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)

M.E. III Sem.   Branch :   E & C Engg.

Specialization : Communication System Engineering

Course Code	Subject	L	T	P	TA	CT	TOT	ESE	SUB TOTAL	Credits
					SESSIONAL EXAM					
EC-127	Wireless Communication	3	1	-	10	20	30	70	100	4
	Elective - III (Any One)									
EC-128A	Advanced Optical Communication	3	1	-	10	20	30	70	100	4
EC-128B	Video Processing									
(PRACTICAL/DRAWING/DESIGN)										
EC-129L	Seminar/ Project	-	-	4	100	-	100	-	100	4
EC-130L	Industrial Training (4 weeks)	-	-	-	-	-	-	100	100	4
EC-131L	Preliminaries of Dissertation Presentation	-		4	40	-	40	60	100	4
	Total	6	2	8	160	40	200	300	500	20

T.A. Teachers Assessment, CT- Class Test, ESE - End Semester Examination, Total Marks 500
Total Periods : 16 Total Credits : 20

NOTE : The students shall go on industrial training at the end of second semester and the evaluation
shall be done at the end of third semester. The student has to present a report on the training
and also has to face a viva voice examination infront of a panel headed by head of the department.
The seminar /project shall be asigned by the supervisor

COURSE CONTENT & GRADE   (w.e.f. July 2010)

Branch	Subject Title	Subject Code	Grade for End Sem		CGPA at the end of every even semester
			T	P	
	WIRELESS COMMUNICATION	EC-127	Min "D"	Min "D"	5.0

WIRELESS COMMUNICATION

Unit I The wireless Channel: Path Loss and Empirical path loss models: Okumura model, Hata model, Piecewise Linear model, Shadowing, Physical modeling of wireless channels, Input/output model of the wireless channel, Time and Frequency coherence, Statistical channel models.

Unit II Diversity: Time diversity, Frequency diversity, Antenna diversity: Realization of independent fading paths, Receiver diversity: System model, Selection combining, Maximal ratio combining, Equal gain combining, Transmitter diversity: Channel known at transmitter, Channel unknown at transmitter- The Alamouti scheme.

Unit III Capacity of Wireless Channels: AWGN channel capacity, Resources of AWGN channel, Linear time-invariant Gaussian channels, Capacity of fading channels: Channel distribution information (CDI) known, Channel side information at receiver, Channel side information at Transmitter and Receiver, Capacity with receiver diversity, Capacity comparison.

Unit IV Multiple Antennas and Space-Time Communications: Narrowband MIMO model, Parallel decomposition of MIMO Channel, MIMO channel capacity, MIMO diversity gain, Diversity/Multiplexing tradeoffs.

Unit V Selected Coding for Wireless Channels: Concatenated codes, Turbo codes, Low density parity check codes, Coded modulation, Unequal error protection codes.

References:
1. **A. Goldsmith: Wireless Communications**
2. **D. Tse and P. Viswanath: Fundamentals of Wireless Communication**
3. **G. L. Stuber: Principles of Mobile Communication**
4. **T. S. Rappaport: Wireless Communications: Principles and Practice**

COURSE CONTENT & GRADE (w.e.f. July 2010)

Branch	Subject Title	Subject Code	Grade for End Sem		CGPA at the end of every even semester
			T	P	
	ADVANCE OPTICAL COMMUNICATION	EC-128A	Min "D"	Min "D"	5.0

ADVANCE OPTICAL COMMUNICATION

Unit 1. Overview Of Optical Fiber Communication :

Need of Optical Transmission, Fibre Optics Communication System, Basic Blocks, Evolution of Fibre Optic Systems, Advantage of OFC.

Optical Fibre Structure and Wave-Guide: Basic Optical Laws and Transmission Parameters, Optical Fiber Structure, Mode Theory for Optical Propagation, Modes in a Planar Wave, Phase and Group Velocity, Phase Shift on TER and Evanescent Field, Cylindrical Wave-guides, Step Index and Graded Index, Planar and Dielectric Wave guides.

Unit2 Optical Network:

Services, Circuit Switching, Packet Switching, Optical Networks, Optical Layer, Transparency and All Optical Networks, Optical Packet Switching, Transmission Basics, Network Evolution. Basic networks, SONET/ SDH networks, broadcast and select VDM networks, wavelength routed networks, non linear effects on N/w performance, performance of WDM & EDFA systems, LAN, solitions, optical CDMA, high frequency capacity network. Pulse propagation and solitons, integrated optics and photonic switching. DWDM.

Unit 3 Multiplexers and Filters to Wavelength Converters:

Gratings, Diffraction Pattern, Bragg Gratings, Fiber Gratings, Fabry-Perot filters, Multilayer Dielectric Thin-Film Filters, Mach-Zehnder Interferometers, Arrayed Waveguide Grating, Acousto-Optic Tunable Filter, High channel Count Multiplexer Architectures, Optoelectronics Approach, Optical Gating, Interferometric Techniques, Wave Mixing.

Unit 4. Transmission System Engineering:

System Model, Power Penalty, Transmitter, Receiver, Optical Amplifiers, Cross talk, Dispersion, Fiber Nonlinearities, Wavelength Stabilization Design of Soliton Systems, Design of Dispersion –Managed Soliton Systems.

Unit 5. WDM Network Elements & Design:

Optical Line Terminals, Optical Line Amplifiers, Optical Add/Drop Multiplexers, Optical Cross connects. Cost Trade-Offs: A Detailed Ring Network Example, LTD and RWA Problems, Dimensioning Wavelength-Routing Networks, Statistical Dimensioning Models, Maximum Load Dimensioning Models. Giga bit Ethernet.

Reference Books

1. Optical Networks: A practical Perspective. RAMASWAMI & K.N. SIVARAJAN Morgan
2. Franz and Jain, " Optical communication system ", Narosa Publications, New Delhi, 1995.
3. G.Keiser, " Optical fiber communication ", Systems, McGraw-Hill, New York, 2000.
4. Franz & Jain, " Optical communication ", Systems and components, Narosa Publications,
5. Multiwavelength Optical Networks: A Layered Approach Thomas E. Stern and Krishna Bala Addison Wesley

COURSE CONTENT & GRADE (w.e.f. July 2010)

Branch	Subject Title	Subject Code	Grade for End Sem		CGPA at the end of every even semester
			T	**P**	
	VIDEO PROCESSING	EC-128B	Min "D"	Min "D"	5.0

VIDEO PROCESSING

Unit I
Basics of analog and digital video: color video formation and specification, video raster, frequency domain characterization of video signals, analog TV systems (color multiplexing and demultiplexing). Frequency domain analysis of video signals, spatial and temporal frequency response of the human visual system Digital video format and video format conversion

Unit II
2D motion estimation, Part I: 3D and 2D motion modeling, and basic motion estimation methods 2D motion estimation, Part II: advanced techniques (mesh-based, global motion estimation, multi-resolution approach)

Unit III
Basic compression techniques: information bounds for lossless and lossy source coding, binary encoding techniques (LZW, Arithmetic Coding) scalar and vector quantization

Unit IV
Waveform-based coding: transform coding, predictive coding Video coding: motion compensated prediction and interpolation, block-based hybrid video coding, scalable video coding, Error control in video communications and video streaming over Internet and wireless networks.

Unit V
Video compression standards : standards(H.261 and H.263, MPEG1, MPEG2, MPEG4, H.264). (Chap. 13, 4/1, 4/8, 2 lectures),Stereo, 3D and multiview video processing,Video compression using MATLAB programming.
Book :

1 . Y. Wang, J. Ostermann, and Y.Q.Zhang, *Video Processing and Communications.* Prentice Hall,
2. Mohammed Ghanbari *Advanced Video Codecs*

COURSE CONTENT & GRADE   (w.e.f. July 2010)

Branch	Subject Title	Subject Code	Grade for End Sem		CGPA at the end of every even semester
			T	**P**	
	SEMINAR/PROJECT	EC-129L			5.0

SEMINAR/PROJECT

The student shall take up a small project under the supervision of a supervisor and shall complete the task. He has to present the report before a committee credit by H.O.D. and answer the queries

COURSE CONTENT & GRADE   (w.e.f. July 2010)

Branch	Subject Title	Subject Code	Grade for End Sem		CGPA at the end of every even semester
			T	**P**	
	INDUSTRIAL TRAINING	EC-130L	Min "D"	Min "D"	5.0

INDUSTRIAL TRAINING

The student shall go to an Industry at the end of Second Semester during summer and shall prepare a report on the Practical Training undergone there. He has to present the report at the time of practical examination of Third Semester.

COURSE CONTENT & GRADE   (w.e.f. July 2010)

Branch	Subject Title	Subject Code	Grade for End Sem		CGPA at the end of every even semester
			T	**P**	
	PRELIMINARIES OF DISSERTATION PRESENTATION	EC-131L	Min "D"	Min "D"	5.0

PRELIMINARIES OF DISSERTATION PRESENTATION

The student shall prepare a literature review of the dissertation work to be undertaken. He shall also prepare the scheme of dissertation