SHRI VENKATESHWARA UNIVERSITY

SYLLABUS

B.TECH

ELECTRONIC & COMMUNICATION ENGINEERING

V SEMESTER

(THREE YEARS PROGRAMME)

(W.E.F. 2019-20)

SCHOOL OF ENGINEERING & TECHNOLOGY

Electronic & Communication Engineering
SEMESTER- V

Sl. No.	Subject Codes	Subject	Periods			Evaluation Scheme				End Semester		Total		Credit
			L	T	P	CT	TA	Total	PS	TE	PE			
1	**SEC - 501**	Electromagnetic Waves	3	0	0	20	10	30		70		100		3
2	**SEC-502**	Digital Signal Processing	3	0	0	20	10	30		70		100		3
3	**SEC-503**	Probability Theory and Stochastic Processes	3	0	0	20	10	30		70		100		3
4	**SEC-504**	Computer Architecture	3	0	0	20	10	30		70		100		3
5	**SEC-505**	Fiber Optic Communication	3	0	0	20	10	30		70		100		3
6	**SOE-051**	Application of Psychology	2	0	0	20	10	30		70		100		2
7	**SEC-511**	Electromagnetic Waves Lab	0	0	2				25		25	50		1
8	**SEC-512**	Digital Signal Processing Lab	0	0	2				25		25	50		1
												700		**19**

SEC-501	Electromagnetic Waves	3L:0T:0P	3 credits

Transmission Lines- Equations of Voltage and Current on TX line, Propagationconstant and characteristic impedance, and reflection coefficient and VSWR, Impedance Transformation on Loss-

less and Low loss Transmission line, Power transfer on TX line, Smith Chart, Admittance Smith Chart, Applications of transmission lines: Impedance Matching, use transmission line sections as circuit elements.

Maxwell's Equations- Basics of Vectors, Vector calculus, Basic laws ofElectromagnetics, Maxwell's Equations, Boundary conditions at Media Interface.

Uniform Plane Wave- Uniform plane wave, Propagation of wave, Wavepolarization, Poincare's Sphere, Wave propagation in conducting medium, phase and group velocity, Power flow and Poynting vector, Surface current and power loss in a conductor

Plane Waves at a Media Interface- Plane wave in arbitrary direction, Reflection and refraction at dielectric interface, Total internal reflection, wave polarization at media interface, Reflection from a conducting boundary.

Wave propagation in parallel planewaveguide, Analysis of waveguide general approach, Rectangular waveguide, Modal propagation in rectangular waveguide, Surface currents on the waveguide walls, Field visualization, Attenuation in waveguide.

Radiation: Solution for potential function, Radiation from the Hertz dipole, Powerradiated by hertz dipole, Radiation Parameters of antenna, receiving antenna, Monopole and Dipole antenna,

Text/Reference Books:

1. R.K. Shevgaonkar, Electromagnetic Waves, Tata McGraw Hill India, 2005
2. E.C. Jordan & K.G. Balmain, Electromagnetic waves & Radiating Systems, Prentice Hall,India
3. Narayana Rao, N: Engineering Electromagnetics, 3rd ed., Prentice Hall, 1997.
4. David Cheng, Electromagnetics, Prentice Hall

Course Outcomes:

At the end of this course students will demonstrate the ability to

1. Understand characteristics and wave propagation on high frequency transmission lines
2. Carryout impedance transformation on TL
3. Use sections of transmission line sections for realizing circuit elements
4. Characterize uniform plane wave
5. Calculate reflection and transmission of waves at media interface
6. Analyze wave propagation on metallic waveguides in modal form
7. Understand principle of radiation and radiation characteristics of an antenna

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SEC-511: Electromagnetic Waves Lab [0L:0T:2P 1 credit]

Hands-on experiments related to the course contents SEC-501

SEC-502	Digital Signal Processing	3L:0T:0P	3 credits

Discrete time signals: Sequences; representation of signals on orthogonal basis; Samplingand reconstruction of signals; Discrete systems attributes, Z-Transform, Analysis of LSI systems, frequencyAnalysis, Inverse Systems, Discrete Fourier Transform (DFT),Fast Fourier Transform Algorithm, Implementation of Discrete Time Systems

Designof FIR Digital filters: Windowmethod,Park-McClellan's method.Design of IIR Digital Filters: Butterworth, Chebyshev and Elliptic Approximations;Lowpass, Bandpass, Bandstop and High pass filters.

Effect of finite register length in FIR filter design.Parametric and non-parametric spectral estimation. Introduction to multirate signalprocessing.
Application of DSP.

Text/Reference Books:

1. S.K.Mitra, Digital Signal Processing: A computer based approach.TMH
2. A.V. Oppenheim and Schafer, Discrete Time Signal Processing, Prentice Hall, 1989.
3. John G. Proakis and D.G. Manolakis, Digital Signal Processing: Principles, Algorithms AndApplications, Prentice Hall, 1997.
4. L.R. Rabiner and B. Gold, Theory and Application of Digital Signal Processing, PrenticeHall, 1992.
5. J.R. Johnson, Introduction to Digital Signal Processing, Prentice Hall, 1992.
6. D.J.DeFatta, J. G. Lucas andW.S.Hodgkiss, Digital Signal Processing, John Wiley& Sons, 1988.

Course Outcomes:

At the end of this course students will demonstrate the ability to

1. Represent signals mathematically in continuous and discrete time and frequency domain
2. Get the response of an LSI system to different signals
3. Design of different types of digital filters for various applications

SEC-503	Probability and Stochastic Processes	3L:0T:0P	3 credits

Sets and set operations; Probability space; Conditional probability and Bayes theorem;Combinatorial probability and sampling models.

Discrete random variables, probability mass function, probability distribution function,example random variables and distributions; Continuous random variables, probability density function, probability distribution function, example distributions;

Joint distributions, functions of one and two random variables, moments of randomvariables; Conditional distribution, densities and moments; Characteristic functions of a random variable; Markov, Chebyshev and Chernoff bounds;

Random sequences and modes of convergence (everywhere, almost everywhere,probability, distribution and mean square); Limit theorems; Strong and weak laws of large numbers, central limit theorem.

Random process. Stationary processes. Mean and covariance functions. Ergodicity.Transmission of random process through LTI. Power spectral density.

Text/Reference Books:

1. H. Stark and J. Woods, ``Probability and Random Processes with Applications to SignalProcessing,'' Third Edition, Pearson Education
2. A.Papoulis and S. Unnikrishnan Pillai, ``Probability, Random Variables and Stochastic Processes,'' Fourth Edition, McGraw Hill.
3. K. L. Chung, Introduction to Probability Theory with Stochastic Processes, Springer International
4. P. G. Hoel, S. C. Port and C. J. Stone, Introduction to Probability, UBS Publishers,
5. P. G. Hoel, S. C. Port and C. J. Stone, Introduction to Stochastic Processes, UBS Publishers
6. S. Ross, Introduction to Stochastic Models, Harcourt Asia, Academic Press.

Course Outcomes:

At the end of this course students will demonstrate the ability to

1. Understand representation of random signals
2. Investigate characteristics of random processes
3. Make use of theorems related to random signals

To understand propagation of random signals in LTI system

SEC-504	***Computer Architecture***	***3L:0T:0P***	***3 credits***

Basic Structure of Computers, Functional units, software, performance issues software, machine instructions and programs, Types of instructions, Instruction sets: Instruction formats, Assembly language, Stacks, Ques, Subroutines.

Processor organization, Information representation, number formats.

Multiplication & division, ALU design, Floating Point arithmetic, IEEE 754 floating point formats Control Design, Instruction sequencing, Interpretation, Hard wired control - Design methods, andCPU control unit. Microprogrammed Control - Basic concepts, minimizing microinstruction size,multiplier control unit. Microprogrammed computers - CPU control unit

Memory organization, device characteristics, RAM, ROM, Memory management, Concept of Cache& associative memories, Virtual memory.
System organization, Input - Output systems, Interrupt, DMA, Standard I/O interfaces Concept of

parallel processing, Pipelining, Forms of parallel processing, interconnect network

Text/Reference Books:

1. V.Carl Hammacher, "Computer Organisation", Fifth Edition.
2. A.S.Tanenbum, "Structured Computer Organisation", PHI, Third edition
3. Y.Chu, "Computer Organization and Microprogramming", II, Englewood Chiffs, N.J.,Prentice Hall Edition
4. M.M.Mano, "Computer System Architecture", Edition
5. C.W.Gear, "Computer Organization and Programming", McGraw Hill, N.V. Edition
6. Hayes J.P, "Computer Architecture and Organization", PHI, Second edition

Course Outcomes

At the end of this course students will demonstrate the ability to

1. learn how computers work
2. know basic principles of computer's working
3. analyze the performance of computers
4. know how computers are designed and built
5. Understand issues affecting modern processors (caches, pipelines etc.).

SEC-512: Digital Signal Processing Laboratory [0L:0T:2P 1 credit]

Hands-on experiments related to the course contents SEC-502

SEC-505	***Fiber Optic Communication***	***3L:0T:0P***	***3 credits***

Introduction to vector nature of light, propagation of light, propagation of light ina cylindricaldielectric rod, Ray model, wave model.

Different types of optical fibers, Modal analysis of a step index fiber.
Signaldegradation on optical fiber due to dispersion and attenuation. Fabrication of fibers andmeasurement techniques like OTDR.

Optical sources - LEDs and Lasers, Photo-detectors - pin-diodes, APDs, detectorresponsivity, noise,optical receivers. Optical link design - BER calculation, quantum limit, power penalties.

Optical switches - coupled mode analysis of directional couplers, electro-opticswitches.Optical

amplifiers - EDFA, Raman amplifier.

WDM and DWDM systems. Principles of WDM networks.

Nonlinear effects in fiber optic links. Concept of self-phase modulation, groupvelocity dispersionand solition based communication.

Text/Reference Books

1. J. Keiser, Fibre Optic communication, McGraw-Hill, 5th Ed. 2013 (Indian Edition).
2. T. Tamir, Integrated optics, (Topics in Applied Physics Vol.7), Springer-Verlag, 1975.
3. J. Gowar, Optical communication systems, Prentice Hall India, 1987.
4. S.E. Miller and A.G. Chynoweth, eds., Optical fibres telecommunications, Academic Press, 1979.
5. G. Agrawal, Nonlinear fibre optics, Academic Press, 2nd Ed. 1994.
6. G. Agrawal, Fiber optic Communication Systems, John Wiley and sons, New York, 1997
7. F.C. Allard, Fiber Optics Handbook for engineers and scientists, McGraw Hill, New York (1990).

Course Outcomes:

At the end of the course, students will demonstrate the ability to:

1. Understand the principles fiber-optic communication, the components and the bandwidth advantages.
2. Understand the properties of the optical fibers and optical components.
3. Understand operation of lasers, LEDs, and detectors
4. Analyze system performance of optical communication systems
5. Design optical networks and understand non-linear effects in optical fibers

APPLICATIONS OF PSYCHOLOGY
Course code: SOE-051

Credits: 2-0-0

1. OBJECTIVES:

The objectives of this course are to make students:

1) aware of the different applications of psychology to everyday issues of life,
2) aware of the different social issues, workplace issues, and behavioural issues, and
3) understand how the knowledge gained from this course can be used in their own personal and professional work life.

2. COURSE TOPICS:

2.1 Unit 1: Introduction: Nature and fields. (6)

2.2 Unit 2: Psychology in industries and organizations: Job analysis; fatigue and accidents; consumer behavior. (8)

2.3 Unit 3: Psychology and mental health: Abnormality, symptoms and causes psychological disorders.(10)

2.4 Unit 4: Psychology and Counseling: Need of Counseling, Counselor and the Counselee, Counseling Process, Areas of Counseling. (6)

2.5 Unit 5: Psychology and social behavior: Group, group dynamics, teambuilding, Prejudice and
stereotypes; Effective Communication, conflict and negotiation. (10)

Text

1. Schultz, D. & Schultz, S.E. (2009). Psychology and Work Today (10th ed.). New Jersey:Pearson/Prentice Hall.
2. Butcher, J. N., Mineka, S., & Hooley, J. M. (2010). Abnormal psychology (14th ed.). NewYork: Pearson
3. Gladding, S. T. (2014). Counselling: A comprehensive profession. New Delhi: Pearson Education
4. Aronson, E., Wilson, T. D., & Akert, R. M. (2010). Social Psychology (7th Ed.). UpperSaddle River, NJ: Prentice Hall.