Sl No	Course Code	Course Title	Credits	Cat
1	EEL 309	Power Electronics	6	DC
2	CSL 311	Computer Architecture & Organization	6	DC
3	ECL 301	Analog Communication	6	DC
4	ECL 302	Device Modeling	6	DC
5	EEL 310	Control Systems	6	DC
6	EEP 309	Power Electronics Lab	2	DC
7	ECP 301	Analog Communication Lab	2	DC
8	ECP 302	Device Modeling Lab.	2	DC
9	EEP 310	Control Systems Lab.	2	DC

EEL309 POWER ELECTRONICS (3-1-0-8)

Contents

Semiconductor devices used in power electronics: SCR, ASCR, RCT , LASCR, TRIAC, IGBT, Power MOSFET,
GTO, Triggering devices: UJT, PUT,construction characteristics, ratings, Applications.ce treatment should deal
with, Application.Thermal equivalent circuit, Heat sink calculation, protection requirements and methods.
Thyristor as power controller, phase angle control, Extinction angle control, Symmetrical angle control, time ratio
control, pulse width modulation, Burst-Integral cycle, Turn on methods: Circuits for single phase line communicated
converter, single phase converter , single phase inverter, Digital methods,. Turn off (commutation) Methods: type A,
B, C, D, E and F.
Uncontrolled Rectifiers: single phase: (M-2), (B-2),(M-3), B-6; Single phase/three phase half control(one quadrant
operation); Single phase full wave converter, Three phase converter, three pulse, six pulse, (Bridge & midpoint
type), Semi converter, Dual converter operation, Single phase bridge, therr phase bridge (circulating & non
circulating).
Invertors : Types-series, parallel, bridge, PWM voltage source inverter (CSI), Current source invertors (CSI),
Filters-Types, calculation. Commutations methods, transistorized power controllers circuits
Choppers: Types A, B, C, D, E Multiphase, line filter; one, two and four quadrant operation of choppers,
commutation methods: AC Regulator: Single phase and three phase Manual, Auto solid state, servo control,
uninterrupted power supply (UPS), switched mode power supplied (SMPS).

Reference Books

1. Sen P. C. ;Morden Power Electronics; Wheeler Publishers,1998
2. Singh. M. G., K.B. Khanchandani; Power Electronics; Tata MaGraw Hill, 2000.
3. Bose. B. K.; Morden Power Electronics and AC Drives; Pearson education India, Indian Reprint, 2003
4. Ned Mohan, etal; Power Electronics; John Willey, 2000.
5. Lander C. Y; Power Electronics: McGraw Hill International, 1993

Course Code & Title: - CSL311 : Computer Architecture & Organization

(DC) (L-T-P-C: 3-0-0-6)

Pre-requisite:

Basic Structure of Computers, Functional units, software, performance issues software, machine instructions and programs, Types of instructions, Instruction sets: Instruction formats, Assembly language, Stacks, Ques, Subroutines.

Processor organisation, Information representation, number formats.
multiplication& division ALU design, Floating Point arithmetic, IEEE 754 floating point formats

Control Design, Instruction sequencing, Interpretation, Hard wired control - Design methods, and CPU control unit. Microprogrammed Control - Basic concepts, minimizing microinstruction size, multiplier control unit.Microprogrammed computers - CPU control unit

Memory organization, device characteristics, RAM, ROM, Memory management, Concept of Cache & associative memories, Virtual memory,.

System organization, Input - Output systems, Interrupt, DMA, Standard I/O interfaces
Concept of parallel processing, Pipelining, Forms of parallel processing, interconnect network

Text/References:

1. Computer Organisation ,V.CarlHammacher, Fifth Edition.
2. Structured Computer Organisation, A.S.Tanenbum, PHI. Third edition
3. Computer Organisation and Microprogramming, Y.Chu, II, Englewood Chiffs, N.J. Prentice Hall
4. Computer System Architecture, M.M.Man

Course Code & Title: - ECL301 Analog Communication
(DC) (L-T-P-C: 3-0-0-6)

Pre-requisite:

Unit1: Review of Signal Analysis using Fourier Series representation of periodic signals, Fourier transform, Properties of Fourier transform, Convolution, Analysis of Linear time invariant systems.

Unit2: Transmission of signals through systems: Criteria for distortion less transmission, ideal filters, distortions in practical systems, power and energy of signals.

Unit3: Amplitude modulation: Need of modulation, AM DSB-SC, SSB-SC and vestigial side band modulation and demodulation, AM transmitter (broadcast and low power), FDM, Noise in AM systems.

Unit4: Angle modulation: FM and PM, reactance FET modulator Armstrong method, Foster-Seely discriminator, PLL detector, Stereophonic FM, Spectrum of FM, Narrow band and wide band FM, FM transmitter (broadcast and low power). Noise in FM systems..

Unit5: Radio receivers : TRF and super-heterodyne receiver, AGC, FM receiver, sensitivity, selectivity, image frequency rejection measurements, communication receiver and its special features. Transceivers for wireless mobile communication devices.

Unit6: Analog pulse modulation: Sampling theorem, PAM, PWM, PPM, generation & Detection of these pulse modulated signals, TDM,

Text/References:

1. Introduction to Analog & Digital Communication System :Haykin Simon,John Wiley.
2. Modern Analog & Digital Communication Systems: Lathi B.P,John Wiley.
3. Electronic Communication Systems :Kennedy,TMH.
4. Communication Electronics Principles and Applications :Frenzel,TMH (3e).
5. Electronic Communication Modulation and Transmission :Schoenbeck,PHI.

Course Code & Title: - ECL302Device Modeling(L-T-P-C: 3-0-0-6)

Pre-requisite:

Introduction to SPICE Simulation, Analysis of complex electronic circuits, simulation and analysis using SPICE, AC/DC operation, DC sweep transfer function, frequency response, feedback control analysis, transient response, device models, simulation and analysis of electronic circuits and systems

Review of semiconductor physics, The pn junction, , The built-in voltage, Depletion width and junction capacitance, Diode current/voltage characteristic, Minority carrier charge storage

MOS transistors, Threshold voltage and the body effect, Current/voltage characteristics, Subthreshold current, Short channel effect and narrow width effect, Drain induced barrier lowering

Channel length modulation, Hot carrier effects, Effective mobility and velocity saturation SPICE models, MOS inverter circuits

Bipolar transistors, Current gain, Gummel plots and output characteristics, Recombination in the emitter/base depletion region, Charge storage and forward transit time, Cut-off frequency, TTL gates.

Basic SPICE Models, Ebers-Moll and basic Gummel-Poon model, Small-signal model, Parameter extraction

Text/References:

1. Solid State Electronic Devices :B.G.Streetman and S.Banerjee, Prentice Hall India.
2. Analysis and Design of Digital Integrated circuits : D.A.Hodges, and H.G.Jackson, McGrraw-Hill, International
3. Introduction to VLSI circuit and systems :J.P.Uyemura, John Wiley and Sons
4. Fundamentals of Modern VLSI devices :Y.Taur, T.H.Ning, Cambridge University Press
5. Principles of CMOS VLSI design , A systems perspective : Eshraghian K, Addison Wesley.

EEL310 CONTROL SYSTEM (3-1-0-8)

Contents

Introduction to need for automation and automatic control.Use of Feedback, Broad spectrum of system application.
Mathematical modelling, Diff. Equations, transfer functions, block diagram, signal flow graphs, Application to
elementary system simplifications, Effect of feedback on parameter variation, disturbance signal, servomechanisms
and regulators. Control system components, Electrical, Electromechanical, hydraulic, pneumatic and other
components. Their functional analysis and input output representation.
Time response of systems, First order and second order system, standard inputs concept of gain and time
constants. Steady state error, type of control system, approximate methods for higher order system.
Root location and its effect on time response, Elementary idea of Root Locus, effect of adding pole and zero in
proximity of imaginary axis.
Stability control systems , conditions of stability, characteristic equation, Routh Hurwitz criterion, special
cases for determining relative stability.
Frequency response method of analysing linear system.Nyquist and Bode plots stability and accuracy analysis from frequency responses, open loop and close loop frequency response. Nyquist criterion, Effect of
variation of gain and addition of pole and zero on response plot, stability margins in frequency response.
State variable method of analysis , characteristic of system state, choice of state representation in vector matrix,
different standard form, relation between transfer function and state variable.

Reference Books

1. Nagrath&Gopal ; Control System Analysis
2. D'AzzoHoupis; Linear System Analysis; 1975.Huelsoman, McGraw Hill, Logakusha.
3. Kuo. B. C.; Automatic Control Systems; Prentice Hall, 1991.
4. NomanNise; Control System Engineering; John Wiley &Sons,INC 2000.
5. Gopal M.; Control Systems : Principle of Design.

EEP308 POWER ELECTRONICS LAB (0-0-2-2)

Syllabus based on above mentioned course

ECP301 : Analog Communication Lab.

Syllabus based on above mentioned course

ECP 302 :Device Modeling Lab.

Syllabus based on above mentioned course

EEP 310 :Control Systems Lab.

Syllabus based on above mentioned course