Faculty of Engineering & Technology

P.K.University

Shivpuri (MP)

Department of Electronics & Communication Engineering

Evaluation Scheme & Syllabus

B.Tech. Final Year

(VII & VIII Sem)

(Effective from session 2025-26)

P.K.UNIVERSITY,SHIVPURI(M.P.)

STUDY AND EVALUATION SCHEME FOR B.TECH Electronics & Communication Engineering

YEAR4th/SEMESTER-7th

SUBJECT CODE	SUBJECTS NAME	STUDY SCHEME Periods/Week			Credits	MARKS IN EVALUATION SCHEME						Total Marks of Internal & External
						INTERNALASSESSMENT			EXTERNALASSESSMENT			
		L	T	P		Th	Pr	Tot	Th	Pr	Tot	
UENTREC701	Entrepreneurship Development	3	1	0	4	30	-	30	70	-	70	100
UDIGIEC702	Digital Image Processing	3	0	0	3	30	-	30	70	-	70	100
UOPTIEC703	Optical Communication	3	0	0	4	30	-	30	70	-	70	100
UDATAEC704	Data Communication Networks	3	0	0	3	30	-	30	70	-	70	100
UVLSIEC705	VLSI Design	3	0	0	3	30	-	30	70	-	70	100
UELECEC706	Electronic Circuit Design Lab	0	0	2	1	-	25	25	-	25	25	50
UOPTIEC707	Optical Communication & Network Lab	0	0	2	1	-	25	25	-	25	25	50
UMINIEC708	Mini project	0	0	2	1	-	25	25	-	25	25	50
UINDUEC709	Industrial training	0	0	2	1	-	25	25	-	25	25	50
Total		15	1	8	21	150	100	250	350	100	450	700

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IV Year Semester-VII

UENTREC701

ENTREPRENEURSHIP DEVELOPMENT

(L-T-P-3-1-0)

UNIT -I

Entrepreneurship- definition. growth of small scale industries in developing countries and their positions vis-a-vis large industries; role of small scale industries in the national economy; characteristics and types of small scale industries; demand based and resources based ancillaries and sub-control types. Government policy for small scale industry; stages in starting a small scale industry.

UNIT -II

Project identification- assessment of viability, formulation, evaluation, financing, field-study and collection of information, preparation of project report, demand analysis, material balance and output methods, benefit cost analysis, discounted cash flow, internal rate of return and net present value methods.

UNIT -III

Accountancy- Preparation of balance sheets and assessment of economic viability, decision

making, expected costs, planning and production control, quality control, marketing, industrial relations, sales and purchases, advertisement, wages and incentive, inventory control, preparation of financial reports, accounts and stores studies.

UNIT -IV

Project Planning and control:

The financial functions, cost of capital approach in project planning and control. Economic evaluation, risk analysis, capital expenditures, policies and practices in public enterprises. profit planning and programming, planning cash flow, capital expenditure and operations. control of financial flows, control and communication.

UNIT -V

Laws concerning entrepreneur viz, partnership laws, business ownership, sales and income taxes and workman compensation act. Role of various national and state agencies which render assistance to small scale industries.

Text / Reference Books:

I Forbat, John, “Entrepreneurship” New Age International.

J Havinal, Veerbhadrappa, “Management and Entrepreneurship” New Age International

K Joseph, L. Massod, “Essential of Management", Prentice Hall of Indi

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IV Year Semester-VII

UDIGIEC702

DIGITAL IMAGE PROCESSING

(L-T-P-3-0-0)

I. **Introduction:** Overview of Image Processing, Nature of Image Processing, 8

Application area of image processing, Digital Image Representation, Types of images,

Digital Image Processing Operations, Fundamental steps in DIP, Overview of Digital Image Systems, Physical Aspect of Image Acquisition, and biological Aspect of Image Acquisition, sampling & quantization, Digital Halftone Process, Image storage and File formats.

II **Image Transforms:** Need for image transforms, Properties of Fourier 8 transform, Discrete cosine transform, Discrete sine transform, Hadamard transform, Haar transform, Slant transform, SVD and KL transforms, Comparison between transforms.

Image Enhancement: Image Quality and Need for image enhancement, Image enhancement operations, Image enhancement in spatial domain, histogram based techniques, Spatial Filtering concepts, Image smoothing spatial filters, Image Sharpening spatial filters, Image smoothing in frequency domain filtering, Image sharpening in frequency domain, Homomorphism filtering.

III **Image Restoration:** Introduction to degradation, Types of Image 8 degradations, image degradation models, noise modeling, Estimation of degradation functions, Image restoration in presence of noise only, Periodic noise and band – pass and band reject filtering, difference between enhancement & restoration, Image restoration techniques.

IV **Image Compression:** Image compression model, Compression algorithms 8 and its types, Type of redundancy, lossless compression algorithms, Lossy compression algorithms, Image and video compression standards.

V **Image Segmentation:** Introduction, Detection of Discontinuities, Edge 8 Detection, Hough Transforms and Shape Detection, corner detection, Principle of thresholding, Principle of region - growing.

Text Books:

1. S. Sridhar, “Digital Image Processing”, OXFORD University Press, Second Edition.
2. Rafael C. Gonzalez Richard E woods Steven L. Eddins, „„Digital Image“”, Pearson.
3. Rafael C. Gonzalez Richard E woods Steven L. Eddins, „„Digital Image Processing Using MATLAB“”, Mc Graw Hill, 2nd Edition.
4. Anil K Jain, „“Fundamentals of Digital Image Processing”, Pearson.

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IV Year Semester-VII
UOPTIEC703
OPTICAL COMMUNICATION

(L-T-P-3-0-2)

Unit-I: Overview of optical fiber communication: The general system, Advantages of optical fiber communication. Optical spectral band. Optical Fiber waveguides: Introduction, Ray theory transmission

Total internal reflection, acceptance angle, numerical aperture, skew rays. Electromagnetic mode theory for optical propagation: Electromagnetic waves, modes in a planar guide, phase and group velocity, phase shift with total internal reflection and the evanescent field, goos hanchen shift.

Unit-II: Cylindrical Fiber: modes, mode coupling, step index fibers Graded index fibers, Single mode Fiber: Cut-off wavelength, Mode field diameter and spot size, effective refractive index, Group delay and mode delay factor, The Gaussian approximation, equivalent step index methods. Signal distortion in optical fibers - Attenuation, Material Absorption, losses in silica glass fibers; Intrinsic absorption, Extrinsic absorption. Linear scattering losses; Ray light scattering, Mie scattering. Non linear Scattering losses: fiber bending losses; Dispersion, Chromatic dispersion: material dispersion, waveguide dispersion. Intermodal dispersion: Multimode step index fiber, Multimode graded index fiber. Overall fiber dispersion Multimode fiber, Dispersion modified single modefibers ,Dispersion–shifted fiber, dispersion flatted fibers, nonzero-dispersion- shifted fibers (MZ-DSF), Polarization: Fiber birefringence, polarization mode dispersion, polarization- maintaining fibers, Non linear effects: Scattering effects, Kerr effects.

Unit-III: Optical sources - Light Emitting Diodes (LEDs): Structures, light source materials, Quantum Efficiency on LED Power Modulation of a LED, Laser Diodes- models and threshold conditions, laser diode rate equations, External quantum efficiency, resonant frequency, laser diode structures and radiation patterns, single mode lasers modulation of laser diodes, laser lines.

Unit-IV: Source to fiber power launching, Source Output patterns, Power coupling calculation, Power launching versus wavelength, equilibrium numerical aperture. Photo detectors: Physical principles of photodiodes: The PIN photo detector, Avalanche photodiodes. Photo detector Noise: Noise sources, signal to noise ration.

Detector Response time: Depletion layer photocurrent, response time structure of in GaAs APDs, Temperature effect on Avalanche gain, comparison of photo detectors.

Unit-V: Optical receiver operation: Fundamental receiver operation: Digital signal transmission, error sources, front end amplifier. Digital receiver performance: Probability of error receiver sensitivity, The Quantum Unit. Eye Diagram: Eye Pattern Features, BER and Q Factor Measurement Coherent Detection: Fundamental concepts, Homodyne detection, heterodyne detection, IBER comparisons. Digital links: Point to point links, power penalties.

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IV Year Semester-VII
UDATAEC704

DATA COMMUNICATION NETWORKS

(L-T-P-3-0-0)

Unit-I: Communication problem and system models, components of communication systems, communication channels and their characteristics, mathematical models for communication

channels, multiple access techniques, link budget analysis

Unit-II: Representation of deterministic and stochastic signals, random noise characterization in communication systems, signal-to-noise ratio, characterization of communication signals and systems: signal space representations, representation of analog and digitally modulated signals, spectral characteristics of modulated signals Coding, Channel Coding (Hamming codes)

Unit-III: Optimal receivers: Receivers for signals corrupted by AWGN, Error performance Analysis of receivers for memory-less modulation, optimal receivers for modulation methods with memory, OFDM, MIMO, Source Ethernet and Wireless LANs; Hubs, bridges and switches

Unit-IV: Error Control, Flow Control, Sliding Window Protocols, HDLC, PPP, Local area networks: Ethernet, Fast Ethernet, Token Ring, Introduction to Gigabit

Unit-V: MAC Layer

Static Channel Allocation in LANs and MANs, Dynamic Channel Allocation in LANs and MANs, ALOHA,

Carrier Sense Multiple Access Protocols, Collision-Free Protocols, Limited-Contention Protocols, Wavelength Division Multiple Access Protocols, Wireless LAN Protocols, IEEE Standard 802.3

Text Books:

1. Madhow, U., (2008), Fundamentals of Digital Communication, Cambridge University Press
2. Lathi, B. P. & Ding, Z., (2010), Modern Digital and Analog Communication Systems, Oxford University Press
3. Stallings, W., (2010), Data and Computer Communications, Pearson.
4. Andrew S. Tanenbaum, "Computer Networks" Pearson.
5. Ajit Pal, "Data Communication and Computer Networks", PHI
6. Dimitri Bertsekas, Robert G. Gallager, "Data Networks", Prentice Hall, 1992

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IV Year Semester-VII

UVLSIIEC705

VLSI DESIGN

(L-T-P-3-0-0)

Unit-I: Introduction: A Brief History, Preview, MOS Transistors, CMOS Logic, CMOS Fabrication and Layout, Design Partitioning, Logic Design, Circuit Design, Physical Design, Design Verification, Fabrication, Packaging and Testing.

Unit-II: Delay: Introduction, Transient Response, RC delay model, Linear Delay Energy – Delay Optimization, Low Power Architectures.
Interconnect: Introduction, Interconnect Modelling, Interconnect Impact, Interconnect Engineering, Logical Effort with Wires

Unit-III: Energy – Delay Optimization, Low Power Architectures. Interconnect: Introduction, Interconnect Modelling, Interconnect Impact, Interconnect Engineering, Logical Effort with Wires

Unit-IV: Dynamic logic circuits: Introduction, basic principle of pass transistor circuits, synchronous dynamic circuit techniques, dynamic CMOS circuit techniques, domino CMOS logic. Semiconductor memories: Introduction, DRAM, SRAM, ROM, flash memory.

Unit-V: Low – Power CMOS Logic Circuits: Introduction, Overview of Power Consumption, Low – Power Design through voltage scaling, Estimation and Optimization of switching activity, Reduction of Switched Capacitance and Adiabatic Logic Circuits. Design for Testability: Introduction, Fault Types and Models, Controllability and Observability, Ad Hoc Testable Design Techniques, Scan Based and BIST Techniques

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IV Year Semester-VII

UELECEC706
Electronic Circuit Design Lab

(L-T-P-0-0-2)

Electronics Circuit Design Lab. In this practical course students will carry out a design oriented project work using various analog/ digital building blocks which they have already studied in their analog electronic/ digital electronic courses such as Electronic circuits, integrated circuits and filter design. The project may include but not restricted to any of the following:

1.Universal op-amp based biquad

2.Universal OTA biquad

3.Amplitude control or stabilization applied to any sinusoidal oscillators

4.Op-amp/ OTA based function generator

5.Any application of log/antilog circuits

6.Any applications of analog multiplier/ divider

7.Any digital system design and its hardware implementation using TTL/ CMOS ICs

8.Any circuit idea (not studied in the course) using 555 Timer in conjunction with any otherICs

The above must include

1.Design the circuit.

2.Make hardware and measure various parameters.

3.Simulation in Spice of the designed circuit.

4.Comparison of measured and simulated results.

A report is to be made for evaluation.

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IV Year Semester-VII

UOPTIEC707

Optical Communication & Networking Lab (L-T-P-0-0-2)

Part - A

1. Familiarisation of different types of cables and different commands.

a) Identify Cat5 cable , RJ 45 Connector , Crimping Tool , Wire Stripper
b) Use Wire Stripper for Cutting wire shield and Understanding of Internal Structure of Cat 5 Cable
c) Finding Pin No-1 on RJ 45 Connector and Inserting Wires in connector
d) Crimping of RJ45 connector using Crimping tool
e) Preparation of Straight cable (used for Dissimilar devices such as PC to Switch , PC to router) and Cross cables (used for similar devices such as PC to PC , Router to Router , Switch to Switch)
f) Understand different commands like ping, treacert, ifconfig, dig etc..

2. Making a subnet and configuring router

a) Understand the working of a router & method to access the router via console or using telnet, different types of cables used for connectivity.
b) Different types of show commands & their purpose.
c) Assignment of IP address and enabling layer 3 connectivity.
d) Implement sub netting

3. Configuring web and DHCP servers

a) Understand Internet Information Services tool and its installation.
b) To configure web services using IIS tool.
c) Configure DHCP

4. Configuring VLAN

a) Understand the configuration of Vlan in a switch
b) How to make the port of a switch as an access port & a trunk port, purpose of the Vlan in a network
c) Different types of show commands & their purpose.

5. To implement a simple file transfer protocol (FTP) using connection oriented and connectionless sockets.

6. To develop a concurrent file server that spawns several threads, one for each client requesting a specific file.

7. To develop a simple chatting application using

(i) Connection oriented and (ii) Connectionless sockets

Part – B **(Any 4 Experiments):**

1. To setting up fiber optic analog link.
2. Study and measurement of losses in optical fiber.
3. Study and measurement of numerical aperture of optical fiber.
4. Study and perform time division multiplexing (digital).
5. Study of framing in time division multiplexing.
6. Study of Manchester coding and decoding.
7. Study of voice coding and codec chip.
8. Study and measure characteristics of fiber optic LED's and photo detector.

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IV Year Semester-VII

UMINOEC708
MINOR PROJECT

(L-T-P-0-0-2)

This project course may be in continuation of Project allotted in the beginning of the VIII semester. Here, the students are supposed to do the detailed work as scheduled in the last semester. Finally, he/she will be required to submit the detailed project report on which viva-voice examination will be conducted by a committee having at least one external examiner.

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UINDUEC709: INDUSTRIAL TRAINING

Students shall carryout industrial training as a part of their curriculum after the completion of their 3rd year for 6 WEEKS/ 45 DAYS. After this their performance shall be evaluated during 7th semester by SUBMITTING TRAINING REPORT & CERTIFICATE, taking viva of each and every student.

STUDY AND EVALUATION SCHEME FOR B.TECH ELECTRONICS & COMM. ENGG.

SEMESTER-VIII

SUBJECT CODE	SUBJECTS NAME	STUDY SCHEME Periods/Week			Credits	Marks In Evaluation Scheme						Total Marks of Internal & External
						INTERNAL ASSESSMENT			EXTERNAL ASSESSMENT			
		L	T	P		Th	Pr	Tot	Th	Pr	Tot	
UNONCEC801	Non-Conventional Energy Resources	3	0	0	3	30	-	30	70	-	70	100
USATEEC802	Satellite & RADAR systems	3	1	-	4	30	-	30	70	-	70	100
UWIREEC803	Wireless & Mobile Communication	3	1	0	4	30	-	30	70	-	70	100
UOPTIEC804	Optical Network	3	0	-	3	30	-	30	70	-	70	100
UMAJOEC805	Major Project	-	0	12	7		100	100		200	200	300
Total		12	2	12	21	120	100	220	280	200	480	700

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IV Year Semester-VIII
UNONCEC801
NON-CONVENTIONAL ENERGY RESOURCES

(L-T-P-3-0-0)

Unit-II Introduction: Various non-conventional energy resources- Introduction, availability, classification, relative merits and demerits.
Solar Cells: Theory of solar cells.Solar cell materials, solar cell array, solar cell power plant, limitations.

UNIT-IISolar Thermal Energy: Solar radiation, flat plate collectors and their materials, applications and performance, focusing of collectors and their materials, applications and performance; solar thermal power plants,thermal energy storage for solar heating and cooling, limitations.

UNIT-III Geothermal Energy: Resources of geothermal energy, thermodynamics of geo-thermal energy conversion-electrical conversion, non-electrical conversion, environmental considerations.

Magneto-hydrodynamics (MHD): Principle of working of MHD Power plant, performance and limitations.

Fuel Cells: Principle of working of various types of fuel cells and their working, performance and limitations.

UNIT-IV Thermo-electrical and thermionic Conversions: Principle of working, performance and limitations.

Wind Energy: Wind power and its sources, site selection, criterion, momentum theory, classification of rotors, concentrations and augments, wind characteristics. performance and limitations of energy conversion systems.

NIT-V Bio-mass: Availability of bio-mass and its conversion theory

cean Thermal Energy Conversion (OTEC): Availability, theory and working principle,

Performance and limitations of energy.

Availability, theory and working principle, performance and limitations.

Wave and Tidal Wave: Principle of working, performance and limitations. Waste Recycling Plants.

- Raja etal, “Introduction to Non-Conventional Energy Resources” ScitechPublications.
- John Twideu and Tony Weir, “Renewal Energy Resources” BSPPublications,2006.
- M.V.R. KoteswaraRao, “Energy Resources: Conventional & Non-Conventional “ BSPPublications,2006.
- D.S. Chauhan,”Non-conventional Energy Resources” New AgeInternational.
- C.S. Solanki, “ Renewal energy technologies: A Practical guide for beginners” PHI Learning.

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IV Year Semester-VIII

USATEEC802
SATELLITE & RADAR SYSTEMS

(L-T-P-3-1-0)

Unit-I: Introduction to radar, radar block diagram and operation, radar frequencies, Applications of radar.

The Radar Equation: Detection of signals in noise , Receiver noise and the signal to noise ratio, Probabilities of detection and false alarm, Integration of Radar Pulses, Radar cross section of targets, Radar cross section fluctuations, Transmitter Power, Pulse Reception Frequency , Antenna Parameters, System Losses.

Unit-II: MTI and Pulse Doppler Radar: Introduction to Doppler and MTI Radar, Delay Line cancellers, Staggered Pulse Reception Frequencies, Doppler Filter Banks, Digital MTI Processing, Moving Target Detector, Limitations to MTI Performance.

Unit-III: Tracking Radar: sequential lobing, conical scan, monopulse Tracking, low angle tracking, tracking in range. Elements of Satellite Communications, Orbital mechanics, look angle and orbit determination, launches and launch vehicle, orbital effects. Introduction to geo-synchronous and geo-stationary satellites.

Unit-IV: Satellite sub-systems: Attitude and Orbit control systems, Telemetry, Tracking and command control system, Power supply system, Introduction to satellite link design, basic transmission theory, system noise temperature and G/T ratio, design of down link and uplink, design of satellite links for specified C/N, satellite data communication protocols.

Unit-V: Direct broadcast satellite television and radio, satellite navigation and the global positioning systems, GPS position location principle, GPS receivers and codes, Satellite Signal Acquisition, GPS navigation Message, GPS Signal Levels, Timing Accuracy, GPS Receiver Operation.

Text / Reference Books:

1. Merrill I. Skolnik " Introduction to Radar Systems", Mc Graw- Hill.
2. J.C.Toomay, Paul J. Hannen "Principles of Radar", PHI Learning.
3. B.Pratt, A.Bostian, "Satellite Communications", Wiley India.
4. D.Roddy, "Satellite Communications", TMH.

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IV Year Semester-VIII

UWIREEC803

WIRELESS & MOBILE COMMUNICATION

(L-T-P-3-1-0)

Unit-I: Evolution of mobile radio communication fundamentals. General Model ofWireless Communication Link, Types of Signals, Cellular Infrastructure, Cellular System Components, Antennas for Cellular Systems, Operation of Cellular Systems, Channel Assignment, Frequency reuse, Channel Assignment strategies, Handoff Strategies Cellular Interferences, Sectorization; Wireless Channel and Radio Communication, Free Space Propagation Model, Channel Noise and Losses, Fading in Land Mobile Systems, Multipath Fading, Fading Effects on Signal and Frequency, Shadowing; Wireless Channel Modeling: AWGN Channel, Rayleigh Channel, Rician Fading Channel, Nakagami Fading Channel, Ocumura and Hata Path Loss Model; Channel Modelling: Stochastic, Flat Fading, Wideband Time-Dispersive Channel Modelling.

Unit-II: Theory of Vocoders, Types of Vocoders; Spread Spectrum Modulation, Pseudo-Noise Codes with Properties and Code Generation Mechanisms, DSSS and FHSS Systems, Time Hopping and Hybrid Spread Systems; Multicarrier Modulation Techniques, Zero Inter Symbol Interference Communication Techniques, Detection Strategies, Diversity Combining Techniques: Selection Combining, Threshold Combining, Equal Gain Combining, Maximum Ratio Combining; Spatial Diversity and Multiplexing in MIMO Systems, Channel Estimation.

Unit-III: Equalization Techniques: Transversal Filters, Adaptive Equalizers, Zero Forcing Equalizers, Decision Feedback Equalizers, and related algorithms; Multiplexing and Multiple Access: FDMA, TDMA, CDMA, OFDMA, SC-FDMA, IDMA Schemes and Hybrid Method of Multiple Access Schemes,RAKE Receiver; Multiple Access for Radio Packet Systems: Pure ALOHA, Slotted ALOHA, CSMA and their versions; Packet and Pooling Reservation Based Multiple Access Schemes.

Unit-IV: GSM system for mobile Telecommunication, General Packet Radio Service, Edge Technology; CDMA Based Standards: IS 95 to CDMA 2000, Wireless Local Loop, IMT 2000 and UMTS, Long Term Evolution (LTE), Mobile Satellite Communication.

Unit-V: Introduction to Mobile Adhoc Networks, Bluetooth, Wi-Fi Standards, WiMax Standards, Li-Fi Communication, Ultra-Wideband Communication, Mobile data networks, Wireless Standards IMT 2000, Introduction to 4G and NGN

Text Book:

1. T.S. Rappaport, “Wireless Communication-Principles and practice”, Pearson Publications, Second Edition.
2. Upena Dalal, “Wireless Communication and Networks”, Oxford Press Publications.

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IV Year Semester-VIII

UOPTIEC804

OPTICAL NETWORK

(L-T-P-3-0-)

Unit-I: Introduction to Optical Network:- Optical Networks: multiplexing techniques, second generation optical networks. The optical layer, optical packet switching. Transmission Basics: wavelength, frequencies and channel spacing, wavelength standards. Non linear Effects: Effective length and area, stimulated brillouin scattering, stimulated raman scattering, Propagation in a non linear medium, self phase modulation, cross phase modulation Four wave mixing.

Unit-II: Components:-Couplers: Principles of operation, Conservation of energy, Isolators and circulators: Principles of operation Multiplexers and filters: Gratings, diffraction pattern, Bragg grating, Fiber gratings, Fabry-perot filters, multilayers dielectric thin – film filters, Mach-Zehnder interferometers, Arrayed waveguide grating, Acousto-optic tunable filter, High channel count multiplexer Architecture. Switching : large optical switches, Optical switch Technologies, large electronic switches wavelength converters: Optoelectronic Approch , optical grating, interferometric techniques wave mixing. Crosstalk: Intra-channel crosstalk, inter-channel crosstalk, crosstalk in Networks, Bidirectional system crosstalk reduction.

Unit-III: Networks- SONET/SDH: Multiplexing, SONET/SDH layers, SONET Frame structure, SONET/SDH physical layer, Elements of a SONET/SDH infrastructure. ATM: Function of ATM, Adaptation layers, Quality of service. IP: Routing and forwarding, QOS, WDM Network elements: Optical line terminals, Optical line amplifiers,. Optical add/Drop multiplexers: Architecture, reconfigurable OADMS, Optical cross connects: All optical OXC configuration.

Unit-IV: WDM Network Design Cost Trade-offs, Light path Topology Design, and Routing and wavelength assignment problems, Dimensioning Wavelength Routing Networks, Network Survivability, Basic Concepts, Protection in SONET/SDH, Protection in client layer, Optical Layer Protection, Different Schemes, Interworking between Layers, Access Networks, Network Architecture Overview, Enhanced HFC, FTTC, PON evolution.

Unit-V: Optical Switching, OTDM, Synchronization, Header Processing, Buffering, Burst Switching, Deployment Considerations- SONET/SDH core Network

Text Books:

1. R. Ramaswami, & K. N. Sivarajan, “Optical Networks a Practical perspective”,

   Morgan Kaufmann Publishers, 3rd Ed.

2. U. Black, “Optical Networks: Third Generation Transport Systems”/ Pearson

   Educations

Reference Books:

Biswanath Mukherjee “Optical WDM Networks” Springer Pub 2006.

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IV Year Semester-VIII

UMAJOEC805

MAJOR PROJECT

L	T	P
-	0	12

This project course may be in continuation of Project allotted in the beginning of the VIII semester. Here, the students are supposed to do the detailed work as scheduled in the last semester. Finally, he/she will be required to submit the detailed project report on which viva-voice examination will be conducted by a committee having at least one external examiner.