Syllabus for 4 Year B. Tech Course in Electronics and Communication Engineering

EIGTH SEMESTER

Sl. No.	Code	Subject	Contacts			Credits
			L	T	P	
A. Theory						
1	TIU-UEC-T40#	Career Advancement & Skill Development-VIII-Values and Ethics	2	0	0	2
2	TIU-UEC-E40#	Elective - V	3	0	0	3
B. Sessionals						
1	TIU-UEC-P40#	Project - II (Final Thesis/Dissertation)	0	4	8	8
2	TIU-UEC-G498	Grand Viva	0	0	0	3
3	TIU-UES-S498	Entrepreneurship Skill Development	0	0	2	2
Total						18

Elective - V

TIU-UEC-E40#: Nanoelectronics

TIU-UEC-E40#: Biomedical Electronics

TIU-UEC-E40#: Wavelets

TIU-UEC-E40#: Satellite Communications

TIU-UEC-E40#: Industrial Psychology

TIU-UEN-T40#: Career Advancement & Skill Development-VIII-Values and Ethics
L-T-P: 2-0-0
Credits: 2
Detailed Syllabus:
Employment Mentorship & Grooming -2
Module 1: i). Interview process from recruiter's perspective, ii). The approach the candidates should adopt during the interview

Module 2 : i). Discussion on job roles for ECE, ii). Discussion of interview/Written test questions for specific roles

Module 3: i) Resume writing, ii)Cover Letter writing, iii) statement of purpose

Module 4: i). expectation from a newly joined employee in a corporate organization, ii). How to succeed in corporate environment.

Elective - V
TIU-UEC-E40#: Nanoelectronics
L-T-P: 3-0-0
Credits: 3
Course Outcomes:
At the end of the course, students will demonstrate the ability to:

1. Understand various aspects of nanotechnology and the processes involved in making nano components and material.
2. Leverage advantages of the nano-materials and appropriate use in solving practical problems.
3. Understand various aspects of nanotechnology and the processes involved in making nano components and material.
4. Leverage advantages of the nano-materials and appropriate use in solving practical problems.

Detailed Syllabus:
Introduction to nanotechnology, meso structures,Basics of Quantum Mechanics: Schrodinger equation, Density of States. Particle in a box Concepts, Degeneracy. Band Theory of Solids. Kronig-Penny Model. Brillouin Zones. (12)

Shrink-down approaches: Introduction, CMOS Scaling, The nanoscale MOSFET, Finfets, Vertical MOSFETs, limits to scaling, system integration limits (interconnect issues etc.). (12)

Resonant Tunneling Diode, Coulomb dots, Quantum blockade, Single electron transistors,Carbon nanotube electronics, Band structure and transport, devices, applications, 2D semiconductors and electronic devices, Graphene, atomistic simulation. (12)

Recommended Textbooks:

1. G.W. Hanson, Fundamentals of Nanoelectronics, Pearson, 2009.

2. W. Ranier, Nanoelectronics and Information Technology (Advanced Electronic Materialand Novel Devices), Wiley-VCH, 2003.
3. K. E. Drexler, Nanosystems, Wiley, 1992.
4. J. H. Davies, The Physics of Low-Dimensional Semiconductors, Cambridge University Press, 1998.
5. C. P. Poole, F. J. Owens, Introduction to Nanotechnology, Wiley, 2003

Elective - V

TIU-UEC-E40#: Biomedical Electronics

L-T-P: 3-0-0

Credits: 3

Course Outcomes:

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

1. Understand the application of the electronic systems in biological and medical applications.
2. Understand the practical limitations on the electronic components while handling bio-substances.
3. Understand and analyze the biological processes like other electronic processes.

Detailed Syllabus:

Brief introduction to human physiology. Biomedical transducers: displacement,velocity, force, acceleration, flow, temperature, potential, dissolved ions and gases. Bio-electrodes and biopotential amplifiers for ECG, EMG, EEG, etc. (18)

Measurement of blood temperature, pressure and flow. Impedance plethysmography. Ultrasonic, X-ray and nuclear imaging.Prostheses and aids: pacemakers, defibrillators, heart-lung machine, artificial kidney, aids for the handicapped. Safety aspects. (18)

Recommended Textbooks:

1. W. F. Ganong, “Review of Medical Physiology”, 8th Asian Ed, Medical Publishers, 1977.
2. J. G. Webster, ed., “Medical Instrumentation”, Houghton Mifflin, 1978.
3. A. M. Cook and J. G. Webster, eds., “Therapeutic Medical Devices”, Prentice-Hall, 1982.

Elective - V

TIU-UEC-E40# : Wavelets

L-T-P: 3-0-0

Credits: 3

Course Outcomes:

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

1. Understand time-frequency nature of the signals.
2. Apply the concept of wavelets to practical problems.
3. Mathematically analyze the systems or process the signals using appropriate wavelet functions.

Detailed Syllabus:

Introduction to time frequency analysis; the how, what and why about wavelets, Short-time Fourier transform, Wigner-Ville transform.;Continuous time wavelet transform, Discrete wavelet transform, tiling of the time-frequency plane and wave packet analysis, Construction of wavelets. Multiresolution analysis. Introduction to frames and biorthogonal wavelets, Multirate signal processing and filter bank theory, Application of wavelet theory to signal denoising, image and video compression, multi-tone digital communication, transient detection. (36)

Recommended Textbooks:

1. Y.T. Chan, Wavelet Basics, Kluwer Publishers, Boston, 1993.
2. I. Daubechies, Ten Lectures on Wavelets, Society for Industrial and Applied Mathematics, Philadelphia, PA, 1992.
3. C. K. Chui, An Introduction to Wavelets, Academic Press Inc., New York, 1992.
4. Gerald Kaiser, A Friendly Guide to Wavelets, Birkhauser, New York, 1995.
5. P. P. Vaidyanathan, Multirate Systems and Filter Banks, Prentice Hall, New Jersey, 1993.
6. A.N. Akansu and R.A. Haddad, Multiresolution signal Decomposition: Transforms, Subbands and Wavelets, Academic Press, Oranld, Florida, 1992.
7. B. Boashash, Time-Frequency signal analysis, In S.Haykin, (editor), Advanced Spectral Analysis, pages 418--517. Prentice Hall, New Jersey, 1991.

Elective - V

TIU-UEC-E40#: Satellite Communications

L-T-P: 3-0-0

Credits: 3

Course Outcomes:

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

1. Visualize the architecture of satellite systems as a means of high speed, high range communication system.
2. State various aspects related to satellite systems such as orbital equations, sub-systems in a satellite, link budget, modulation and multiple access schemes.
3. Solve numerical problems related to orbital motion and design of link budget for the given parameters and conditions.

Detailed Syllabus:

Introduction to Satellite Communication: Principles and architecture of satellite Communication, Brief history of Satellite systems, advantages, disadvantages, applications and frequency bands used for satellite communication. (6)

Orbital Mechanics: Orbital equations, Kepler's laws, Apogee and Perigee for an elliptical orbit, evaluation of velocity, orbital period, angular velocity etc. of a satellite, concepts of Solar day and Sidereal day. (6)

Satellite subsystems: Study of Architecture and Roles of various sub-systems of a satellite system such as Telemetry, tracking, command and monitoring (TTC & M), Attitude and orbit control system (AOCS), Communication subsystem, power sub-systems etc. (6)

Typical Phenomena in Satellite Communication:Solar Eclipse on satellite, its effects, remedies for Eclipse, Sun Transit Outage phenomena, its effects and remedies, Doppler frequency shift phenomena and expression for Doppler shift. (6)

Satellite link budget: Flux density and received signal power equations, Calculation of System noise temperature for satellite receiver, noise power calculation, Drafting of satellite link budget and C/N ratio calculations in clear air and rainy conditions. (6)

Modulation and Multiple Access Schemes:Various modulation schemes used in satellite communication, Meaning of Multiple Access, Multiple access schemes based on time, frequency, and code sharing namely TDMA, FDMA and CDMA. (6)

Recommended Textbooks:

1. T. Pratt, C. W. Bostian and J. E. Allnutt, “Satellite Communications”, Wiley, 2nd edition 2002.
2. T. T. Ha, “Digital Satellite Communications”, Tata McGraw Hill, 2009.
3. D. Roddy, “Satellite Communications”, 4th edition, McGraw Hill, 2009.
4. G. Maral and M. Bosquet, “Satellite Communication Systems”, Wiley, 5th edition, 2009.
5. M. Mitra, “Satellite Communications”, Prentice Hall of India, 2005.

Elective - V
TIU-UEC-E40#: Industrial Psychology
L-T-P: 3-0-0
Credits: 3
Course Outcomes:
At the end of the course, students will demonstrate the ability to:

1. Understand the basics of industrial psychology
2. Understand the differences between decision making by individuals and groups
3. Know about organizational culture and changes

Detailed Syllabus:
Module 1: Introduction: Concept of Industrial Psychology, Roles of Industrial Psychology, Organizational Attitude. (4)

Module 2: Motivation at Work: Motivation & work behavior. (Theory X and Y, McClelland’s, Need Theory, Herzberg’s Two Factor Theory, Cultural Differences in Motivation. (4)

Module 3:Work Teams and Groups: Groups & work teams, Group Behavior, Group formation & development. (4)

Module 4:Decision Making: Decision making process, individual and group. (4)

Module 5:Introduction to Organizational Design: Key design process, Structural differentiations, Forces affecting organizations. (4)

Module 6:Leadership: Leadership vs Management, Theories, Emerging issues. (4)

Module 7: Organizational Culture: Function, Organizational Socialization, Assessing Cultural Values and Fit, Cross Cultural issues. (4)

Module 8:Change: Forces for change, Resistance to change, Lewin's Change Model. (4)

Module 9:Personality and Organization: Meaning, Application of Personality theory in organization, traits, Common personality measurement tools. (2)

Module 10:Emerging Topics: Complexity, challenges and choices in the future. (2)

Recommended Textbooks:

1. Nelson, Quick and Khandelwal, ORGB : An innovative approach to learning and teaching Organizational Behaviour. A South Asian Perspective, Cengage Learning, 2012
2. Luthans, Fred, Organizational Behavior, McGraw Hill 2008
3. Udai Pareek, Understanding Organizational Behavior, Oxford University Press
4. Robbins, Stephen, Organizational Behavior, Prentice Hall, India