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)
B.E. Fourth Year Branch: Electronics & Telecommunication Engg. SEM: Eighth

Course Code	Subject	Periods			EVALUATION SCHEME					Credits
		L	T	P	SESSIONAL EXAM			ESE	SUB TOTAL	
					TA	CT	TOTAL			
EC -38	Advance VLSI Design	3	1	-	10	20	30	70	100	4
EC - 51	Advance Communication System	3	1	-	10	20	30	70	100	4
EC -66	Nano Electronics	3	1	-	10	20	30	70	100	4
Refer Table	Elective -II	3	1	-	10	20	30	70	100	4
(PRACTICAL/DRAWING/DESIGN)										
EC –39L	Advance VLSI Design Lab	-	-	2	20	-	20	30	50	2
EC -52L	Advance Communication System Lab	-	-	2	20	-	20	30	50	2
EC – 67L	Nano Electronics Lab	-	-	2	20	-	20	30	50	2
EC-69L	Major Project	-	-	08	80	-	80	120	200	8
EC-70L	Seminar /Group Discussion			2	50	-	50	-	50	2
	Total	12	4	16	230	80	310	490	800	32

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

Elective-II					
EC-068A	1. Satellite Communication	EC-068B	2.Embedded System	EC-068C	3.Principles of Management & Managerial Economics

COURSE CONTENT & GRADE (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	**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 CONTENT & GRADE (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	**ADVANCE COMMUNICATION SYSTEM**	EC-51	Min "D"	Min "D"	5.0

ADVANCE COMMUNICATION SYSTEM

Unit-I

Carrier and Symbol Synchronization: Signal parameter estimation, The likelihood function, Carrier recovery and symbol synchronization in signal demodulation, Carrier phase estimation, Maximum likelihood carrier phase estimation, The phase locked loop, Effect of additive noise in phase estimation, Decision directed loops, Symbol timing estimation, Maximum likelihood timing estimation, Non-decision directed timing estimation, Joint estimation of carrier phase and symbol timing.

Unit-II

Multicarrier Modulation: Data transmission using multiple carriers, Multicarrier modulation with overlapping subchannels, Mitigation of subcarrier fading, Coding with interleaving over time and frequency, Frequency equalization, Precoding, Adaptive loading, Discrete implementation of multicarrier, The cyclic prefix, Challenges in multicarrier systems, Peak to average Power ratio, Frequency and timing offset.

Unit-III

Multiuser Communications: Introduction to multiple access techniques, Capacity of multiple access methods, Code division multiple access, CDMA signal and channel models, The optimum receiver, Suboptimum receivers, Performance characteristics of Detectors, Random access methods, ALOHA systems and protocols, Carrier sense systems and protocols.

Unit-IV

Orthoganal Frequency Division Multiplexing Systems: Digital-signal-processing-centric implementation of OFDM, Matrix representation of OFDM, Vector coding, PSD of OFDM signal, PAR reduction strategies.

Unit–V

Cognitive Networks: Definition, Requirements, Cognitive radio, Cross-layer design, Cognitive process, Cognitive network design.

References:

1. J. G. Proakis: Digital Communications, Mc Graw Hills.
2. A. Goldsmith: Wireless Communications, Cambridge University Press.
3. U. Madhow: Fundamentals of Digital Communication, Cambridge University Press.
4. H. Arslan: Cognitive Radio, Software Defined Radio, and Adaptive Wireless Systems, Springer

COURSE CONTENT & GRADE (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	**NANO ELECTRONICS**	EC-66	Min "D"	Min "D"	5.0

NANO ELECTRONICS

Unit I: Introduction Nanoscale technology: Consequences of the nanoscale for technology and society. Molecular building blocks for nanostructure systems, Nano-scale 1D to 3D structures, Band structure and density of states at low dimensional structure. Size dependent properties (Elelctrical, mechanical, optical, thermal etc).top down and bottom up technique, lithographic, nanolithographic and nonlithographic techniques:plused laser depositon,plasma arc discharge, e-beam sputtering, ball milling , solgel, electrodeposition, chemical vapour deposition.

Unit II : Characterization technique Scanning probe microscopy: (Principle, construction and working;) Scanning tunnelling microscope, Atomic force microscope, scanning electron microscope, Transmission electron microscope, Carbon materials :Allotropes of carbon, Structure of Carbon Nanotubes, types of CNTs-, Electronic properties of CNTs, Band structure of Graphene ,Band structure of SWNT from grapbene ,electron transport properties of SWNTs ,

Unit-1II : Introduction to magnetism and superconductivity Basic magnetic phenomena: paramagnetism, ferromagnetism, ferrimagnetism, anti-ferromagnetism;nano-magnetism; giant and colossal magnetoresistance; ferrofluids. Basic superconductivity phenomena; flux quantisation and Josephsoneffects.

Unit - IV : Fundamental of nano eletronics Charging of quantum dots, Coulomb blockade, Quantum mechanical treatment of quantum wells, wires and dots, Widening of bandgap in quantum dots, Strong and weak confinement, spin field effect transistor. single electron transistors, other SET and FET structure.

Unit - V : Silicon MOSFETs Silicon MOSFET: fundamental of MOSFET devices, scaling rules, silicon dioxide based gate dielectrics, metal gates , junction and contacts, advanced MOSFET concepts

References:

1.G. W. Hanson: Fundamentals of Nanoelectronics, Pearson Education.
2. K. K. Chattopadhyay and A. N. Banerjee: Introduction to Nanoscience and Nanotechnology, PHI Learning.
3. John H. Davis: Physics of low dimension semiconductor, Cambridge Press.
4.K Tu, JW Mayer, LC Feldman, "Electronic Thin Film Science", Macmillan, New York, 1992.
5. Z Cui , "Mico-Nanofabrication", Higher Education press, Springer, 2005.
6.Brian Cantor, "Novel Nanocrystalline Alloys and Magnetic Nanomaterials," Institute of Physics Publications, 2005.
7. S.Chikazumi and S.H. Charap," Physics of Magnetism", Springer-verlag berlin Heideberg, 2005
8.Cao Guozhong, "Nanostructures and Nanomaterials - Synthesis, Properties and Applications", Imperial College Press, 2004.
9. Sadamichi Maekawa, "Concepts in Spintronics", Oxford University Press, 2006.

COURSE CONTENT & GRADE (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	SATELLITE COMMUNICATION	EC-068A	Min "D"	-	5.0

SATELLITE COMMUNICATION

UNIT- I

Kepler's Laws, Newton's law, orbital parameters, orbital perturbations, station keeping, geo stationary and non Geo-stationary orbits – Look Angle Determination- Limits of visibility – eclipse-Sub satellite point –Sun transit outage-Launching Procedures - launch vehicles and propulsion.

UNIT -II

Spacecraft Technology- Structure, Primary power, Attitude and Orbit control, Thermal control and Propulsion, communication Payload and supporting subsystems, Telemetry, Tracking and command. Satellite uplink and downlink Analysis and Design, link budget, E/N calculation-performance impairments-system noise, inter modulation and interference, Propagation Characteristics and Frequency considerations- System reliability and design lifetime.

UNIT - III

Modulation and Multiplexing: Voice, Data, Video, Analog – digital transmission system, Digital video Brocast, multiple access: FDMA, TDMA, CDMA, Assignment Methods, Spread Spectrum communication, compression – encryption

UNIT - IV

Earth Station Technology-- Terrestrial Interface, Transmitter and Receiver, Antenna Systems TVRO, MATV, CATV, Test Equipment Measurements on G/T, C/No, EIRP, Antenna Gain.

UNIT - V

INTELSAT Series, INSAT, VSAT, Mobile satellite services: GSM, GPS, INMARSAT, LEO, MEO, Satellite Navigational System. Direct Broadcast satellites (DBS)- Direct to home Broadcast (DTH), Digital audio broadcast (DAB)- Worldspace services, Business TV(BTV), GRAMSAT, Specialized services – E –mail, Video conferencing, Internet

TEXT BOOKS:

1. Dennis Roddy, 'Satellite Communication', McGraw Hill International, 4th Edition, 2006.
2. Wilbur L. Pritchard, Hendri G. Suyderhoud, Robert A. Nelson, 'Satellite Communication Systems Engineering', Prentice Hall/Pearson, 2007.
3. Satellite Communication by Dr. P. C. Agarwal, Khanna Publishers 2009
4. Design of Geo synchronous Space craft, PHI 1986

COURSE CONTENT & GRADE (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	**EMBEDDED SYSTEM**	EC-068B	Min "D"		5.0

EMBEDDED SYSTEM

UNIT-I :

Embedded Processing Systems – Introduction, Components of Embedded Systems Embedded Processors: Microprocessors, Microcontrollers, DSP and ASICs, Comparative Assessment of Embedded Processors Pipelining.

UNIT-II :

Memory Devices: ROM family, RAM family, Interfacing memory, Embedded Programming – C and C++, Programming languages for embedded systems: desirable characteristics of programming languages for embedded systems, low-level versus high-level languages.

UNIT- III :

Input-output Ports and Interfacing, I/O Programming Interrupts and their servicing, timing devices and interfacing, Analog I/O techniques Embedded Communications: Serial Bus, Parallel Bus, Networking and Wireless Standards Introduction to Real-Time Operating System (RTOS), RTOS: memory management

Unit-IV :

I/O Management and Device Drivers Software Engineering Practices: Embedded Software development process

UNIT - V :

Hardware-Software Co-design in an embedded system Tools and Trends in Embedded systems design

Recommended Books

1. Raj Kumar, "Embedded Systems: Architecture, Programming and Design", Tata McGraw Hill,Third Reprint, (2003).
2. John Catsoulis, O'Reilly, "Designing Embedded Hardware", First Indian Reprint, (2003).
3. David E. Simon, "An Embedded Software Primer", Pearson Education Asia, Fifth Indian Reprint,(2002).
4. Michael Barr, O'Reilly, "Programming Embedded Systems in C and C ++", (1999).
6. J.W. Valvano, "Embedded Microcomputor System: Real Time Interfacing", Brooks/Cole, 2000.
7. Jack Ganssle, "The Art of Designing Embedded Systems", Newnes, 1999.
8. V.K. Madisetti, "VLSI Digital Signal Processing", IEEE Press (NY, USA), 1995.

COURSE CONTENT & GRADE (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	**PRINCIPLE OF MANAGEMENT & MANAGERIAL ECONOMICS**	EC-068C	Min "D"		5.0

PRINCIPLE OF MANAGEMENT & MANAGERIAL ECONOMICS

Unit - I

Management Concept: Management, Administration and Organization Difference and Relationship between Organization Management and Administration. Importance of Management, Characteristics of Management.

Unit : II

Management: Scientific Management, Principles of Management, Process of Management, Functions of Management, Levels of Management, Project Management.

Unit - III

Decision Making: Introduction and Definition, Types of Decisions, Techniques of Decision Making, Decision making under certainty Decision making under uncertainty, Decision Making under risk.

Unit - IV

Managerial Economics: Introduction, Factors Influencing Manager, Micro and Macro-economics, Theory of the Cost, Theory of the Firm, Theory of Production Function.

Unit - V

Productivity: Input-Output Analysis, Micro-economics Applied to Plants and Industrial Undertakings, Production and Production system, Productivity, Factors affecting Productivity, Increasing Productivity of Resources.

References:

1. Peter Drucker, Harper and Row: The Practice of Management.
2. Koontz: Essentials of Management, PHI Learning.
3. Staner: Management, PHI Learning.
4. Daft: Principles of Management, Cengage Learning.
5. T. N. Chhabra: Principle and Practice of Management, Dhanpat Rai, New Delhi.
6. Hirschey: Managerial Economics, Cengage Learning.
7. T. R. Banga and S.C. Sharma: Industrial Organisation and Engineering Economics, Khanna Publishers.
8. O.P. Khanna: Industrial Engineering and Management, Dhanpat Rai.
9. Joel Dean: Managerial Economics, PHI learning.
10. V. L. Mote, Samuel Paul and G.S. Gupta: Managerial Economics Concepts & Cases, TMH, New Delhi

COURSE CONTENT & GRADE (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	**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 CONTENT & GRADE (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	**ADVANCE COMMUNICATION SYSTEM LAB**	EC-52L	Min "D"	Min "D"	5.0

ADVANCE COMMUNICATION SYSTEM LAB

List of practical's :

1. Write a program to carrier recovery and symbol synchronization in non-coherent FSK demodulation.
2. Implement a multicarrier modulation system in MATLAB and show the advantages of precoding through the simulation results.
3. Implement two PAPR reduction techniques in MATLAB.
4. Implement the optimum receiver for CDMA system.
5. Study the performance characteristics for a CDMA system using MATLAB.
6. Implement the basic OFDM system in MATLAB.
7. Simulate the systems showing the methods a secondary user senses a channel in cognitive radio environment.

COURSE CONTENT & GRADE (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	**NANO ELECTRONICS LAB**	EC-67L	Min "D"	Min "D"	5.0

LIST OF EXPERIMENTS FOR BE VIII SEMSTER (ELECTRONICS & TELECOM)
NANO ELECTRONICS LAB

1. Simulation of Nanoscale transistor using MATLAB.
2. Building a CMOD p-well 2D n-MOSEFT Using TCAD Sentarus Process simulator.
3. Study of C.V characteristics of MOSFETs for different channel lengths & widths.
4. Study & plot the energy level diagram of a Nanoscale transistor.
5. To plot the I – V characteristics of Nanoscale transistor.

COURSE CONTENT & GRADE (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	**MAJOR PROJECT**	EC-69L	-	Min "D"	5.0

MAJOR PROJECT

The major project will be made on the basis of knowledge of subjects acquired during the the entire course of B E Degree. Major Project can be made in following broad areas

1. A complete hardware project

2. A complete software based simulation project in matlab/higher level languages

3 . Project based on experiments carried out in lab.

4. Microprocessor and micro controller based software/hardware project

5. Theoretical project on new emerging technologies

6. Inter disciplinary project eg Biomedical electronics, mechatronics, nanotechnology etc

Project work is normally carried out by the group of students . Individual projects are not advised at UG level. The list of batches displayed along with guide name during sixth sem minor project and same remains valid for major project.. Student have liberty to make smaller groups with the Permission of guide/ supervisor. Project report normally submitted 60 -70 single side print pages in a hard bind form including certificates and cover pages.

COURSE CONTENT & GRADE (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	**SEMINAR / GROUP DISCUSSION**	EC-70L	-	Min "D"	5.0

SEMINAR & GROUP DISCUSSION

The seminar and group discussion has special role in viii semester. Student has to present their major project progress in ppt form to respective guides. Student will have to prepare a ppt under the supervision of project guide. Group discussion will also be carried out among the project mates in presence of guide. Sessional marks shall be awarded by project guide on the basis of performance shown by students in GD and seminar