonic level gauge	**30**	**To be covered**
31	**5**	Measurement of humidity and moisture.	**31**	**To be covered**
32	**5**	Introduction to MEMS, finger print &wireless sensors	**32**	**To be covered**

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LECTURE PLAN
(Jan-June-2024)
SUBJECT: Circuit Design using HDL (EI27504)

Sr. No.	Unit No.	Topics To Be Covered	Lecture No.	Remark
01.	1	The need of EDA Tools in VLSI, Front End–backend tools	01	
02.		Recent advancement in VLSI industry, VLSI design flow.	02	
03.		Gajeski‘s chart, Various design approaches: Top-down, Bottom-up Mixed	03	
04.		PLD based design flow, Synthesis, Simulation	04	
05.		Physical Design: Placement & Routing, Floor planning.	05	
06.		Verification,Back-annotationetc.	06	
07.	2	Introduction to VHDL, Concepts of Package and library,	07	
08.		Concurrent Vs. Sequential statements, Delay modeling	08	
09.		Entity, Architecture, Configuration, Component instantiation,	09	
10.		Syntax and Semantics of VHDL,	10	
11.		Variable and signal types, arrays and attributes.	11	
12.		Operators, expressions and signal assignments. Component instantiation	12	
13.	3	Various modeling supported by VHDL: Data flow and Structural Modeling	13	
14.		Behavioral modeling with examples	14	
15.		Processstatement, Loop controlstatements, Multiple Processes, Examples of combinatorial logic circuits	15	
16.		Concurrent Assignment statements, Block statements, Signal Drivers. Examples of combinatorial circuits	16	
17.		Examples of synchronous logic circuits including flip-flops	17	
18.		Examples of synchronous circuits including counters, registers, etc.	18	
19.	4	Introduction to Verilog, Syntax and Semantics of Verilog.,	19	
20.		Variable types, arrays and tables.	20	
21.		Operators, expressions and signal assignments.	21	
22.		Modules,netsand registers,	22	
23.		Few examples of combinational and sequential circuits	23	
24.		Introduction to System Verilog	24	
25.	5	Programmable logic arrays(PLAs), Programmable array logic (PLAs)	25	
26.		Programmable logic devices (PLDs), Complex, Programmable logic devices (CPLDs)	26	
27.		Concept of FPGA	27	
28.		Altera FELX10Kseries COLDs. Xilinx 3000 series FPGAs, Designing with FPGAs, Xilinx 4000seriesFPGAs	28	
29.		LUT Based examples	29	
30.		LUT Based examples	30	

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LECTURE PLAN

Subject Name & Subject Code: EI37701-MICROCONTROLLER & EMBEDDED

S. No.	UNIT	CONTENT TO BE COVERED	LECTURE NO	Remark
1	GEN	DISCUSSION ABOUT SUBJECT NOMENCULTURE	1	
2	1	IDEAL NON IDEAL SOURCES	2	
3		DEPENDENT SOURCES	3	
4		SOURCE TRANSFORMATION	4	
5	2	SUPERPOSITION THEOREM PROBLEMS	5	
6		THEVENIN-NORTONS THEOREM	6	
7	3	FREQ. RESPONSE SELECTIVE NETWORK	7	
8	5	STEP INPUT TO INTEGRATOR CIRCUIT	8	
9	3	AC FUNDAMENTALS. COUPPLED CIRCUIT	9	
10		THEVENIN-NORTONS PROBLEM OF COUPPLED CIRCUIT	10	
11	5	STEP INPUT TO DIFFRENCIATOR CIRCUIT	11	
				CT- 1
12		INITIAL VALUE IN CIRUCIT ALIMENTS CONCEPT OF DUALITY	12	
13		FIRST AND SECOND DARIVATIVE OF INTIAL VALUES	13	
14		PROBLEM ON CIRCUIT TRANSAINTS	14	
15		TIME CONSTANT & SOLUTION TO FIRST ORDER CIRCUITS	15	
16	4	TWO PORT PARAMETERS (Z-Y-h) & IT'S INVERSE	16	
17		TWO PORT PARAMETERS PROBLEMS	17	
18		CONDITON OF RACIPROCITY AND SYMMETRY (TWO PORT)	18	
19		APPLICATION OF TWO PORT PARAMETER	19	
20		SERIES AND PARALLEL TWO PORT NETWORK AND PROBLEMS	20	
21	3	DAMPING ANALYSIS. STEP INPUT TO SERIES RLC CIRCUIT.	21	
22	2	RECEPROCITY THEOREM	22	
				QUIZ
23	3	SERIES AND PARALLEL RESONANCE.	23	

24	5	PROPERTIES OF LAPLACE RANSFORM	24	
25		APPLICATION OF LAPLACE TRANSFORM	25	
				CT-2
26	4	POLES AND ZEROS , PR FUNCITONS	26	
27		CAUER FIRST AND SECOND FORM OF NETWORK SYNTHESIS	27	
28	2	3-PH NETWORK AND PHESOR DIAGRAM. AC POWERS	28	
29		TELLEGEN'S THEOREM	29	
30	1	POWER AND ENERY RELETION	30	
31	3	RLC CIRCUITS AND DAMPING	31	
32	1	BASIC OF GRAPH THEORY	32	
33	2	COMPENSATION THEOREM	33	
34		MIILER 'S THEOREM	34	
35	ALL	RIVISIONOF FULL SYLLEBUS		REMEDIAL CLASSES 6-8 NOV 23

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LECTURE PLAN

(Jan-June-2024)

Subject Name & Subject Code: EI37513-HIGH FREQUENCY ENGINEERING

Sr.	Unit No	Topics to be covered	Lecture No	Remarks
1.	I	Review of Wave Propagation: Maxwell's equations	**01-02**	
2.		Importance at high frequency Wave	**03**	
3.		Propagation through various media	**04**	
4.		Behaviour of passive components at high frequency	**05**	
5.		Equivalent circuit of R, L, C,	**06**	
6.	II	Reflection coefficient, input impedance of transmission line	**07-08**	
7.		Lossy and loss-less transmission lines,	**09**	
8.		primary and secondary constants of transmission line	**10**	
9.		Propagation through various media	**11**	
10		Skin effect, Skin depth.	**12**	
11		Standing waves and VSWR.	**13-14**	
12.	III	Transmission lines-II: Open and Short circuited transmission lines, causes of attenuation in transmission.	**15-16**	
14.		*i*nput impedance of short and open circuited transmission line, their voltage and current equations,	**17, 18, 19**	
15.		Concept of impedance matching,	**20, 21**	
16.		Perfectly matched transmission line, Stub matching, Single and double stub technique,	**22, 23**	
17		Smith chart and its applications, calculations using Smith chart,	**24-25**	
18		Importance of Smith chart at high frequency	**26**	
19.	IV	Wave Guides: Waves between parallel planes of perfect conductors, field patterns, waves, Wave impedances, attenuation in wave guides	**27, 28**	
20.		Types: Parallel plate, rectangular, circular wave guides,	**29**	
21.		Field equations, modes in wave guides, excitation of modes,	**30**	

22.		Cut-off wavelength and phase velocity, dominant mode, transverse Electric and Transverse Magnetic (TE and TM)	**31**	
23.	**V**	High frequency devices: High frequency Transistors and their equivalent circuit analysis,	**32**	
24.		IMPATT, BARITT, TRAPATT, Gunn diode	**33**	
25		Klystron, Magnetron and TWT	**34**	
26		IOT (Inductive Output Tube) IOT (Inductive Output Tube) Construction &operating principle. Comparison of IOT with Klystron	**35**	

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LECTURE PLAN

(Jan-June-2024)

Subject Name & Subject Code: EI37701-MICROCONTROLLER & EMBEDDED SYSTEM (Elective)

S. No.	Unit No	Name of Topic	Lecture no.	Remark
1	I	Introduction to Microcontroller	1	
2		Features of various families of microcontrollers		
3		Similarities & Difference between general purpose & application specific, RISC vs CICS	2	
4		Van Neumann and Harvard Architecture.	3	
5		Applications of Microcontrollers in real-world		
6	II	Features and Architecture of 8051-Block diagram, Memory allocation	4	
7		Programming model & instruction set Assembly language programming	5	
8		GPRs & SFRs	6	
9		Timer	7,8	
10		8051-Timer/Counter and its Programming,	9	
11		Interrupt	10,11	
12		Serial Communication	12,13	
13		External Memory Interfacing	14	
14	III	Interfacing of LEDs	15	
15		7 Segment display device, DIP Switches/Push buttons		
16		LCD display	16,17,18	
17		Key denounce techniques	19	
18		Keyboard connections load per key and matrix form,		
19		Interfacing A/D converter,,	20	
20		stepper motor and DC motor	21,22	
21	IV	Introduction to Embedded systems, Functional unit of Embedded system	23	
22		Categories of embedded systems,	24	
		Characteristics and their applications.		
23		Hardware architecture of Embedded system-	25	
		Design Process step & Design cycle	26	
24	V	System planning and development of project	27	
25		Few cases studies life cycle models- waterfall, V-model, spiral & rapid prototype. Various Software architecture of embedded systems	28,29	
26		Real time operating system	30	
27		Block diagram, Types, characteristics & scheduling.	31	