Rajiv Gandhi University of Knowledge Technologies

Basar, Nirmal – 504107

B. TECH. ELECTRONICS AND COMMUNICATION ENGINEERING

II YEAR II SEMISTER

Code	Subject	L-T	P	C
EC2201	Analog electronic Circuits	4	-	4
EC2202	Digital Electronics Circuits	4	-	4
EE2202	Linear Control System Engineering	4	-	4
MA2203	Probability Theory and stochastic	4	-	4
CS2201	Computer Organization and Architecture	4	-	4
BM2201	Personality Development-I	2	-	1
EC2801	Analog electronic Circuits Lab	-	3	2
EC2802	Digital Electronics Circuits Lab	-	3	2
CS2801	Computer Organization and Architecture	-	3	2
EC2902	Seminar-II	1	-	1
	Total	**23**	**9**	**28**

EC2201 Analog Electronics Circuits

Externals: 60Marks **(L-T)-P-C**

Internals: 40Marks **4-0-4**

Course Objectives:

1. The concepts of high frequency equivalent transistor circuits like BJT, FET, and frequency response of single stage and multi stage amplifiers.
2. The fundamental concepts of positive and negative feedback and their applications.
3. The concepts of large signal amplifiers and radio frequency amplifiers.

UNIT-I:Transistor Models:

Equivalent circuits using transconductance parameter for low and high frequency operation of BJTs and FETs, Ebers-Moll model view.

UNIT-II:**Multistage Amplifiers:**

Design and analysis of single and multistage amplifiers, wideband and narrowband amplifiers differential amplifiers ; current mirror- different configurations, Current source and Current sink.

UNIT-III:Feedback:

Feedback amplifiers, Y feedback, h and g negative feedback, oscillators and waveform generators, timers.

UNIT-IV:Operational Amplifiers:

Op-amp design: different stages of op-amp-a case study, active filter design, switched capacitor circuits , ADC , DAC.

UNIT-V: Power amplifiers:

Class AB/class B push-pull/class C

TEXT BOOKS:

1. Integrated Electronics – Jacob Millman, Christos C Halkias, Mc Grawhill.
2. Electronic Devices and Circuit Theory – Robert L.Boylestad, Louis Nashelsky, 9th edition, 2008 PE
3. Electronic Devices and Circuits- David A. Bell- 5th Edition, Oxford University Press.
4. Design of Analog CMOS Integrated Circuits – Behzad Razavi, 2008

REFERENCE BOOKS:

1. Electronic Circuits Analysis and Design – Donald A Neamen, Third Edition, Tata McGraw-Hill, 2007.
2. Introductory Electronic Devices and Circuits- Robert T. Paynter, 7th edition, 2009, PEI.
3. Microelectric circuits- sedra/ Smith- 5th edition, 2009, Oxford University Press.
4. Electronic Circuit Analysis- K.Lal Kishore, 2004, BSP.
5. Electronic Devices and Circuits – S.Salivahanan, N.Suresh Kumar, A. Vallavaraj, 2nd edition, 2009

EC2202 Digital Electronic Circuits

Externals: 60Marks **(L-T)-P-C**

Internals: 40Marks **4-0-4**

Course Objectives:

1. To understand the concepts of various combinational and sequential circuits.
2. To learn various techniques for logic circuit reduction.

UNIT-I: **INTRODUCTION**

Digital & analog signals, Number System, BCD & its arithmetic, Binary, Decimal, Hexadecimal, Negative numbers& its arithmetic, Number base conversions, Octal

UNIT-II**: BOOLEAN ALGEBRA&SIMPLIFICATION TECHNIQUES**

Duality Principals & Canonical Form, K-Maps

UNIT-I**II: LOGIC GATES**

All Logic Gates & Implementations

UNIT-IV: **COMBINATIONAL LOGICS**

Adders, Array Multiplier Code Converters, Comparators, Decoders (DeMultiplexers), Encoders, Multiplexers, Parity Generators Checkers,Subtractors

UNIT-V:**SEQUENTIAL LOGIC CIRCUITS**

Asynchronous Circuits, Synchronous Circuits, Flip-Flops, Master SlaveOperation Flip-Flop, Counters, State Machine, Pattern Identifier

TEXTBOOKS:

1. Switching & Finite Automata theory – Zvi Kohavi, TMH,2nd Edition.

2. Digital Design – Morris Mano, PHI, 3rd Edition, 2006.

3. Switching Theory and Logic Design-A.Anand kumar, 2008.

REFERENCES:

1. An Engineering Approach to Digital Design – Fletcher, PHI.

2. Fundamentals of Logic Design – Charles H. Roth, 5th Edition, 2004, Thomson Publications.

3. Digital Logic Applications and Design – John M. Yarbrough, 2006.

EE2202 Linear Control System Engineering

Externals: 60Marks **(L-T)-P-C**

Internals: 40Marks **4-0-4**

Course Objectives:

1. To acquire the basic concepts of automatic control systems
2. To learn the basics of control systems representations/modeling
3. To learn stability analysis in time and frequency domains.

UNIT – I: INTRODUCTION

Concepts of Control Systems- Open Loop and closed loop control systems and their differences- Examples of control systems- Classification of control systems, Feed-Back Characteristics, Effects ofFeedback, Mathematical modeling of physical systems: Differential equation and Transfer functions , Examples of modeling different types (e.g. electrical, mechanical, chemical, biological, social etc.) of systems, Equivalence between the elements of different types of systems. Block diagram algebra –Signal flow graph -Reduction using Mason‘s gain formula.

UNIT -II : CHARACTERIZATION OF SYSTEMS

Time Domain Analysis: Standard test signals - Time response of first order systems – Characteristic Equation of Feedback control systems, Transient response of second order systems - Time domain specifications, Steady state response - Steady state errors and error constants, Frequency domain response -- Transfer function and its interpretation in terms of frequency responses peak and peaking frequency, bandwidth and cut-off rate; Link between time and frequency domain response features. Advantages of closed loop operation: Sensitivity and complementary sensitivity, Disturbance and noise reduction. Effects of proportional, integral, derivative Controls.

UNIT – III: STABILITY ANALYSIS IN S-DOMAIN

The concept of stability – Routh‘s stability criterion – qualitative stability and conditional stability – limitations of Routh‘s stability. The root locus concept - construction of root loci- and relative stability using root-locus approach ,effects of adding poles and zeros to G(s)H(s) on the root loci.

UNIT – IV: STABILITY ANALYSIS IN FREQUENCY DOMAIN

Polar Plots-Nyquist Plots-Stability Analysis. Bode diagrams- Determination of Frequency domain specifications and transfer function from the Bode Diagram-Phase margin and Gain margin-Stability Analysis from Bode Plots. P, PD, PI, PID Controllers and Compensation techniques – Lag, Lead, Lead-Lag Controllers design in frequency Domain,

UNIT – V: STATE SPACE ANALYSIS OF LINEAR CONTINUOUS SYSTEMS

Concepts of state, state variables and state model, derivation of state models from block diagrams, Diagonalization- Solving the Time invariant state Equations- State Transition Matrix and it‘s Properties.

TEXTBOOKS:

1. Automatic Control Systems– by B. C. Kuo and Farid Golnaraghi – John wiley and son‘s, 8th edition, 2003.
2. Control Systems Engineering – by I. J. Nagrath and M. Gopal, New Age International (P) Limited,Publishers, 5th edition, 2007.

REFERENCE BOOKS:

1. Modern Control Engineering – by Katsuhiko Ogata – Prentice Hall of India Pvt. Ltd., 5th edition, 2010.
2. Control Systems Engineering - by NISE 5th Edition – John wiley.

MA2203 Probability Theory and Stochastic Processes

Externals: 60Marks **(L-T)-P-C**

Internals: 40Marks **4-0-4**

Chapter 1.Introduction

Algebra of Sets and Counting Methods, Basic Concepts in Probability, Definitions of probability, Theorems in probability, Baye's Theorem and Its Applications

Chapter 2PROBABILITY DISTRIBUTIONS

Random Variable, Bivariate random variable, Mathematical Expectation, Discrete Probability Distributions, Continuous Probability Distributions, Functions of Random Variables, Correlation coefficient and Bivariate Normal Distribution

CHAPTER 3Probability Inequalities and Generating Functions

Probability Inequalities, Moment Generating Function, Characteristic Function, Cumulate Generating Function, Probability Generating Function

CHAPTER 4Order Statistics and Limit Theorems

Order Statistics, Convergence of Sequence of Random Variables, Weak Law of Large Numbers, Strong Law of Large Numbers, Central Limit Theorem

CHAPTER 5STOCHASTIC PROCESSES

Stationarity of Stochastic Processes, Autocorrelation, Cross Autocorrelation function and Ergodicity, Power Spectral Density Function, Linear Systems with Random Inputs, Random walk and Telegraph signal processes, Poisson ProcessGaussian Process, Processes Depending on Stationary Gaussian ProcessMarkov Chains

TEXT BOOKS:

1. Probability, Random Variables & Random Signal Principles - Peyton Z. Peebles, TMH, 4thEdition, 2001.
2. Probability, Random Variables and Stochastic Processes –Athanasios Papoulis and S. Unnikrishna Pillai, Tata McGraw-Hill,4thedition, 2002.
3. Principles of Communication Systems-H.Taub. Donlad.L. Schilling, Goutam saha, 3ed. 2007, TMH.
4. Theory of Probability and Stochastic Processes-Pradip Kumar Ghosh, University Press.

REFERENCES:

1. Probability Theory and Stochastic Processes-Mallikarjuna Reddy, cengage Learning.
2. Probability and Random Processes with Application to Signal Processing – Henry Stark and John W. Woods, Pearson Education, 3rd Edition.
3. Probability Methods of Signal and System Analysis. George R. Cooper, Clave D. MC Gillem, 3rd Edition, 1999, Oxford.
4. Statistical Theory of Communication - S.P. Eugene Xavier, New Age Publications, 2003

CS2201 Computer Organization & Architecture

Externals: 60Marks **(L-T)-P-C**

Internals: 40Marks **4-0-4**

Unit I:

Basic functional blocks of a computer, Basic Functional blocks - CPU, Memory, Input-output, Control unit, Instructions and Instruction execution cycle, Instruction set architecture-Elements of machine instructions, Instruction representation, Instruction types, classification based on number of addresses, Data types, Types of operations-Data transfer, Arithmetic, Logical, Conversion, Input-output, system, Control and transfer of control operations, Addressing modes, Case study of 8086 instruction set.

Unit II :

Data representation and Arithmetic Data Representation: signed number representation, fixed and floating point representations, character representation. Converting between different b it lengths, Integer arithmetic: Negation, integer addition and subtraction, ripple carry adder, carry look-ahead adder, etc. multiplication shift-and-add, and Booth multiplier Division nonrestoring and restoring techniques, floating point : floating point representation and floating point arithmetic: Addition, Subtraction, Division, Multiplication

Unit III :

CPU control unit design Micro operations : fetch, indirect, interrupt, execute, Instruction cycle, Control Signals: inputs and outputs, Hard Wired Control Unit, Micro instructions: horizontal and vertical instruction formats, Micro program, Micro programmed control unit, Advantages and Disadvantages of hardwired and Micro programmed control unit Pipelining: Basic concepts of pipelining, throughput and speedup, pipeline hazards

Unit IV :

Input-output organization External devices, Input -output Interface: I/O Bus and interface Modules, I/O Versus memory Bus, I/O Modules structure and their functions, Modes of Transfer: Programmed I/O, Interrupt driven I/O, Direct Memory Access: DMA Controller and Transfer, DMA Configurations, Privileged and Non-privileged instructions, Software Interrupts and exceptions, Processor modes: User mode and kernel mode.

Unit V :

Semi-conductor main memory & Memory organization Memory Hierarchy, Main Memory: Semiconductor main memory, Organization of memory cell, RAM: DRAM, SRAM and ROM Chips, Memory Connection to CPU. Auxiliary memory: Disks, Read and write mechanisms, Data organization and formatting, Physical Characteristics, Disk performance parameters, Overview of optical discs, Memory Organization: Memory Interleaving, Cache memory, Cache memory principles, Mapping functions: Direct mapping, Associative mapping function,Set-Associative mapping function, Replacement Algorithms, Write policy.

Suggested Reading:

1. William Stallings, Computer Organization & Architecture, 6thdition, Pearson Education Asia
2. M.Morris Mano, Computer System Architecture,3rd edition, Pearson Education Asia
3. V.Carl Hamacher, Z.G.Vranesic, S.G.Zaky, Computer organization, McGraw Hill.

BM2201 PERSONALITY DEVELOPMENT 1

Guidelines: Learning approach is based on Real time case studies with class room activities

Course Objectives:

1. To develop interpersonal skills and be an effective goal oriented team player.
2. To develop professionals with idealistic, practical and moral values.
3. To develop communication and problem solving skills.
4. To re-engineer attitude and understand its influence on behavior.
5. To enhance holistic development of students and improve their employability skills.

UNIT I-SELF ANALYSIS (6 hours)

SWOT Analysis, Who am I, Personality Traits, Importance of Self Confidence, Self Esteem.

UNIT II-GOALS SETTINGS (6 hours)

Short term , Long term goal settings, SMART concept
Diversifying Risk and Optimizing Opportunities

UNIT III- TEAM DYNAMICS WITH INTERPERSONAL SKILLS (8 hours)

Team Dynamics, Team Work, Interpersonal Skills

Behavioral Skills GD, PI, Body Language Public Speaking, Verbal, Non Verbal Communications

UNIT II-CREATIVITY and Rationality (8 hours)

Out of Box thinking, Idea Generation with creativity

Brain Storming, Effective group meetings, Rationalization of ideas and way to effective implementation

.Class room and team activities coupled with group tasks depending upon time availability

EC2801 Analog Electronic Circuits Lab

Externals: 60Marks **(L-T)-P-**

CInternals: 40Marks **0-3-2**

LIST OF EXPERIMENTS:

1. D.C. characterization and finding ac model parameters of a BJT.
2. D.C. characterization and finding ac model parameters of a MOSFET.
3. Design of feedback amplifiers with BJT.
4. Design of amplifiers with MOSFET.
5. Design and characterization of simple current mirror circuits using BJT and MOSFET.
6. Design and characterization of cascode current mirror circuits using BJT and MOSFET.
7. Design of Common collector amplifier
8. Design of differential amplifier using BJT with resistive load.
9. Design of differential amplifier using MOSFET with active load.
10. Design of R-C and L-C oscillators (phase shift/Colpitt/Hartley).
11. Design of a tuned amplifier.
12. Design of a second order active filter (low pass/high pass/band pass)
13. Design of a timer.

EC2802 Digital Electronic Circuits Lab

Externals: 60Marks **(L-T)-P-C**

Internals: 40Marks **0-3-2**

LIST OF EXPERIMENTS:

1. Functioning of monoshot, shift register, master slave flip flop, ALU
2. Design of a counter asynchronous and synchronous
3. I/O characteristics of a NAND gate
4. Design of a digital comparator
5. Design of a full adder circuit
6. Design of a multiplexer
7. Design of a 7-segment LED display
8. Design of an ALU.

CS2801 Computer Organization & Architecture Lab

Externals: 60Marks **(L-T)-P-C**

Internals: 40Marks **0-3-2**

EC2902 Seminar - II

Externals: 60Marks **(L-T)-P-C**

Internals: 40Marks **1-0-1**