EE301 POWER SYSTEM ANALYSIS

L	T	P	C
3	1	0	4

Course Objectives: To model various power system components and carry out load flow, short circuit and stability studies

Prerequisites: Linear Algebra , Partial Differential Equations, Knowledge in circuit theory, Transmission and Distribution

Modeling of power system components - single line diagram –per unit quantities – bus impedance and admittance matrix

Power flow analysis methods - Gauss- Seidel, Newton-Raphson and Fast decoupled methods of load flow analysis

Fault studies - Symmetrical fault analysis, Analysis through impedance matrix, Current limiting reactors

Fault analysis - Unsymmetrical short circuit analysis- LG, LL, LLG; Fault parameter calculations – Open circuit faults

Stability studies - Steady state and transient stability – Swing equation - Equal area criterion – multi-machine stability analysis

Text Books:

1. *John .J.Grainger & Stevenson.W.D., ' Power System Analysis', McGraw Hill, 1st Edition 2003.*
2. *D P Kothari, I J Nagrath 'Modern Power System Analysis', 3rd Edition, 2011.*
3. *Hadi Saadat, 'Power System Analysis ', Tata McGraw - Hill Education, 2nd Edition, 2002.*

Reference Books:

1. *J. Duncan Glover, M.S.Sarma & Thomas J. overbye, 'Power system analysis and design', 5th Edition, 2011.*
2. *J.C.Das, 'Power System Analysis', Short-Circuit Load Flow and Harmonics', 1st Edition, 2002.*
3. *Arthur R. Bergen, 'Power System Analysis', Peterson Education India, 2nd Edition, 2009.*

COURSE OUTCOMES:

Upon completion of this course , students will be able to

1. Carry out load flow study of a practical system
2. Simulate and analyze fault
3. Study the stability of power systems

EE303 CONTROL SYSTEMS

L	T	P	C
3	0	0	3

Course Objectives: To equip the students with the fundamental concepts in control systems

Prerequisites: Laplace Transform , Complex Analysis

Test signals - Response of second order systems – time domain specifications - generalised error series - Frequency domain specifications - polar plots - Bode plots.

Stability Analysis - Routh-Hurwitz criterion - Nyquist criterion - Stability of systems with transportation lag - gain margin and phase margin.

Root Locus Technique – Definitions - Root locus diagram - Rules of constructions of root loci - Effect of pole zero additions on the root loci - root contours.

Gain adjustments for the desired M_p – constant M and N loci - Nichols Chart - Compensator design by Bode and Root locus techniques - PID controller design.

Control system components - error detectors - potentiometers and synchros - a.c and d.c servomotors - stepper motors -tacho generators – Proportional, integral and derivative controllers.

Text Books:

1. *Katsuhiko Ogata, 'Modern Control Engineering', Pearson Education Publishers, 5th Edition, 2010.*
2. *Nagrath I.J. and Gopal M, 'Control Systems Engineering', New Age International Publications, 5th Edition, 2010.*

Reference Books:

1. *Richard C. Dorf and Robert H. Bishop. 'Modern control systems', Pearson Prentice Hall Publications, 12th Edition, 2010.*
2. *Gene F. Franklin, J. David Powell and Abbas Emami-Naeini, 'Feedback control of Dynamic Systems', Pearson Education India Publications, 6th Edition, 2008.*
3. *Benjamin C.Kuo and Farid Golnaraghi, 'Automatic Control Systems', John Wiley & Sons Publications, 8th Edition, 2002.*

COURSE OUTCOMES:

Upon completion of the course, the students will be able to

1. Understand the concepts of closed loop control systems.
2. Analyse the stability of closed loop systems.
3. Apply the control techniques to any electrical systems.
4. Design the classical controllers such as P, PI etc for electrical systems.

EE305 LINEAR INTEGRATED CIRCUITS

L	T	P	C
3	0	0	3

Course Objectives: To provide in-depth instructions on the characteristics and applications of operational amplifiers, timers and voltage regulators

Prerequisites: Basics of analog and digital Electronic

Block diagram of a typical op-amp - characteristics of ideal and practical op amp - parameters of op-amp – inverting and non-inverting amplifier configurations - frequency response - circuit stability

DC and AC amplifiers - summing amplifier - difference amplifier - voltage follower- differentiator - integrator - clamper - clipper – filters

Oscillators, sine wave, square wave, triangular wave, saw tooth wave generation, Schmitt trigger, window detector

Analog to digital, digital to analog, sample and hold circuits. voltage controlled oscillator, phase locked loop – operating principles , applications of PLL

IC555 Timer, monostable and astable modes of operation ; voltage regulators - fixed voltage regulators, adjustable voltage regulators - switching regulators

Text Books:

1. *Gayakwad R.A., 'Op-amps & Linear Integrated Circuits', Prentice Hall of India, New Delhi, 4th edition, 2009.*
2. *Roy Choudhury and Shail Jain, 'Linear Integrated Circuits', 4th Edition, New Age International Publishers, 2010.*

Reference Books:

1. *Sergio Franco,' Design with operational amplifiers and Analog Integrated circuits', Tata McGraw Hill, 3rd Edition, 2002.*
2. *Sedra Smith, 'Microelectronic Circuits', Oxford University Press, 6th Edition, 2009.*

COURSE OUTCOMES:

Upon completion of this course , students will be able to

1. Describe the various ideal and practical characteristics of an OPAMP
2. Develop simple OPAMP based circuits
3. Implement various signal generating circuits.
4. Analyze and design various types of ADCs and DACs
5. Analyze and construct various application circuits using 555 timer

EE307 DATA STRUCTURES AND ALGORITHMS

L	T	P	C
3	0	0	3

Course Objectives: To obtain knowledge on data structures and their usage in an algorithmic perspective.

Prerequisites: Basic knowledge on computers

Algorithms – Algorithmic Notation, Statements and Control Structures, Operations and Expressions, Functions, Procedures, Time and Space requirement Analysis. Information- nature, storage and transmission of information, Primitive Data structures.

Linear Data structures and their sequential storage representation – arrays, structures and array of structures, stacks, queues; their storage representation and applications. Strings – storage representation and string manipulation applications.

Linear Data structures and their linked storage representation – pointers, linked allocation- single, double and circular linked list and their applications.

Nonlinear data structures – Trees, storage representation and operation on binary trees, application of trees; Graphs- representations and applications of graphs.

Sorting and searching – Selection Sort – Bubble Sort – Merge Sort – Tree Sort – Partition-Exchange Sort. Searching – Sequential Searching – Binary Searching- Search trees, Hash-Table methods - File Structures - External Storage Devices, Record Organization, File types and their structure.

Text Books:

1. *Debasis Smanata, 'Classic Data Structures', 2nd edition, PHI learning, 2009.*
2. *Adam Drozdek-Duquesne, 'Data Structures and Algorithms in C++', Thomson Press, 2nd edition India Ltd., 2006*
3. *Mark Allen Weiss, 'Data Structures and Algorithm Analysis in C++', Pearson, 4th edition, 2013.*

Reference Books:

1. *Michael T. Goodrich, Roberto Tamassia, David M. Mount, 'Data Structures and Algorithms in C++', 2nd edition, Wiley, 2011.*
2. *John R.Hubbard, 'Schaum's outline of theory and problem of data structure with C++', McGraw-Hill, New Delhi, 2000.*
3. *Jean Paul Tremblay and Paul.G.Sorenson, 'An Introduction to Data Structures with Applications', Tata McGraw Hill, 2nd Edition, 2008.*

COURSE OUTCOMES:

Upon completion of this course , students will have

1. Knowledge on algorithmic notations and concepts
2. Clear understanding of the primitive data structures and their applications
3. Familiarity of linked linear and non-linear data structures and operations on such data structures
4. The awareness of various sorting, searching algorithms and file structures
5. The ability to design and develop menu driven application programs.

EC319 COMMUNICATION SYSTEMS

L	T	P	C
3	0	0	3

Course Objectives:

- To develop a fundamental understanding on communication systems with emphasis on analog and digital modulation techniques
- To get introduced the basics of error control coding techniques

Prerequisites: Signals and Systems, Digital Electronics

Analog Modulation - Principles of Amplitude Modulation, single and double side band - suppressed carrier system and frequency modulation - varactor diode and reactance modulator - AM detectors - FM discriminators - AM and FM transmitters and receivers

Digital communication - Sampling theorem - pulse modulation techniques - PAM, PWM and PPM concepts - PCM encoder and decoder - Data transmission using analog carriers (FSK, PSK, QPSK, MSK &QAM)

Synchronous & Asynchronous transmission - error control techniques – protocols - data communication, link oriented, asynchronous

Modern Communication Systems – Microwaves - optical communication system - Satellite communication system - Mobile communication system

Principles of television engineering - Requirements and standards - need for scanning - types of camera tubes and picture tubes - B/W and colour systems - PAL - CCTV - Cable TV

Text Books:

1. *Simon Haykins, 'Communication Systems', John Wiley, 3rd Edition, 1995.*
2. *D.Roddy & J.Coolen, 'Electronic Communications', Prentice Hall of India, 4th Edition, 1999.*
3. *Kennedy G, 'Electronic Communication System', McGraw Hill, 1987.*

Reference Books:

1. *Gulati R R, 'Modern Television Engineering', New Age International Pvt. Ltd, 2nd Edition, 2002.*
2. *Shulin Daniel, 'Error Control Coding', Pearson, 2nd Edition, 2011.*

COURSE OUTCOMES:

Upon completion of the course

1. Students are able to apply the basic knowledge of signals and systems and understand the basics of communication system and analog modulation techniques.
2. Students are able to apply the knowledge of digital electronics and understand the error control coding techniques.
3. Students are able to summarize different types of communication systems and its requirements.
4. Students are able to design and analyse the performance of communication systems.

EE309 INTEGRATED CIRCUITS LABORATORY

L	T	P	C
0	0	3	2

Course Objectives: To enrich the students' knowledge on practical circuit design using analog and digital ICs.

Prerequisites: Basics of Electronic Devices and Circuits

List of Experiments

1. Understanding of OPAMP Imperfections
2. Application of OPAMP in closed loop
3. Application of OPAMP in open loop
4. Design of Analog filters using OPAMP
5. Output verification of Analog to Digital Converter
6. Output verification of Digital to Analog converter
7. Design of Multivibrators using 555 Timer
8. Design of combinational logic circuits
9. Design of sequential logic circuits
10. Design of Code converter with seven segment display

Mini project

COURSE OUTCOMES:

Upon completion of the course, the students will be able to

1. Understand the non-ideal behavior of Op-amp.
2. Analyze and prepare the technical report on the experiments carried out.
3. Design application oriented circuits using Op-amp and 555 timer ICs.
4. Create and demonstrate live project using ICs.

EE311 DATA STRUCTURES LABORATORY

L	T	P	C
0	0	3	2

Course Objectives: To have a better understanding of the different types of data and data structures; storage structures, representations and operations on these data structures.

Prerequisites: Programming in C/C++/any language

List of Experiments

1. Functions and parameter passing
2. Arrays, Structures and string operations
3. Stack and queue operations
4. Single linked lists: linear and circular
5. Double linked lists: linear, circular and restricted deques
6. Linked list Applications
7. Trees and tree traversals
8. Applications of trees
9. Sorting Searching techniques
10. Mini Project: Developing menu driven program for specific applications

COURSE OUTCOMES:

Upon completion of the course, the students will

1. Have a clear understanding of the various data structures, their storage structures and operations on these data structures
2. Be able to identify the suitable data structure for implementation based on given input data and the required output.
3. Be able to design algorithms to perform operations like insertion, deletion, search and sort on various data structures
4. Be able to develop programs for a specific application