JABALPUR ENGINEERING COLLEGE, JABALPUR (MP)
(An Autonomous Institute of Govt. of M.P.)
Affiliated to Rajiv Gandhi Technological University, Bhopal (MP)
Scheme of Study and Examination (w.e.f. July 2010)

BE (PTDC) **Branch : Electronics & Telecom. Engineering** **Sem: Sixth**

Course Code	Subject	Periods			EVALUATION SCHEME					Credits
		L	T	P	SESSIONAL EXAM			ESE	SUB TOTAL	
					TA	CT	TOTAL			
EC-29A	Microprocessor and Microcontrollers	3	1	-	10	20	30	70	100	4
EC-33	Antenna Wave Propagation	3	1	-	10	20	30	70	100	4
EC-37	Data Communication & Computer Network	3	1	-	10	20	30	70	100	4
EC-38	Advance VLSI design	3	1	-	10	20	30	70	100	4
(PRACTICAL/DRAWING/DESIGN)										
EC-30AL	Microprocessor and Microcontrollers Lab	-	-	2	20	-	20	30	50	2
EC-34L	Antenna Wave Propagation Lab	-	-	2	20	-	20	30	50	2
EC-39L	Advance VLSI Design Lab	-	-	2	20	-	20	30	50	2
EC-40AL	Minor Project	-	-	2	50	-	50	-	50	2
	Total	**12**	**4**	**8**	**150**	**80**	**230**	**370**	**600**	**24**

T.A. Teachers Assessment, CT- Class Test, ESE - End Semester Examination, Total Marks 800 Total Periods : 32, Total Credits : 32

COURSE CONTENTS **(w.e.f. July 2010)**

Course	Subject Title	Subject Code	Grade for End Sem		CGPA at the end of every even semester
			T	P	
BE/PTDC	MICROPROCESSOR AND MICROCONTROLLERS	EC-29A	Min "D"	Min "D"	5.0

MICROPROCESSOR AND MICROCONTROLLERS

Unit I

Intel 8086 Microprocessor: Introduction to 16-bit microprocessors, 8086 pin functions, Minimum and maximum mode operations. 8086 Architecture, register organization, addressing Modes, 8086 Memory banks and Memory organization, 8086 Instruction set and Assembly language programming.

Unit II

Advanced microprocessors: Salient features of advanced microprocessors. Review of evolution of advanced microprocessors: 186 / 286 / 386 / 486 / Pentium. Super scalar architecture of Pentium. 80286/386 Memory segmentation with descriptor tables, Privilege levels, Changing privilege levels, Paging including address translation, Page level protection, MMU, cache memory, Virtual memory.

Unit III

I/O INTERFACING: Introduction to the interfacing chips 8255. Interfacing keyboards, printers, LEDS with Intel 8086 Microprocessor. Interfacing of 8254 programmable interval timer, 8259A Programmable interrupt controller & 8257 DMA controller with Intel 8086 Microprocessor.

Unit IV

Memory Interfacing: Interfacing of RAM and ROM with Intel 8086 Microprocessor.

Serial communication interface: RS 232C standards, Interfacing of USART chip 8251 with Intel 8086 Microprocessor.

Unit V

Microcontroller: Introduction to micro controller 8051, its architecture, Register set, operational features, pin description, I/O configuration, interrupts, addressing modes, an overview of 8051 instruction set.

Books

1. B.B. Brey (PHI), "The Intel Microprocessors, Architecture, Programming and Interfacing".
2. A Triebel & Avtar Singh (PHI), "The 8088 & 8086 Microprocessor".
3. D. Hall (Mc-Graw Hill), "Advanced Microprocessor and Interfacing".
4. A. Pal (TME), "Microprocessors Principles & Applications".
5. A.P. Mathur (TMA), "Introduction to Microprocessors". Intel Corporation Microprocessors Data manuals.
6. Microprocessor Training Inc., "Microprocessor Fundamentals & Applications (Handson)".

COURSE CONTENTS (w.e.f. July 2010)

Course	Subject Title	Subject Code	Grade for End Sem		CGPA at the end of every even semester
			T	P	
BE/PTDC	ANTENNA AND WAVE PROPAGATION	EC - 33	Min "D"	Min "D"	5.0

ANTENNA AND WAVE PROPAGATION

Unit I : Introduction to antenna: antenna terminology, radiation, retarded potential, radiation field from current element, radiation resistance of short dipole and half wave dipole antenna, network theorems applied to antenna, self and mutual impedance of antenna, effect of earth on vertical pattern and image antenna.

Unit II : Antenna arrays: of point sources, two element array, end fire and broad side arrays, uniform linear arrays of n-elements, linear arrays with non-uniform amplitude distribution (binomial distribution and Chebyshev optimum distribution), arrays of two-driven half wavelength elements (broad side and end fire case), principle of pattern multiplication.

Unit III : Types of antennas: Babinet's principles and complementary antenna, horn antenna, parabolic reflector antenna, slot antenna,log periodic antenna, loop antenna, helical antenna, biconical antenna, folded dipole antenna, Yagi-Uda antenna, lens antenna, turnstile antenna. Long wire antenna: resonant and travelling wave antennas for different wave lengths, V-antenna, rhombic antenna, beverage antenna, microstrip antenna.

Unit IV : Antenna array synthesis: introduction, continuous sources, methods-Schelknoff polynomial method, Fourier transform method, Woodward- Lawson method, Taylor's method, Laplace transform method, Dolph- Chebychev method, triangular, cosine and cosine squared amplitude distribution, line source, phase distribution, continuous aperture sources.

Unit V : Propagation of radio wave: structure of troposphere, stratosphere and ionosphere, modes of propagation, ground wave propagation, duct propagation. Sky wave propagation: Mechanism of Radio Wave Bending by Ionosphere, critical angle and critical frequency, virtual height, skip distance and LUF, MUF. Single hop and multiple hop transmission, influence of earths magnetic field on radio wave propagation, Fading Space Wave Propagation: LOS, effective earth's radius, field strength of space or tropospheric propagation.

References:

1. J. D. Krauss: Antennas;for all applications, TMH.
2. R. E. Collin, Antennas and Wave Propagation, Wiley India Pvt. Ltd.
3. C. A. Balanis: Antenna Theory Analysis and Design, Wiley India Pvt. Ltd.
4. Jordan and Balmain: Electromagnetic Fields and Radiating System, PHI.
5. A. R. Harish and M. Sachidananda: Antennas and wave propagation, Oxford University Press.
6. K. D. Prasad: Antennas and Wave Propagation, Satya Prakashan.
7. B. L. Smith: Mordern Anteenas, 2nd Edition, Springer, Macmillan India Ltd.

COURSE CONTENTS (w.e.f. July 2010)

Course	Subject Title	Subject Code	Grade for End Sem		CGPA at the end of every even semester
			T	P	
BE/PTDC	DATA COMMUNICATION & COMPUTER NETWORK	EC - 37	Min "D"	Min "D"	5.0

DATA COMMUNICATION & COMPUTER NETWORK

Unit – I : Introduction to Data Communication and Networks: Data Communication, Networks – Physical structures; different topologies, Categories of Networks: LAN, MAN, WAN, Interconnection of networks, The Internet, Protocols and Standards, Standards Organizations. Network Models, Layered tasks, The OSI model, different layers in OSI model. TCP/IP protocol suite ; different layers, addressing, - physical, logical, port and specific addresses, Analog
and digital, digital signals-Bit Length, Digital Signal as a Composite Analog Signal, Transmission of Digital Signals, Data Rate Limits-Noiseless Channel, Noisy Channel.

Unit – II : Physical Layer : Digital-to-Digital Conversion-Line Coding, Line Coding Scheme, Block Coding, Scrembling. Multiplexing – Frequency Division, Wavelength Division, Synchronous Time Division, Statistical Time Division Multiplexing. Circuit-Switched Networks – Three Phases, Efficiency, Delay. Datagram Networks - Routing Table, Efficiency, Delay, Datagram Networks in the Internet. Virtual Circuit Networks - Addressing, Three Phases, Efficiency,
Delay, Circuit Switched Technology in WANs. Structure of Circuit and Packet switches, Dial-up Modems, Digital Subscriber Line - ADSL, ADSL Lite, HDSL, SDSL, VDSL, Cable TV for Data Transfer- Bandwidth, Sharing, CM and CMTS, Data Transmission Schemes.

Unit – III : Data Link Layer: Introduction - Types of Errors, Redundancy, Detection Vs Correction, Forward Error Correction Vs Retransmission, Modular Arithmetic. Block Coding - Error Detection, Error Correction, Hamming Distance, Minimum Hamming Distance. Linear Block Codes, Cyclic Codes - Cyclic Redundancy Check, Hardware Implementation, Polynomials, Cyclic Code Analysis, Advantages. Checksum, Framing - Fixed and Variable-Size. Flow and Error Control, Protocols, Noiseless Channels – Simplest and Stop-and-Wait Protocols. Noisy Channels - Stop-and-Wait Automatic Repeat Request, Go-Back-N Automatic Repeat Request, Selective Repeat Automatic Repeat Request.

Unit – IV : Medium Access: Random Access- ALOHA, Carrier Sense Multiple Access (CSMA), Carrier Sense Multiple Access with Collision Detection (CSMA/CD), Carrier Sense Multiple Access with Collision Avoidance (CSMA/CA). Controlled Access-Reservation, Polling, Token Passing. Channelization- Frequency-Division Multiple Access (FDMA), Time- Division Multiple Access (TDMA), Code-Division Multiple Access (CDMA). IEEE Standards, Standard Ethernet,
Changes in the Standard, Fast Ethernet, Gigabit Ethernet, IEEE 802.11- Architecture, MAC Sub layer, Addressing Mechanism, Physical Layer. Bluetooth- Architecture, Radio Layer, Baseband Layer, L2CAP.

Unit V

Connecting LANs: Connecting Devices- Passive Hubs, Repeaters, Active Hubs, Bridges, Two-Layer Switches, Three-Layer Switches, Gateway. Backbone Networks-Bus, Star, Connecting Remote LANs. Virtual LANs -Membership, Configuration, Communication between Switches, Network layer – logical addressing - .IPv4Addresses- Address Space, Notation, Classful Addressing, Classless Addressing, Network Address Translation (NAT). IPv6 Addresses - Structure and Address Space. Internetworking - Need for Network Layer, Internet as a
Datagram Network, Internet as a Connectionless Network. IPv4- Datagram, Fragmentation, Checksum, Options. IPv6 - Advantages, Packet Format, Extension Headers. Transition from IPv4 to IPv6. Address Mapping- Logical to Physical Address, Physical to Logical Address, Routing – Delivery forwarding techniques and processes, routing table,, Unicast routing protocols – Optimization, inter domain, intra domain, distance vector, link state and path vector
routing, Multicast routing protocol - Unicast, multicast and broadcast, applications, multicast routing and routingprotocols.

References:

1. B. A. Forouzan and Sophia Chung Fegan: Data Communications and Networking, 4th Ed, TMH.
2. W. Tomasi: Introduction to Data Communications and Networking, Pearson Education.
3. A. S. Tanenbaum: Computer Networks, Pearson Education.
4. W. Stalling: Data and Computer Communication, Pearson Education.
5. P. C. Gupta: Data Communications and Computer Networks, PHI.
6. A. Elahi and M. Elahi: Data Network and Internet-Communications Technology, Cengage Learning.
7. Duck: Data Communication and Networking, Pearson Education

COURSE CONTENTS (w.e.f. July 2010)

Course	Subject Title	Subject Code	Grade for End Sem		CGPA at the end of every even semester
			T	P	
BE/PTDC	ADVANCE VLSI DESIGN	EC - 38	Min "D"	Min "D"	5.0

ADVANCE VLSI DESIGN

Unit I

Single-Stage Amplifier: Basic Concepts, Common Source Stage, Source Follower, Common-Gate Stage, Cascode Stage.

Frequency Response of Amplifiers: General Consideration, Common-Source Stage, Source Followers, Common-Gate Stage, Cascode Stage, Differential Pair.

Unit II

Differential Amplifier: Single-Ended and Differential Operation, Basic Differential Pair, Common-Mode Response, Differential Pair with MOS Loads, Gilbert Cell.

Feedback Amplifier: General Consideration, Feedback Topologies, Effect of Loading, Effect of Feedback on Noise.

Switched-Capacitor Circuits: General Consideration, Sampling Switches, Switched-Capacitor Amplifier, Switched-Capacitor Integrator, Switched-Capacitor Common-Mode Feedback.

Unit III

Oscillator: General Consideration, Ring Oscillator, Voltage Controlled Oscillator, Mathematical Model of VCOs.

Phase-Locked Loops: Simple PLL, Charge-Pump PLLs, Nonideal Effects in PLLs, Delayed-Locked Loops.

Unit IV

Sequential Circuit Design: Introduction, Sequencing Static Circuit, Circuit Design of Latches and Flip-Flops, Static Sequencing Element Methodology.

Array Subsystem: Introduction, SRAM, DRAM, Read-Only Memory, Serial Access Memories, Content-Addressable Memory, Programmable Logic Arrays.

Unit V

Datapath Subsystems: Introduction, Addition/Subtraction, One/Zero Detector, Comparators, Counters, Boolean Logic Operation, Coding, Shifters, Multiplication, Division, Parallel-Prefix Computations.

References:

1. B. Razavi: Design of Analog CMOS Integrated Circuits, TMH Publication.
2. Weste, Harris and Banerjee: CMOS VLSI Design, Pearson Education
3. J. M. Rabaey, Digital Integrated Circuits, PHI Learning.
4. R. Jacob Baker: CMOS-Circuit Design, Layout and Simulation, Wiley.
5. A. A. Raj and T. Latha: VLSI Design, PHI Learning.

COURSE CONTENTS **(w.e.f. July 2010)**

Course	Subject Title	Subject Code	Grade for End Sem		CGPA at the end of every even semester
			T	P	
BE/PTDC	**MICROPROCESSOR & MICROCONTROLLERS LAB**	**EC-30AL**	**Min "D"**	**Min "D"**	**5.0**

MICROPROCESSOR & MICROCONTROLLERS LAB

(Suggested Exercise)

List of Experiments (Expandable):

1. BYTE MULTIPLICATION.
2. WORD MULTIPLICATION
3. PACKED BCD FROM ASCII
4. BCD MULTIPLICATION
5. BCD DIVISION
6. BCD SUBTRACTION
7. SIGNED BYTE TO WORD
8. SCAN STRING FOR CHARACTER
9. IF THEN ELSE IMPLIMENTATION
10. BCD TO HEX (REGISTER PARAMETER).

COURSE CONTENTS (w.e.f. July 2010)

Course	Subject Title	Subject Code	Grade for End Sem		CGPA at the end of every even semester
			T	P	
BE/PTDC	ANTENNA AND WAVE PROPAGATION Lab	EC-34L	Min "D"	Min "D"	5.0

ANTENNA AND WAVE PROPAGATION Lab

(Suggested Exercise)

List of Experiments (Expandable):

1. To Plot the Radiation Pattern of an Omni Directional Antenna.
2. To Plot the Radiation Pattern of a Directional Antenna.
3. To Plot the Radiation Pattern of a Parabolic Reflector Antenna.
4. To Plot the Radiation Pattern of a Log Periodic Antenna.
5. To Plot the Radiation Pattern of a Patch Antenna.
6. To Plot the Radiation Pattern of a Dipole/ Folded Dipole Antenna.
7. To Plot the Radiation Pattern of a Yagi (3-EL/4EL) Antenna.
8. To Plot the Radiation Pattern of a Monopole/ WHIP/ Collinear Antenna.
9. To Plot the Radiation Pattern of a Broad site Antenna.
10. To Plot the Radiation Pattern of a Square Loop Antenna.

COURSE CONTENTS (w.e.f. July 2010)

Course	Subject Title	Subject Code	Grade for End Sem		CGPA at the end of every even semester
			T	P	
PTDC	ADVANCE VLSI DESIGN LAB	EC-39L	Min "D"	Min "D"	5.0

ADVANCE VLSI DESIGN LAB

(Suggested Exercise)

List of Experiments (Expandable):

Practicals should be performed using any Electronic Design Automation (EDA) - eg. Microwind / Cadence / Sylvaco / Tanner silicon HiPer / Xilinx ISE 9i or any similar software.

1. Design and simulation of: (a) Common source amplifier (b) Source follower amplifier (c) Common gate amplifier (d) Cascode amplifier.
2. Estimation of frequency response of: (a) Common source amplifier (b) Source follower amplifier. (c) Common gate amplifier (d) Cascode amplifier.
3. Design and simulation of differential amplifier.
4. Design and simulation of feedback amplifier.
5. Design and simulation of oscillators: (a) Ring Oscillator (b) L-C Oscillator (c) Voltage controlled Oscillator.
6. Design and simulation of: (a) Adder (b) Subtractor (c) One/zero detector (d) Comparator (e) Counter (f) Multiplier (g) Divider.

COURSE CONTENTS (w.e.f. July 2010)

Course	Subject Title	Subject Code	Grade for End Sem		CGPA at the end of every even semester
			T	P	
PTDC	MINOR PROJECT	EC-40AL	Min "D"	Min "D"	5.0

The exercises in this component shall be designed to demonstrate the basic principles outlined in different units of the theory paper. After completing the exercises the student should have developed a good grasp of the practical utilities of the theory content.

(Suggested Exercise)

Developing research/practical ability and finding solution of any application oriented problem. Project problems may be implemented in any hardware or software or solutions.

There will be a term work presentation/ Seminar . A group students will work in form of batches which may be approved by head of the department.