KANNUR UNIVERSITY

FACULTY OF ENGINEERING

Curricula, Scheme of Examinations & Syllabus for Semesters VII & VIII of B.Tech. Degree Programme in Electronics & Communication Engineering with effect from 2007 Admissions

SEVENTH SEMESTER

Code	Subject	Hours/Week			Sessional Marks	University Examination	
	L	L	T	P/D		Hrs	Marks
2K6 EC 701	Microelectronics Technology	3	1	-	50	3	100
2K6 EC 702	Microwave Engineering	3	1	-	50	3	100
2K6 EC 703	Information Theory and Coding	3	1	-	50	3	100
2K6 EC 704	Television Engineering	3	1	-	50	3	100
2K6 EC 705	Elective II	3	1	-	50	3	100
2K6 EC 706(P)	Simulation Lab	-	-	3	50	3	100
2K6 EC 707(P)	Communication Engineering Lab –II	-	-	3	50	3	100
2K6 EC 708(P)	Mini Project	-	-	4	50	-	-
2K6 EC709(P)	Physical Education, Health & Fitness	-	-	-	50	-	-
TOTAL		15	5	10	450	-	700

Elective II

2K6 EC 705 (A) - Probability and Random Process
2K6 EC 705 (B) - Satellite Communication
2K6 EC 705 (C) - Soft Computing
2K6 EC 705 (D) - R F System Design
2K6 EC 705 (E) -Industrial Electronics
2K6 EC 705 (F) - Data Compression

EIGHTH SEMESTER

Code	Subject	Hours/Week			Sessional Marks	University Examination	
		L	T	P/D		Hrs	Marks
2K6 EC 801	Radar and Navigation	3	1	-	50	3	100
2K6 EC 802	Optical Communication	3	1	-	50	3	100
2K6 EC 803	Computer Communication & Networking	3	1	-	50	3	100
2K6 EC 804	Wireless Mobile Communication	3	1	-	50	3	100
2K6 EC 805	Elective III	3	1	-	50	3	100
2K6 EC 806(P)	Seminar	-	-	4	50	-	-
*2K6 EC 807(P)	Project & Industrial Training	-	-	6	100	-	-
2K6 EC 808(P)	Viva Voce	-	-	-	-	-	100
TOTAL		15	5	10	400	-	600
Aggregate marks for 8 semesters = 8400					3000		5400

*25 Marks is allocated for Industrial Training

Elective III

2K6 EC 805(A) – Advanced Digital Signal Processing
2K6 EC 805(B) – Digital Image Processing
2K6 EC 805 (C) –Communication Switching Systems
2K6 EC 805 (D) – Embedded System
2K6 EC 805 (E)– Secure Communications
2K6 EC 805(F)– Optimization Techniques

2K6 EC 701: MICROELECTRONICS TECHNOLOGY

3 hours lecture and 1 hour tutorial per week

Module 1 (12 hours)

Crystal growth and wafer preparation: - Diffusion of impurities - Flick's I and II law of diffusion-Ion implantation. Oxidation - deal-grove method Optical lithography - Modulation transfer function. Photo resists - types. Chemical vapor deposition (CVD) - Epitaxial growth. Etching - wet plasma & ion etching. Contacts & Metallization: - Schottky contacts & Implanted ohmic contacts.

Module 2 (12 hours)

MOS transistor: - Depletion & Enhancement types - Threshold voltage-NMOS inverter - various pull-ups - CMOS & BiCMOS inverter.

Introduction to IC technology: - Bipolar technology - Early bipolar & advanced bipolar processes. MOS technology: - NMOS, PMOS, CMOS, BiCMOS technologies, n well, p well, twin tub process. Hot carrier effects in BJT & CMOS-Latch up in CMOS

Module 3 (15 hours)

VLSI design fundamentals :- MOS layers-Stick diagrams - NMOS& CMOS design styles - Layouts – lambda based design rules - 2 micro meter design rules - Diagrams for NMOS & CMOS inverters & gates - Simple Combinational Logic Design (half & full adders, multiplexers).

Module 4 (13 hours)

Device isolation: - Junction & oxide isolation – LOCOS, SILO,SWAMI process - Trench isolation - Silicon on insulator isolation.

Introduction to nanotransistors – Energy level diagram- Fermi function- ohms law in nanometer scaled devices-electron and spin transport- current in a one level model- potential profile-ballistic nanotransistors – nanotransistors with scattering.

Text Books

1. The Science & Engineering of Microelectronics Fabrication: - Stephan A Campbell.
2. Basic VLSI Design: - Douglas A Pucknell & Kamran Eshraghian – PHI Third Edition, 2004
3. VLSI technology :- Sze S.M – MGH

Reference Books

1. Quantum Transport: Atom to Transistor: - S.Dutta – Cambridge University Press
2. Electronic Transport in Mesosiopic Systems: - S.Dutta – Cambridge University Press
3. Solid-state Physics: - Aschroft and Meizmin
4. Principle of CMOS VLSI Design:-Neil, H.E Weste & Kamran Eshraghian - Pearson Education
5. Introduction to NMOS & CMOS VLSI System Design :-Amar Mukhergee -PHI USA 1990
6. The Material Science of Microelectronics :- Klaus J Backmann – VCH publishers
7. Microelectronic Processing :- W Scott Ruska –MGH
8. CMOS – Circuit Design, Layout & Simulation :- Jacob Baker R., Harry W Li & David E Boyce – PHI
9. www. nanohub.org

Theory of ballistic transistors-IEEE Trans.Electron Dev.:-Rahman A.,Guo J.,Dutta S.and Landstorm M.(2003)

Sessional work assessment

Tests (2X15) – 30 marks
Assignments (2X10) – 20 marks
Total – 50 marks

University Examination Pattern

Q I – 8 short answer type questions of 5 marks, 2 from each module.
Q II - 2 questions (covering entire module) of 15 marks each from module I with choice to answer any one.
Q III - 2 questions (covering entire module) of 15 marks each from module II with choice to answer any one.
Q IV - 2 questions (covering entire module) of 15 marks each from module III with choice to answer any one.
Q V - 2 questions (covering entire module) of 15 marks each from module IV with choice to answer any one.

2K6 EC 702: MICROWAVE ENGINEERING

3 hours lecture and 1 hour tutorial per week

Module I (13 hours)

Introduction- Introduction to TE & TM Modes, Dominant Modes - Resonators - Rectangular and Circular wave guide resonators. Klystrons - Re-entrant cavities, Velocity modulation, Bunching (including analysis), Output power and beam loading, Reflex Klystron, , Admittance. Traveling wave tubes – Slow wave structures, Helix TWT, Amplification process, Convection current, Axial electric field, Wave modes, Gain consideration. Magnetron oscillators – Cylindrical magnetron, Cyclotron angular frequency, Power output and efficiency.

Module II (14 hours)

Microwave hybrid circuits – Waveguide tees, Magic tees, Hybrid rings, Corners, Bends, Twists. Formulation of S-matrix. Directional couplers – Two hole couplers, S-matrix of a directional coupler. Circulators and isolators. Microwave Network Analysis – Equivalent voltages and currents, Impedance, Impedance and Admittance matrices, scattering matrix, The transmission matrix. Signal flow graphs. Impedance matching and tuning – Matching with lumped elements, Single stub tuning, Double stub-tuning.

Module III (12 hours)

Solid state microwave devices – Microwave bipolar transistors – Physical structures, Power-frequency limitations. Principle of operation of Tunnel diode, MESFET. TEDs – Introduction Gunn diodes - Gunn oscillation modes. Avalanche Transit Time Devices – Introduction, IMPATT and TRAPATT Diodes Principle of Operation and Characteristics.. Measurement of Microwave power, Frequency and Impedance.

Module IV (13 hours)

Microwave filters – Periodic structures – Analysis of infinite periodic structures and terminated periodic structures, Filter design by image parameter method – Constant k, m-derived and composite. Filter design by insertion loss method. Filter transformation and implementation.

Microwave amplifiers and oscillators – Amplifiers – Gain and stability, Oscillator design – Basics.

Text Books:

1. Samual Y Liao,"Microwave devices and Circuits",2nd edition,Prentice Hall of India
2. Robert E. Collin: *Foundation of Microwave Engineering,* Mc. Graw Hill.

References:

1. David M Pozar : *Microwave Engineering,* 2nd Edn., John Wiley & Sons (Asia) Pvt. Ltd.
2. Wayne Tomasi : *Advanced Electronic Communication Systems,* PHI, (Chap. 7), 5th Ed, Pearson Education, 2001
3. K. C. Gupta : *Microwaves*, New Age International.
4. Sitesh Kumar Roy, Monojit Mitra : *Microwave Semiconductor Devices,* PHI - 2003

Sessional work assessment

Tests (2X15) – 30 marks
Assignments (2X10) – 20 marks
Total – 50 marks

University examination pattern

Q I - 8 short answer type questions of 5 marks, 2 from each module
Q II - 2 questions A and B of 15 marks from module I with choice to answer any one
Q III - 2 questions A and B of 15 marks from module II with choice to answer any one
Q IV - 2 questions A and B of 15 marks from module III with choice to answer any one
Q V - 2 questions A and B of 15 marks from module IV with choice to answer any one

2K6 EC 703: INFORMATION THEORY AND CODING

3 hours lecture and 1 hour tutorial per week

Module 1 (14 hours)

Information theory: - Concept of amount of information –units - Entropy -marginal, conditional and joint entropies - relation among entropies - Mutual information - information rate-channel capacity- redundancy and efficiency of channels. Binary memoryless source - extension of a binary memoryless source –Markov sorce –Entropy -lossless-source coding- Uniquely decodable codes- Instantaneous codes- Kraft's inequality - Optimal codes- Huffman code-Shannon's Source Coding Theorem - Lempel-Ziv coding – Channel coding theorem

Module 2 (8 hours)

Introduction to algebra - groups - fields - binary field arithmetic - construction of Galois field Basic properties - computations - vector spaces - matrices

Module 3 (18 hours)

Codes for error detection and correction: - Parity check coding, Linear block codes, Error detecting and correcting capabilities, Generator and Parity check matrices, Standard array and Syndrome decoding, Hamming codes, Encoding and decoding of systematic and unsystematic codes. Cyclic codes: - Generator polynomial, Generator and Parity check matrices, Encoding of cyclic codes, Syndrome computation and error detection, Decoding of cyclic codes. BCH codes-description-decoding-Reed Solomon codes

Module 4 (12 hours)

Convolution codes - encoder - generator matrix - state diagram – distance properties - maximum likelihood decoding - viterbi decoding - sequential decoding - Burst error correction – interleaved codes-Turbo coding- Turbo decoding

Text Books

1. Norman Abramson, *Information Theory*, John Wiley
2. Shu Lin, Costello D.J., *Error Control Coding - Fundamentals and applications*, Prentice
3. Simon Haykin, *Digital Communications*, John Wiley
4. Taub & Schilling, *Principles of Communication System*, Tata McGraw Hill

Reference books

1. Tomasi, *Electronic Communication, Fundamentals Through Advanced*, Pearson education
2. Sklar, *Digital Communication*, Pearson Education
3. T. Cover and Thomas, "Elements of Information Theory", John Wiley & Sons

Sessional work assessment

Two tests (2 x 15) = 30
Two assignments(2 x 10) = 20
Total marks = 50

University examination pattern

Q I - 8 short answer type questions of 5 marks, 2 from each module
Q II - 2 questions A and B of 15 marks from module I with choice to answer any one
Q III - 2 questions A and B of 15 marks from module II with choice to answer any one
Q IV - 2 questions A and B of 15 marks from module III with choice to answer any one
Q V - 2 questions A and B of 15 marks from module IV with choice to answer any one

2K6 EC 704: TELEVISION ENGINEERING

3 hours lecture and 1 hour tutorial per week

MODULE—I(14 hrs)

Introduction-Image Continuity - Number of scanning lines - Interlaced scanning - Picture resolution - Camera tubes-Basic Block Schematic of Monochrome TV Transmitter and receiver, Gross structure, flicker& interlaced scanning ,number of scanning lines. Horizontal and Vertical resolution, Resolution and Bandwidth. Composite video signal- Vertical and horizontal synchronization, Vestigial Sideband Transmission, transmission of Sound signal. Modulation Positive and Negative Modulation and its comparison - Picture tubes. Television Cameras, Working Principle and operation of CCD cameras

MODULE –II (12 hrs)

Television camera and transmitters: Photoelectric effects, Working principle of image orthicon, vidicon, plumbicon, CCD, structure of CCD and its working, Monochrome and Colour television camera: block schematic explanation, TV transmitters. Colour TV picture tubes: colour signal transmission-modulaton-formation of chrominance signal. purity and convergence, Delta gun, PIL, Trinitron tubes, LCD screens.

MODULE—III (12hrs)

NTSC colour TV system- NTSC colour receiver- limitations of NTSC system – PAL colour TV system – cancellation of phase errors- PAL –D colour system- PAL coder – Pal-Decolour receiver- chromo signal amplifier- separation of U and V signals- colour burst separation – Burst phase Discriminator – ACC amplifier- Reference Oscillator- Ident and colour killer circuits- U and V demodulators- Colour signal matrixing – merits and demerits of the PAL system – SECAM system – merits and demerits .

MODULE –IV (14hrs)

Video coding and compression: Need for compression- video image representation – quantization of image data- intra frame compression techniques: DPCM –DCT based transform coding- Motion Compensation –H261 video conference coding standard-MPEG video compression- Digital TV, Working, HDTV- DVB-TSatellite, High Definition and Digital TV

Text books

1. The Electronics Hand Book edited by JC Whitaker ,IEEE Press
2. RR Gulati, Monochrome and Colour Television, New Asian Age
3. S P Bali ‘Colour Television - Theory and Practice‘
4. ‘Basic Television Engineering’: Bernad Grob, Mc Graw Hill.

Reference:

1. A.M Dhake, “Television and Video Engineerign”, Second edition, TMH, 2003.
2. Bernord Grob ‘Basic Television and Video Systems, 5th 1984 McGraw Hall
3. Kinsler , Frey, Coppens, Fundamentals of Acoustics , Wiley Eastern, 4 edition

Sessional work assessment

Tests (2X15) – 30 marks
Assignments (2X10) – 20 marks
Total – 50 marks

University examination pattern

Q I - 8 short answer type questions of 5 marks, 2 from each module
Q II - 2 questions A and B of 15 marks from module I with choice to answer any one
Q III - 2 questions A and B of 15 marks from module II with choice to answer any one
Q IV - 2 questions A and B of 15 marks from module III with choice to answer any one
Q V - 2 questions A and B of 15 marks from module IV with choice to answer any one

2K6 EC 705 (A): PROBABILITY AND RANDOM PROCESS

3 hours lecture and 1 hour tutorial per week

Module I: (13 hours)
Axioms of probability – Conditional probability – Total probability – Baye's theorem – Random variable – Probability mass function – Probability density functions – Properties –Moments – Moment generating functions and their properties

Module II: (14 hours)
Binomial – Poisson – Uniform – Exponential – Gamma – Normal distributions and their properties – Functions of a random variable – Chebyshev Inequality.

Module III: (13 hours)
Joint distributions – Marginal and conditional distributions – Covariance –

Correlation and regression – Transformation of random variables – Central limit theorem.

Module IV: (12 hours)
Definition and examples – first order – second order – strictly stationary – wide – sense stationary and Ergodic processes – Markov process – Binomial – Poisson and Normal processes – Sine wave process.

TEXT BOOKS

1. Ross S., "A First Course in Probability", Seventh Edition , Pearson Education, 2006.

2. S.Karlin and H.M. Taylor, "An Introduction to Stochastic Modeling", Academic Press, 2007.

Reference books

1. Veerarajan T., "Probabilitiy – Statistics and Random process", Second Edition , Tata McGraw–Hill, 2006.
2. Richard A Johnson, "Probability and Statistics for Engineers" Seventh Edition , Pearson Education, 2005.
3. Mood, Alexander McFarlane, "Introduction to Theory of Statistics", Tata McGraw – Hill,1974.

Sessional work assessment
Tests (2X15) – 30 marks
Assignments (2X10) – 20 marks
Total – 50 marks

University examination pattern
Q I - 8 short answer type questions of 5 marks, 2 from each module
Q II - 2 questions A and B of 15 marks from module I with choice to answer any one
Q III - 2 questions A and B of 15 marks from module II with choice to answer any one
Q IV - 2 questions A and B of 15 marks from module III with choice to answer any one
Q V - 2 questions A and B of 15 marks from module IV with choice to answer any one

2K6 EC 705 (B): SATELLITE COMMUNICATION

3 hours lecture and 1 hour tutorial per week

MODULE I (14 hours)

Origin of Satellite Communications, Historical Back-ground, Basic Concepts of Satellite Communications, Frequency allocations for Satellite Services, Applications, Future Trends of Satellite Communications. Orbital Mechanics, Look Angle determination, Orbital perturbations, Orbit determination, launches and launch vehicles, Orbital effects in communication systems performance. LOW EARTH ORBIT AND GEO-STATIONARY SATELLITE SYSTEMS: Orbit consideration, coverage and frequency considerations, Delay & Throughput considerations

MODULE II (13 hours)

SATELLITE SUBSYSTEMS: Attitude and orbit control system, `telemetry, tracking, Command and monitoring, power systems, communication subsystems, Satellite antenna Equipment reliability and Space qualification.
EARTH STATION TECHNOLOGY: Introduction, Transmitters, Receivers, Antennas, Tracking systems, Terrestrial interface, Primary power test methods.

MODULE III (13 hours)

MULTIPLE ACCESS: Frequency division multiple access (FDMA) Inter modulation, Calculation of C/N. Time division Multiple Access (TDMA) Frame structure, Examples. Satellite Switched TDMA Onboard processing, DAMA,Code Division Multiple access (CDMA), Spread spectrum transmission and reception.

MODULE IV (12 hours)

SATELLITE LINK DESIGN: Basic transmission theory, system noise temperature and G/T ratio, Design of down links, up link design, Design of satellite links for specified C/N, system design example
SATELLITE NAVIGATION & THE GLOBAL POSITIONING SYSTEM: Radio and Satellite Navigation, GPS Position Location principles, GPS Receivers and codes, Satellite signal acquisition, GPS Navigation Message, GPS signal levels, GPS receiver operation, GPS C/A code accuracy, Differential GPS.

TEXT BOOK:

1. Satellite Communications – Timothy Pratt, Charles Bostian and Jeremy Allnutt, WSE, Wiley Publications, 2nd Edition, 2003.
2. Satellite Communications Engineering – Wilbur L. Pritchard, Robert A Nelson and Henri G.Suyderhoud, 2nd Edition, Pearson Publications, 2003.

REFERENCES:

1. Satellite Communications : Design Principles – M. Richharia, BS Publications, 2nd Edition, 2003.
2. Satellite Communication - D.C Agarwal, Khanna Publications, 5th Ed.
3. Fundamentals of Satellite Communications – K.N. Raja Rao, PHI, 2004
4. Satellite Communications – Dennis Roddy, McGraw Hill, 2nd Edition, 1996

Sessional work assessment

Tests (2X15) – 30 marks
Assignments (2X10) – 20 marks
Total – 50 marks

University examination pattern

Q I - 8 short answer type questions of 5 marks, 2 from each module
Q II - 2 questions A and B of 15 marks from module I with choice to answer any one
Q III - 2 questions A and B of 15 marks from module II with choice to answer any one
Q IV - 2 questions A and B of 15 marks from module III with choice to answer any one
Q V - 2 questions A and B of 15 marks from module IV with choice to answer any one

2K6 EC 705 (C): SOFT COMPUTING

3 hours lecture and 1 hour tutorial per week

Module I (13 hours)

Basic concepts – Single Layer Perception – Multi Layer Perception – Adaline – Madaline – Learning Rules – Supervised Learning – Back Propagation Networks – Training Algorithm – Practical Difficulties – Advanced Algorithms – Adaptive Network – Radial Basis – Network – Modular Network – Applications.

Module II (13 hours)

Unsupervised Learning – Competitive Learning Networks – Kohonen self organising networks – Learning Vector Quantization – Hebbian Learning – Hopfield Network –Content Addressable Nature – Binary Hopfield Network – Continuous Hopfield Network Traveling Salesperson Problem – Adaptive Resonance Theory – Bidirectional Associative Memory – Principle Component Analysis

Module III (13 hours)

Fuzzy Sets–Fuzzy Rules: Extension Principle, Fuzzy Relation – Fuzzy Reasoning – Fuzzy Inference Systems – Mamdani Model – Sugeno Model – Tsukamoto Model– Fuzzy decision Making – Multiobjective Decision Making – Fuzzy Classification– Fuzzy Control Methods – Application.

Module IV(13 hours)

Adaptive Neuro Fuzzy Based Inference Systems – Classification and Regression Trees: Decision Tress – Cart Algorithm – Data Clustering Algorithms: K Means Clustering, Fuzzy C Means Clustering, Mountain Clustering, Subtractive Clustering, Rule Base Structure Identification – Neuro Fuzzy Control – Feedback Control Systems– Expert Control – Inverse Learning – Specialized Learning – Back Propagation Through Real Time Recurrent Learning .

TEXT BOOK

1. Jang J S R Sun C T and Mizutani E, "Neuro Fuzzy and Soft computing", Pearson Education, (Singapore) 2004.
2. Timothy J Ross, "Fuzzy Logic Engineering Applications", McGrawHill NewYork, 1997

REFERENCES

1. David E Goldberg, "Genetic Algorithms in Search Optimization and Machine Learning", Pearson Education, Asia, 1996.
2. Laurene Fauseett, "Fundamentals of Neural Networks" Prentice Hall, India, New Delhi, 1994.
3. S Rajasekaran and G A Vijayalakshmi Pai, "Neural networks Fuzzy logics and Genetic algorithms", Prentice Hall of India, 2003.
4. George J Klir and Bo Yuan, "Fuzzy Sets and Fuzzy Logic", Prentice Hall

Sessional work assessment

Tests (2X15) – 30 marks

Assignments (2X10) – 20 marks

Total – 50 marks

University examination pattern

Q I - 8 short answer type questions of 5 marks, 2 from each module

Q II - 2 questions A and B of 15 marks from module I with choice to answer any one

Q III - 2 questions A and B of 15 marks from module II with choice to answer any one

Q IV - 2 questions A and B of 15 marks from module III with choice to answer any one

Q V - 2 questions A and B of 15 marks from module IV with choice to answer any one

2K6 EC 705 (D): RF SYSTEM DESIGN

3 hours lecture and 1 hour tutorial per wee

Module I (15 hours)

Importance of RF Design – Electromagnetic Spectrum – RF behavior of Passive Components – Chip components and Circuit Board Considerations – Scattering Parameters – Smith Chart and Applications.

RF Filter Design: Overview – Basic Resonator and Filter Configuration – Special Filter Realizations – Filter Implementations – Coupled Filter.

Module II (13 hours)

RF Diodes – BJT, RF FETs – High Electron Mobility Transistors, Matching and Biasing Networks – Impedance Matching using Discrete Components – Microstrip Line Matching Networks – Amplifier Classes of Operation and Biasing Networks.

Module III (12 hours)

RF Amplifier Design: Characteristics – Amplifier Power Relations – Stability Considerations – Constant Gain Circles – Constant VSWR Circles– Low Noise Circuits – Broadband – High Power and Multistage Amplifiers

Module IV(12 hours)

Oscillators Mixers & Applications: Basic Oscillator Model – High Frequency Oscillator Configuration – Basic Characteristics of Mixers – Phase Locked Loops – RF Directional Couplers and Hybrid Couplers – Detector and Demodulator Circuits.

TEXT BOOK

1. Reinhold Ludwig and Powel Bretchko "RF Circuit Design Theory and Applications", 1st Edition, Pearson Education Asia, 2001
2. Ulrich L. Rohde and David P. NewKirk, "Microwave Circuit Design", John Wiley and Sons USA, 2000

REFERENCES

1. Joseph J. Carr, "Secrets of RF Circuit Design", 3rd Edition, McGraw Hill Publishers 2000.
2. Mathew M. Radmanesh, "Radio Frequency & Microwave Electronics", 2nd Edition, Pearson Education Asia, 2002.
3. Roland E., "Best Phase Locked Loops Design simulation and applications", 5th edition, McGraw Hill Publishers, 2003.

Sessional work assessment

Tests (2X15) – 30 marks
Assignments (2X10) – 20 marks
Total – 50 marks

University examination pattern

Q I - 8 short answer type questions of 5 marks, 2 from each module
Q II - 2 questions A and B of 15 marks from module I with choice to answer any one
Q III - 2 questions A and B of 15 marks from module II with choice to answer any one
Q IV - 2 questions A and B of 15 marks from module III with choice to answer any one
Q V - 2 questions A and B of 15 marks from module IV with choice to answer any one

2K6 EC 705 (E):– INDUSTRIAL ELECTRONICS

3 hours lecture and 1 hour tutorial per week

MODULE-I(13hours)

Measurement of length – Plainness – Area – Diameter – Roughness – Angle – Comparators – Gauge blocks – Optical Methods of length and distance measurements.Relative velocity – Translational and Rotational velocity measurement – Revolution counters and Timers - Magnetic and Photoelectric pulse counting stroboscopic methods - Accelerometers of different types - Gyroscopes.

MODULE-II(13 hours)

Force measurement – Different methods –Torque measurement – Dynamometers- Gyroscopic Force and Torque Measurement – Vibrating wire Force transducer
Basics of Pressure measurement – Deadweight Gages and Manometers types – Force-Balance and Vibrating Cylinder Transducers – High and Low Pressure measurement – McLeod Gage, Knudsen Gage, Momentum Transfer Gages, Thermal Conductivity Gages, Ionization Gazes, Dual Gage Techniques.

MODULE-III(13 hours)

Flow measurement - Head type, Area type (Rota meter), electromagnetic type, Positive displacement type, mass flow meter, ultrasonic type ,vertex shedding type, Hotwire anemometer .Laser Doppler Veloci-meter.
Volume Flow meter Plus Density measurement – Strain Gauge load cell method – Buoyancy method - Air pressure balance method – Gamma ray method – Vibrating probe method. Direct Mass Flow meters.

MODULE-IV(13 hours)

Radiation Fundamentals. Radiation Detectors. Radiation Thermometers. Optical Pyrometers.
Sound-Level Meter. Microphones. Time, Frequency, and Phase-Angle measurement. Liquid Level. Humidity. Chemical Composition.

TEXT BOOKS:

1. Measurement Systems – Applications and Design – by Doeblin E.O., 4/e, McGraw Hill International, 1990.
2. Principles of Industrial Instrumentation – Patranabis D. TMH. End edition 1997

REFERENCES:

1. Process Instruments and Control Handbook – by Considine D.M., 4/e, McGraw Hill International, 1993.
2. Mechanical and Industrial Measurements – by Jain R.K., Khanna Publishers, 1986.
3. Instrument Technology, vol. I – by Jones E.B., Butterworths, 1981.

Sessional work assessment

Tests (2X15) – 30 marks
Assignments (2X10) – 20 marks
Total – 50 marks

University examination pattern

Q I - 8 short answer type questions of 5 marks, 2 from each module
Q II - 2 questions A and B of 15 marks from module I with choice to answer any one
Q III - 2 questions A and B of 15 marks from module II with choice to answer any one
Q IV - 2 questions A and B of 15 marks from module III with choice to answer any one
Q V - 2 questions A and B of 15 marks from module IV with choice to answer any one

2K6 EC 705(F): DATA COMPRESSION

3 hours lecture and 1 hour tutorial per week

Module I (15 hours)

Data Representations – Fundamental Concepts in Video and Digital Audio – Storage Requirements for Multimedia Applications – Need for Compression – Taxonomy of Compression Techniques –Scalar and Vector Quantization Theory – Text compression - Adaptive Huffman Coding - Arithmetic Coding – Dictionary Techniques – LZW Family Algorithms .

Module II (13 hours)

Audio Compression Techniques – μ–Law and A–Law Companding – Frequency Domain and Filtering – Basic Sub Band Coding– Application to Speech Coding MPEG Audio – Progressive Encoding for Audio – Silence Compression - Speech Compression Techniques – Basics of Formant and CELP vocoders.

Module III (12 hours)

Predictive Techniques – DM– PCM –DPCM – Optimal Predictors and Optimal Quantization – Contour Based Compression – Transform Coding – JPEG Standard – Sub Band Coding Algorithms: Design of Filter Banks – Basics of JPEG 2000 Standards .

Module IV (12 hours)

Video compression techniques and standards- Motion estimation and compensation techniques - MPEG video coding - MPEG 1 and 2 standards - MPEG 4 - H.264 standards - Basics of DVI technology - Packet Video.

Text books

1. Khalid Sayood, "Introduction to Data Compression", 2nd Edition, Morgan Kauffman Harcourt, India,
2. Watkinson J., "Compression in Video and Audio", Focal Press, London, 1995.

Reference books

1. David Salomon, "Data Compression The Complete Reference", 2nd Edition, Springer Verlag, New York Inc., 2001.
2. Peter Symes , "Digital Video Compression" , McGraw Hill Pub, 2004.
3. Mark Nelson, "Data compression BPB", Publishers, New Delhi, 1998.
4. Yun Q. Shi Huifang, "Sun Image and Video Compression for Multimedia Engineering Fundamentals Algorithms & Standards", CRC press,

Sessional work assessment

Tests (2X15) – 30 marks
Assignments (2X10) – 20 marks
Total – 50 marks

University examination pattern

Q I - 8 short answer type questions of 5 marks, 2 from each module
Q II - 2 questions A and B of 15 marks from module I with choice to answer any one
Q III - 2 questions A and B of 15 marks from module II with choice to answer any one
Q IV - 2 questions A and B of 15 marks from module III with choice to answer any one
Q V - 2 questions A and B of 15 marks from module IV with choice to answer any one

2K6PTEC 706(P): SIMULATION LAB

3 hours practical per week Experiments using MATLAB/OCTAVE/DSP Kit

1. Fundamental operations-Convolution, Modulation etc
2. Digital Filter-IIR
3. Digital Filter- FIR
4. Up-sampling and down sampling operations in time domain and frequency domain
5. Implementation of FFT algorithm.
6. Mean Square Error estimation of a signals.
7. Huffman coding and decoding.
8. Implementation of LMS algorithm.
9. Time delay estimation using correlation function.
10. Comparison of effect in a dispersive channel for BPSK, QPSK and MSK.
11. Study of eye diagram of PAM transmission system.
12. Generation of QAM signal and constellation graph.

Sessional work assessment

Laboratory practical and record - 35 marks
Tests – 15 marks
Total – 50 marks

2K6 EC 707(P): COMMUNICATION ENGINEERING LAB II

3 hours practical per week

Microwave and Optical Experiments

1. Klystron characteristics.
2. Slotted line measurements-VSWR & Impedance.
3. Antenna radiation pattern measurements.
4. Directional Coupler & Isolator
5. Optical Fiber Experiments-Analog & Digital

Hardware Experiments

6. Generation and detection of BASK,BFSK,BPSK
7. Generation and Detection of QAM using multiplier IC
8. Implementation of A/D and D/A converters
9. Digital TDM
10. PN and Orthogonal Code Generation.
11. Spreader and de spreader for CDMA
12. Delta Modulation

Sessional work assessment
Laboratory practical and record - 35 marks
Tests – 15 marks
Total – 50 marks

2K6 EC 708(P): MINI PROJECT

4 hours practical per week

Each group consisting of Two members is expected to design and develop a moderately complex hardware /hardware with software system - a working model of the hardware system should be fabricated and tested - the assessment of all the mini-projects will be done by a committee consisting of three faculty members, specialized in various fields of electronics and communication engineering - the students will present and demonstrate the project work before the committee - a detailed report is also to be submitted - sixty percent of total marks will be awarded by the guide and the remaining forty percent will be awarded by the evaluation committee

Sessional work assessment

Design & Development - 20 marks
Demonstration – 20 marks
Report-10 marks
Total Marks – 50 marks

2K6 EC 709(P): PHYSICAL EDUCATION, HEALTH & FITNESS

Introductory Lectures:

Unit 1: Health and fitness: Modern concept of health and fitness, meaning, scope, need and importance of health, fitness and wellness.

Unit II: Exercise and fitness: Means and methods of developing fitness. Importance of physical activities and exercises in developing and maintaining good health, Physical fitness and well being.

Unit III : Sports and Physical education: Meaning and scope, role and importance of sports and games in the development of physical fitness and personality. Social values of sports. Rules of major games.

Practical Sessions:

(All classes will be conducted after the normal working hours of the college)

50 sessions of minimum 1 hour duration each are envisaged (including Theory and Practical). The student can opt for one of the following activities in line with the specific programme / schedule announced by the faculty.

Athletics, Badminton, Basketball, Cricket, Football, General fitness, Hockey, Kabadi, Table Tennis, Ball Badminton, Archery, Volley ball, Yoga (not all activities may be offered in a particular semester. More disciplines will be offered based on the availability of infrastructure and expertise).

In addition, health and fitness assessment such as height, Weight, Resting Pulse rate and blood Pressure will be carried out.

Objective :

1. Basically to inculcate awareness of health, general fitness and attitude to voluntary physical involvement.
2. To promote learning of basic skills in sports activities and secondarily to pave the way for mastering some of the skills through continued future involvement.

Scheme of assessment:

The student will be continuously assessed on his performance on the field of play. There will not be minimum mark for pass or fail. Total 50 marks will be given assessing their attendance, regularity, punctuality and performance for 50 hours of activity from 1st semester to 7th semester.

2K6 EC 801: RADAR AND NAVIGATION

3 hours lecture and 1 hour tutorial per week

Module I (13 hours)

Radar Block diagram and operation- radar frequencies- the origins of Radar- the applications of Radar

Radar Equation: Prediction of range-minimum detectable signal- receiver noise-transmitter power- pulse repetition frequency and range ambiguity- antenna parameters-system losses and propagation effects.

Module II (13 hours)

MTI and Pulse Doppler Radar: Introduction to Doppler and MTI Radar-Delay-Line Cancellers-Staggered Pulse Repetition Frequencies-Doppler filter banks-Digital MTI processing-Moving target detector-limitations to MTI performance-MTI from a Moving platform - pulse Doppler Radar-other Doppler Radar topics-Tracking with Radar-Monopulse tracking-conical scan and sequential lobing-limitations to tracking accuracy-low-angle tracking-Tracking in range-other tracking Radar topics-comparison of trackers-Automatic Tracking with Surveillance Radars (ADT)

Module III (13 hours)

Detection of signals in Noise: Introduction -Matched filter Receiver-Detection criteria-Detectors-Automatic Detector-The Radar operator-Signal Management-Propagation radar waves-Atmospheric Refraction-standard propagation-Nonstandard propagation-The radar antenna-reflector antennas-Electronically steered phased array antennas-phase shifters-frequency-scan arrays

Radar Transmitters

Introduction-linear Beam power tubes-solid state RF Power sources-Magnetron-crossed field amplifiers-other RF power sources-other aspects of Radar Transmitter

Radar Receivers

The Radar receiver-Receiver noise figure-Superhetrodyne receiver-Duplexers and receiver protectors-Radar displays

Module IV (13 hours)

Introduction - Methods of Navigation-Radio Direction Finding-.Radio Ranges-Hyperbolic systems of Navigation (Loran and Decca) Doppler Navigation-The Doppler effect-Beam configurations-Doppler Frequency equations-track stabilization-Doppler Spectrum-components of the Doppler Navigation system-Doppler range equation-Accuracy of Doppler Navigation systems. Satellite Navigation System-The Transit System-Navstar Global Positioning System (GPS)

TEXT BOOK:

1. Merrill I. Skolnik,"Introduction to Radar Systems", Tata McGraw-Hill (3rd Edition) 2003
2. F.C Jordan & B. C.Balmann, "Electromagnetic waves & radiating System", P.H.I

REFERENCES:

1. Peyton Z.Peebles,"Radar Principles", Johnwiley, 2004.
2. J.C Toomay,"Principles of Radar", 2nd Edition-PHI, 2004.

Sessional work assessment

Tests (2X15) – 30 marks

Assignments (2X10) – 20 marks

Total – 50 marks

University Examination Pattern

Q I – 8 short answer type questions of 5 marks, 2 from each module.

Q II - 2 questions (covering entire module) of 15 marks each from module I with choice to answer any one.

Q III - 2 questions (covering entire module) of 15 marks each from module II with choice to answer any one.

Q IV - 2 questions (covering entire module) of 15 marks each from module III with choice to answer any one.

Q V - 2 questions (covering entire module) of 15 marks each from module IV with choice to answer any one.

2K6 EC 802: OPTICAL COMMUNICATION

3 hours lecture and 1 hour tutorial per week

Module I (14 hours)

Introduction to: The Electromagnetic Spectrum- Fiber Optic Communication System, Benefits and disadvantages Fiber Optics Transmission through Optical Fiber, Types of Fiber. Solution to Maxwell's equation in circularly symmetric step indexed optical fiber. Concept of single mode and multi mode fibers-V number-linearly polarized modes. Attenuation mechanism in single and multi mode optical fibers. Dispersion: dispersion shifted and dispersion flattened fibers polarization maintaining fibers. Basics of optical couplers, build out attenuators and optical switches

Module—II (12hours)

Optical Sources: Basic principle of LED and, LASER – structure- quantum efficiency -characteristics material used concept of line width, Distributed feedback (DFB) laser. Detectors: PIN -Avalanche Photodiode: - material used, working principle and characteristics Photo detector-responsivity-sensitivity- noise - response time- structure of detectors- receiver units.

Module –III(13 hours)

Coherent optical systems. Methods of modulation, Heterodyne and Homodyne systems, Noise in coherent systems Multichannel coherent systems. Intensity modulated direct detection systems. Detected signals and shot noise-ISI and equalization. Performance degradation due to fiber dispersion and non-linear effects in fiber propagation.

Module –IV(13 hours)

Optical amplifiers: semiconductors and rare earth doped fiber amplifiers-Raman amplifier-Brillouin amplifier-principle of operation-amplifier noise. Optical TDM, SCM, WDM and Hybrid multiplexing methods. Optical networks:- SONET/ SDH, DWDM, Optical CDMA, FDDI, performance of various systems.

Text books

1. Leonid Kazovsky, Sergio Benedetto and Alan Willner: `Optical Fiber Communication Systems' , Artech House, 1996.
2. John Senior: `Optical Fiber Communications', Second Edition, PHI, 1992
3. Silvello Betti, Giancarlo De Marchis and Eugenio Iannone : `Coherent Optical Communications Systems', John Wiley, 1995.
4. G.P.Agrawal : `Nonlinear Fiber Optics', Second edition, Academic Press, 2000.
5. Gerd Keiser: Optical Fibre Communications (3rd Ed.), McGraw Hill, 2000.

References

1. Fibre optic communication technology: Djafer K Mynbaev, Pearson Education.
2. Electronic communication: Dennis Roddy & John coolen, PHI. .
3. Optical communication system: John Gower, PHI
4. Fibre optics in telecommunication: Sharma, Mc Graw Hill
5. Optical fibre and fibre optic communication: Subir Kumar Sarkar, S Chand & co. Ltd
6. Optical communication: M Mukund Rao , Universities press.
7. Fiber Optic Communication: Palais, Pearson Education.

Sessional work assessment

Tests (2X15) – 30 marks
Assignments (2X10) – 20 marks
Total – 50 marks

University examination pattern

Q I - 8 short answer type questions of 5 marks, 2 from each module
Q II - 2 questions A and B of 15 marks from module I with choice to answer any one
Q III - 2 questions A and B of 15 marks from module II with choice to answer any one
Q IV - 2 questions A and B of 15 marks from module III with choice to answer any one
Q V - 2 questions A and B of 15 marks from module IV with choice to answer any one

2K6 EC 803: COMPUTER COMMUNICATION & NETWORKING

3 hours lecture and 1 hour tutorial per week

Module 1: (14 hours)

Characteristics of communication networks - traffic characterization and quality of service CBR, VBR, UBR traffic - network services - flow control - congestion control - error control - error detection - ARQ retransmission strategies - analysis - OSI model - Ethernet - token ring - FDDI - DQDB - frame relay

Module 2: (12 hours)

TCP/UDP - TCP congestion control - congestion avoidance - window adjustment in TCP - routing optimization in datagram networks - circuit switched networks - SONET - SDH- routing optimization in circuit switched networks

Module 3: (12 hours)

Markov chain- Discrete time and continuous time Markov chains- Poisson process- Queuing models for Data gram networks- Little's theorem- M/M/1 queuing systems- M/M/m/m queuing models- M/G/1 queue

Module 4: (14 hours)

ATM networks - main features - statistical multiplexing - addressing, signaling and routing - ATM header structure - ATM adaptation layer - IP over ATM-- IPV4, IPV6. Introduction to WSN ; MAC Protocols - classification, comparative analysis Overview/Architectures.

Text books and references:

1. Jean Walrand & Pravin Varaiya, "*High Performance Communication Networks*". Morgan Kaufman Publishers, 2nd Edition
2. James. F. Kurose and Keith.W. Ross, "Computer Networks, A top-down approach featuring the Internet", Addison Wesley, 2001.
3. D. Bertsekas and R. Gallager, "Data Networks", PHI, 2000.
4. Tannenbaum A., "*Computer Networks*", Prentice Hall
5. S. Keshav, "An Engineering Approach to Computer Networking", Addison Wesley
6. Peterson L.L. & Davie B.S., "Computer Networks: A System Approach", Morgan Kaufman Publishers.
7. Anurag Kumar, D. Manjunath, and Joy Kuri, Communication Networking: An Analytical Approach, Morgan Kaufman Publ. 2004.
8. C. Siva Ram Murthy and B. S. Manoj, "Ad Hoc Wireless Networks: Architectures and Protocols", Prentice Hall.

Sessional work assessment

Two tests (2 x 15) = 30
Two assignments(2 x 10) = 20
Total marks = 50

University examination pattern

Q I - 8 short answer type questions of 5 marks, 2 from each module
Q II - 2 questions A and B of 15 marks from module I with choice to answer any one
Q III - 2 questions A and B of 15 marks from module II with choice to answer any one
Q IV - 2 questions A and B of 15 marks from module III with choice to answer any one
Q V - 2 questions A and B of 15 marks from module IV with choice to answer any one

2K6 EC 804: WIRELESS MOBILE COMMUNICATION

3 hours lecture and 1 hour tutorial per week

Module I (14 HOURS)

Introduction to Wireless Communication System: Evolution-wireless communication system Definitions-steps involved in making a cellular telephone call-Modern Wireless Communication Systems-2G-3G-4G

Module II (10 HOURS)

The Cellular Concept: Frequency Reuse-channel assignment strategies-handoff strategies-Interference and system capacity-improving coverage and capacity in cellular system-cell splitting-sectoring-repeaters for range extension-micro cell concept

Module III (12 HOURS)

Free space propagation models-ground reflection model-the basic propagation mechanisms-small scale multipath propagation-impulse response model of a multipath channel-parameters of mobile multipath channels-Types of small scale Fading.

Module IV (16 HOURS)

Spread spectrum and CDMA-Motivation- Direct sequence spread spectrum- Frequency Hopping systems- Time Hopping.- Anti-jamming- Pseudo Random (PN) sequence- Maximal length sequences- Gold sequences- Generation of PN sequences.- Diversity in DS-SS systems- Rake Receiver- Performance analysis. Spread Spectrum Multiple Access- CDMA Systems- Interference Analysis for Broadcast and Multiple Access Channels- Capacity of cellular CDMA networks- Reverse link power control- Hard and Soft hand off strategies.

Text Books:

1. T.S. Rappaport, "Wireless Communication, principles & practice", PHI, 2001
2. Andrea Goldsmith, "Wireless Communications", Cambridge University press.
3. Simon Haykin and Michael Moher, " Modern Wireless Communications", Person Education.

Reference Books:

1. G.L Stuber, "Principles of Mobile Communications", 2nd edition, Kluwer Academic Publishers.
2. Kamilo Feher, 'Wireless digital communication', PHI, 1995.
3. R.L Peterson, R.E. Ziemer and David E. Borth, "Introduction to Spread Spectrum Communication", Pearson Education.
4. A.J.Viterbi, "CDMA- Principles of Spread Spectrum", Addison Wesley, 1995.

Sessional work assessment

Tests (2X15) – 30 marks
Assignments (2X10) – 20 marks
Total – 50 marks

University examination pattern

Q I - 8 short answer type questions of 5 marks, 2 from each module
Q II - 2 questions A and B of 15 marks from module I with choice to answer any one
Q III - 2 questions A and B of 15 marks from module II with choice to answer any one
Q IV - 2 questions A and B of 15 marks from module III with choice to answer any one
Q V - 2 questions A and B of 15 marks from module IV with choice to answer any one

2K6PTEC 805 (A): ADVANCED DIGITAL SIGNAL PROCESSING

3 hours lecture and 1 hour tutorial per week

Module I (13 HOURS)

Introduction to Multi-rate Digital Signal Processing – Sample rate reduction - decimation by integer factors- sampling rate increase – interpolation by integer facto - Design of practical sampling rate converters: Filter Specification- filter requirement for individual stages - Determining the number of stages and decimation factors - Sampling rate conversion using poly-phase filter structure – poly-phase implementation of interpolators.

Module II(13 HOURS)

Adaptive Signal Processing – Adaptive filters – Concepts- Adaptive filter as a Noise Canceller - Other configurations of the adaptive filter - Main components of the adaptive filter – Basic Wiener filter theory – The basic LMS adaptive algorithm – Practical limitations of the basic LMS algorithm - Recursive Least Square Algorithm – Limitations - Factorization Algorithm.

Module III (13 HOURS)

Introduction to two dimensional signal and systems - 2D – DFT Transforms - Properties and applications - Discrete Hilbert Transform and Discrete Cosine Transform – Properties and Applications - Short term Fourier Transform - Gabor Transform - Properties and Applications.

Module IV (13 HOURS)

Wavelets – Wavelet Analysis – The Continuous Wavelet Transform - scaling - shifting - scale and frequency - The Discrete Wavelet Transform - One Stage filtering - Approximation and Details - Filter bank analysis – Multilevel Decomposition – Number of levels – Wavelet reconstruction – Reconstruction filter- Reconstructing Approximations and details- Multilevel Reconstruction - Wavelet packet synthesis- Typical Applications.

Text books:

1. Digital Signal Processing: Emmanuel C Ifeachor, Barrie W Jrevis, Pearson Education.
2. Theory and Applications of DSP: L.R Rabiner and B gold
3. Electronic filter Design Hand Book: A .B Williams and FT Taylor, McGraw

References

1.Wavelets and Subband Coding: Valterli & Kovaceric, PHI.

Sessional work assessment

Tests (2X15) – 30 marks
Assignments (2X10) – 20 marks
Total – 50 marks

University examination pattern

Q I - 8 short answer type questions of 5 marks, 2 from each module
Q II - 2 questions A and B of 15 marks from module I with choice to answer any one
Q III - 2 questions A and B of 15 marks from module II with choice to answer any one
Q IV - 2 questions A and B of 15 marks from module III with choice to answer any one
Q V - 2 questions A and B of 15 marks from module IV with choice to answer any one

2K6 EC 805 (B): DIGITAL IMAGE PROCESSING

3 hours lecture and 1 hour tutorial per week

Module I (13 hours)

Digital Image Fundamentals :Elements Of Digital Image Processing Systems – Elements Of Visual Perception – Psycho Visual Model – Brightness – Contrast, Hue, Saturation, Mach Band Effect Color Image Fundamentals – Rgb – Hsi Models – Image Sampling, Quantization– Dither– Two– Dimensional Mathematical Preliminaries .1D DFT 2D transforms – DFT DCT Discrete Sine Walsh Hadamard – Slant – Haar – KLT – SVD – Wavelet Transform

Module II (13 hours)

Image Enhancement and Restoration-Histogram Modification And Specification Techniques – Noise Distributions – Spatial Averaging – Directional Smoothing Median – Geometric Mean – Harmonic Mean Contraharmonic And Yp Mean Filters – Homomorphic Filtering – Color Image Enhancement Image Restoration – Degradation Model – Unconstrained And Constrained Restoration – Inverse Filtering – Removal Of Blur Caused By Uniform Linear Motion – Wiener Filtering – Geometric Transformations – Spatial Transformations Gray Level– Interpolation .

Module III (13 hours)

Image Segmentation and Recognition– Image Segmentation by Region Growing – Region Splitting and Merging – Edge Linking – Image Recognition – Patterns and Pattern Classes – Matching By Minimum Distance Classifier – Matching by Correlation – Back Propagation Neural Network – Neural Network Applications in Image Processing .

Module IV (13 hours)

Image Compression: Need for Data Compression – Huffman – Run Length Encoding – Shift Codes – Arithmetic Coding - QM/MQ codes– Vector Quantization – Block Truncation Coding – Transform Coding – DCT and Wavelet JPEG –JPEG 2000- MPEG Standards – Concepts of Context Based Compression .

TEXT BOOKS

1. Rafael C Gonzalez and Richard E Woods, "Digital Image Processing", Second Edition, Pearson Education Inc, 2004.

2. Milman Sonka Vaclav Hlavac Roger Boyle, "Image Processing Analysis and Machine Vision", 2nd Edition, Brooks/Cole Vikas Publishing House, 1999

Reference books

1. Anil K Jain, "Fundamentals of Digital Image Processing", Prentice Hall of India, 2002.
2. David Salomon, "Data Compression the Complete Reference", 2nd Edition Springer Verlag, New York Inc, 2001.
3. William K Pratt, "Digital Image Processing", John Wiley, New York, 2002.

Sessional work assessment

Tests (2X15) – 30 marks
Assignments (2X10) – 20 marks
Total – 50 marks

University examination pattern

Q I - 8 short answer type questions of 5 marks, 2 from each module
Q II - 2 questions A and B of 15 marks from module I with choice to answer any one
Q III - 2 questions A and B of 15 marks from module II with choice to answer any one
Q IV - 2 questions A and B of 15 marks from module III with choice to answer any one
Q V - 2 questions A and B of 15 marks from module IV with choice to answer any one

2K6 805 (C): COMMUNICATION SWITCHING SYSTEMS

3 hours lecture and 1 hour tutorial per week

Module I (12 hours)

Electronic switching systems: basics of a switching system - electronic space division switching - stored program control - time division switching - time multiplexed space switching - time multiplexed time switching - two stage, three stage and N-stage combination switching

Module II (14 hours)

Digital circuit switching networks: two-stage network - three-stage network - n-stage network - non-blocking switches - blocking probability analysis of multistage switches - lee approximation - improved approximate analysis of blocking switch - examples of digital switching systems - AT & T 5ESS and NTI - DMS 100 switching systems

Module III (14 hours)

Elements of traffic engineering: network traffic load and parameters - grade of service and blocking probability - incoming traffic and service time characterization - blocking models and loss estimates - delay systems

Module IV (12 hours)

Signaling: customer line signaling - outband signaling - inband signaling - PCM signaling - inter register signaling - common channel signaling principles - CCITT signaling system No: 7 - digital customer line signaling

Introduction to ATM switching – Strict sense non block switch – self routing switches – Bense network – ATM routers – Design of typical switches.

TEXT BOOK:

1. Viswanathan T., *Telecommunication Switching Systems and Networks*, Prentice Hall of India Pvt. Ltd.
2. Schwartz M., *Telecommunication Networks - Protocols, Modeling and Analysis*, Addison Wesley Publishing Company

REFERENCES:

1. Flood J.E., *Telecommunications Switching Traffic and Networks*, Pearson Education Pvt. Ltd., Publishers
2. Freeman R.L., *Telecommunication System Engineering*, Wiley Inter Science Publications

Das J., *Review of Digital Communication*, New Age Internal (P) Ltd., Publishers

Sessional work assessment

Tests (2X15) – 30 marks
Assignments (2X10) – 20 marks
Total – 50 marks

University examination pattern

Q I - 8 short answer type questions of 5 marks, 2 from each module
Q II - 2 questions A and B of 15 marks from module I with choice to answer any one
Q III - 2 questions A and B of 15 marks from module II with choice to answer any one
Q IV - 2 questions A and B of 15 marks from module III with choice to answer any one
Q V - 2 questions A and B of 15 marks from module IV with choice to answer any one

2K6 EC 805 (D): EMBEDDED SYSTEMS

3 hours lecture and 1 hour tutorial per week

Module I (12 hours)

Embedded Computers – Characteristics of Embedded Computing Applications – Challenges in Embedded Computing System Design – Embedded System Design –Process Requirements – Specification – Architectural Design – Designing Hardware and Software Components – System Integration – Formalism for System Design – Structural Description, Behavioral Description – Design Example: Model Train Controller.

Module II (13 hours)

ARM Processor – Processor and Memory Organization – Data Operations – Flow of Control – SHARC Processor – Memory Organization – Data Operations – Flow of Control – Parallelism with Instructions – CPU Bus Configuration, ARM Bus, SHARC Bus – Memory Devices, Input/output Devices – Component Interfacing – Designing with Microprocessor Development and Debugging – Design Example Alarm Clock .

Module III(13 hours)

Distributed Embedded Architecture – Hardware and Software Architectures – Networks for Embedded Systems – I2C, CAN Bus – SHARC Link Ports – Ethernet – Myrinet– Internet, Network – Based Design – Communication Analysis – System Performance Analysis – Hardware Platform Design – Allocation and Scheduling – Design Example Elevator Controller

Module IV (14 hours)

Clock Driven Approach – Weighted Round Robin Approach – Priority Driven Approach – Dynamic versus Static Systems – Effective Release Times and Deadlines – Optimality of the Earliest Deadline First (EDF) Algorithm – Challenges in Validating Timing Constraints in Priority Driven Systems – Off–Line versus On–Line Scheduling.

TEXT BOOKS

1. Wayne Wolf, "Computers as Components Principles of Embedded Computing System Design", Morgan Kaufman Publishers, 2001.
2. Frank Vahid and Tony Givargi, "Embedded System Design A Unified Hardware/Software", John Wiley & Sons, 2000.

REFERENCES

1. Jane W S Liu, "Real Time systems", Pearson Education, Asia, 2000.
2. C M Krishna and K G Shin, "Real Time Systems", McGraw Hill 1997.

Sessional work assessment

Tests (2X15) – 30 marks
Assignments (2X10) – 20 marks
Total – 50 marks

University examination pattern

Q I - 8 short answer type questions of 5 marks, 2 from each module
Q II - 2 questions A and B of 15 marks from module I with choice to answer any one
Q III - 2 questions A and B of 15 marks from module II with choice to answer any one
Q IV - 2 questions A and B of 15 marks from module III with choice to answer any one
Q V - 2 questions A and B of 15 marks from module IV with choice to answer any one

2K6 EC 805(E): SECURE COMMUNICATIONS

3 hours lecture and 1 hour tutorial per week

Module I: (10 hours)

Rings and fields - Homomorphism- Euclidean domains - Principal Ideal Domains - Unique Factorization Domains -- Field extensions- Splitting fields - Divisibility- Euler theorem - Chinese Remainder Theorem - Primality

Module II: (13 hours)

Basic encryption techniques - Concept of cryptanalysis - Shannon's theory - Perfect secrecy - Block ciphers - Cryptographic algorithms - Features of DES - Stream ciphers - Pseudo random sequence generators - linear complexity - Non-linear combination of LFSRs - Boolean functions

Module III: (14 hours)

Private key and Public key cryptosystems - One way functions - Discrete log problem - Factorization problem - RSA encryption - Diffie Hellmann key exchange - Message authentication and hash functions -Digital signatures - Secret sharing - features of visual cryptography - other applications of cryptography -

Module IV: (15 hours)

Elliptic curves - Basic theory - Weirstrass equation - Group law - Point at Infinity -Elliptic curves over finite fields - Discrete logarithm problem on EC - Elliptic curve cryptography - Diffie Hellmann key exchange over EC - Elgamal encryption over EC - ECDSA

Text Books:

1. Douglas A. Stinson, "Cryptography, Theory and Practice", 2nd edition, Chapman & Hall, CRC Press Company, Washington
2. William Stallings, " Cryptography and Network Security", 3rd edition, Pearson Education

Reference Books:

1. Lawrence C. Washington, " Elliptic Curves", Chapman & Hall, CRC Press Company, Washington.
2. David S. Dummit, Richard M. Foote, " Abstract Algebra", John Wiley & Sons
3. Evangelos Kranakis, " Primality and Cryptography", John Wiley & Sons
4. Rainer A. Ruppel, " Analysis and Design of Stream Ciphers", Springer Verlag

Sessional work assessment

Tests (2X15) – 30 marks
Assignments (2X10) – 20 marks
Total – 50 marks

University examination pattern

Q I - 8 short answer type questions of 5 marks, 2 from each module
Q II - 2 questions A and B of 15 marks from module I with choice to answer any one
Q III - 2 questions A and B of 15 marks from module II with choice to answer any one
Q IV - 2 questions A and B of 15 marks from module III with choice to answer any one
Q V - 2 questions A and B of 15 marks from module IV with choice to answer any one

2K6 EC 805(F): OPTIMIZATION TECHNIQUES

3 hours lecture and 1 hour tutorial per week

Module I: Linear programming I (13 hours)

Systems of linear equations and inequalities - convex sets - convex functions - formulation of linear programming problems - theory of simplex method - simplex algorithm - Charne's M method - two phase method - duality in linear programming - dual simplex method

Module II: Linear programming II (13 hours)

Sensitivity analysis - parametric programming - bounded variable problems - transportation problem - development of the method - integrality property - degeneracy - unbalanced problems - assignment problem - development of the Hungarian method - routing problems

Module III: Nonlinear programming (13 hours)

Mathematical preliminaries of non-linear programming - gradient and Hessian - unimodal functions - convex and concave functions - role of convexity - unconstrained optimization - fibonacci search - golden section search - optimal gradient method - classical optimization - Lagrange multiplier method - Kuhn-tucker conditions - quadratic programming - separable convex programming - frank and wolfe method

Module IV: Dynamic programming & game theory (13 hours)

Nature of dynamic programming problem - Bellman's optimality principle - cargo loading problem - replacement problems - multistage production planning and allocation problems - rectangular games - two person zero sum games - pure and mixed strategies - 2 ▪ m and m ▪ 2 games - relation between theory of games and linear programming

REFERENCES

1. Bazarra M.S., Jarvis J.J. & Sherali H.D. '*Linear Programming and Network Problems*', John Wiley
2. Bazarra M.S., Sherali H.D. & Shetty C.M., *'Nonlinear Programming, Theory and Algorithms',* John Wiley
3. Hadley G., '*Linear Programming*', Addison Wesley, Narosa
4. Hillier F.S. & Lieberman G.J. *'Introduction to Operations Research'*, McGraw Hill
5. Ravindran A., Phillips D.T. & Solberg J. J., *Operations Research Principles and Practice*, John Wiley
6. Taha H.A., *Operations Research, An introduction*, P.H.I.
7. Wagner H.M., '*Principles of Operations Research with Application to Managerial Decisions'*, P.H.I.

Sessional work assessment

Tests (2X15) – 30 marks
Assignments (2X10) – 20 marks
Total – 50 marks

University examination pattern

Q I - 8 short answer type questions of 5 marks, 2 from each module
Q II - 2 questions A and B of 15 marks from module I with choice to answer any one
Q III - 2 questions A and B of 15 marks from module II with choice to answer any one
Q IV - 2 questions A and B of 15 marks from module III with choice to answer any one
Q V - 2 questions A and B of 15 marks from module IV with choice to answer any one

2K6 EC 806(P) SEMINAR

4 hours per week

Each student is expected to give a seminar on a topic of current relevance in Electronics and Communication Engineering –they have to refer published papers from standard journals-the seminar report must not be the reproduction of the original paper

Sessional work assessment

Presentation	= 30 marks
Report	= 10 marks
Discussion	= 10 marks
Total marks	= 50 marks

2K6 EC 807(P) PROJECT & INDUSTRIAL TRAINING

6 hours practical per week

Each student group consisting of not more than four members is expected to develop a complete product- the design and development of which may include hardware and /or software- the students will present and demonstrate the project work before the committee - a detailed report is also to be submitted

All students shall undergo an industrial training programme either by attending training program for a minimum of five days in a registered industry/Govt. establishment/Research institute or by visiting at least five reputed industries/Engineering establishments. They have to submit a report of the industrial training program.

The assessment of all the projects shall be done by a committee consisting of three or four faculty members specialised in the various fields of Electronics & Communication Engineering - the students will present their project work before the committee - the group average marks for the various projects will be fixed by the committee - the guides will award the marks for the individual students in a project maintaining the group average

A maximum of 25 marks will be awarded for the industrial training

Sessional work assessment	
Project work	: 75
Industrial Training	: 25
Total marks	: 100

2K6 EC 808(P) : VIVA VOCE

There is only University examination for Viva Voce. Examiners will be appointed by the university for conducting the viva voce. The viva voce exam will be based on the subjects studied for the B.Tech course, mini project, project & Industrial training and seminar reports of the student - the relative weightages would be as follows

Sessional work assessment

Subjects	: 30
Mini project	: 20
Project & Industrial Training	: 30
Seminar	: 20
Total marks	: 100