परीक्षा नियंत्रण प्रकोष्ठ, जबलपुर इंजीनियरिंग महाविद्यालय, जबलपुर (म.प्र.)

क्रमांक / प.नि.प्र. / 2020 / 219 जबलपुर, दिनांक 30/12/2020

सूचना

महाविद्यालय के B.E. / B.Tech. एवं B.E. (PTDC) कोर्स के अंतर्गत विभिन्न स्कीम के समान पाठ्यक्रम के सिलेबस की समतुल्यता संलग्न सारणी अनुसार निर्धारित की गयी है। अतः CE/EE/EC/CSE/IT/IP विभाग के विद्यार्थी सारणी के तृतीय कॉलम मे दर्शित विषयों के स्थान पर उनके सम्मुख अंतिम कॉलम में दर्शित विषय एवं Mechanical विभाग के विद्यार्थी संलग्न सारणी अनुसार सरल क्रमांक (Serial No.) में दर्शित प्रथम विषय के कोड अनुसार Final Subject Code & Subject (After Equivalence) के सेलेबस द्वारा आगामी परीक्षाओं की तैयारी करना सुनिश्चित करें।

प्राचार्य / मुख्य परीक्षा नियंत्रक
जबलपुर इंजीनियरिंग महाविद्यालय,
जबलपुर (म.प्र.)

EQUIVALENCE OF SUBJECTS OF DIFFERENT SCHEMES OF UNDER GRADUATE COURSES (B.E. / B.Tech.)
OF ELECTRONICS & TELECOMMUNICATION ENGG.

S.No.	Schemes	Subject Code & Subject Name (Semester) Having Equivalence in Syllabus	Final Subject code & subject (after equivalence)
1	Grading	EC41 TV and Digital display Devices **B.E./B.E. (PTDC) VII Sem.**	EC701 TV and Digital Display **B.Tech. VII Sem.**
	CBGS	EC7001 TV and Digital Display **B.E. VII Sem.**	
	AICTE	EC701 TV and Digital Display **B.Tech. VII Sem.**	
2	Grading	EC-33 Antenna & Wave Propagation **B.E. / B.E. (PTDC) VI Sem.**	EC703 Antenna Wave Propagation **B.Tech. VII Sem.**
	CBGS	EC6001 Antenna & Wave Propagation **B.E. VI Sem.**	
	AICTE	EC703 Antenna Wave Propagation **B.Tech. VII Sem.**	
3	Grading	EC-048C Wireless & Mobile Communication **B.E./B.E. (PTDC) VII Sem.**	EC704A Wireless Communication **B.Tech. VII Sem.**
	CBGS		
	AICTE	EC704A Wireless Communication **B.Tech. VII Sem.**	
4	Grading	EC-47 Information Theory & Coding **B.E. /B.E. (PTDC) VII Sem.**	EC704B Information Theory & Coding **B.Tech. VII Sem.**
	CBGS	EC7004A Information Theory & Coding **B.E. VII Sem.**	
	AICTE	EC704B Information Theory & Coding **B.Tech. VII Sem.**	

5	Grading	EC-48A Image Processing and Patten Recognisation **B.E./B.E.(PTDC) VII Sem.**	EC705A Digital Image Processing **B.Tech. VII Sem.**
	CBGS	EC7005D Digital Image Processing **B.E. VII Sem.**	
	AICTE	EC705A Digital Image Processing **B.Tech. VII Sem.**	
6	Grading	EC-048B Artificial Intelligence & Neural Network **B.E./B.E. (PTDC) VII Sem.**	EC705B Artificial Intelligence **B.Tech. VII Sem.**
	CBGS	EC7005B Artificial Intelligence **B.E. VII Sem.**	
	AICTE	EC705B Artificial Intelligence **B.Tech. VII Sem.**	
7	Grading	EC-43 Optical communication **B.E./B.E. (PTDC) VII Sem.**	EC801 Optical communication **B.Tech. VIII Sem.**
	CBGS	EC7002 Optical communication **B.E. VII Sem.**	
	AICTE	EC801 Optical Communication **B.Tech. VIII Sem.**	
8	Grading	EC-51 Advance communication System **B.E./B.E. (PTDC) VIII Sem.**	EC802 Advance Communication **B.E. VIII Sem.**
	CBGS	EC8002 Advance communication System **B.E. VIII Sem.**	
	AICTE	EC802 Advance Communication **B.Tech. VIII Sem.**	
9	Grading	EC-66 Nano Electronics **B.E. VIII Sem.**	EC803A Nano Electronics **B.E. VIII Sem.**
	CBGS	EC8004B Nano Electronics **B.E. VIII Sem.**	
	AICTE	EC803A Nano Electronics **B.Tech. VIII Sem.**	

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10	Grading		EC803C Sensor Technolgoy **B.Tech. VIII Sem.**
	CBGS	EC7004C Sensor Technolgoy **B.E. VIII Sem.**	
	AICTE	EC803C Sensor Technolgoy **B.Tech. VIII Sem.**	
11	Grading		EC804C Fuzzy Logic & NN **B.Tech. VIII Sem.**
	CBGS	EC7004B Fuzzy Logic & Neural Network **B.E. VII Sem.**	
	AICTE	EC804C Fuzzy Logic & NN **B.Tech. VIII Sem.**	

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COURSE CONTENTS w.e.f. July 2017-18 batch

Category of Course	Course Title	Course Code	Credits-4			Theory Papers
B. Tech. VII SEM EC	TV and Digital Display Devices	**EC701**	**L**	**T**	**P**	**Max. Marks-70 Min. Marks - 22 Duration-3 hours**
			3	**-**	**2**	

Module-I
Fundamentals of television Engineering, Scanning mechanism frequency interleaving aspect ratio kell factor plumbicon, vidicon Image acquisition by CCD, CMOS Camera devices, B/W Picture Tube, Color picture tube principle, Various T. V. Standard.(NTSC CCIRB PAL)

Module-II
Composite Video Signal, Horizontal and Vertical blanking pulses, Calculation of BW in T. V., Vestigial side band transmission, Sound signal transmission, B/W T. V. Transmitter block diagram ad its working ,Color T.V. transmission.

Module-III
B/W T. V. Receiver block diagram and its working. Color T.V. Receivers block Diagram and its working. RF section, IF section in receivers, Video detector, FM sound section. PAL-D system

Module-IV
Basics of color formations in color TV. Luminance signal, Chrominance signal, Negative modulation, Quadrature amplitude modulation. Various kinds of antennas used in T.V. transmission and reception satellite T.V. principle.

Module-V
Digital display method, TFT monitor, LCD, LED, PLASMA display system, High definition TV Flat panel T. V. OLED display, quantum dot display, Holography and 3D TV

Books
1. TV Engineering by R R Gulati
2. A.M. Dhake Television & Video Engineering.
3. For LCD, LED PLASMA "Service manuals of various companies"

Course Outcomes:
Upon successful completion of course students will be able to:

CO1	Understanding of basics of T.V. and scanning.
CO2	Knowledge of design aspect of video signal BW calculation
CO3	Understand of TV receiver and transmitter
CO4	Comprehensive knowledge of basics of T.V. modulation and Antenna
CO5	Comprehensive study of model Display devices.

LIST OF EXPERIMENTS

1. To Study Picture Tube.
2. To Study RF Section.
3. To Study VIF Section.
4. To Study Vertical Deflection Section.
5. To. Study Horizontal Deflection Section and EHT Section.
6. To study chroma Section.
7. To Study Video Amplifier.
8. To Study Control System.
9. To Study Sound Section.
10. To Study Switch Mode Power Supply.
11. (a)To study the Transmission characteristics of the different Diode limiter configuration.
    (b) To observe limiting action of sine wave on the C.R.O.
    (c) To study the Diode capacitance at higher frequency.
12. (a) To study R-C differentiating Ckt Response at 1 KHz & 10 KHz for various combination of R & C.
    (b) To study R-C Integrating Ckt Response at 1 KHz & 10 KHz for various combination of R & C
13. To Study TV pattern Generator.
14. To Study of flat panel TV receiver.

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Category of Course	Course Title	Course Code	Credits-4			Theory Papers
B. Tech. VII SEM EC	ANTENNA AND WAVE PROPAGATION	EC703	L	T	P	Max. Marks-70 Min. Marks - 22 Duration-3 hours
			3	-	2	

Module - 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.

Module - 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.

Module - 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.

Module - 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. Beam forming.

Module - 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, SatyaPrakashan.
7. B. L. Smith: MordernAnteenas, 2nd Edition, Springer, Macmillan India Ltd.

Course Outcomes:

Upon successful completion of course students will be able to:

CO1	Understand various antenna terminologies
CO2	Designing of antenna arrays
CO3	Knowledge of working of various types of antenna
CO4	Synthesize various antenna arrays
CO5	Differentiate between various mechanism of propagation of radio waves

RADAR & 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 polarization 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 Biconical antenna, construction & its radiation pattern
12 Study of Horn antenna
13. Study of Rhombic antenna

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Category of Course	Course Title	Course Code	Credits-4			Theory Papers
			L	T	P	
B. Tech. VII SEM EC	WIRELESS COMMUNICATION	EC704A	3	1	-	Maximum Marks – 70 Minimum Marks – 22 Duration – 3 Hours

Module-I : Mobile Radio Propagation I: Path Loss and Shadowing

Radio Wave Propagation, Transmit and Receive Signal Models, Free-Space Path Loss, Ray Tracing, Two-Ray Model, Ten-Ray Model (Dielectric Canyon), General Ray Tracing, Local Mean Received Power, Empirical Path Loss Models, The Okumura Model, Hata Model, COST 231ExtensiontoHataModel, Piecewise Linear (Multi-Slope) Model, Indoor Attenuation Factors, Simplified Path Loss Model, Shadow Fading, Combined Path Loss and Shadowing, Outage Probability under Path Loss and Shadowing, Cell Coverage Area.

Module-II: Mobile Radio Propagation II: Statistical Multipath Channel Models

Time-Varying Channel Impulse Response, Narrow band Fading Models, Autocorrelation, Cross Correlation, and Power Spectral Density, Envelope and Power Distributions, Level Crossing Rate and Average Fade Duration, Finite State Markov Channels, Wideband Fading Models, Power Delay Profile, Coherence Bandwidth, Doppler Power Spectrum and Channel Coherence Time, Transforms for Autocorrelation and Scattering Functions, Discrete-Time Model ,Space-Time Channel Models.

Module-III : Capacity of Wireless Channels

Capacity in AWGN , Capacity of Flat-Fading Channels ,Channel and System Model ,Channel Distribution Information(CDI)Known ,Channel Side Information at Receiver Channel Side Information at Transmitter and Receiver, Capacity with Receiver Diversity Capacity Comparisons, Capacity of Frequency-Selective Fading Channels , Time-Invariant Channels, Time-Varying Channels.

Module-IV: Diversity

Realization of Independent Fading Paths, Receiver Diversity, System Model, Selection Combining, Threshold Combining, Maximal Ratio Combining, Equal-Gain Combining, Channel Known at Transmitter Channel Unknown at Transmitter-The Alamouti Scheme, Moment Generating Functions in Diversity Analysis, Diversity Analysis for MRC, Diversity Analysis for EGC and SC, Diversity Analysis for Noncoherent and Differentially Coherent Modulation

Module-V: Wireless system and standards

Global Systems for mobile (GSM), GSM Services and features, GSM system architecture, GSM radio Subsystem, GSM Channel types, Example of GSM call, Frame structure for GSM, Signal processing in GSM, CDMA Digital Cellular Standards (IS-95), Frequency and Channel Specification, Forward CDMA Channel, Reverse CDMA Channel, Third generation systems, OFDM and 4G communication.

Reference Books:

1. Fundamentals of Wireless Communication: David Tse and Pramod Viswanath
2. Principles of Mobile Communication : Gordon L. Stüber
3. WIRELESSCOMMUNICATIONS : AndreaGoldsmith
4. Wireless Communication Principles and Practice : T. S. Rappaport

Course Outcomes:

Upon successful completion of course students will be able to:

CO1	Understand path loss and shadowing in mobile radio propagation
CO2	Describe statistical multipath channel modes
CO3	Knowledge of capacity of various wireless channels
CO4	Analyze the diversity in wireless channels
CO5	Elaborate various wireless systems and standards

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Category of Course	Course Title	Course Code	Credits-4			Theory Papers
			L	T	P	
B. Tech. VII SEM EC	INFORMATION THEORY AND CODING	EC704B	3	1	-	Maximum Marks – 70 Minimum Marks – 22 Duration – 3 Hours

Module -I
Source Coding: A logarithmic measure of information, Average mutual information and entropy, Information measures for continuous random variables, Noiseless coding theorem, Coding for discrete memoryless sources, Discrete stationary sources, The Lampel-Ziv algorithm, Coding for analog sources, rate distortion function.

Module -II
Channel Capacity and Coding: The converse to the coding theorem, Channel models, Channel capacity, Achieving channel capacity with orthogonal Signals, Channel reliability functions, Random coding based on M-ary Binary-coded signals, Practical Communication systems in light of Shannon's equation.

Module -III
The Noisy-channel coding theorem: Linear Block codes, The generator matrix and the parity check matrix, Some specific linear block codes, Cyclic codes, Decoding of linear block codes, bounds on minimum distance of the linear block codes.

Module -IV
Convolutional Codes: Basic properties of the convolutional codes, The transfer function of a convolutional code, Optimum decoding of convolutional codes- The Viterbi algorithm, Distance properties of binary convolutional codes, Other decoding algorithms for convolutional codes, Practical considerations in the application of convolutional codes.

Module –V
Complex codes based on combination of simple codes: Product codes, Concatenated codes, Turbo codes, The BCJR algorithm.
Coding for Bandwidth-constraint channels: Combined coding and modulation, Trellis coded modulation.

References:

1. Simon Haykins: Communication Systems, 4th Edition, John Wiley.
2. J. G. Proakis: Digital Communications, McGraw Hills
3. B.P. Lathi: Modern Analog and Digital Communication System, Oxford University Press
4. R. G. Gallager: Information Theory and Reliable Communication, John Wiley and Sons
5. A. J. Viterbi and J. K. Omura: Principles of Digital Communications and Coding, McGraw Hill Series.

6. U. Madhow: Fundamentals of Digital Communication, Cambridge University Press.

Course Outcomes:
Upon successful completion of course students will be able to:

CO1	Understand various source coding algorithms
CO2	Describe channel capacity
CO3	Translate the noisy channel coding theorems
CO4	Describe various convolution codes
CO5	Execute complex codes based on combination of simple codes

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Category of Course	Course Title	Course Code	Credits-4			Theory Papers
B. Tech. VII SEM EC	DIGITAL IMAGE PROCESSING	EC705A	L	T	P	Max. Marks-70 Min. Marks - 22 Duration-3 hours
			3	1	-	

Module-I : DIGITAL IMAGE PROCESSING :
Elements of a Digital Image Processing system, Structure of the Human eye, Image formation and contrast sensitivity, Sampling and Quantization, Neighbors of a pixel, Distance measures, Image acquisition Systems, CMOS display demises

Module - II : IMAGE ENHANCEMENT :
Definition, Spatial domain methods, Frequency domain methods, Histogram modify technique, Neighborhood averaging, Media filtering, Low pass filtering, Averaging of multiple images, Image sharpening by differentiation and high pass filtering.

Module-III : IMAGE TRANSFORMS:
Introduction to Fourier transform-DFT, Properties of two dimensional FT, Separability, Translation, Periodicity, Rotation, Average value, FFT algorithm, Walsh transforms, Hadamard transform, Discrete Cosine transform, Wavelet transform and comparison of all the transforms.

Module – IV : IMAGE RESTORATION :
Definition, Degradation model, Discrete formulation, Circulant matrices, Block circulant matrices, Effect of diagnolization of circulant and block circulant matrices, Unconstrained and constrained restorations , Inverse filtering, Wiener filter, Restoration in spatial domain.

Module - V : IMAGE ENCODING :
Objective and subjective fidelity criteria, Basic encoding process, Variable length coding, LZW, Bit-plane coding-Bit-plane coding, Lossless predictive coding - Lossy compression: Lossy predictive coding, transform coding, wavelet coding. Image compression. Introduction to all the Image compression techniques and standards, CCITT, JPEG, JPEG 2000, Video compression standards . Basics of Pattern Recognition, image segmentation

References :
1. “Digital Image Processing” by Rafael, C. Gonzlez., and Paul, Wintz, Addison-Wesley Publishing
Company.
2. “Fundamentals of Digital Image Processing” by Jain Anil K. Prentice Hall.
3. “Digital Image Processing” by Sosenfeld, and Kak, A.C., Academic Press.
4. The Image Processing Handbook, (5/e), CRC, 2006 by J.C. Russ,
5. Digital Image Processing with MATLAB by .R.C.Gonzalez& R.E. Woods; Prentice Hall, 2003

Course Outcomes:

Upon successful completion of course students will be able to:

CO1	Knowledge of elements of digital image processing system
CO2	Describe about Image enhancement techniques
CO3	Illustrate the Image transforming techniques
CO4	Understand ways for Image restoration
CO5	Elaborate Image encoding techniques

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Category of Course	Course Title	Course Code	Credits-4			Theory Papers
B. Tech. VII SEM EC	Artificial Intelligence and Neural Network	EC705B	L	T	P	Max. Marks-70 Min. Marks - 22 Duration-3 hours
			3	1	-	

Module - I: Meaning and definition of artificial intelligence, various types of production systems, Characteristics of production systems.

Module - II: Knowledge Representation, Problems in representing knowledge, knowledge representation using propositional and predicate logic, comparison of propositional and predicate logic, Resolution, refutation, deduction, theorem proving, inferencing, monotonic and non-monotonic reasoning.

Module - III: Probabilistic reasoning, Baye's theorem, semantic networks, scripts, schemas, frames, conceptual dependency, fuzzy logic, forward and backward reasoning.

Module - IV: Game playing techniques like mini-max procedure, alpha-beta cut-offs etc, planning, Study of the block world problem in robotics, Introduction to understanding and natural languages processing.

Module - V: Introduction to learning, Various techniques used in learning, introduction to neural networks, applications of neural networks, common sense, reasoning, some example of expert systems, Free software.

References:-

- Rich E and Knight K, Artificial Intelligence, TMH New Delhi.
- Nelsson N.J., Principles of Artificial Intelligence, Springer Verlag, Berlin.
  Barr A, Fergenbaub E.A. and Cohen PR. Artificial Intelligence, Addison
- Wesley, Reading Waterman D.A., A guide to Expertsystem, Adision -
- Wesley, Reading
  Artificial Intelligence Hand book, Vol. 1-2, ISA, Research
- Triangle Park. Kos Ko B, Neural Networks and Fuzzy
- system –PHI.
  Haykin S, Artificial Neural Networks-Comprehensive Foundation, Asea,Pearson.

Course Outcomes:

Upon successful completion of course students will be able to:

CO1	Characterize Artificial intelligence system
CO2	Describe knowledge representation in AI systems
CO3	Illustrate reasoning using fuzzy
CO4	Elaborate natural language processing
CO5	Knowledge of neural networks

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Category of Course	Course Title	Course Code	Credits-4			Theory Papers
B. Tech. VIII SEM EC	Optical Communication	EC801	L	T	P	Max. Marks-70 Min. Marks - 22 Duration-3 hours
			3	-	2	

Module-I

Overview of Optical Fiber Communications (OFC): Motivation, optical spectral bands, key elements of optical fiber systems. **Optical fibers**: basic optical laws and definitions, optical fiber modes and configurations, mode theory for circular waveguides, single mode fibers, graded-index fiber structure, fiber materials, photonic crystal fibers, fiber fabrication, fiber optic cables.

Module -II

Optical sources: Light emitting diodes (LEDs): structures, materials, quantum efficiency, LED power, modulation of an LED. Laser diodes: modes, threshold conditions, laser diode rate equations, external quantum efficiency, resonant frequencies, structure and radiation patterns, single mode lasers, modulation of laser diodes. **Power launching and coupling**: source to fiber power launching, fiber to fiber joints, LED coupling to single mode fibers, fiber splicing, optical fiber connectors. Multimode fibers.

Module -III

Photo detectors: pin photo detector, avalanche photodiodes, photo detector noise, detector response time, avalanche multiplication noise. **Signal degradation in optical fibers:** Attenuation: units, absorption, scattering losses, bending losses, core and cladding losses. Signal distortion in fibers: overview of distortion origins, modal delay, factors contributing to delay, group delay, material dispersion, waveguide dispersion, polarization-mode dispersion. Characteristics of single mode fibers: refractive index profiles, cutoff wavelength, dispersion calculations, mode field diameter, bending loss calculation. Specialty fibers.

Module-IV Optical receivers: fundamental receiver operation, digital receiver performance, eye diagrams, coherent detection: homodyne andheterodyne, burst mode receiver, analog receivers. **Digital links**: point to point links, link power budget, rise time budget, power penalties. **Analog links**: overview of analog links, carrier to noise ratio, multichannel transmission techniques.

Module -V

Optical technologies Wavelength division multiplexing (WDM) concepts: operational principles of WDM, passive optical star coupler, isolators, circulators, Active optical components: MEMS technology, variable optical attenuators, tunable optical filters, dynamic gain equalizers, polarization controller, chromatic dispersion compensators. **Optical amplifiers**: basic applications and types of optical amplifiers, Erbium Doped Fiber Amplifiers (EDFA): amplification mechanism, architecture, power conversion efficiency and gain. Amplifier noise, optical SNR, system applications. CWDM & DWDM.

Performance Measurement and monitoring: measurement standards, basic test equipment, optical power measurements, optical fiber characterization, eye diagram tests, optical time-domain reflectometer, optical performance monitoring.

References:

1. G. Keiser: Optical Fiber Communications, 4th Edition, TMH New Delhi.
2. J. M. Senior: Optical Fiber Communication- Principles and Practices, 2nd Edition, Pearson Education.
3. G. P. Agarwal: Fiber Optic Communication Systems, 3rd Edition, Wiley India Pvt. Ltd.
4. J. C. Palais: Fiber Optics Communications,5th Edition, Pearson Education.
5. R.P. Khare: Fiber Optics and Optoelectronics, Oxford University Press.
6. A. Ghatak and K. Thyagrajan: Fiber Optics and Lasers, Macmillan India Ltd.
7. S. C. Gupta: Optoelectronic Devices and Systems, PHI Learning.
8. Sterling: Introduction to Fiber Optics, Cengage Learning.

List of Experiments:

1. Launching of light into the optical fiber and calculate the numerical aperture and V-number.
2. Observing Holograms and their study.
3. Optic version Mach-Zehnder interferometer.
4. Measurement of attenuation loss in an optical fiber.
5. Diffraction using gratings.
6. Construction of Michelson interferometer.
7. Setting up a fiber optic analog link and study of PAM.
8. Setting up a fiber optic digital link and study of TDM and Manchester coding.
9. Measurement of various misalignment losses in an optical fiber.

Course Outcomes:

Upon successful completion of course students will be able to:

CO1	Understand basics of optical fibers
CO2	Knowledge of various light sources
CO3	Describe various detectors and other theoretical aspects of fibers
CO4	Illustrate various optical receivers
CO5	Elaborate optical technologies

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Category of Course	Course Title	Course Code	Credits-4			Theory Papers
			L	T	P	
B. Tech. VIII SEM EC	ADVANCE COMMUNICATION SYSTEMS	EC802	3	-	2	Maximum Marks – 70 Minimum Marks – 22 Duration – 3 Hours

Module-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.

Module-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.

Module-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.

Module-IV
Orthogonal Frequency Division Multiplexing Systems: Digital-signal-processing-centric implementation of OFDM, Matrix representation of OFDM, Vector coding, PSD of OFDM signal, PAR reduction strategies. Application of WCDMA and OFDM.

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

References:
1. J. G. Proakis: Digital Communications, McGraw 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 Outcomes:
Upon successful completion of course students will be able to:

CO1	Basic study of carrier and symbol synchronization
CO2	Knowledge of multicarrier modulation
CO3	Analyze various access methods
CO4	Discuss various OFDM techniques
CO5	Illustrate cognitive radio

List of practical:

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.

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COURSE CONTENTS w.e.f. July 2017-18 batch

Category of Course	Course Title	Course Code	Credits-4			Theory Papers
B. Tech. VIII SEM	Nano Electronics	EC803A	L	T	P	Max. Marks-70 Min. Marks - 22 Duration-3 hours
			3	-	-	

Module-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 (Electrical, mechanical, optical, thermal etc).top down and bottom up technique, lithographic, nanolithographic and nonlithographictechniques:pulsed laser deposition,plasma arc discharge, e-beam sputtering, ball milling, solgel, electrodeposition, chemical vapour deposition.

Module-II : Characterization technique Scanning probe microscopy: (Principle, construction and working;) Scanning tunneling 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 ofSWNTs ,

Module-III:Introduction to magnetism and superconductivity Basic magnetic phenomena: paramagnetism, ferromagnetism, ferrimagnetism, anti-ferromagnetism;nano-magnetism; giant and colossal magnetoresistance; ferrofluids. Basic superconductivity phenomena; flux quantization and Josephsoneffects.

Module-IV: Fundamental of nanoelectronics 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.

Module-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.KTu, 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.CaoGuozhong, "Nanostructures and Nanomaterials - Synthesis, Properties and Applications", Imperial College Press, 2004.
9. SadamichiMaekawa, "Concepts in Spintronics", Oxford University Press, 2006.

Course Outcomes:
Upon successful completion of course students will be able to:

CO1	Understand Nanoscale technologies
CO2	Describe various characterization techniques
CO3	Illustrate magnetism and superconductivity
CO4	Knowledge about fundamental of nano electronics
CO5	Elaborate silicon MOSFET

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Category of Course	Course Title	Course Code	Credits-4			Theory Papers
B.Tech. VIII SEM	Sensor Technology	EC803C	L	T	P	Max. Marks-70 Min. Marks - 22 Duration-3 hours
			3	-	-	

Course structure

Module I- Sensors Fundamentals and Characteristics

Sensors, Signals and Systems; Sensor Classification; Units of Measurements; Sensor Characteristics

Module II-Physical Principles of Sensing

Electric Charges, Fields, and Potentials; Capacitance; Magnetism; Induction; Resistance; Piezoelectric Effect; Hall Effect; Temperature and Thermal Properties of Material; Heat Transfer; Light; Dynamic Models of Sensor Elements

Module III- Interface Electronic Circuits

Input Characteristics of Interface Circuits, Amplifiers, Excitation Circuits, Analog to Digital Converters, Direct Digitization and Processing, Bridge Circuits, Data Transmission, Batteries for Low Power Sensors

Module IV- Sensors in Different Application Area

Occupancy and Motion Detectors; Position, Displacement, and Level; Velocity and Acceleration; Force, Strain, and Tactile Sensors; Pressure Sensors, Temperature Sensors

Module V- Sensor Materials and Technologies

Materials, Surface Processing, Nano-Technology

Reference Books:

1. J. Fraden, Handbook of Modern Sensors:Physical, Designs, and Applications, AIP Press, Springer

2. D. Patranabis, Sensors and Transducers, PHI Publication, New Delhi

3. Mechatronics- Ganesh S. Hegde, Published by University Science Press (An imprint of Laxmi Publication Private Limited).

Course Outcomes:

Upon successful completion of course students will be able to:

CO1	Understand sensor fundamentals
CO2	Describe physical principle of sensing
CO3	Interface various Electronic circuits
CO4	Discuss sensors in different application area
CO5	Knowledge of sensor material and technologies

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COURSE CONTENTS w.e.f. July 2017-18 batch

Category of Course	Course Title	Course Code	Credits-4			Theory Papers
B.Tech. VIII SEM	Fuzzy and Neural Network	EC804C	L	T	P	Max. Marks-70 Min. Marks - 22 Duration-3 hours
			3	-	-	

Course structure

Module – I : Classical & Fuzzy Sets
Introduction to classical sets – properties, Operations and relations; Fuzzy sets, Membership, Uncertainty, Operations, properties, fuzzy relations, cardinalities, membership functions.

Module – II: Fuzzy Logic System Components
Fuzzification, Membership value assignment, development of rule base and decision making system, Defuzzification to crisp sets, Defuzzification methods.

Module–III : Introduction to Neural Networks
Introduction, Humans and Computers, Organization of the Brain, Biological Neuron, Biological and Artificial Neuron Models, Hodgkin-Huxley Neuron Model, Integrate-and-Fire Neuron Model, Spiking Neuron Model, Characteristics of ANN, McCulloch-Pitts Model, Historical Developments, Potential Applications of ANN. Artificial Neuron Model, Operations of Artificial Neuron, Types of Neuron Activation Function, ANN Architectures, Classification Taxonomy of ANN – Connectivity, Neural Dynamics (Activation and Synaptic), Learning Strategy (Supervised, Unsupervised, Reinforcement), Learning Rules, Types of Application

Module - IV: Single and Multi Layer Feed Forward Neural Networks
Introduction, Perceptron Models: Discrete, Continuous and Multi-Category, Training Algorithms: Discrete and Continuous Perceptron Networks, Perceptron Convergence theorem, Limitations of the Perceptron Model, Applications. Credit Assignment Problem, Generalized Delta Rule, Derivation of Back propagation (BP) Training, Summary of Back propagation Algorithm, Kolmogorov Theorem, Learning Difficulties and Improvements.

Module - V: Applications
Neural network applications: Process identification, control, fault diagnosis and load forecasting. Fuzzy logic applications: Fuzzy logic control and Fuzzy classification.

Books

1. Neural Networks, Fuzzy logic, Genetic algorithms: synthesis and applications by Rajasekharan and Rai – PHI Publication
2. Neural Networks – James A Freeman and Davis Skapura, Pearson Education, 2002.
3. Neural Networks – Simon Hakins , Pearson Education
4. Neural Engineering by C.Eliasmith and CH.Anderson, PHI Neural Networks and Fuzzy Logic System by Bart Kosko, PHI Publications

Course Outcomes:

Upon successful completion of course students will be able to:

CO1	Introduction to Neural Network
CO2	Differentiate between single and multilayer feed forward neural network
CO3	Discuss classical and fuzzy sets
CO4	Knowledge of fuzzy logic system components
CO5	Illustrate various Neural network application