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: Eighth**

Course Code	Subject	Periods			EVALUATION SCHEME					Credits
					SESSIONAL EXAM			ESE	SUB TOTAL	
		L	T	P	TA	CT	TOTAL			
EC-45	RADAR Engg. & Adv. Antenna	3	1	-	10	20	30	70	100	4
EC –51	Advance Communication System	3	1	-	10	20	30	70	100	4
Refer Table	Elective -II	3	1	-	10	20	30	70	100	4
(PRACTICAL/DRAWING/DESIGN)										
EC – 46L	RADAR Engg. & Adv. Antenna Lab	-	-	2	20	-	20	30	50	2
EC – 52L	Advance Communication System Lab	-	-	2	20	-	20	30	50	2
EC – 69AL	Major Project	-	-	6	60	-	60	90	150	6
EC-71L	Professional Activity	-	-	2	50	-	50	-	50	2
	Total	9	3	12	180	60	240	360	600	24

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(PTDC)	**RADAR ENGINEERING & ADVANCED ANTENNA**	EC-45	Min "D"	Min "D"	5.0

RADAR ENGINEERING & ADVANCED ANTENNA

Unit-I

Radar Equation, Radar Block Diagram and Operation, Prediction of Range, Minimum Detectable Signal, Receiver Noise, Probability Density Functions, S/N, Integration of Radar Pulses, Radar Cross-section, Transmitter Power, PRF and Range Ambiguities, Radar Antenna Parameters, System Losses and Propagation Effects.

Unit- II

MTI and Pulse Doppler Radar: Introduction, Delay line Cancellers, Moving target Detector, Limitation to MTI performance, MTI from moving platform, Pulse Doppler Radar

Unit- III

Tracking Radar, Sequential Lobing, Conical Scan, Monopulse tracking Radar, Low angle tracking, Pulse compression, Block Diagrams of Synthetic Aperture Radar (SAR), Phased array Radars,.
MST Radar, ECM, ECCM

Unit- IV

Radar Receiver, Mixers, Radar Displays, Receiver Protectors. Principles of Direction Finders, Aircraft Homing and ILS, Radio Altimeter, LORAN, DECCA, OMEGA, Inland Shipping Aids.

Unit- V

Microstrip Antenna, Various types of patch and slot Antenna, Design aspects of microstrip Antenna. Phased array antenna, active electronically steered array(AESA), passive electronically steered array (PESA), Array Effects, array error effects, element patterns & mutual impedance effects.

Text Book:
1. Radar Engineering and Fundamentals of Navigational Aids, G S N Raju, IK International Publishers, 2008
2. Introduction to Radar Systems, Skolnik, McGraw Hill, 2007.
3. Elements of Phased Array, " Robert J. Maillboux"

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(PTDC)	**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(PTDC)	**SATELITE COMMUNICATION**	EC-068A	Min "D"	-	5.0

SATELITE 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(PTDC)	**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(PTDC)	**PRINCIPLES OF MANAGEMENT & MANAGERIAL ECONOMICS**	EC-068C	Min "D"	-	5.0

PRINCIPLES 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(PTDC)	**RADAR ENGINEERING & ADVANCED ANTENNA LAB**	EC-46L	Min "D"	Min "D"	5.0

RADAR ENGINEERING & ADVANCED ANTENNA LAB

LIST OF EXPERIMENTS

1. To study the variation of field strength of radiated wave, with distance from transmitting antenna.

2. To plot radiation pattern of an omni directional antenna.

3. To plot the radiation pattern of a directional antenna. (Yagi-Uda 3 elements)

4. To study the phenomenon of linear & circular polarisation of antennas.

5. To demonstrate that the transmitting and receiving pattern of an antenna are equal & hence conform the reciprocity of the antennas

6. Study of dipole antenna/ folded dipole antenna & its radiation pattern.

7. Study of Yagi (3ele/4ele) antenna & its radiation pattern

8. Study of Log-periodic antenna & its radiation pattern.

9. Study of Parabolic reflector & its construction & its radiation pattern.

10. Study of Loop antennas, (Quad & Square loop)construction & its radiation pattern.

11. Study of Bioconical antenna , construction & its radiation pattern

12 Study of Horn antenna

13. Study of Rhombic antenna

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(PTDC)	**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(PTDC)	**MAJOR PROJECT**	EC-69AL	-	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 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(PTDC)	**PROFESSIONAL ACTIVITY**	EC-71L	-	Min "D"	5.0