7^{th} Semester

Course No.	Subject	Teaching Periods		Credits
		L	T	
ESCECE71	**Power Electronics**	2	1	3

Section	Course contents	Hours
1.	Review of power semiconductor switching devices, Diode, Thyristors, MOSFET, IGBT, Characteristics and applications	7
2.	Introduction to Turn-ON/Turn-OFF mechanism of switching devices, Gate-drive circuits, Switching-aid circuits, protection, Heat sink design	7
3.	Single phase rectifiers (uncontrolled, semi-controlled, controlled) with passive loads, Performance analysis, Applications	8
4.	Three-phase rectifiers (uncontrolled, semi-controlled, controlled) with passive loads, Performance analysis, Applications	7
5.	Single-phase inverter: principle of operation, single phase bridge inverter, voltage Control in inverters and harmonic reduction using PWM strategies, Applications	8
6.	Three-phase inverters: 180 degree conduction and 120 degree conduction, voltage Control in inverters and harmonic reduction using PWM strategies	8
7.	Introduction to DC-DC converters; buck ,boost and buck-boost converters, Applications	5
TOTAL HOURS FOR THE COURSE		**50**

References

1. Fundamental of Power Electronics: Robert Erickson, D.Maksimovic
2. Power Electronics, Circuits, Devices and Applications: Muhammad H. Rashid
3. Power Electronic, Devices, Applications, and Passive Components: Barry W. Williams
4. Power Electronics-converters, Applications, and Design: NedMohan, Tore.M.Undel and, William P. Robbins

Course No.	Subject	Teaching Periods		Credits
		L	T	
PCCECE72	**Data Communication**	2	1	3

Section	Course contents	Hours
1	***Introduction*** **-** Data Communications, The OSI Model, TCP/IP Protocol Suite	3
2	***(PHYSICAL LAYER and MEDIA)_Data and Signals*** **-** Analog And Digital, Periodic Analog Signals, Digital Signals, Transmission Impairment, Data Rate Limits, Performance	5
3	***Digital Transmission*** **-** Digital-To-Digital Conversion, Analog-To-Digital Conversion, Transmission Modes	6
4	***Analog Transmission*** **-** Digital-To-Analog Conversion, Analog-To-Analog Conversion	6
5	***Bandwidth Utilization: Multiplexing and Spreading*** **–** Multiplexing, Spread Spectrum	4
6	***Transmission Media*** **-** Guided Media, Unguided Media	2
7	***(DATA LINK LAYER)_Error Detection and Correction*** **–** Introduction, Block Coding, Linear Block Codes, Cyclic Codes, Checksum	5
8	***Data Link Control*** **–** Framing, Flow And Error Control, Protocols, Noiseless Channels, Noisy Channels, HDLC, Point-To-Point Protocol	5
9	***Multiple Access*** **–** Random Access, Controlled Access, Channelization	5
10	***Wired LANs: Ethernet*** **-** IEEE Standards , Standard Ethernet , Changes In The Standard, Fast Ethernet, Gigabit Ethernet	2
11	***Wireless LANs*** **-** IEEE 802.11, Bluetooth	2
12	***Connecting LANs, Backbone Networks, and Virtual LANs*** **-** Connecting Devices, Backbone Networks, Virtual LANs	3
13	***Wireless WANs: Cellular Telephone and Satellite Networks*** **-** Cellular Telephony, Satellite Networks	2
TOTAL HOURS FOR THE COURSE		**50**

References

1. Data Communications and Networking by Behrouz A. Forouzan, Tata McGraw Hill
2. Computer Networks by Andrew S. Tanenbaum, Pearson Education
3. Data Communications and Computer Networks by W. Stallings

Course No.	Subject	Teaching Periods		Credits
		L	T	
PCCECE73	**Microwave Engineering**	3	1	4

S. No.	Course contents	Hours
1	Microwave Semiconductor Devices: Classification of Microwave Devices	2
2	Point Contact diode; Tunnel Diode	3
3	Gunn Diode, two valley structures, mode of operation, circuit realization	3
4	IMPATT Diode, circuit realization	2
5	PIN diode, basic principles of operation equivalent circuit, and application as switch, modulator and Phase shifter	4
6	Microwave Components: Microwave Hybrid Circuits: Waveguide tee: E-plane tee, H-plane tee, Magic tee, hybrid rings (rat-race circuits)	5
7	Directional Couplers, S-Matrix of direction Coupler. Circulators and isolators	4
8	Microwave Amplifiers & Oscillators : Microwave tubes: lead inductance and Inter electrode capacitive effects Transient angle effect, Gain bandwidth Limitation	3
9	Klystrons: Multi-cavity Klystron and Reflex Klystron	3
10	Gunn Oscillator, Magnetron oscillator	3
11.	Transmission Lines Transmission Line equations and solutions,	3
12.	Characteristic impedance and propagation constant	3
13.	Reflection and transmission coefficients, SWR	3
14.	Open and short circuit lines- their use as circuit elements at UHF	3
15.	Line impedance and admittance	2
16.	Smith Chart	2
17.	Impedance Matching	2
TOTAL HOURS FOR THE COURSE		**52**

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
		L	T	
PCCECE74	**Computer Organization and Architecture**	2	1	3

Section	Course contents	Hours
1	Computer organization and architecture, Computer Level Hierarchy, Evolution of Computers, Von-Neumann Architecture, Structure and Components of Computers	6
2	Computer Functions, Instruction Execution and Instruction Cycle State Diagrams	4
3	Computer Buses, Bus Interconnection and Hierarchy, Elements of Bus Design, Bus Arbitration and Timings	4
4	Basic CPU equation. Measuring Performance – MIPS, FLOPS, CPI/IPC, Benchmark, Speedup, Amdahl's and Moore's Laws	4
5	Instructions and Instruction Set–Characteristics, Types, Functions, Execution, Representation, Format, Addressing Modes, CPU Register Organization	4
6	Computer arithmetic logic design, fast adders, multiplication, Booth's algorithm, fast multiplication, integer division, ALU– Fixed and Floating point ALU Organization, floating point arithmetic	6
7	Control Unit – Functional Requirements, Structure, Control Signals, hardwire and Micro-programmed Wilkes Control unit, Microinstructions and its formats, Control Memory	6
8	Introduction to Pipelining and Parallel Processing	2
9	Memory Hierarchy, types and Characteristics, Primary Memory- Types, Working, Chip Organization, Expansion	2
10	Cache Memory- Mapping Schemes, Replacement Policies, Hit and Miss, Write policies, Coherence, Virtual memory– Overlays, Paging, Segmentation and Fragmentation	6
11	Input-Output organization– Peripheral devices, I/O modules, Input-output interface, Modes of transfer - Programmed I/O, Interrupt-driven I/O, Direct Memory access, I/O processor, Data Communication processor	6
TOTAL HOURS FOR THE COURSE		**50**

References

1. William Stalling: Computer organization and architecture, Latest Edition
2. John P. Hayes: Computer Architecture and Organization, Latest Edition
3. Computer Organization by Hamachar
4. Computer Organization & Architecture by M. M. Mao

Course No.	Subject	Teaching Periods	Credits
		P	
ESCECE71L	**Power Electronics Lab**	2	1

List of Experiments

1: To do the following:

(a) To obtain V-I Characteristics of an SCR.

(b) To obtain V-I Characteristics of a TRIAC.

2: To obtain the Static Emitter Characteristic sofa UJT.

3: To study the Line-synchronized UJT Relaxation Oscillator as a triggering agent for a thyristor and plot load voltage v/s firing angle.

4: To study various firing schemes of an SCR and draw the traces for various waveforms:

(a) Resistance Triggering Technique,

(b)R-C Triggering Technique,

(c)Linear Firing Scheme,

(d)Inverse Cosine Firing Scheme.

5: To study a Single-Phase Half-Wave Converter and plot Source voltage, Load voltage and load current for R and R-L loads.

6: To study a Single-Phase Semi-Converter and plot Source voltage, Source current, Load voltage and load current for R, R-L and Motor Loads.

7: To study a Single-Phase Full-Converter and plot Source voltage, Source current, Load voltage and load current for R, R-L and Motor Loads.

8: To study a Three-Phase Semi-Converter and plot Source voltage, Source current, Load voltage and load current for R, R-Land Motor Loads.

9: To study a Three-Phase Full-Converter and plot Source voltage, Source current, Load voltage and load current for R, R-Land Motor Loads.

10: To study a Single-Phase Dual Converter on Motor Load.

11: To study a DC-DC Buck Converter (Step-Down Chopper)for R, R-L and DC Motor Load and plot Load voltage Vs. Duty Ratio.

12: To study a Single-Phase Voltage Source Inverter on Rand R-L Loads.

13: To study a Three-Phase Voltage Source Inverter on R and R-L Loads.

14: To study a Single-Phase PWM Voltage Source Inverter on R and R-L Loads and plot Load voltage Vs. Modulation index.

Course No.	Subject	Teaching Periods	Credits
		P	
PCCECE72L	**Data Communication Lab**	2	1

List of Experiments

1. Perform pulse coded modulation for analog to digital conversion. Analyze bandwidth requirement, data rate generation, synchronous and asynchronous mode of transmission.
2. Perform bandwidth utilization technique time division multiplexing.
3. Perform various line coding formats and compare transmission characteristic of each formats.
4. Perform digital carrier modulation techniques used in wireless communication.
5. Perform amplitude modulation and demodulation.
6. Perform serial data communication between two data terminal equipment using optical link.
7. Perform digital data transfer through RF transmitter and receiver.
8. Demonstration of different types of cables used in data communication.
9. Perform Installation of LAN and troubleshooting of frequently occurred problems.
10. Create and test wireless sensor networks.
11. To study various aspects of data communication by field visit at data center.
12. Perform data communication using IR.

Course No.	Subject	Teaching Periods	Credits
		P	
PCCECE73L	**Microwave Engineering Lab**	2	1

List of 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. Study of transmission lines concepts using trainer Kit.

Course No.	Subject	Teaching Periods	Credits
		P	
PSIECE76	**Project (Phase-I)**	2	1

DESCRIPTION:

The Project work shall be carried out by a group of students. The maximum number of students in a group can be four (4). In the project work, a student 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. Supervisor/mentor will be assigned to each student in the beginning of the 7th semester of their course. The Project Phase-1 can encompass any of the following.

1. A full-fledged mini project that needs to be submitted in totality at the end of 7th semester. The deliverables include: The working prototype of the project, Project Report and PPT presentation.
2. A part of the major project (Project-phase-II).The Deliverables include the working modules of the project, the partial project completion Report and the PPT presentation.
3. A Part of the major Research based project (Project-phase-II).The deliverables include partial Project completion report containing (Problem Definition, Literature Survey, Design methodology and Simulations), the working modules (H/W or S/W) and PPT presentation.

METHOD OF EVALUATION:

The Project Phase-I will be Evaluated at the end of the 7th Semester. The students need to present themselves before an examination committee (Internal + External) with the working modules of the project.

In case of the students who have developed a full-fledged mini project. The evaluation will be final.

In case of the students who have developed project as part of the Major project will be evaluated for the 7th semester. In Case the examination committee is not satisfied with the work of the team, they will have full authority to cancel the project for further development in the 8th semester.

The Evaluation committee must minimally comprise of the External Examiner, Head of the Department, Internal project guides and Project Faculty Incharge.