KANNUR UNIVERSITY
FACULTY OF ENGINEERING

Curricula, Scheme of Examinations & Syllabi for B.Tech Degree Programme (III-IV Semesters) in ELECTRICAL AND ELECTRONICS ENGINERING With effect from 2007 Admissions

THIRD SEMESTER

Code	Subject	Hours/Week			Sessional Marks	University Examination	
		L	T	P/D		Hrs	Marks
2K6EE 301	Engineering Mathematics II	3	1	-	50	3	100
2K6EE 302	Humanities	3	1	-	50	3	100
2K6EE 303	Mechanical Engineering	3	1	-	50	3	100
2K6EE 304	Electronic Circuits and Systems	3	1	-	50	3	100
2K6EE 305	Network Analysis	3	1	-	50	3	100
2K6EE 306	Electrical Measurements and Measuring Instruments	3	1	-	50	3	100
2K6EE 307(P)	**Mechanical Engineering Lab**	-	-	3	50	3	100
2K6EE 308(P)	**Basic Electronics Lab**	-	-	3	50	3	100
TOTAL		**18**	**6**	**6**	**400**	**-**	**800**

FOURTH SEMSTER

Code	Subject	Hours/Week			Sessional Marks	University Examination	
		L	T	P/D		Hrs	Marks
2K6EE 401	Engineering Mathematics III	3	1	-	50	3	100
2K6EE 402	Computer Programming	3	1	-	50	3	100
2K6EE 403	Microprocessors & Microcontrollers	3	1	-	50	3	100
2K6EE 404	Pulse and Digital Electronics	3	1	-	50	3	100
2K6EE 405	Electrical Machines I	3	1	-	50	3	100
2K6EE 406	Electrical Engineering Materials	3	1	-	50	3	100
2K6EE 407(P)	**Digital Electronics Lab**	-	-	3	50	3	100
2K6EE 408(P)	**Electrical Measurements Lab**	-	-	3	50	3	100
TOTAL		**18**	**6**	**6**	**400**	**-**	**800**

2K6 EE 301 : ENGINEERING MATHEMATICS II

3 hours lecture and 1 hour tutorial per week

Module I:

Infinite Series: Convergence and divergence of infinite series – Ratio test – Comparison test – Raabe's test – Root test – Series of positive and negative terms- absolute convergence – Test for alternating series. ***Power Series***: Interval of convergence – Taylors and Maclaurins series representation of functions – Leibnitz formula for the derivative of the product of two functions – use of Leibnitz formula in the Taylor and Maclaurin expansions

Module II:

Matrices: Concept of rank of a matrix –echelon and normal forms – System of linear equation - consistency – Gauss elimination– Homogeneous liner equations-Fundamental system of solutions- Inverse of a matrix – solution of a system of equations using matrix inversion – eigen values and eigen vectors - Cayley- Hamilton Theorem.

Module III:

Vector Integral Calculus: Evaluation of line integral, surface integral and volume integrals – Line integrals independent of the path, conservative force fields, scalar potential- Green's theorem- Gauss' divergence theorem- Stoke's theorem (proof of these not required).

Module IV:

Vector Spaces: subspaces–linear dependence and independence–bases and dimension-linear transformations -sums, products and inverse of linear transformations.

References:

1. Kreyszing E. Advanced Engineering Mathematics, Wiley Eastern
2. Sastri. S. S. Engineering Mathematics, Prentice Hall of India.
3. Wylie .C. R. Advanced Engineering Mathematics, Mc Grawhill.
4. B .S. Grewal. Higher Engineering Mathematics, Khanna Publishers.
5. Greenberg. M.D. Advanced Engineering Mathematics, Pearson Education Asia.
6. Narayanan .S. Manickavachagom Pella and Ramaiah. Advanced Mathematics for Engineering Students, S. Viswanathan Publishers

Sessional work assessment

Assignments	2x10 = 20
2 tests	2x15 = 30
Total marks	= 50

University examination pattern

Q I - 8 short 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 EE 302 : HUMANITIES

3 hours lecture and 1 hour tutorial per week

Module I (20 hours)

Functional English Grammar: Sentence Analysis -Basic Patterns -Noun Group, Verbal Group, and Adverbial Group- Tenses – Conditionals - Active and Passive Voice - Reported Speech

Module II (14 hours)

Technical Communication

1. Nature, Growing need, and importance of technical communication – technical communication skills – listening, speaking, reading, and writing.
2. Barriers to effective communication – improper encoding, bypassing inter- cultural differences etc.
3. Organization in technical communication – spatial, chronological etc.
4. Style in technical communication - objectivity, accuracy, brevity, clarity etc.
5. Technical reports – types and format

Professional Ethics: 1. Ethics in Engineering, copyright – IPR- patents

Module III (10 hours)

Humanities, Science and Technology

1. Importance of humanities to technology, Education and Society
2. Relevance of a scientific temper
3. Relation between science, society and culture – the views of modern thinkers
4. The development of science and technology in society – science and technology in ancient Greece and India – the contribution of the Arabs to science and technology – recent advances in Indian science.

Reference books

1. Huddleston R, English Grammar – An outline, Cambridge University Press
2. Pennyor, Grammar Practice Activities, Cambridge University Press
3. Murphy, Intermediate English Grammar, Cambridge University Press
4. Hashemi, Intermediate English Grammar, Supplementary Exercises with answers, Cambridge University Press
5. Vesilind; Engineering, Ethics and the Environment, Cambridge University Press
6. Larson E; History of Inventions, Thompson Press India Ltd.
7. Bernal J. D., Science in History, Penguin Books Ltd.
8. Dampier W. C., History of Science, Cambridge University Press
9. Encyclopedia Britannica, History of Science, History of Technology
10. Subrayappa; History of Science in India, National Academy of Science, India
11. Brownoski J, Science and Human Values, Harper and Row
12. Schrödinger, Nature and Greeks and Science and Humanism, Cambridge University Press
13. Bossel. H., Earth at a Crossroads – paths to a sustainable future, Cambridge University Press
14. McCarthy, English Vocabulary in Use, Cambridge University Press
15. M. Ashraf Rizvi, Effective Technical Communication, Tata McGraw Hill, New Delhi, 2005

Sessional work assessment

Assignments	2x10 = 20
2 tests	2x15 = 30
Total marks	= 50

University examination pattern

Q I - 10 short type questions of 2 marks, from Module 1

Q II - 10 questions of 5 marks, from module II and III for writing short notes with choice to answer any **seven**

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

Q IV - 2 questions A and B of 15 marks from module II for writing essay with choice to answer any one

Q V - 2 questions A and B of 15 marks from module III for writing essay with choice to answer any one

2K6 EE 303 : MECHANICAL ENGINEERING

3 hours lecture and 1 hour tutorial per week

Module I (13 hours)
Fluids and continuum-Fluid properties-Ideal and real fluids-Fluid statistics-Fluid Pressure-Manometer-Centre Of pressure-Buoyancy-Metacentric height Fluid dynamics -Equation of continuity, momentum and energy Laminar and turbulent flow-Friction factor

Module II (13 hours)
Heat transfer-basic modes: conduction, convection and radiation. Fourier law-general conduction equation-one dimensional conduction in single geometries-critical insulation thickness-extended surface heat transfer-Fins, Free and forced convection-Empirical relation Laws of radiation-black body –grey body-radiation shape factor-basic idea of solar radiation.

Module III (13 hours)
Steam turbine-basic cycle of operation-Impulse and reaction turbine compounding –efficiency –governing. Gas turbine-Basic cycle of operation-application-single stage and multi stage turbines .Air compressor: Classification, working principle of reciprocating and rotary compressors.

Module IV (13 hours)
Conventional and Non-conventional energy sources. Steam power plant-IC engine power plant-Gas power plant-Hydel power plant –Layouts components and their functions. Mechanical Transmission of power: Elementary ideas of belt, rope, chain and gear drives-comparison and field of application.

Text books
1. White F.M. : Fluid Mechanics, McGrawHill
2. Jagadishlal: Hydraulic Machines and its applications,
3. M.L.Mathur & F.S.Metha, Thermal Engineering, Jain brothers, New Delhi

Reference books
1. Gupta V. & Gupta S. Fluid Mechanics and its applications, Wiley Eastern
2. Dr. R.K. Bansal, Fluid Mechanics & Hydraulic Machine, Lakshmi Publishers
3. Holman J.P. Heat transfer, McGraw Hill
4. Mathur & Metha, Thermodynamics & heat power Engineering

Sessional work assessment

Assignments	2x10 = 20
2 tests	2x15 = 30
Total marks	= 50

University examination pattern
Q I - 8 short 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 EE 304 : ELECTRONIC CIRCUITS AND SYSTEMS

3 hours lecture and 1 hour tutorial per week

Module I (14 hours)

Diode basics & Circuits-PN Junction - Minority carrier storage - diffusion capacitance - transition capacitance- Schottky diode - Diode circuits - load line - piecewise linear model - single phase half wave and full wave rectifier circuits - voltage regulation - ripple factor - rectifier efficiency - transformer utilization factor - bridge rectifier- rectifier filters - LC and RC filters and comparison - diode clipping circuits - single level and two level clippers - clamping circuits - clamping circuit theorem. Tunnel diode Construction and Characteristics. UJT- Construction – Characteristics-Relaxation Oscillator

Module II(12 hours)

Transistor Amplifier Basics-Operating point of a BJT - bias stability - thermal runaway –Different Types of Biasing- h parameter model of a BJT- CE, CB and Emitter follower analysis- biasing a JFET - CS and CD amplifiers.

Module III (13 hours)

Frequency response of amplifiers - Low frequency response of BJT and FET amplifiers - hybrid π equivalent circuit of BJT - high frequency response of CE amplifier- current gain - cut off frequencies - gain bandwidth product - miller effect-Power amplifiers:-Class A, Class B and Class AB - power amplifiers using BJT.

Module IV (13 hours)

Feedback Amplifiers & Oscillators- negative and positive feedback – Different topologies and properties-oscillators -Barkhausen's criterion for stability of feedback amplifiers - transistor phase shift oscillator - Wein's bridge oscillator.

Linear Op-amp Circuits- ideal and practical op-amps - CMRR-slew rate –inverting and non inverting amplifier - voltage follower - summing amplifier - subtracting circuits - voltage to current converter-op-amp integrator-op-amp differentiator.

Reference books:

1. Millman & Halkies.: Integrated Electronics, McGraw Hill
2. Schilling & Belove: Electronic Circuits, McGraw Hill
3. Sedra & Smith: Microelectronic Circuits, Oxford University Press
4. Boylested & Nashesky: Electronic Devices & Circuit Theory, Prentice Hall of India
5. Gayakwad R.A: OPAMPS & Linear Integrated Circuits, Prentice Hall of India,2002
6. Clayton G.B: Operational Amplifiers, ELBS,2002
7. Frederiksen T.M: Intuitive Operational Amplifiers, McGraw Hill,1988

Sessional work assessment

Assignments	2x10 = 20
2 tests	2x15 = 30
Total marks	= 50

University examination pattern

Q I - 8 short 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 EE 305 : NETWORK ANALYSIS

3 hours lecture and 1 hour tutorial per week

Module I (15 Hours)
Network theorems & Laplace Transforms
Mesh analysis- Nodal analysis – superposition theorem- Reciprocity theorem- Thevenin's and Norton's theorem-Maximum power transfer theorem for ac and dc circuits. Review of Laplace Transform-Transform pairs-gate functions-shifting theorem – Iinitial and final value theorem- Laplace transform of periodic signals- inversion of transform by partial fraction -Convolution theorem and Convolution integral-Transformation of circuit into s-domain- impedance and admittance matrix in the s domain

Module II (13 hrs)
Application of Laplace Transforms - Transient analysis of RL, RC and RLC series circuits with DC applied - RL and RC circuits with impressed sinusoidal voltage-
Magnetic Circuits –MMF-Magnetic Flux- Reluctance- Comparison of Electric & Magnetic circuits-self and mutual inductances – coefficient of coupling-dot convention – cumulative and differential connection of coupled coils – steady state solutions of coupled circuits.
Introduction to network topology: -Definition of graph, trees, incidence matrix, cut sets-Fundamental cut sets-Cut set schedule-Tie sets-Fundamental tie sets-tie set schedule-Applications of graph-theoretical methods to formation of network equations-Current Variable and Voltage Variable Methods.

Module III(12 Hours)
Fourier Series and Fourier transforms
Fourier Series representation of non-sinusoidal periodic waveforms- Fourier coefficients-Determination of coefficients- Waveform symmetry- Exponential Fourier Series-Discrete amplitude and phase spectra-Steady state solution of circuits with non-sinusoidal periodic inputs by Fourier series.
Fourier representation of aperiodic signals - Fourier transform and inverse transform -Transform pairs - Properties of Fourier transforms - Continuous amplitude and phase spectra - Relation between Laplace transforms and Fourier transforms-power spectral density-energy spectral density – Parseval's theorem

Module IV (12 hrs)
Two port networks: -Characterisation in terms of impedances and admittances -Hybrid and transmission parameters- Inter relationships among parameter sets-Reciprocal and symmetrical two port networks - Interconnection of two port networks- Series, parallel, and cascade- T and Π equivalent of a two port network- Image impedances.
Filter fundamentals- pass and stop bands- passive filters- different types (Basic Concepts only).

Reference Books :

1. Siskand C.S : Electrical Circuits ,McGraw Hill
2. Valkenberg : Network Analysis ,Prentice Hall of India
3. Hayt and Kemmerly :Engineering Circuit Analysis, McGraw Hill
4. David K. Cheng :Analysis of Linear Systems ,Narosa Publishing House
5. A . Chakrabarti : Circuit Theory (Analysis and Synthesis),Dhanpat Rai &Co
6. B.R. Gupta: Network Systems and Analysis, S.Chand & Company ltd
7. Joseph. A. Edminister: Theory and problems of Electric circuits, TMH
8. Gopal G Bhise et al : Engg Network Analysis & Filter Design. Umesh Publications , New Delhi.

Sessional work assessment

Assignments	2x10 = 20
2 tests	2x15 = 30
Total marks	= 50

University examination pattern

Q I - 8 short 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 EE 306 : ELECTRICAL MEASUREMENTS AND MEASURING INSTRUMENTS

3 hours lecture and 1 hour tutorial per week

Module 1(13 hrs)

General Principles of Measurements: Absolute and Working Standards- Calibration of Meters- Qualities of Measurements - Characteristics - Errors in Measurement - Essentials of indicating instruments- deflecting, damping, controlling torques- Moving Coil, Moving Iron, Dynamo Meter, Induction, Thermal, Electrostatic and Rectifier Type meter; Shunts and Multipliers-Various Types of Galvanometers- Accuracy class

Module II (13 hrs)

Measurement of Resistance, Power and Energy: Measurement of Insulation Resistance, Earth Resistance - Earth Tester-Dynamometer Type Wattmeter - Error and Compensation – Three phase power measurement using one wattmeter and two wattmeter method- Ampere Hour Meter - Single and Three Phase Energy Meters (Induction and Electronic Type) – Calibration- Trivector & TOD Meters - Frequency Meters - Power Factor Meters - Energy / Harmonic Analyzer- Current Transformers and Potential Transformers- ratio & phase angle errors – Clamp on meters. Thermal Imagers for Machinery & Switch Gear. (Concepts Only).

Module III (13 hrs)

Potentiometers: General Principle- Direct Current Potentiometer- AC potentiometer- Application of DC and AC potentiometers

Bridges: Wheatstone's Bridge – Kelvin's Double Bridge - Carry Foster Slide Wire Bridge - Bridge Current Limitations - Maxwell's bridge- Schering bridge- Anderson's bridge and Wein's bridge

Module IV (13 hrs)

Digital Measurements: Oscilloscope – Basic principle of Signal display - Triggered Sweep CRO- Trigger pulse circuit- Delay Line in triggered Sweep - Sync Selector for Continuous Sweep CRO- Dual Beam CRO- Dual Trace Oscilloscope- Applications- Digital storage oscilloscope - Digital Cable fault locators (Concepts Only). **Magnetic Measurements:** Classification - Measurement of Flux and Permeability - Flux Meter - Hall effect Gaussmeter -. B.H. Curve and Permeability measurement - Hysteresis measurement.

Reference Books:

1. Golding E.W: Electrical Measurements & Measuring Instruments, Wheeler Pub.
2. Sawhney AK: A course in Electrical and Electronic Measurements & instrumentation, Dhanpat Rai .
3. Cooper W.D: Modern Electronics Instrumentation, Prentice Hall of India.
4. Stout M.B: Basic Electrical Measurements, Prentice Hall.
5. Oliver & Cage: Electronic Measurements & Instrumentation, McGraw Hill.
6. Harris FK: Electrical Measurements , John Wiley.
7. J B Gupta : A course in Electrical & Electronic Measurement & Instrumentation., S K Kataria & Sons.

Sessional work assessment

Assignments	2x10 = 20
2 tests	2x15 = 30
Total marks	= 50

University examination pattern

Q I - 8 short 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 EE 307(P) : MECHANICAL ENGINEERING LAB

3 hours practicals per week

Set 1

Fluid Mechanics Lab: - calibration of Venturimeter, Orifice Meter, Notches, Pipe Friction

Set 2

Hydraulic Machinery Lab: - Characteristics of Turbines & Pumps – Pelton Turbine & Francis Turbine – Centrifugal, Gear & Reciprocating Pumps

Set 3

Heat Engine Lab: - Constant Speed Characteristics of SI & CI Engines.

Sessional work assessment	
Lab practicals & record	= 30
Test	=20
Total marks	= 50

University evaluation will be for 100 marks of which 70 marks are allotted for writing the procedure/formulae/sample calculation details, preparing the circuit diagram/algorithm/flow chart, conduct of experiment, tabulation, plotting of required graphs, results, inference etc., as per the requirement of the lab experiments, 20 marks for the viva-voce and 10 marks for the lab record.
Note: Duly certified lab record must be submitted at the time of examination

2K6 EE 308(P) : BASIC ELECTRONICS LAB

3 hours practicals per week

1. Use of CRO : a) Measurement of Voltage , Frequency and Phase shift.
   b) Z-Modulation of frequency Measurement.
2. Semiconductor diodes : V-I characteristics, static and dynamic resistance of Si ,Ge and Zener diodes.
3. Transistor characteristics in CB and CE configuration, Identification of cut off, active and saturation regions.
4. JFET characteristics in the common source configuration , determination of equivalent circuit parameter.
5. RC coupled CE amplifier -Measurement of Gain, input & output impedance and Frequency response.
6. FET Amplifier – Measurement of voltage gain, current gain, input & output impedance.
7. UJT Relaxation Oscillator – Design for a particular frequency.
8. Rectifiers & Filters -characteristics of Half wave, Full wave &Bridge Rectifiers –
   Ripple factor, rectification efficiency & % Regulation.
9. BJT Emitter follower- measurement of voltage gain, current gain input and output impedance & Load characteristics.
10. Characteristics of Clipping and Clamping circuit using Diodes and Zener Diodes.
11. Characteristics of voltage regulators-
    a)simple Zener voltage regulator. b)Zener regulator with emitter follower output.
12. Power Amplifiers – class AB (complementary symmetry).
13. RC phase shift & Wien's bridge oscillator using transistor

Reference books

1. Bhargava et.al., *Basic Electronic Circuits and Linear Circuits,* Tata McGraw Hill
2. Boylestead & Nashelski, *Electronic Devices and Circuit Theory*, 9th Ed, Pearson/PHI
3. Nagarath J., *Electronics Analog & Digital*, Prentice Hall India
4. Millman & Halkias, *Integrated Electronics*, Tata McGraw Hill

Sessional work assessment

Lab practicals & record	= 30
Test	= 20
Total marks	= 50

University evaluation will be for 100 marks of which 70 marks are allotted for writing the procedure/formulae/sample calculation details, preparing the circuit diagram/algorithm/flow chart, conduct of experiment, tabulation, plotting of required graphs, results, inference etc., as per the requirement of the lab experiments, 20 marks for the viva-voce and 10 marks for the lab record.
Note: Duly certified lab record must be submitted at the time of examination

2K6 EE 401 : ENGINEERING MATHEMATICS III

3 hours lecture and 1 hour tutorial per week

Module I: (13 hours)

Complex analytic functions and conformal mapping: Complex functions – limits. derivative, analytic function- Cauchy-Riemann equations- elementary complex functions such as powers, exponential function, logarithmic, trigonometric and hyperbolic functions- Conformal mapping – Linear fractional transformations- mapping by elementary functions

Module II: (13 hours)

Complex integration: Line integral, Cauchy's integral theorem - Cauchy's integral formula – Taylor's series, Laurent series – residue theorem – evaluation of real integrals using integration around unit circle, around semicircle, integrating contours having poles on the real axis

Module III: (13 hours)

Jointly Distributed Random Variables: Joint distribution functions, independent random variables , covariance and variance of sums of random variables, joint probability distribution functions of random variables, conditional probability and conditional expectations. ***Curve fitting***: Method of least squares, correlation and regression, line of regression.

Module IV: (13 hours)

Vibrating strings: One dimensional wave equation – D' Alembert's solution – solution by method of separation of variables One dimensional heat equation - solution of the equation by the method of separation of variable Solutions of Laplace's equation over a rectangular region and a circular region by the method of separation of variable

Reference books

1. Kreyszig E. Advanced Engineering Mathematics. Wiley Eastern
2. Johnson, Miller and Freud. Probability and Statistics for Engineers, Pearson Education Asia.
3. Wylie .C.R. Advanced Engineering Mathematics, Mc Grawhill.
4. B.S. Grewal. Higher Engineering Mathematics, Khanna Publishers.
5. Freund. J.E. Mathematical Statistics, Prentice hall of India.

Sessional work assessment

Assignments	2x10 = 20
2 tests	2x15 = 30
Total marks	= 50

University examination pattern

Q I - 8 short 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 EE 402 : COMPUTER PROGRAMMING

3 hours lecture and 1 hour tutorial per week

Module I (15 hours)

Overview of C – Variables, Expressions and assignments, Lexical Elements, Fundamental Data Types, Operators *Control Statements* – if, switch-case, for , while, do, goto, break, switch *Functions*- Parameter passing , scope rules, recursion

Module II (12 hours)

Arrays – One dimensional and Multi Dimensional, *Pointer*-Linked List, Arrays of Pointers, Dynamic Memory Allocations, *Strings* – Operations and functions , *Bitwise Operators and Enumeration Types , Structures and Unions, Files and File Operations*

Module III (13 hours)

Overview of Java Language- Constants, Variables and Data Types, Operators and Expressions *Control Structures* – Decision Making, Branching and Looping, *Object Oriented Programming* – Concept of Classes, Objects and Methods, Benefits Java and OOP- Polymorphism and Overriding of methods, Inheritance

Module IV (12 hours)

Arrays and Strings, Interfaces, Multiple Inheritance, Packages – Putting Classes together – Managing Errors and Exceptions – Applet Programming and Graphics Programming (Basics only) – Managing Input/Output Files in Java

Text books

1. Kelley, Al & Pohl, Ira.,., *A Book on C- Programming in C*, 4th Ed,, Pearson Education (Modules I &II)
2. Balagurusamy E., Programming with Java: A Primer, 3rd Ed., Tata McGraw-Hill (Module III &IV)

Reference books

1. Balagurusamy E., Programming in ANSI C, Tata McGraw Hill
2. Eckel, Bruce., *Thinking in Java*, 2nd Ed, Pearson Education

Sessional work assessment

Assignments	2x10 = 20
2 tests	2x15 = 30
Total marks	= 50

University examination pattern

Q I - 8 short 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 EE 403 : MICROPROCESSORS & MICROCONTROLLERS

3 hours lecture and 1 hour tutorial per week

MODULE I(16 Hours)

Intel 8085 processors - architecture - pin configuration- memory addressing - addressing modes - instruction set - assembly language programming - interrupts - timing diagrams-data Transfer schemes, Programmed Data Transfer-DMA

Intel 8086 processors- architecture - addressing modes-instruction sets- minimum and maximum mode - multiprocessor configuration – Execution of Assembly Language Programs in PC.

MODULE II (10 Hours)

Interfacing - address decoding - interfacing chips - programmable peripheral interface (8255) - programmable communication interface (8251) - programmable timer (8253) - DMA controller (8257) - programmable interrupt controller (8259) - keyboard display interface (8279)

MODULE III (10 Hours)

Introduction to 80386 - memory management unit - descriptors, selectors, description tables and TSS - real and protected mode - memory paging - special features of the Pentium processor - branch prediction logic - superscalar architecture

MODULE IV(16 Hours)

8051 Micro controller- Architecture- Basic Assembly Language programming Concepts- Moving data- Logical Operations- Arithmetic Operations- Jump and Call Instructions- 8051 Micro controller Design- Applications-stepper motor control- Serial data Communication.

Introduction to 80196 microcontroller

Text Books

1. Gaonker R.S., Microprocessor Architecture, Programming and applications
2. Hall D.V., Microprocessors & Interfacing, McGraw Hill
3. Brey B.B., The Intel Microprocessors - Architecture, Programming & Interfacing, Prentice Hall
4. Liu Y.C. & Gibsen G.A., Microcomputer System: The 8086/8088 Family, Prentice Hall of India
5. Uffenbeck J.E., The 8086/8088 Family: Design, Programming & Interfacing, Prentice Hall India Ltd.
6. Ray A.K.& Bhurchandi K.W., Advanced Microprocessors and Peripherals, Tata McGraw Hill
7. Ayala K.J., The 8051 Micro controller, Architecture, Programming and Applications, Penram International Publishing (India).
8. A Nagoor Kani : Microprocessors & Micro Controllers
9. Adithya P Mathur : Introduction to Microprocessors., TMH

Reference Books

1. Intel Data Book Vol.1, Embedded Microcontrollers and Processors
2. Tribel W.A. & Singh A., The 8088 and 8086 Microprocessors, McGraw Hill
3. Mohammed R., Microprocessors & Microcomputer Based System Design, Universal Bookstall
4. Intel Data Book, EBK 6496 16-bit Embedded Controller Handbook
5. Intel Data Book, EBK 6485 Embedded Microcontrollers Data Book
6. B Ram : Introduction to Microprocessors., Dhanpath Rai

Sessional work assessment

Assignments	2x10 = 20
2 tests	2x15 = 30
Total marks	= 50

University examination pattern

Q I - 8 short 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 EE 404 : PULSE AND DIGITAL ELECTRONICS

3 hours lecture and 1 hour tutorial per week

Module I (12 hours)

Pulse circuits - forward recovery and reverse recovery of diodes - switching times of diode - switching behaviour of transistors - switch-on time components - resistive switching and clamped inductive switching of BJTs and switching times - storage time and Schottky BJTs - Bistable circuit - symmetrical and asymmetrical triggering of bistable - collector coupled monostable - collector coupled astable - transistor Schmitt trigger circuit - voltage Sweep errors - constant current sweep circuit - miller sweep using op-amps - current sweep generator.

Module II (14hours)

Regenerative comparator circuits using op-amps (741) - comparator IC LM311 and its applications - square, triangle and ramp generator circuits using op-amps and comparator ICs - effect of slew rate on waveform generation - principles of VCO circuits - precision half wave and full wave rectification using op-amps - log and anti-log amplifiers and applications - phase locked loops - principles - lock and capture ranges - capture process - loop filter - PLL dynamics under locked condition - study of NE564 and CD4046 - applications of PLL in signal reconstruction – 555 applications- Three terminal regulators.

Module III (14 hours)

Logic families - ideal logic gates - truth tables of basic gates - logic levels - noise margin - basic Boolean algebra - De Morgan's theorems - DTL gates - HTL gates - TTL gates - standard TTL - schottky TTL - ECL logic - MOS logic - NMOS logic gates - CMOS logic - tristate logic - comparison of logic families
Combinational circuits - number systems - signed and unsigned numbers - one's complement and two.s complement- Boolean functions - canonical and standard forms - simplification of Boolean functions by Karnaugh.s map up to five variable map - NAND, NOR, EX-OR & EX-NOR implementation - codes and code converters - multi level NAND circuits - multi level NOR circuits - adders - subtractors - BCD adder - magnitude comparator - BCD multiplier - decoders and encoders - multiplexers and demultiplexers - implementation of combinational logic by using multiplexers - ROM, PLA and PAL.

Module IV (12 hours)

Sequential circuits and memories - flip flops - RS, JK, T and D flip flops - triggering of flip flops - registers - shift registers - ripple counters - synchronous counters - ring counter - Johnson counter - memories - ROM, static and dynamic RAM - read/write memory, EPROM, EEPROM, memory decoding - analysis of clocked sequential circuits - state tables and state diagrams - state reduction and assignment - flip flop excitation tables - algorithmic state machine design procedure - design of modulo-m counters - introduction to ASM charts-High intensity LEDs-basics of organic LEDs.

Reference books:

1. Millman & Taub: Pulse, Digital and Switching Waveforms, TMH,1999
2. Jaeger R.C.: Microelectronic Circuit Design, McGraw Hill,1997
3. Morris Mano M.: Digital Design, Prentice Hall of India,2001
4. Taub & Schilling: Digital Integrated Electronics, McGraw Hill,1997
5. Morris & Miller: Designing with TTL Integrated Circuits, McGraw Hill,1971
6. Gayakwad R.A: OPAMPS & Linear Integrated Circuits, Prentice Hall of India,2002

Sessional work assessment

Assignments	2x10 = 20
2 tests	2x15 = 30
Total marks	= 50

University examination pattern

Q I - 8 short 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 EE 405 : ELECTRICAL MACHINES-I

3 hours lecture and 1 hour tutorial per week

Module I (12 hours)
DC machines Fundamentals:- Armature windings –lap winding and wave winding-single layer winding and double layer winding - Commutators- - MMF - torque developed in a winding - EMF developed in a winding -Armature reaction - demagnetising and cross magnetising ampere turns - commutation -

Module II(12hours)
DC generators: EMF Equation- Types of Excitation, Power flow diagram - circuit model - magnetization characteristics - process of voltage build up - terminal characteristics - control of terminal voltage - parallel operation – applications.

Module III (14hours)
DC Motors: Back EMF- Torque and speed equations - Power flow diagram - circuit model- performance characteristics - applications - starting methods - design of starters - methods of speed control – Solid State Speed Control (Block Diagram)-Testing - Swinburne's test - Hopkinson's test - separation of losses - retardation test - permanent magnet DC motor.

Module IV(14hours)
Transformers: - EMF Equation - Magnetising current - harmonics - ideal and real transformer - dot convention - current and voltage ratio - equivalent circuit - phasor diagram - per unit impedance - OC and SC tests - losses - efficiency and regulation - all day efficiency - Sumpner's test - Parallel operation - tap changing - switching transients - auto transformers - voltage and current relationships - saving of copper - different connections of three phase transformers - notations - Scott connection - Transformer with tertiary winding- cooling methods.

Reference books:

1. Clayton & Hancock: Performance & Design Of DC Machines, ELBS
2. Langsdorf A.S.: Theory of DC Machinery, McGraw Hill
3. Nagarath I.J. & Kothari D.P.: Electric Machines, Tata McGraw Hill
4. Say M. G.: Performance & Design of AC Machines, Pitman, ELBS.
5. Chapman S.J.: Electric Machine Fundamentals, McGraw Hill.
6. Toro V.D.: Electrical Machines & Power Systems, Prentice Hall.
7. J B Gupta: Electrical Machines
8. Ashfaq Hussain: Electrical Machines. Dhanpath Rai

Sessional work assessment

Assignments	2x10 = 20
2 tests	2x15 = 30
Total marks	= 50

University examination pattern
Q I - 8 short 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 EE 406 : ELECTRICAL ENGINEERING MATERIALS

3 hours lecture and 1 hour tutorial per week

Module I (13 hours)

Conducting Materials: Fermi – Diarc distribution – Variation of conductivity with temperature and composition – contact potential – Materials for electric – electric resistances, brushes of electrical machines, lamp filaments, fuses and solder.

Semiconductor: Compound semiconductors – Basic ideas of amorphous and organic semiconductors

Magnetic Materials: Classification of magnetic materials – Origin of permanent magnetic dipoles – Ferromagnetism – Ferromagnetic domains (qualitative application only) – Curie-Weiss law – Hard and soft magnetic materials and applications – Ferrites – Magnetic materials used in electrical machines, instruments and relays

Module II (13 hours)

Dielectrics: Dielectric polarization in monatomic gases – Expression of electronic, ionic and dipolar polarizations in polyatomic gases – Derivation for expression for polarization in solids and liquids – Clausius – Mosotti relation – Behavior of dielectric in alternating fields – Complex dielectric constant – Dipolar relaxation – Dielectric Loss – Ferro electricity – Domain theory and explanation of hysteresis curve - (qualitative application only)

Module III (13 hours)

Dielectric Breakdown: Mechanism of breakdown in gases, liquids and solids – Factors influencing dielectric strength – capacitor materials- Basics of transformer oil testing

Insulating Materials: Good insulator properties and classification on temperature basis – Properties of insulators in static Electric Field-Common insulating Material used in electrical apparatus - Inorganic materials (Mica, Glass, Porcelain, Asbestos) – Organic materials (Paper, rubber, cotton, silk, fiber, wood, plastics, bakelite) – Resins and varnishes – liquid insulators (Transformer oil) –Gaseous insulators (air, SF_6) – Ageing of insulators

Module IV (13 hours)

Solar Energy Materials: Photo thermal conversion – Use of coatings for enhanced solar thermal energy collection – Solar selective coatings – Thin Film technology – Cold mirror coatings – Heat mirror coatings – Antireflection coatings – Photovoltaic conversion – Solar cells – Silicon, Cadmium sulphide and Gallium arsenic – Organic solar cells.

Modern Techniques for Materials Studies: Optical microscopy – Electron microscopy – Photo electron spectroscopy – Atomic absorption spectroscopy – Magnetic resonance – Nuclear magnetic resonance – Electron spin resonance – Ferromagnetic resonance – Mossbauer spectroscopy

Text Books

1. Dekker A.J Electrical Engineering Materials, Prentice Hall of India
2. Agnihotri O. P and Gupta B. K, Solar selective Surface, John wily
3. Tareev, Electrical Engineerin Materials, Mir Publications
4. Seth. S.P and Gupta P. V, A Course in Electrical Engineering Materials, Ganpathrai
5. G K Mithal : Electrical Engg Material Science. Khanna Publishers.

Reference Books:

1. Indulkar O.S & Thiruvegadam S., An Introduction to electrical Engineering Materials, S. Chand
2. Yu Koritsky, Electrical Engineering Materials, Peace Publications
3. Arumugam M., Material Science, Anuradha Agencies
4. Meinal A.B and Meinal M. P., Applied Solar Energy – An Introduction, Addisos Wesley
5. Kapoor P.L., Electrical Engineering Materials, Khanna Publications
6. Hutchison T.S. and Baird D.C., The physics of Engineering Solids, John Wiley
7. Srivasthava C.M and Srinivasan C., Science of Engineering Materials, Wiley Eastern

Sessional work assessment

Assignments	2x10 = 20
2 tests	2x15 = 30
Total marks	= 50

University examination pattern

Q I - 8 short 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

2K 6EE 407(P) : DIGITAL ELECTRONICS LAB

3 hours practicals per week

List of experiments:

1) Familiarization of Logic Gates
2) Realisation of basic gates using Universal Gates
3) Half adder & Half Subtractor Circuits.
4) Full adder & Full Subtractor Circuits.
5) Code Converters using basic gates.
6) Realisation of Flip-flops using gates
7) Counters a) Ripple counter
   b) Johnson Counter
8) Shift Registers.
9) Sequence Generator
10) Multivibrator using AND gates
11) Combinational Logic Design using Decoders and MUX
12) 4 bit adder subtracter IC & BCD adder Circuits.
13) Interfacing & addressing Memory Chips.
14) ADC Circuits & ICs
15) DAC Circuits & ICs
16) EEPROM Programming experiments

Sessional work assessment

Lab Practicals and Record	= 30
Test	= 20
Total marks	= 50

Reference books

1. Jain R.P., Modern Digital Electronics, Tata McGraw Hill
2. Mano M.M., *Digital Design*, Prentice Hall of India
3. Taub B. & Schilling D., *Digital Integrated Electronics*, McGraw Hill

University evaluation will be for 100 marks of which 70 marks are allotted for writing the procedure/formulae/sample calculation details, preparing the circuit diagram/algorithm/flow chart, conduct of experiment, tabulation, plotting of required graphs, results, inference etc., as per the requirement of the lab experiments, 20 marks for the viva-voce and 10 marks for the lab record.
Note: Duly certified lab record must be submitted at the time of examination

2K6 EE 408(P) : ELECTRICAL MEASUREMENTS LAB

3 hours practical per week

1. Potential divider connection of a rheostat and study of the dependence of output voltage upon the value of load resistance
2. Verification of superposition Theorem in dc circuits.
3. Verification of Thevenin's Theorem in dc circuits.
4. Determination of impedance, admittance, power factor and real/reactive/ apparent power drawn in RLC series/parallel circuits.
5. Single-phase power measurement using a dynamometer type wattmeter.
6. Single-phase power measurement by three ammeters and three-voltmeter method.
7. 3-phase power measurement using one wattmeter and two-wattmeter method.
8. Determination of B-H curve, μ-H curve and μ-B curve of an iron ring specimen.
9. Measurement of resistance using Wheastone's bridge and Kelvin's double bridge and extension of range of voltmeters and ammeters.
10. Measurement of self/ mutual inductance and coupling co-efficient of iron cored coil and air-cored coil.
11. Calibration of meters and measurement of unknown resistance using slide- wire potentiometer.
12. Calibration of single phase energy meter by direct and phantom loading at various power factors.
13. Calibration of 3-phase energy meter using standard wattmeter.
14. Measurement of capacitance using Schering Bridge.
15. Insulation Resistance measurement using digital insulation tester and interfacing with PC
16. Experiment using Digital Earth Resistance Tester

Sessional work assessment	
Laboratory practicals and record	= 30
Test	= 20
Total marks	= 50

University evaluation will be for 100 marks of which 70 marks are allotted for writing the procedure/formulae/sample calculation details, preparing the circuit diagram/algorithm/flow chart, conduct of experiment, tabulation, plotting of required graphs, results, inference etc., as per the requirement of the lab experiments, 20 marks for the viva-voce and 10 marks for the lab record.
Note: Duly certified lab record must be submitted at the time of examination

This article focuses on the development of software engineering standards in the Institute of Electrial and Electronics Engineers (IEEE). (Portions of this article are reprinted, with permission, from Software Engineering Standards: A User's Road Map, by James W. Moore, IEEE Computer Society Press, copyright 1997 IEEE). It briefly describes the overall IEEE, its Computer Society, and its Standards Association.Â Because the model is behavioral we can extrapolate the model to assess the effect of changes in protocols, the network or user behavior. The increasing complexity of Web traffic has required that we base our model on the notion of a Web-request, rather a Web page. A Web-request results in the retrieval of information that might consist of one or more Web pages.