SYLLABUS

For

B.TECH. PROGRAMME

In

ELECTRONICS & COMMUNICATION ENGINEERING

INSTITUTE OF TECHNOLOGY

UNIVERSITY OF KASHMIR

ZAKURA CAMPUS

SRINAGAR, J&K, 190006

7th Semester

Course No	*Subject*	*Teaching Periods*			Credits
		Lect	*Tut*	*Prac./ Proj.*	
ECE7117B	**VLSI Design**	3	1	0	4
ECE7217B	**Data Communication**	3	1	0	4
ECE7317B	**Microwave Engineering**	3	1	0	4
ECE7417B	**Power Systems**	3	1	0	4
ECE7**17BE	**Elective – I**	3	1	0	4
ECE7117BL	**VLSI Lab**	0	0	2	1
ECE7217BL	**Data Communication Lab**	0	0	2	1
ECE7317BL	**Microwave Engineering Lab**	0	0	2	1
ECE7417BL	**Power Systems Lab**	0	0	2	1
ECE7517B	**Seminar & Pre-project**	0	0	2	1
	Total	15	5	10	25

Course No	Subject	Teaching Periods		Credits
		Lect	Tut	
ECE7117B	**VLSI Design**	3	1	4

Section	Course contents	Hours
1	Review of MOSFET: Constructional & Operational features of MOSFET	3
2	I-V Equation, 2nd Order Effects	3
3	MOS Capacitor, C-V Characteristics	2
4	MOSFET Switch, Transmission gate	2
5	CMOS Inverter (Pull-up & Pull-down), Inverter Static Characteristics, Noise Margin,	3
6	Switching characteristics of Inverter (Fall Time, Rise Time, Delay Time), Dynamic Characteristics, Power Dissipation	3
7	VLSI Technology: Wafer Processing, Oxidation, Epitaxy, Deposition, Ion- Implantation & Diffusion,	4
8	The Silicon gate Process, n-well CMOS Process, p-well Process, Twin-Tub Process, Silicon On Insulator.	4
9	CMOS Logic Design (Gates): CMOS Logic Gate Design (NAND & NOR Logic)	3
10	Switching Characteristics (Delay Time, Power, Fan-in, Fan-out), Transistor Sizing, The Compound Gates	4
11	CMOS Logic Structures: CMOS Logic, Pseudo-nMOS Logic, Dynamic CMOS Logic, C2MOS Logic, BiCMOS Logic, NP Domino Logic.	5
12	Layout: Design Rules/Floor planning, Simple Layout Examples.	5
13	CMOS Logic Design (Circuits): Multiplexers, MUX Implementation in CMOS & Transmission Gate,	4
14	RAM Cell Implementation, Implementation of Flip-Flop, Register/Counters	5
TOTAL HOURS FOR THE COURSE		**50**

References:

1. CMOS VLSI Design: A Systems Perspective by N. Weste & K. Eshraghian
2. CMOS VLSI Design: A Circuits & Systems Perspective by N. Weste, D. Harris & A. Bannerjee
3. Digital Integrated Circuits: A Design Perspective by Rabaey

Course No.	Subject	Teaching Periods		Credits
		Lect	Tut	
ECE7217B	**Data Communication**	3	1	4

Section	Course contents	hours
1.	Introduction to Data Communications Technology with Diverse Applications. Data Representation, Data Flow, Data Encoding, Data transmission. Introduction to Networks, Internet, Protocols, Standards, Standards-organizations	4
2.	The OSI Model. TCP /IP Protocol, different layers and their functions.	4
3.	Introduction to transmission media (Guided,Unguided) and network topologies. MAN, LAN, WAN, SAN, BAN, PAN and their comparative study. Transmission-Impairments, Bandwidth, Throughput, Data rate, channel capacity, Latency, Bandwidth-Delay product.	6
4.	Line Encoding Schemes and their comparative study, Block coding and Scrambling, Transmission Modes	4
5.	Pseudo-Noise(PN)sequences (Properties and Circuit Implementation), Spread-Spectrum Modulation (theory and applications), Spread- Spectrum techniques, Direct-Sequence Spread Spectrum(DSSS), Frequency Hopping Spread-Spectrum and Time Hopping Spread-Spectrum	9
6.	Multiplexing and de-multiplexing techniques viz. TDM, FDM, CDM, OFDM, WDM, DWDM.	7
7.	Synchronous and asynchronous networks, bit and frame synchronization. Circuit switching, message switching and packet switching, relative advantages and disadvantages.	7
8.	Multiple-access schemes viz. TDMA, FDMA, ALOHA, CSMA techniques. Framing ,Flow and Error control. Error detection and error correction techniques, nature of transmission errors, error detection codes, error correction codes, retransmission codes.	7
9.	Routing techniques, flooding static routing, centralized routing, distributed routing.	4
TOTAL HOURS FOR THE COURSE		**52**

References

1. Data Communications and Computer Networks by W. Stallings
2. Data Communications and Computer Networking by Behrouz Forouzan

Course No.	Subject	Teaching Periods		Credits
		Lect	Tut	
ECE7317B	**Microwave Engineering**	3	1	4

S. No.	Title	Hours
1	Microwave Semiconductor Devices: Classification of Microwave Devices	2
2	Point Contact diode; Tunnel Diode;	4
3	Gunn Diode, two valley structures, mode of operation, circuit realization	4
4	IMPATT Diode, circuit realization.	2
5	PIN diode, basic principles of operation equivalent circuit, and application as switch, modulator and Phase shifter	6
6	Microwave Bi-polar and Field effect Transistors-Characteristics and performance.	6
7	Microwave Components: Microwave Hybrid Circuits: Waveguide tee: E-plane tee, H-plane tee, Magic tee, hybrid rings (rat-race circuits)	10
8	Directional Couplers, S-Matrix of direction Coupler. Circulators and isolators	4
9	Microwave Amplifiers & Oscillators : Microwave tubes: lead inductance and Inter electrode capacitive effects Transient angle effect, Gain bandwidth Limitation,	5
10	Klystrons: Multi-cavity Klystron and Reflex Klystron	4
11	Gunn Oscillator, Magnetron oscillator	3
TOTAL HOURS		**50**

References

1. Liao, S. Y, Microwave Devices & Circuits, PHI
2. David Pozar, Microwave Engineering, John Wiley
3. R E Collin: Foundations for Microwave Engineering, Mc Graw Hill
4. Skolnik: Introduction to Radar Engineering, Mc Graw Hill

Course No.	Subject	Teaching Periods		Credits
		Lect	Tut	
ECE7417B	**Power Systems**	3	1	4

S. No.	Title	Hours
1	DC and AC Distribution System: Introduction to a power system (an overall view) distribution systems Feeder, distribution, service	6
2	Mains classification, connection schemes,	3
3	various types of DC and AC distributors	3
4	voltage drop calculations	3
5	Overhead AC Transmission lines: Line Parameters	3
6	types of conductors. Aluminium Core Steel Reinforced (ACSR) etc. Stranding, bundling of conductors	3
7	Resistance calculations, skin effect, proximity effect	3
8	Inductance and capacitance and capacitance of single Phase, 3 phase, single circuit and double circuit lines	4
9	Representations and performance of short medium and log lines	4
0	ABCD constants	2
11	surge impedance	2
12	Feranti effect	2
13	Power flow through a transmission lines	2
14	Insulators for overhead lines: Materials for insulators, types of insulators, potential distribution over a string of suspension insulators, methods for equalizing the potential	3
15	Interference of power lines with communication circuits, Electrostatic and electromagnetic effect.	3
16	Corona: Visual and critical disruptive voltage, conditions effecting corona, former loss due to corona, Practical consideration	3
17	Mechanical design of transmission lines. Sag and tension calculations	3
TOTAL HOURS		**52**

References

1. Elements of Power System Analysis by W. D. Stevenson
2. Transmission & Distribution of Electrical Energy by H. Cotton & Barber
3. Power System Engg. by Nagrath & Kothari 4. Electrical Power Systems by C. L. Wadwa

Course No.	Subject	Teaching Periods	Credits
		P	
ECE7117BL	**VLSI Lab**	2	1

List of Experiments

Experiments on Design using VHDL and Implementation using Xilinx/Spartan Kits: Combinational Design & Implementation Exercises:

1. Design and implementation of basic Gates: AND, OR, NOT.
2. Design and implementation of universal gates.
3. Design and implementation of 2:1 Mux using other basic gates.
4. Design and implementation of 2 to 4 Decoder.
5. Design and implementation of Half-Adder, Full Adder, Half Subtractor, Full Subtractor.
6. Design and implementation of 3:8 Decoder.
7. Design and implementation of 8:3 Priority Encoder.
8. Design and implementation of 4 Bit Binary to Grey code Converter.
9. Design and implementation of 4 Bit Binary to BCD Converter using sequential statement.
10. Design an 8 Bit parity generator (with for loop and Generic statements).
11. Design and implementation of 2"s Complementary for 8-bit Binary number using Generate statements.

Sequential Design & Implementation Exercises:

12. Design and implementation of all type of Flip-Flops using (if-then-else) Sequential Constructs
13. Design and implementation of 8-Bit Shift Register with shift Right, shift Left, Load and Synchronous reset.
14. Design and implementation of Synchronous 8-bit Johnson Counter.
15. Design and implementation of Synchronous 8-Bit universal shift register (parallel-in, parallel-out) with 3-state output (IC 74299).
16. Design and implementation of counters (MOD 3, MOD 5, MOD 8, MOD 16).
17. Design and implementation of a decimal up/down counter that counts up from 00 to 99 or down from 99 to 00.
18. Design and implementation of 3-line to 8-line decoder with address latch.

Course No.	Subject	Teaching Periods	Credits
		P	
ECE7217BL	**Data Communication Lab**	2	1

Experiments

1. Study of Serial Port, Study of Parallel Port
2. Study of Synchronous Serial Communication Study of Asynchronous Serial Communication
3. Study of PC-PC Serial Communication using RS-232 cable Study of different Modem used in Serial Communication Study of Flow controls in Serial Communication
4. Study of Protocols in Serial Communication Study of Fiber Optic Communication
5. Study of Modem Communication Study of Wireless Communication
6. Study of PC-PC Parallel Communication using DB25 cable Study of printer interface using parallel port
7. Study of various multiplexing techniques using kits.
8. Study of Various Data encoding Techniques.

Course No.	Subject	Teaching Periods	Credits
		P	
ECE7317BL	**Microwave Engineering Lab**	2	1

Experiments

1. Study of Microwave components and Instruments
2. To plot and study the V-I characteristics of a Gunn diode.
3. Tuning of Gunn Oscillator
4. To study the characteristics of reflex Klystron
5. Tuning of Klystron Oscillator
6. To study the Characteristics of Detector.
7. To measure the Frequency using direct reading frequency meter and compare it with indirect frequency meter.
8. To study the properties of E- and H-plane waveguide tee junctions and to determine isolations, coupling coefficients and input VSWR.
9. To measure VSWR, Insertion loss and attention of fixed and variable attenuator
10. Measurement of Directivity and Coupling coefficient of a directional coupler
11. To match impedance for maximum power transfer using a slide screw tuner

Course No.	Subject	Teaching Periods	Credits
		P	
ECE7417BL	**Power Systems Lab**	2	1

List of Experiments

1. A.C distribution
2. D.C. distribution
3. Efficiency, Regulation & ABCD parameters of Transmission line
4. Study of cables & find charging current.
5. Study of different types of insulators.
6. Computer Simulation of Power System.

Course No.	Subject	Teaching Periods	Credits
		P	
ECE7517B	**Seminar & Pre-project**	2	1

Seminar

The students are required to prepare a seminar report and presentation based on the latest trends and technologies in their respective fields of study. The work is to be carried out in the 7th semester of their course individually. Each student will have to deliver a presentation before a panel of experts based on the seminar work carried by him/her.

Pre-project description

The pre-project work is carried out by students in a group. The group comprises of a minimum of three and a maximum of 5 students. In the pre project work students shall choose a specific topic/area for the project. The selected areas shall encompass recent and emerging trends in technologies that prove beneficial for society in general and humanity in particular. Supervisors will be assigned to each group in the beginning of the 7th semester of their course. Each student at the end of the course will submit a Project report and the workable prototype regarding the project and the same will be evaluated for final award of the course.