VII Semester B.E.

Electronics Engineering

SEVENTH SEMESTER BE ELECTRONICS ENGINEERING

Course Code: EN701/ET701
Title of the Course: UHF and Microwave

Course Scheme					Evaluation Scheme (Theory)				
Lecture	Tutorial	Practical	Periods/ week	Credits	Duration of paper (in hrs)	MSE	IE	ESE	Total
3	1	3	4	5	3	10	10	80	100

Units	Contents	Hours
1	**Microwave tubes**: Causes of Failure of Conventional Tubes at Microwave Frequencies, Velocity Modulation and Electronic Efficiency In Single Cavity and Two Cavity Klystron.	10
2	**Microwave tubes:** Slow Wave Structure, Traveling Wave Tube and Backward Wave oscillator, Electron Motion In Parallel Plane Magnetron and Cylindrical Magnetron.	09
3	**Introduction to S –Matrix:** Scattering Matrices and their Properties, Scattering Matrices of E plane Tee, H Plane Tee, Magic Tee, Directional Coupler and Transmission Lines.	09
4	**Microwave Passive Device**: Phase Shifter, Attenuator, Tees, Directional Coupler, Circulator, Isolators, Gyrators, Transmission Line Resonant Circuits.	09
5	**Microwave Measurement And Solid State Devices:** Low, Medium and High Power Measurement, Measurement of VSWR, Measurement of Impedance, Attenuation Measurement, Q Factor Measurement. GaAs Oscillator, PIN Diode, Parametric Amplifier, Maser, Microstrip Lines.	08
	Total	45

Text Books:

1. Foundations of microwave engineering : R.E. Collins McGraw Hill
2. Microwave Device and Circuits: Samuel Y. Lio Prentice Hall of India

Reference books:

1. Radio Engg-Terman McGraw hill
2. Microwave Principles-Reich Wiley Eastern
3. Microwave engineering: R. Chatterjee. Prentice Hall of India
4. Microwave Engineering, Kulkarni, New Age International

SEVENTH SEMESTER B.E. (ELECTRONICS ENGINEERING)

Course Code: EN702
Title of the Course: Digital & Wireless Communication

Course Scheme					Evaluation Scheme (Theory)				
Lecture	Tutorial	Practical	Periods/ week	Credits	Duration of paper (in hrs)	MSE	IE	ESE	Total
3	1	0	4	4	3	10	10	80	100

Units	Contents	Hours
1	**The cellular concept:** History of wireless communication, Evolution of mobile radio communication. Cellular telephone system, frequency reuse, channel assignment and handoff strategies, interference and system capacity, trunking and grade of service, improving capacity in cellular system.	9
2	**Modulation techniques:** ASK, FSK, BPSK, DPSK, QPSK, $\pi/4$ QPSK, QAM, MSK, and GMSK Transmission and detection techniques.	9
3	**Equalization, diversity and channel coding:** Fundamentals of equalization, frequency and time diversity techniques, space diversity, polarization diversity, frequency and time diversity, fundamentals of channel coding.	9
4	**Multiple access techniques for wireless communication:** Introduction to multiple access, FDMA, TDMA, Spread spectrum multiple access - frequency hopped multiple access (FHMA), code division multiple access (CDMA), space division multiple access.	9
5	**GSM- Global System for Mobile:** Services and features, GSM system architecture, GSM radio subsystem, GSM channel types, GSM frame structure, signal processing in GSM.	9
	Total	45

Text Books:

1. Wireless Communication – Principles and practice by T S. Rappaport. (Prentice Hall PTR, upper saddle river, New Jersey.)
2. Mobile Communications – Design fundamentals by William C. Y. Lee, (John Willey)

Reference Books:

1. Wireless digital communication by Kamilo Feher (PHI)
2. Mobile Cellular Communication by W. C. Y. Lee (McGraw Hill)
3. The Mobile Radio Propagation channel by J.D. Parson.

SEVENTH SEMESTER B.E. (ELECTRONICS ENGINEERING)

Course Code: EN703
Title of the Course: Digital Signal Processing

Course Scheme					Evaluation Scheme (Theory)				
Lecture	Tutorial	Practical	Periods/ week	Credits	Duration of paper (in hrs)	MSE	IE	ESE	Total
3	1	3	4	3+2	3	10	10	80	100

Units	Contents	Hours
1	**FFT and IFFT:** Introduction to FFT and IFFT, radix 2 decimation in time, radix 2 decimation in frequency FFT & IFFT.	9
2	**Structure of FIR and IIR Systems:** Structures for realization of discrete time systems, Basic structures for FIR systems: direct form, cascade form, frequency sampling structure. Basic structure for IIR systems: Direct forms I, II, cascade, parallel forms, transposed forms.	9
3	**FIR Filters :** Introduction to FIR filters, linear phase filters, symmetric and anti symmetric filters, Window method, Design of FIR filters using Rectangular, Hanning, Hamming, Bartlet, Blackman Window, Study of Kaiser Window, frequency sampling method. Comparison of design methods for linear phase FIR filters.	9
4	**IIR Filters :** Introduction to IIR filters, Butterworth approximation, Chebyshev approximation, Design of IIR filter: impulse invariance method, bilinear transformation, approximation derivative method, Frequency transformations: low pass to high pass, band pass, band reject. Comparison between FIR and IIR filters.	9
5	**Multirate Digital Signal Processing :** Introduction, Decimation by a factor D, Interpolation by a factor I, Sampling rate conversion by a rational factor I/D, Implementation of sampling rate conversion, Applications of multi rate signal processing, Introduction to digital filter banks.	9
	Total	**45**

Text Books:

1. Proakis J. G and D. G. Manolakis, "Digital Signal Processing, Principles, Algorithms and Applications", Pearson Education, PHI.
2. Johnson J. R, "Introduction to Digital Signal Processing", PHI
3. P. Ramesh Babu, "Digital Signal Processing", SciTech Publications.
4. Digital Signal Processing by S Salivahanan, C Gnanapriya, TMH,2e

Reference Books:

1. S. K. Mitra, “Digital Signal Processing: A Computer based Approach”, TMH, 2001.
2. Oppenheim A. V and R. W. Schafer, “Discrete Time Signal Processing”, Person Education, India
3. Rabnier, Gold, “Theory and Applications of Digital Signal Processing”, TMH.

SEVENTH SEMESTER BE ELECTRONICS ENGINEERING

Course Code: EN704/ET705
Title of the Course: VLSI Design

Course Scheme					Evaluation Scheme (Theory)				
Lecture	Tutorial	Practical	Periods/ Week	Credits	Duration of paper (in hrs)	MSE	IE	ESE	Total
3	1	3	4	3+2	3	10	10	80	100

Unit	Contents	Hours
1	**Introduction To CMOS Technology:** History of CMOS Technology, MOS transistors, MOS transistor switches, CMOS logic, Inverter, Combinational logic, NAND gate, NOR gate, Compound gates, Multiplexers, Memory-Latches and registers.	9
2	**MOS Transistor Theory:** NMOS enhancement Transistor, PMOS enhancement Transistor, Threshold Voltage and Body Effect, MOS Device Equations, Second order Effects, MOS Models, Small Signal AC Characteristics, CMOS Inverter DC Characteristics, Bn & Bp ratios, Noise margin, Static Load MOS Inverters, Transmission Gate, BICMOS Inverters.	9
3	**CMOS Processing Technology:** Silicon Semiconductor Technology, Wafer Processing, Oxidation, Epitaxy, Deposition, Ion Implantation, and Diffusion, Silicon Gate Process, Basic CMOS technology ,n-well process, p-well Process, Twin tub Process, SOI technology, Layout Design Rules, Latch up.	9
4	**Circuit Characterization And Performance Estimation:** Resistance Estimation, Capacitance estimation, Inductance, Switching Characteristics, Analytical delay models, Fall time, Rise time, Delay time, CMOS Gate Transistor sizing, Power dissipation, Charge sharing, Yield.	9
5	**CMOS Circuit And Logic Design:** CMOS Logic Gate Design, Basic Physical Design of Simple logic gates, inverter, NAND, NOR gates, Euler Graphs, CMOS Logic Structures, Clocking Strategies.	9
	Total	45

Text Books:

1. Principles of CMOSVLSI DESIGN-Neil Weste, Kamran Eshraghian- Pearson Education.

Reference Books:

1. Introduction to VLSI Systems -Carver Mead, Lynn Conway -BS Publications.
2. Modern VLSI Design- Wayne Wolf- Pearson Education.
3. Basic VLSI Design- Douglas Pucknell, Kamran Eshraghian - Prentice Hall Publications.
4. Introduction to VLSI circuits and Systems- John Uyemura- John Wiley and sons.
5. CMOS Digital Integrated Circuits - SungMo Kang, Yusuf Leblebici - Tata McGraw Hill Publications.

SEVENTH SEMESTER BE ELECTRONICS ENGINEERING

Course Code: EN705/ ET 705 Elective-I (i)

Title of the Course: Elective-I**:** Biomedical Engineering

Course Scheme					Evaluation Scheme (Theory)				
Lecture	Tutorial	Practical	Periods/ week	Credits	Duration of paper (in hrs)	MSE	IE	ESE	Total
3	1	0	4	4	3	10	10	80	100

Units	Contents	Hours
1	**Physiological Systems and signals:** Physiological Systems of the Body - Cardiovascular System, The Respiratory System, The Nervous System, Basic Medical Instrumentation System, Origin of Biomedical Signals, Basics and Waveforms of Bioelectric Signals like ECG, EEG and EMG.	9
2	**Physiological Transducer:** Displacement, Position and Motion Transducers, Pressure Transducers, Transducers for body temperature measurement, photoelectric.	9
3	**Biomedical Recorders:** Basic working and block diagram of biomedical recorders - Electrocardiograph, Phonocardiograph, Electroencephalograph and Electromyography.	9
4	**Patient Monitoring Systems:** System Concept, Cardiac Monitor, Bedside Patient Monitoring Systems, Central Monitors, Measurement of heart rate, Measurement of pulse rate, Blood pressure measurement, Measurement of respiration rate. **Patient Safety:** Electric Shock Hazards, Leakage Currents, Safety code for Electrical Equipment, Electrical Safety Analyzers, Testing of Biomedical Equipments.	9
5	**Imaging Techniques:** **X Ray**: Production of X Ray, X-Ray Machines. **CT-Scanning**: Basic principle of X-Ray Computed Tomography, System Components of CT Scan, **MRI**: Nuclear Magnetic Resonance (NMR) basic components. **Ultra Sound**: Ultrasonic basic pulse-echo apparatus.	9
	Total	45

Text Books:

1. Khandpur R. S., “Handbook of Biomedical Instrumentation”, Tata McGraw Hill, second edition, 2003.
2. Carr and Brown, “Introduction to biomedical equipment technology”, 4th edition, Pearson press, 2003.
3. W. R. Hendee & E. R. Ritenour, “Medical Imaging Physics”, 3rd edition, Mosbey Year-Book, inc. 1992.

Reference Books:

1. John G. Webster, Bioinstrumentation John Wiley and sons, 2004 2. Joseph Bronzino (Editor-in-Chief), Handbook of Biomedical Engineering, CRC Press, 1995.
2. Neelina Malsch, Biomedical nanotechnology by CRC press release, Malsch echnoValuation, Utrecht, The Netherlands.
3. Khandpur R S, Handbook of Analytical Instrumentation, Tata McGraw Hill
4. Harold E. Smalley, “Hospital Management Engineering – A guide to the improvement of hospital management system”, PHI. C. A. Caceras ,”Clinical Engineering” Inc., 1992
5. Sujata V. Bhat, “Biomaterials”, Narosa Publishing House, 2002.

SEVENTH SEMESTER BE ELECTRONICS ENGINEERING

Course Code: ET 705/EN705 Elective –I (ii)
Title of the Course: Elective –I: Nanotechnology

Course Scheme					Evaluation Scheme (Theory)				
Lecture	Tutorial	Practical	Periods/ week	Credits	Duration of paper (in hrs)	MSE	IE	ESE	Total
3	1	0	4	4	3	10	10	80	100

Units	Contents	Hours
1	**Introduction:** Introduction to Nanotechnology: Fundamental science behind nanotechnology, tools for measuring nanostructures, tools to make nanostructures and imagine nano-behaviours.	9
2	**Nano-CMOS Devices:** Silicon Nanocrystal non volatile memories, Novel dielectric materials for future transistors, Nano-CMOS devices and applications. Scanning probe instrument, nanoscale lithography.	9
3	**Nano particles and Nanotubes:** Properties of Nano particles: Metal nanostructures and semiconducting nanoparticles, Carbon nanostructures: carbon molecules, clusters, nanotubes, properties of nanotubes-strength and elasticity, applications of carbon nanotubes.	9
4	**Nanomachines and Nanodevices:** Nanomachines and Nanodevices, NEMS and MEMS and their fabrication, molecular and super molecular switches. Lithography.	9
5	**Nanoelectronics:** Introduction, the tools of manufacturing of micro and nano fabrication optical lithography, electron beam lithography, atomic lithography. Nano-Electronics for advanced computation and communication. **Use of Nanotechnology in Electronics:** Application of nano structures in electronics, sensors, optics, energy capture, transformation and storage. Application of nanotechnology in biomedical electronics.	9
	Total	45

Text Books:

1. Anatoli Korkin, Jan Labanowski, Evgeni Gusev, Serge Luryi, "Nanotechnology for Electronic Materials and Devices"; Springer.
2. Mark Ratner, Daniel Ratner, "Nanotechnology: A Gentle introduction to a next big Idea"; Pearson Education.
3. Gregory Timp, "Nanotechnology"; Springer-Verlag NY.
4. Introduction to Nanotechnology –by Charles P. Poole Jr., Frank J. Owens – John Wiley & Sons.

SEVENTH SEMESTER BE ELECTRONICS ENGINEERING

Course Code: ET705/ EN705 Elective –I (iii)
Title of the Course: Elective –I: Device Modeling

Course Scheme					Evaluation Scheme (Theory)				
Lecture	Tutorial	Practical	Periods/ week	Credits	Duration of paper (in hrs)	MSE	IE	ESE	Total
3	1	0	4	4	3	10	10	80	100

Units	Contents	Hours
1	**Introduction to SPICE Simulation**: Circuit Descriptions, DC circuit analysis, modeling of dc sources, AC circuit analysis, modeling of ac sources, transient analysis, modeling of transient sources.	9
2	**p-n junction- concepts and models**: The p-n junction, contact potential, Depletion width, carrier injection, Diode I-V characteristic, junction capacitance, SPICE model for diode.	9
3	**Bipolar transistors and models:** Amplification with BJT, Minority carrier distributions and terminal currents, Switching cycle, Ebers-Moll equations, The coupled diode model, Basic SPICE Models, Small-signal model.	9
4	**MOS transistors:** Threshold voltage, Current-voltage characteristics, Subthreshold conduction, Hot electron effects, Drain induced barrier lowering Short channel effect and narrow width effect.	9
5	**MOS modeling:** MOS model in SPICE, Level 1 device model, BSIM3 model, mobility model, MOS inverter circuits, voltage transfer characteristics, Noise margin.	9
	Total	45

Reference Books:

1. “Solid State Electronic Devices”, “B. G. Streetman and S. Banerjee”, Prentice Hall India
2. “Analysis and Design of Digital Integrated circuits”, “D. A. Hodges, and H. G. Jackson”, McGraw-Hill International.
3. “SPICE for circuits and electronics using PSPICE’’, “ Muhammad H. Rashid”, Prentice Hall India
4. “Introduction to VLSI circuit and systems”, “J. P. Uyemura”, John Wiley and Sons

SEVENTH SEMESTER BE ELECTRONICS ENGINEERING

Course Code: ET705/EN 705 Elective-I (iv)
Title of the Course: Elective –I: Wireless Sensor Network

Course Scheme					Evaluation Scheme (Theory)				
Lecture	Tutorial	Practical	Periods/ week	Credits	Duration of paper (in hrs)	MSE	IE	ESE	Total
3	1	0	4	4	3	10	10	80	100

Units	Contents	Hours
1	Introduction and Overview of Wireless Sensor Networks, Commercial and Scientific Applications of Wireless Sensor Networks, Basic Wireless Sensor Technology, Sensor Taxonomy, wireless network environment, wireless network trends.	09
2	Sensors Network Protocols, Data dissemination and gathering, Routing Challenges and design issues in wireless sensor network, Routing strategies in WSN.	09
3	Radio technology primer, Available wireless technologies, Wireless Sensors Networks Protocols, Physical Layer, Fundamentals of Medium Access Control Protocols for Wireless Sensor Networks, MAC protocols for WSN, Case Study, IEEE 802.15 4LR WPAN, Standard case study.	09
4	Protocols, Transport Control Protocols for Wireless Sensors Networks, Traditional transport control protocol, transport protocol design issues, examples of existing transport control protocol, performance of TCP.	09
5	Middleware for Sensor Networks, WSN middleware principles, Middleware architecture, existing middleware.	09
	Total	45

Text Books:

1. Morgan Kaufmann F. Zhao and L. Guibas, 'Wireless Sensor Networks', a Francisco, 2004.
2. C. S. Raghavendra, Krishna M. Sivalingam, Taieb F. Znati, 'Wireless sensor networks', Edition: 2,
   Published by Springer, 2004 ISBN 1402078838, 9781402078835

Reference Books:

1. "Wireless Sensor Networks: Technology, Protocols, and Applications", Kazem Sohraby, Daniel Minoli, Taieb Znati, WIey Interscience Publication, 2007
2. "Computer Networks" ,Andrew Tanenbaum, 4th ed., Pearson Education,2007

SEVENTH SEMESTER BE ELECTRONICS ENGINEERING

Course Code: ET705/EN705 Elective-I (v)
Title of the Course: Elective –I: Modern TV Engineering

Course Scheme					Evaluation Scheme (Theory)				
Lecture	Tutorial	Practical	Periods/ week	Credits	Duration of paper (in hrs)	MSE	IE	ESE	Total
3	1	0	4	4	3	10	10	80	100

Unit	Contents	Hours
1	**Fundamentals of television**	
	Television basics: Factors of TV systems, Composite video signal, Signal transmission and channel bandwidth, Colour TV systems, Colour fundamentals, Mixing of colours, Colour Perception, Chromaticity diagram.	9
2	**TV standards**	
	NTSC, PAL, SECAM systems, colour TV transmitter, high level, low level transmitters, colour TV receivers, remote control, antennas for transmission, TV alignment and TV pattern generation.	9
3	**Digital TV**	
	Introduction to Digital TV, Principle of Digital TV, Digital TV signals and parameters, Digital TV Transmitters, MAC signals, advanced MAC signal transmission, Digital TV receivers, Basic principles of Digital Video compression techniques, MPEG1, MPEG2, MPEG4, Video compression ITU-Standards(H.). Digital TV recording techniques.	9
4	**Satellite and cable television**	
	Geostationary satellites, Satellite communication systems, Cable signal sources, Cable signal processing and distribution, Cable signal converters.	9
5	**Advanced TV technologies**	
	HDTV standards and systems, HDTV transmitter and receiver/encoder, Digital TV satellite Systems, video on demand, CCTV, CATV, direct to home TV, set top box with recording facility, conditional access system (CAS),LCD TV System, Plasma TV Systems & LED technologies.	9
	Total	**45**

Text Books:

1. Television and video Engineering, A. M. Dhake, TMH Publication.
2. Video Simplified, Kelth jack, Penram International Publication.
3. Audio Video Systems, R.G. Gupta, Technical Education.

Reference Books:

1. S. P. Bali, “Color TV Theory and Practice”.
2. Bernard Grobb, Charles E, “Basic TV and Video Systems”
3. R.R. Gulathi, “Modern television practice ”.New age international

SEVENTH SEMESTER BE ELECTRONICS ENGINEERING

Course Code: EN706
Title of the Course: UHF & Microwave (Practical)

Course Scheme					Evaluation Scheme(Laboratory)		
Lecture	Tutorial	Practical	Periods/ week	Credits	TW	POE	Total
0	0	3	3	3	25	25	50

List of suggested practicals

1. To study propagation of microwaves.
2. Study of primary antennas.
3. Measurement of microwaves power
4. Measurement of frequency and wavelength
5. Measurement of VSWR.
6. Measurement of Impedance.
7. To study characteristics of E-plane and H-plane tee.
8. To study the characteristics of magic tee.
9. Study of Directional Couplers.
10. Study of ferrite devices
11. Find the Reflection loss within a wave guide.
12. To study the characteristics of Reflex Klystron.

Note: Minimum 8 experiments from above list or experiment based on syllabus.

SEVENTH SEMESTER BE ELECTRONICS ENGINEERING

Course Code: EN707
Title of the Course: Digital Signal Processing (Practical)

Course Scheme					**Evaluation Scheme(Laboratory)**		
Lecture	Tutorial	Practical	Periods/ week	Credits	TW	POE	Total
0	0	3	3	3	25	25	50

Note: Minimum 8 experiments based on the prescribed syllabus.

SEVENTH SEMESTER BE ELECTRONICS ENGINEERING

Course Code: EN708
Title of the Course: Major Project Phase –I (Practical)

Course Scheme					**Evaluation Scheme(Laboratory)**		
Lecture	Tutorial	Practical	Periods/ week	Credits	TW	POE	Total
0	0	4	3	4	100	00	100

- The Major Project Phase–I - It includes seminar work, literature survey and minimal implementation of the project including software and Hardware, which is to be carried out in the institution/industry/research laboratory.
- The duration of project work should be a minimum of two semesters: Major Project Phase –I & II.
- Each student has to present a seminar, on any technical topic related to any subject not covered in the syllabus or preferably based on the project.
- The presentation time is of minimum 10 minutes followed by a 5 minutes session for discussion/question and answers.
- The seminar topic selected by the student must be approved by the project committee of the department at the beginning of the semester; the duplicity of the topics must be avoided.
- Each student/project group has to demonstrate the minimal implementation of the project work and should submit individual seminar report on the day of seminar to the department along with the project progress report.
- The seminar presentation & submission of the report will carry 50% weightage and demonstration and submission of project progress report will carry 50% weightage for final evaluation. The evaluation is to be carried out by department project committee including guide.