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JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD

(Established by JNTU Act No.30 of 2008)

Kukatpally, Hyderabad – 500 085, Telangana State (India)

Lr.No.D1/960/2017

Date: 17.11.2017

DR. N.YADAIAH
B.E (OUCE), M. Tech (IIT KGP), Ph.D.(JNTU)
SMIEEE, FIE, FIETE, MSSI, MISTE
Professor of Electrical & Electronics Engineering &
REGISTRAR

To,
The Principal,
Vidya Jyothi Institute of Technology,
Aziznagar Gate, C.B. Post,
Hyderabad,

Sir,

Sub:- JNT University Hyderabad-Academic & Planning – Nominations for Academic Council, Governing Body and Board of Studies members for various Departments offered by Vidya Jyothi Institute of Technology, Aziznagar Gate, C.B. Post, Hyderabad,

Ref:- 1. Your letter dated 23.10.2017
2. Note Orders of the Vice-Chancellor dated 14.11.2017

***

With reference to your letters 1st cited, I am by direction to inform you that the following faculty members of the University are nominated to constitute the following bodies mentioned below for a period of two years as per the UGC guidelines as desired by you:

I Academic Council (Three members)

S.No	Name of the University Nominee
1.	Dr.B.N. Bhandari, Director, Academic & Planning, JNTUH
2.	Dr.G.K. Vishwanadh, OSD to VC, JNTUH
3.	Dr.M. Manzoor Hussain, Director, Admissions, JNTUH

II. Governing Body (One member)

S.No	Name of the University Nominee
1.	Dr.N. Yadaiah, Registrar, JNTUH

II. Board of Studies (One nominee for each department)

S.No	Name of the Department	Courses	Name of the University Nominee
1.	Civil	B.Tech/M.Tech	Dr.G.V. Narsimha Reddy
2.	EEE	B.Tech/M.Tech	Dr.N. Venkata Ramana
3.	Mech. Engineering	B.Tech/M.Tech	Dr.B. Sudheer Prem Kumar
4.	ECE	B.Tech/M.Tech	Dr.M. Madhavilatha
5.	CSE/IT	B.Tech/M.Tech	Dr.M. Sreenivasa Rao
6.	English	B.Tech	Dr.N.V.S.N. Lakshmi
7.	Mathematics	B.Tech, M.Tech and MBA	Dr.V. Srinivasa Kumar
8.	Physics	B.Tech	Dr.T. Srikanth
9.	Chemistry	B.Tech	Dr.M. Thirumala Chari
10.	Environmental Studies	B.Tech	Dr.V. Hima Bindhu
11.	MBA	MBA & B.Tech	Dr.A. Prabhu Kumar
12.	NSS & Yoga	Physical Education	Dr.Y. Gopi Krishna

Yours sincerely,

REGISTRAR

Copy to the individuals concerned
Copy to PA to VC/Rector/Registrar for information

Vidya Jyothi Institute of Technology

(An Autonomous Institution)
(Accredited by NAAC & NBA, Approved by AICTE New Delhi & Permanently Affiliated to JNTUH)
Aziznagar Gate, C.B. Post, Hyderabad-500 075

Dr. P. Venugopal Reddy
Ph. D, F.A.P.A.Sc., F.T.S.A.Sc.,
DIRECTOR

e-mail : director@vjit.ac.in
Ph. No: 9848212388
Hyderabad

Ref: VJIT/Dir.off/29/2018-19

Date: 07.03.2019

OFFICE ORDER

As few members of BoS in ECE left the college, it has been decided by the administration of the college to reconstitute the Board of Studies in ECE, with effect from 2019 and the newly constituted members of BoS are as follows:

The list of members of the reconstituted Board of Studies in ECE Departments is,

1.	Dr. Harikrishna Kamatham, Professor & Head, ECE, VJIT	Chairman
2.	Dr. M. Madhavilatha, Professor, JNTUH	University Nominee
3.	Dr. K.S. Rao, Director, Anurag Group of Institutions	External Member
4.	Dr. G. Laxmi Narayana, Principal, Anurag College of Engg., Aushapur,	External Member
5.	Dr. P. Chandra Sekhar, HoD, Dept., of ECE, Osmaina University	External Member
6.	Mr. Ch. Satyanarayana, Scientist G, RCI, Hyderabad	External Member
7.	Mr. N. Venkatesh, Sr. Vice-President, Redpine Signals, Hyderabad	External Member
8.	Dr. S. Thulasi Prasad, Professor, ECE,VJIT	Internal Member
9.	Dr. K. Vasanth, Professor, ECE, VJIT	Internal Member
10.	Mr. M. Rajendra Prasad, Associate Professor, ECE, VJIT	Internal Member
11.	Mrs. A. Jaya Lakshmi, Associate Professor, ECE, VJIT	Internal Member

- The above Board shall frame the syllabi, prepare the course structure and all other academic related matters of both B.Tech & M.Tech courses.
- The above members of the Board of Studies in ECE Departments shall hold the office for a period of two years with effect from the date of issue of this order.
- The external members attending the meeting of the Board of Studies are eligible for T.A. and D.A. as per the rules of the Institutions in force.
- The members are also requested to intimate this office in case if any change in their address and or designation.

Head of the Department
Department of Electronics and Communication Engg.
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Hyderabad-500075

(P.Venugopal Reddy)

Copy to all members

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R 18

Department of Electronics and Communication Engineering

R18 REGULATIONS

Syllabus

Department of ECE

Course Structure

Department of Electronics and Communication Engineering

Board of Studies Meeting

held on

01April 2019

Vidya Jyothi Institute of Technology

Minutes of the Board of studies of Dept. of Electronics and Communication Engineering meeting held on 1st APRIL 2019

at 1:00pm in Board Room

The following members were present in the meeting.

S.No	Name of the Member	Designation	Signature
1	Dr. Harikrishna Kamatham, Professor & Head ECE, VJIT.	Chairman	
2	Dr. M.Madhavi Latha, Professor, JNTUH.	University Nominee	
3	Dr. K S Rao, Director, Anurag Group of Institutions.	External Member	
4	Dr. G. Laxmi Narayana, Principal, Anurag College of Engg., Aushapur.	External Member	
5	Dr. P. Chandra Sekhar, Dept. of ECE, Osmania University	External Member	
6	Mr. Ch. Satyanarayana, Scientist G, RCI, Hyderabad.	External Member	
7	Mr. N. Venkatesh, Sr. Vice – President, Redpine Signals, Hyderabad.	External Member	
8	Dr. S. Thulasi Prasad, Professor, ECE, VJIT.	Internal Member	
9	Dr. K. Vasanth, Professor, ECE, VJIT.	Internal Member	
10.	Mr. M Rajendra Prasad, Assoc. Professor, ECE, VJIT.	Internal Member	
11.	Mrs. A. Jaya Lakshmi, Assoc. Professor, ECE, VJIT.	Internal Member	

Head of the Department

Item No. 1: Presentation of 2nd, 3rd & 4th Year ECE (R18) B.Tech Course Structure

The Chairman presented the B.Tech course structure of all three years under R18 Regulations for ECE students as per ANNEXURE - I.

Item No. 2: Presentation of 2nd, 3rd & 4th Year ECE (R18) B.Tech Syllabi

The Chairman presented the detailed syllabi of all subjects of 2nd, 3rd & 4th B.Tech (ECE) under R18 Regulations along with prerequisites, course objectives and course outcomes as per ANNEXURE - II.

Item No. 3: Presentation of Engineering Science Subjects offered to other Departments under R18 regulations.

a. The Chairman presented the detailed syllabi of the following subjects offered to EEE Departme[illegible] as per ANNEXURE - III
   i. Electronic Devices and Circuits for II Year II Semester
   ii. Electronic Devices and Circuits Lab for II Year II Semester
   iii. Switching Theory and Logic Design for III Year I Semester
   iv. Integrated Circuits and Applications for III Year II Semester
   v. Microprocessors and Interfacing for IV Year I Semester
   vi. Microprocessors and Interfacing Lab for IV Year I Semester

b. The Chairman presented the detailed syllabi of the following subjects offered to CSE/IT Departments as per ANNEXURE - III
   i. Electronic Devices and Circuits for II Year I Semester
   ii. Digital Logic Design for II Year I Semester
   iii. EDC & DLD Lab for II Year I Semester

Item No. 4: Presentation of 1st & 2nd Year ECE (R19) M.Tech Course Structure

The Chairman presented the Course Structure (R19 regulation) for the following PG programs offered by ECE Department as per ANNEXURE – IV.

a. VLSI System Design
b. Embedded Systems

Item No. 5: Presentation of 1st Year ECE (R19) M.Tech Syllabi.

The Chairman presented the detailed syllabi of all subjects of 1st year for the following PG Courses as p[illegible] ANNEXURE - V.

a. VLSI System Design
b. Embedded Systems

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Item No. 6: Discussion regarding the Panel of examiners

The Chairman emphasized the necessity of Panel of Examiners. Their services will be utilized in the preparation of End-Semester Question paper(s), Evaluation of End-Semester Examination Answer Scripts. They will be paid remuneration as per the recommendations of College Finance Committee.

RESOLUTIONS

After discussing various aspects of the syllabi the committee passed the following resolution.

Resolution (1): The members after thorough discussion approved the course structure and syllabi of 2nd, 3rd & 4th Year B.Tech (R18) as per Annexure – I, II & III.

Noted and Approved.

Resolution (2): The members after thorough discussion approved the course structure and syllabi of M.Tech (R19) Programs (VLSISD & ES) as per Annexure – IV & V.

Noted and Approved.

Resolution (3): The BoS Chairman is authorized to prepare the Panel of examiners for both B.Tech & M.Tech.

Noted and Approved.

Signatures of the Members Present:

1. 
2. 
3. 
4.
5. 
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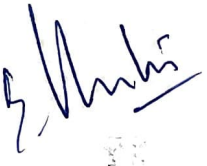
9. 
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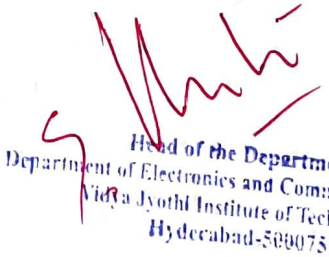
11. 



ANNEXURE – I

VIDYA JYOTHI INSTITUTE OF TECHNOLOGY, AUTONOMOUS

DEPARTMENT OF ELECTRONICS & COMMUNICATION ENGINEERING

COURSE STRUCTURE FOR B.TECH II YEAR

II B.Tech I Sem ECE:

S.No.	Subject Code	Subject Name	Lectures			Credits
			L	T	P	
1.	BS	Mathematics-III(Complex Analysis and Fourier Transforms)	2	1	-	3
2.	ES	OOPS	3	-	-	3
3.	PC-1	Electronic Devices and Circuits	2	1	-	3
4.	BS	Probability Theory and Stochastic Processes	3	-	-	3
5.	PC-2	Signals and Systems	3	-	-	3
6.	PC-3	Network Analysis and Transmission Lines	3	-	-	3
7.	PC Lab-1	Electronic Devices and Circuits Laboratory	-	-	2	1
8.	PC Lab-2	Basic Simulation Laboratory	-	-	2	1
9.	MC	Gender Sensitization/Environmental Science	2	-	-	–
		Total number of Credits				**20**

II B.Tech II Sem ECE:

S.No.	Subject Code	Subject Name	Lectures			Credits
			L	T	P	
1.	PC-4	Switching Theory and Logic Design	2	1	-	3
2.	ES	Electrical Technology	3	-	-	3
3.	HS	Professional Communications	2	-	-	2
4.	PC-5	Analog and Digital Communications	3	1	-	4
5.	PC-6	Analog and Pulse Circuits	3	-	-	3
6.	PC-7	Electromagnetic Waves	3	-	-	3
7.	PC Lab-3	Analog & Digital Comm. Laboratory	-	-	2	1
8.	PC Lab-4	Analog and Pulse Circuits Laboratory	-	-	2	1
9.	MC	Gender Sensitization/Environmental Science	2	-	-	–
		Total number of Credits				**20**

Head of the Department
Department of Electronics and Communication Engg.

ANNEXURE – II

ELECTRONIC DEVICES AND CIRCUITS

II B.Tech I Semester

Pre-Requisites:

- Applied Physics

Course Objectives: The aim of the course is

- To Understand the characteristics of the different diodes used in electronics with its application
- To familiarize the characteristics, biasing and models of transistors and its applications

UNIT I

Diode: PN junction Diode – Characteristics, Current equation, Temperature dependence, Static and Dynamic resistances, Equivalent circuit, Diffusion and Transition Capacitances,
Diode Applications: Rectifier - Half Wave Rectifier, Full Wave Rectifier, Bridge Rectifier, Rectifiers with Capacitive Filter, Clippers, Clampers.

UNIT II

Bipolar Junction Transistor (BJT): Principle of Operation and characteristics - Common Emitter, Common Base, Common Collector Configurations, Operating point, DC & AC load lines, Transistor Hybrid parameter model, Determination of h-parameters from transistor characteristics, Conversion of h-parameters.

UNIT III

Transistor Biasing and Stabilization: Bias Stability, Fixed Bias, Collector to Base bias, Self Bias, Bias compensation using Diodes and Transistors.
Analysis and Design of Small Signal Low Frequency BJT Amplifiers: Analysis of CE, CC, CB Amplifiers and CE Amplifier with emitter resistance, low frequency response of BJT Amplifiers, effect of coupling and bypass capacitors on CE Amplifier.

UNIT IV

Junction Field Effect Transistor: Construction, Principle of Operation, Pinch-Off voltage, Volt-Ampere characteristic, comparison of BJT and FET, Biasing of FET, FET as voltage variable resistor, MOSFET construction and its characteristics in enhancement and depletion modes.

UNIT V

FET Amplifiers: Small Signal Model, Analysis of CS, CD, CG JFET Amplifiers. Basic Concepts of MOSFET Amplifiers.
Special Purpose Devices: Zener Diode - Characteristics, Voltage Regulator; Principle of Operation - SCR, Tunnel diode, UJT, Varactor Diode.

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TEXT BOOKS:

1. Millman and Halkias," Electronic devices and circuits", 2nd Edition, McGraw Hill Publication, 2007
2. Electronic Devices and Circuits – R.L. Boylestad and Louis Nashelsky, 9 Ed., 2006, PEI/PHI.
3. Jacob Millman, Herbert Taub and Mothiki S. Prakash Rao, Millman's Pulse, Digital and Switching Waveforms, Tata McGraw-Hill,3rd Edition, 2008.

REFERENCES:

1. Electronic Devices and Circuits – S. Salivahanan, N. Suresh Kumar, A. Vallavaraj, 2 Ed., 2008, TMH.
2. Integrated Electronics – J. Millman and Christos C. Halkias, 1991 Ed., 2008, TMH.
3. Electronic Devices and Circuits-J.B Gupta
4. Electronic Devices and Circuits - K. Lal Kishore, 2 Ed., 2005, BSP
5. A. Anand Kumar, Pulse and Digital Circuits, 2005, PHI.

Course Outcomes:

After going through this course the student will be able to:

CO1: Demonstrate the concepts of semiconductor theory.
CO2: Interpret the characteristics of different semiconductor devices with its applications.
CO3: Apply different biasing techniques of transistors for amplification.
CO4: Analyze transistor amplifiers using small signal model.

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PROBABILITY THEORY AND STOCHASTIC PROCESSES

II B.Tech I Semester

Pre-Requisites:

- Mathematics-II

Course Objectives:

In this course it is aimed to

- Introduce basic concepts of probability theory and random variables and random process in electronics engineering.
- Analysis of random process and application to the signal processing in the communication system.

UNIT-I: Probability & Random variables

Probability: Probability introduced through Sets and Relative Frequency: Experiments and Sample Spaces, Discrete and Continuous Sample Spaces, Events, Probability Definitions and Axioms, Joint Probability, Conditional Probability, Total Probability, Bay's Theorem, Independent Events.

Random Variable: Definition, Conditions for a Function to be a Random Variable, Discrete, Continuous and Mixed Random Variable, Distribution and Density functions, Properties, Binomial, Poisson, Uniform, Gaussian, Exponential, Rayleigh, Methods of defining Conditioning Event, Conditional Distribution, Conditional Density and their Properties.

UNIT-II: Operations on single & multiple random variables– expectations

Expected Value of a Random Variable, Function of a Random Variable, Moments about the Origin, Central Moments, Variance and Skew, Chebychev's Inequality, Characteristic Function, Moment Generating Function, Joint Distribution Function and its Properties, Marginal Distribution Functions, Conditional Distribution and Density – Point Conditioning, Conditional Distribution and Density – Interval conditioning, Statistical Independence, Sum of Two and more Random Variables, Central Limit Theorem, Equal and Unequal Distribution. Expected Value of a Function of Random Variables- Joint Moments about the Origin, Joint Central Moments, Joint Characteristic Functions

UNIT-III: Random processes – Temporal characteristics

The Random Process Concept, Classification of Processes, Deterministic and Nondeterministic Processes, Distribution and Density Functions, concept of Stationarity and Statistical Independence. First-Order Stationary Processes, Second- Order and Wide- Sense Stationarity, (N-Order) and Strict-Sense Stationarity, Time Averages and Ergodicity, Mean-Ergodic Processes, Correlation-Ergodic Processes, Autocorrelation Function and Its Properties, Cross- Correlation Function and Its Properties, Random Signal Response of Linear Systems: System Response –Mean and Mean-squared Value of System Response, autocorrelation Function of Response, Cross-Correlation Functions of Input and Output.

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UNIT-IV: Random processes – Spectral characteristics

The Power Spectrum: Properties, Relationship between Power Spectrum and Autocorrelation Function, The Cross-Power Density Spectrum, Properties, Relationship between Cross-Power Spectrum and Cross-Correlation Function. Spectral Characteristics of System Response: Power Density Spectrum of Response, Cross-Power Density Spectrums of Input and Output.

UNIT-V: Noise sources

Resistive/Thermal Noise Source, Arbitrary Noise Sources, Effective Noise Temperature, Noise equivalent bandwidth, Average Noise Figures, Average Noise Figure of cascaded networks, Narrow Band noise, Quadrature representation of narrow band noise & its properties.

TEXT BOOKS

1. Probability, Random Variables & Random Signal Principles - Peyton Z. Peebles, TMH, 4th Edition, 2001.
2. Principles of Communication systems by Taub and Schilling (TMH),2008

REFERENCES

1. Random Processes for Engineers-Bruce Hajck, Cambridge unipress,2015
2. Probability, Random Variables and Stochastic Processes – Athanasios Papoulis and S. Unnikrishna Pillai, PHI, 4th Edition, 2002.
3. Probability, Statistics & Random Processes-K .Murugesan, P. Guruswamy, Anuradha Agencies, 3rd Edition, 2003.
4. Signals, Systems & Communications - B.P. Lathi, B.S. Publications, 2003.
5. Statistical Theory of Communication – S.P Eugene Xavier, New Age Publications, 200?

Course Outcomes:

After going through this course the student will be able to:

CO1: Demonstrate knowledge in Probability theory, Single and multiple random variables and Random processes and their characteristics

CO2: Analyze operations on single and multiple random variables and processes.

CO3: Compute Simple probabilities using an appropriate sample space, Expectations from probability density functions, Least-square & maximum likelihood estimators for engineering problems Mean and Covariance functions for simple random processes.

CO4: Design solutions for complex engineering problems involving random processes.

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SIGNALS AND SYSTEMS

II B.Tech I Semester

Pre-Requisites:

- Mathematics –I & II

Course Objectives: The aim of the course is to

- Understand the mathematical concepts related to operations done on signals and systems
- Illustrate the different methods of sampling and impact of Z transform on discrete signals

UNIT I: Signal Analysis

Analogy between Vectors and Signals, Orthogonal Signal Space, Signal approximation using Orthogonal functions, Mean Square Error, Closed or complete set of Orthogonal functions, Orthogonality in Complex functions, Classification of Signals and systems, Exponential and Sinusoidal signals, Concepts of Impulse function, Unit Step function, Signum function.

UNIT-II: Fourier series & Fourier Transforms

Representation of Fourier series, Continuous time periodic signals - Dirichlet's conditions, Trigonometric Fourier Series and Exponential Fourier Series, Complex Fourier spectrum. Deriving Fourier Transform from Fourier series, Fourier Transform of arbitrary signal - standard signals - Periodic Signals – Properties - Introduction to Hilbert Transform.

UNIT III: Signal Transmission through Linear Systems

Linear System, Impulse response, Response of a Linear System, Linear Time Invariant(LTI) System, Linear Time Variant (LTV) System, Transfer function of a LTI System, Filter characteristic of Linear System, Distortion less transmission through a system, Signal bandwidth, System Bandwidth, Ideal LPF, HPF, and BPF characteristics, Causality and Paley-Wiener criterion for physical realization, Relationship between Bandwidth and rise time.

UNIT V: Laplace Transforms

Laplace Transforms (L.T), Inverse Laplace Transform, Concepts of Region of Convergence (ROC) for Laplace Transforms, Properties of L.T, Relation between L.T and F.T of a signal, Laplace Transform of certain signals using waveform synthesis.

UNIT-IV: Sampling Theorem and Z–Transforms

Graphical and analytical proof for Band Limited Signals, Impulse Sampling, Natural and Flat top Sampling, Reconstruction of signal from its samples, Effect of under sampling – Aliasing, Introduction to Band Pass Sampling.

Concept of Z-Transform of a Discrete Sequence, Distinction between Laplace, Fourier and Z Transforms, Region of Convergence in Z-Transform, Constraints on ROC for various classes of signals, Inverse Z-transform, Properties of Z-transforms.

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TEXT BOOKS:

1. Signals, Systems & Communications - B.P. Lathi, BSP, 2013.
2. Signals and Systems - A.V. Oppenheim, A.S. Willsky and S.H. Nawabi, 2 Ed.

REFERENCES:

1. Signals and Systems – Simon Haykin and Van Veen , Wiley 2 Ed.,
2. Signals and Systems – A. Rama Krishna Rao, 2008, TMH
3. Fundamentals of Signals and Systems - Michel J. Robert, 2008, MGH International Edition.
4. Signals, Systems and Transforms - C. L. Philips, J.M.Parr and Eve A.Riskin, 3 Ed., 2004, PE.
5. Signals and Systems – K. Deergha Rao, Birkhauser, 2018.

Course Outcomes:

After going through this course the student will be able to:

CO1: Understand the Mathematics, operations and classification of signals and systems
CO2: Apply the transform on standard and arbitrary signals
CO3: Infer the signal transmission through linear systems
CO4: Interpret the concepts of sampling and role of Z-Transform in analysis of systems.

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NETWORK ANALYSIS AND TRANSMISSION LINES

II B.Tech I Semester

Pre requisites:

- Mathematics-I,II
- Basic Electrical Engineering

Course Objectives:
In this course it is aimed to

- Introduce basic concepts of networks, Transmission lines and applications

UNIT-I: Network Theorems
Source transformation - Superposition Theorem - Thevenin's theorem - Norton's theorem - Reciprocity theorem - Maximum power transfer theorem

UNIT-II: Transient Analysis
Transient response of R-L, R-C, R-L-C circuits (Series and Parallel combinations) for D.C. and sinusoidal excitations – Initial conditions –Laplace transforms methods of solutions. Transient response for different inputs such as step, ramp, pulse and impulse by using Laplace transforms method.

UNIT – III: Network Parameters and Functions
Two port network parameters, Z, Y, ABCD, ***h*** and ***g*** parameters, Characteristic impedance, Image transfer constant, image and iterative impedance, network function, driving point and transfer functions – using transformed (S) variables, Poles and Zeros. Standard T, π, L Sections characteristic impedance, image transfer constants, Design of Attenuators.

UNIT – IV: Transmission Lines - I
Types, Parameters, Transmission Line Equations, Primary & Secondary Constants, Equivalent Circuit, Characteristic Impedance, Propagation Constant, Phase and Group Velocities, Infinite Line Concepts, Lossless / Low Loss Characterization, Types of Distortion, Condition for Distortion less line, Minimum Attenuation, Loading - Types of Loading.

UNIT- V: Transmission Lines – II
Input Impedance Relations, SC and OC Lines, Reflection Coefficient, VSWR. λ/4, λ/2, λ/8 Lines – Impedance Transformations, Smith Chart – Configuration and Applications, Single Stub Matching.

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TEXT BOOKS

1. Network Analysis – Van VelKen Burg, 3rd Ed., Pearson, 2016
2. Networks, Lines and Fields - JD Ryder, PHI, 2nd Edition, 1999.

REFERENCES

1. Electric Circuits – J. Edminister and M.Nahvi – Schaum's Outlines, MCGRAW HILL EDUCATION, 1999.
2. Engineering Circuit Analysis – William Hayt and Jack E Kemmerly, MGH, 8th Edition, 1993.
3. Electromagnetics with Applications – JD. Kraus, 5th Ed., TMH
4. Transmission Lines – Richard Collier, Cambridge University Press, 2013.

Course Outcomes:

After going through this course the student will be able to:

CO1: Recite basic concepts of network parameters, theorems and transmission line theory.
CO2: Differentiate the changes of transient networks using Laplace transform
CO3: Compare and contrast the parameters, functions and synthesis of the network
CO4: Apply the concepts of theorems on networks and transmission line theory to solve impedance matching issues.

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ELECTRONIC DEVICES AND CIRCUITS LABORATORY

II B.Tech I Semester

Course Objective:

- The aim of the Course is to study the characteristics and response of different electronic devices and circuits

PART A: (Only for Viva-voce Examination)
Electronic Workshop Practice (In 3 Lab Sessions):

1. Identification, Specifications, Testing of R, L, C Components (Color Codes), Potentiometers, Switches (SPDT, DPDT, and DIP), Coils, Gang Condensers, Relays, Bread Boards and PCBs
2. Identification, Specifications and Testing of Active Devices, Diodes, BJTs, Low power JFETs, MOSFETs, Power Transistors, LEDs, LCDs, SCR and UJT.
3. Study and operation of
    a. Multimeters (Analog and Digital)
    b. Function Generator
    c. Regulated Power Supplies
    d. CRO.

PART B: (For Laboratory Examination – Minimum of 12 experiments)

1. Forward & Reverse Bias Characteristics of PN Junction Diode.
2. Zener diode characteristics and Zener as voltage Regulator.
3. Half Wave Rectifier with & without filters.
4. Full Wave Rectifier with & without filters.
5. Input & Output Characteristics of Transistor in CB Configuration and h-parameter calculations.
6. Input & Output Characteristics of Transistor in CE Configuration and h-parameter calculations.
7. FET characteristics.
8. Lissajous patterns using CRO
9. Frequency Response of CC Amplifier.
10. Frequency Response of CE Amplifier.
11. Frequency Response of Common Source FET amplifier.
12. SCR characteristics.
13. UJT Characteristics
14. Clippers
15. Clampers

Course Outcomes:
After going through this course the student will be able to:

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Hyderabad - 500 075

CO1. Identify and use the basic components and instruments in electronics laboratory
CO2. Outline the characteristics of different semiconductor devices.
CO3. Interpret the ripple factor, regulations of rectifiers.
CO4. Sketch the frequency response of small signal amplifiers.

BASIC SIMULATION LABORATORY

II B.Tech I Semester

Course Objectives: The aim of the Course is to

- interpret the Generation, operation, transforms and sampling on signals, properties on systems
- Showcase the application of correlation and transform

Minimum 12 experiments to be Simulated Using MATLAB

1. Generation of various signals and sequences (Periodic and A periodic), such as Unit Impulse, Unit step, square, saw tooth, Triangular, Sinusoidal, Ramp, Sinc.
2. Operations on Signals and Sequences such as Addition, multiplication, scaling, Shifting, Folding, computation of Energy and average power.
3. Finding the Even and Odd parts of Signal/sequence and Real and imaginary parts of signal.
4. Convolution between signals and sequences.
5. Auto correlation and cross correlation between signals and sequences.
6. Verification of Linearity and Time Invariance Properties of a given continuous/Discrete system.
7. Gibbs Phenomenon.
8. Finding the Fourier Transform of a given signal and plotting its magnitude and phase spectrum.
9. Waveform synthesis using Laplace Transform.
10. Locating the Zeros and Poles and plotting the Pole-Zero maps in S plane and Z-plane for the given transfer function.
11. Generation of Guassian noise (Real and complex), Computation of its mean, M.S. value and its Skew, Kurtosis, and PSD, probability distribution function.
12. Sampling Theorem Verification.
13. Removal of noise by Autocorrelation / Cross correlation.
14. Extraction of Periodic signal masked by noise using correlation.

Course Outcomes:

After going through this course the student will be able to:

CO1. Evaluate the operation on signals and systems using arithmetic operations and transforms

CO2. Application of correlation and transforms on noise removal and signal extraction

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SWITCHING THEORY AND LOGIC DESIGN

II B.Tech II Semester

Pre requisites:

- Electronic Devices and circuits.

Course Objectives:

In this course it is aimed to introduce

- Basic concepts of number systems, logic circuits.
- Design combinational logic circuits, sequential logic circuits.

Unit-I: Number System and minimization techniques

Number System: Review of number system and base conversion, complements, signed binary numbers, Floating point number representation, Error detection (parity detection only).
Minimization techniques: Boolean Algebra, postulates ,basic logic gates, Canonical and Standard Form, NAND and NOR implementation, Minimization of switching function using theorem, The Karnaugh Map Method-Up to Five Variable Maps, Tabular Method.

UNIT-II: Combinational Circuits

Adders& Subtractor, Binary Adder-Subtractor, Decimal Adder, Binary Multiplier, Magnitude Comparators, Multiplexers, De-multiplexers, Decoders, Encoders and Code converters, Hazards and Hazard Free Relations.

UNIT-III: Sequential circuits-I

Basic Architectural Distinctions between Combinational and Sequential circuits, Latches, Flip Flops: SR, JK, Race Around Condition in JK, JK Master Slave, D and T Type Flip Flops, Excitation Table of all Flip Flops, Design of a Clocked Flip-Flop, Timing and Triggering Consideration, Clock Skew, Conversion from one type of Flip-Flop to another.

Unit-IV: Sequential Circuits-II

Synchronous – Asynchronous – Comparison, Design of Single mode Counter, Ripple Counter, Ring Counter, Shift Register, Shift Register Sequences, Ring Counter Using Shift Register, MOD Counters. Finite state machine-capabilities and limitations, Mealy and Moore models.

UNIT-V: Logic Families and Semiconductor Memories

Logic Families: DCTL, RTL, DTL, TTL and CML Logic –gate realization - Comparison,
Semiconductor Memories: Introduction to ROM, PAL, PLA, CPLD, FPGA.

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TEXT BOOKS:

1. Switching and Finite Automata Theory - Zvi Kohavi & Niraj K. Jha, 3rdEdition, Cambridge, 2010.
2. Modern Digital Electronics – R. P. Jain, 3rd edition, Tata McGraw-Hill, 2007.

REFERENCES:

1. Digital Design- Morris Mano, PHI, 4th Edition,2006
2. Introduction to Switching Theory and Logic Design – Fredriac J. Hill, Gerald R. Peterson, 3rd Ed,John Wiley & Sons Inc.
3. Fundamentals of Logic Design- Charles H. Roth, Cengage Learning, 5th, Edition, 2004.
4. Switching Theory and Logic Design – A Anand Kumar, PHI,2013

Course Outcomes:

At the end of the course the student should be able to

CO1: Demonstrate the basic theorems of Boolean algebra, logic gates, combinational and sequential circuits and memories.

CO2: Analyze the combinational and sequential circuits and memories.

CO3: Design of logic circuits

CO4: Realization of gates using different logic families.

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ANALOG AND DIGITAL COMMUNICATIONS

II B.Tech II Semester

Pre-Requisites:

- Electronic Devices and circuits
- Network Analysis and Transmission Lines
- Signals and Systems
- Probability theory and stochastic process.

Course Objectives:

In this course it is aimed to

- Introduce basic concepts analog and digital modulation schemes
- Analyze noise performance of analog and digital communication systems.

UNIT-I: Amplitude Modulation

Review of signals and systems, Amplitude Modulation: Time and Frequency domain representations – Power and Bandwidth, AM Generators: Square law modulator - Switching modulator, AM Detectors: Square law detector - Envelope detector, DSBS Modulation: Time domain and frequency domain representations, DSB-SC Generators: Balanced Modulators - Ring Modulator, DSB-SC Detectors: Coherent detector - COSTAS Loop, SSB Modulation: Time and Frequency domain representations - SSB Generators and Detectors, VSB Modulation: Time and Frequency domain representation - Envelope detection of a VSB wave, Comparison and Applications of different AM Systems, Frequency Division Multiplexing.

UNIT-II: Frequency Modulation

Angle Modulation: Time domain representation - Single tone FM wave - NBFM and WBFM - Spectral analysis of single tone FM Wave - Power and Bandwidth, FM Generators: Indirect FM and Direct FM Generators, FM Detectors: Balanced Frequency discriminator - Ratio detector, Pre-emphasis & De-emphasis, Threshold effect, Comparison of FM between AM.

UNIT-III: Pulse and Base Band Digital Modulations

Pulse Analog Modulation:

Sampling process, Pulse Amplitude Modulation and Demodulation, Pulse Width Modulation and demodulation, Pulse Position Modulation and Demodulation, Time Division Multiplexing.

Pulse Digital Modulation:

Quantization process, Pulse Code Modulation (PCM), Differential PCM (DPCM), Delta Modulation (DM), Inter Symbol Interference (ISI) - Nyquist criterion, Optimal detection of digital signals

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UNIT-IV: Passband Digital Modulations

Pass-band Digital Modulation Schemes: ASK – PSK – DPSK - FSK – QAM, Probability of error, Optimal Coherent detection of PSK and FSK

UNIT-V: Noise In Communication Systems

Output SNR & Noise Figure in Analog modulation systems: AM – DSBSC - SSB - FM, Output SNR in PCM and DM systems, Comparison of PCM and DM systems.

TEXT BOOKS:

1. Haykin S., "Communications Systems", John Wiley and Sons, 2001.
2. Sam Shanmugam, "Digital and Analog Communication Systems", John Wiley, 2006.
3. Taub H. and Schilling D.L., "Principles of Communication Systems", Tata McGraw Hill, 2001.
4. B.P. Lathi, "Modern Analog and Digital Communication", 3rd Edition, Oxford reprint, 2004.
5. Proakis J. G. and Salehi M., "Communication Systems Engineering", Pearson Education, 2002.
6. Barry J. R., Lee E. A. and Messerschmitt D. G., "Digital Communication", Kluwer Academic Publishers, 2004.

REFERENCE BOOKS:

1. Proakis J.G., "Digital Communications", 4th Edition, McGraw Hill, 2000.
2. Wozencraft J. M. and Jacobs I. M., "Principles of Communication Engineering", John Wiley, 1965.
3. Simon Haykin, "Digital communications", John Wiley, 2005.

Course Outcomes:

On successful completion of the course, the students will be able to

CO1: Demonstrate fundamental knowledge in Elements of Analog and Digital Communication systems.

CO2: Analyze different types of analog and digital modulation systems and calculate total power & bandwidth.

CO3: Design an efficient Transmitter and Receiver based on SNR, bandwidth and equipment complexities.

CO4: Formulate and solve engineering problems in the core area of analog and digital communications in developing information transmitting systems and telemetry system.

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ANALOG AND PULSE CIRCUITS

II B.Tech II Semester

Pre Requisites

- Electronic Devices and Circuits

Course Objectives

In this course it is aimed to introduce

- Circuit realizations using transistors such as large signal amplifiers, tuned amplifiers, multivibrators and time base generators.
- The Concepts of feedback in amplifiers so as to differentiate between negative and positive feedback.

UNIT I

Multistage Amplifiers

Classification of Amplifiers, Distortion in amplifiers, Different coupling schemes used in amplifiers, Frequency response and Analysis of multistage cascade amplifiers, Cascode amplifier, Darlington pair.

Transistor at High Frequency

Hybrid - model of Common Emitter transistor model, $f\alpha$, β and unity gain bandwidth, Gain bandwidth product.

UNIT II

Feedback Amplifiers

Concepts of feedback – Classification of feedback amplifiers – General characteristics of Negative feedback amplifiers – Effect of Feedback on Amplifier characteristics – Voltage series, Voltage shunt, Current series and Current shunt Feedback configurations.

UNIT III

Oscillators

Condition for Oscillations, RC type Oscillators-RC phase shift and Wien-bridge Oscillators, LC type Oscillators –Generalized analysis of LC Oscillators, Hartley and Colpitts Oscillators, Frequency and amplitude stability of Oscillators, Crystal Oscillator.

UNIT IV

Large Signal Amplifiers

Class A Power Amplifier- Series fed and Transformer coupled, Conversion Efficiency, Class B Power Amplifier- Push Pull and Complimentary Symmetry configurations, Conversion Efficiency, Principle of operation of Class AB and Class C Amplifiers.

Tuned Amplifiers

Single Tuned Amplifiers – Q-factor, frequency response of tuned amplifiers, Concept of stagger tuning and synchronous tuning.

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UNIT V

Multivibrators

Analysis and Design of Astable Multivibrators, Types of Triggering, Monostable Multivibrators, Bistable Multivibrators and Schmitt trigger using Transistors.

Time Base Generators

General features of a Time base Signal, Methods of Generating Time Base Waveform, concepts of Transistor Miller and Bootstrap Time Base Generator, Methods of Linearity improvement

TEXT BOOKS

1. Integrated Electronics, Jacob Millman, Christos C Halkias, McGraw Hill Education, 2nd Ed., 2010
2. Millman's Pulse, Digital and Switching Waveforms –J. Millman, H. Taub and Mothiki S. Prakash Rao, 2 Ed., TMH, 2008.

REFERENCES

1. Electronic Devices and Circuits, David A. Bell – 5th Ed., Oxford, 1986.
2. Electronic Devices and Circuits theory– Robert L. Boylestead, Louis Nashelsky, 11th Ed., Pearson, 2009.
3. Electronic Devices Conventional and current version -Thomas L. Floyd, Pearson, 2015.
4. Pulse, Switching and Digital Circuits –David A. Bell, 5th Ed, Oxford, 2015.

Course Outcomes:

After going through this course the student will be able to:

CO1: Understand the concepts of amplifiers, feedback, large signal model and time base generators.

CO2: Utilize the Concepts of feedback to improve the stability in amplifiers and oscillators.

CO3: Analyze different multistage amplifiers, multivibrators and time base generators.

CO4: List different classes of Power Amplifiers and tuned amplifiers useable for audio and Radio applications

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ELECTROMAGNETIC WAVES

II B.Tech II Semester

Pre Requisites

- Vector Calculus
- Engineering Physics

Course Objectives

In this course it is aimed to introduce

- Basic concepts of Electromagnetic fields using Vector and Scalar Multiplication
- EM Wave Propagation through different media

UNIT I: Electrostatics

Introduction to coordinate system- Coulomb's Law, Electric Field Intensity – Fields due to Different Charge Distributions, Electric Flux Density, Gauss Law and Applications, Electric Potential, Relation between E and V,Maxwell's Two Equations for Electrostatic Fields, Energy Density, Convection and Conduction Currents, Dielectric Constant, Isotropic and Homogeneous Dielectrics, Continuity Equation, Relaxation Time, Poisson's and Laplace's Equations, Capacitors – Parallel Plate, Coaxial, Spherical.

UNIT II: Magneto statics

Biot-Savart's Law, Ampere's Circuit Law and Applications, Magnetic Flux Density, Maxwell's two Equations for Magneto static Fields, Magnetic Scalar and Vector Potentials, Forces due to Magnetic Fields, Ampere's Force Law.

UNIT III: Maxwell's Equations (Time Varying Fields)

Faraday's Law and Transformer EMF, Inconsistency of Ampere's Law and Displacement Current Density, Maxwell's Equations in Different Forms, Conditions at a Boundary Surface -Dielectric-Dielectric and Dielectric-Conductor Interfaces.

UNIT IV: EM Wave Characteristics

Wave Equations for Conducting and Perfect Dielectric Media, Uniform Plane Waves – Definitions, Relation between E & H, Sinusoidal Variations, Wave Propagation in Lossless and Conducting Media, Conductors & Dielectrics – Characterization, Wave Propagation in Good Conductors and Good Dielectrics, Polarization. Reflection and Refraction of Plane Waves – Normal and Oblique Incidences for both Perfect Conductor and Perfect Dielectrics, Brewster Angle, Critical Angle and Total Internal Reflection, Surface Impedance, Poynting Vector and Poynting Theorem.

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UNIT V: Waveguides

Electromagnetic Spectrum and Bands. Rectangular Waveguides – Solution of Wave Equationsin Rectangular Coordinates, TE/TM mode analysis, Expressions for Fields, CharacteristicEquation and Cut-off Frequencies, Dominant and Degenerate Modes, Sketches of TE and TMmode fields in the cross-section, Phase and Group Velocities, Wavelengths and ImpedanceRelations, Equation of Power Transmission, Impossibility of TEM Mode. Microstrip Lines – ZoRelations, Effective Dielectric Constant, Circular waveguides.

TEXT BOOKS

1. Engineering Electromagnetics – William H. Hayt Jr. and John A. Buck, 8th Ed.,McGrawHill,2014
2. Principles of Electromagnetics – Matthew N.O. sadiku and S.V. Kulkarni, 6th Ed., OxfordUniversity Press, Aisan Edition, 2015.

REFERENCES

1. Electromagnetic Waves and Radiating Systems – E.C. Jordan and K.G. Balmain, 2ndEd.,PHI, 2000.
2. Engineering Electromagnetics – Nathan Ida, 2ndEd., Springer (India) Pvt. Ltd., New Delhi,2005.
3. Electromagnetic Field Theory Fundamentals – Bhag Singh Guru and Huseyin R. Hiziroglu,Cambridge University Press, 2nd Ed., 2006.

Course Outcomes

At the end of the course the student should be able to

CO1: Demonstrate the EM Field Characteristics – divergence and curl of fields

CO2: Interpret the Maxwell's equations for static Electric and Magnetic fields and dynamic Electromagnetic fields

CO2: Analyze the behavior of EM waves in different media

CO4: Apply the knowledge of EM Wave Propagation at microwaves

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ANALOG AND DIGITAL COMMUNICATIONS LABORATORY

II B.Tech II Semester

Course Objectives:

- The Course intends to Study of various Analog and Digital modulation and Demodulation schemes

Note: Any 10 experiments to be conducted

1. Amplitude modulation and demodulation
2. DSBSC modulation and demodulation
3. SSB modulation and demodulation
4. Frequency modulation and demodulation
5. Pulse Amplitude Modulation and demodulation
6. Pre-emphasis and De-emphasis
7. Verification of Sampling Theorem
8. Pulse code modulation and demodulation
9. Delta modulation and demodulation
10. PSK Modulation and demodulation
11. FSK Modulation and demodulation
12. DPSK and QPSK Modulation and demodulation

Course Outcomes:

On successful completion of this course, the student will be able to:

CO1: Demonstrate knowledge in different Analog and Digital Communication Systems.
CO2: Compare the characteristics of various Analog and Digital modulation schemes and analyze their performances.
CO3: Develop various analog and digital modulation and demodulation systems

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ANALOG AND PULSE CIRCUITS LABORATORY

II B.Tech II Semester

Course objective:

- The Course is aimed to experiment and verify responses of different electronic circuits.

Note: Any 12 experiments to be conducted

1. Class A Power Amplifier (With Transformer Load)
2. Class C Power Amplifier
3. Single Tuned Voltage Amplifier
4. Hartley Oscillators
5. Colpitts Oscillators
6. Darlington Pair
7. MOS Amplifier
8. Design a Bistable Multi vibrator and draw its waveforms
9. Design a Monostable Multi vibrator and draw its waveforms
10. Design an Astable Multi vibrator and draw its waveforms
11. Response of Schmitt Trigger circuit for loop gain less than and greater one
12. The output – voltage waveform of Boot strap sweep circuit
13. The output – voltage waveform of Miller sweep circuit
14. UJT relaxation oscillator

Course Outcomes:

At the end of the Course, the student will be able to:

CO1. Compare the frequency response of tuned, MOS, Darlington amplifier.
CO2. Sketch the sustained waveforms of oscillators, multivibrators and sweep circuits.
CO3. Interpret the efficiency of power amplifiers.

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Department of Electronics and Communication Engineering

MICRO PROCESSORS & MICRO CONTROLLERS

III B.Tech I Semester

L	T	P	C
3	1	0	3

Pre Requisites

- Switching theory logic design

Course Objective:
In this course it is aimed to introduce

- Operation of Micro Processors and Micro controllers, machine language program and interfacing techniques for different applications.

UNIT-1:
8086 Architecture: 8086 Architecture-Functional diagram, Register Organization, Memory Banks, Memory Segmentation, Programming Model, Memory adresses, Physical Memory Organization, Architecture of 8086, Signal descriptions of 8086, Minimum Modes – Maximum Modes, Timing diagrams.

UNIT-2:
Instruction Set and Assembly Language Programming of 8086: Instruction formats, Addressing modes, Instruction Set, Assembler Directives, Macros, Simple Programs involving Logical, Branch and Call Instructions, sorting, Evaluating Arithmetic Expressions, String Manipulations.

UNIT-3:
Interfacing RAM with 8086: 8255PPI – Modes – Interfacing with 8086 – 8251 – Modes, Interfacing with 8086 – Interfacing Structure of 8086 – Interfacing with 8259 – 8257 DMA – Modes, Interfacing 8086 with – Stepper Motor Interfacing – 0800

UNIT-4:
Introduction to Microcontrollers: Overview of 8051 Microcontroller, Architecture, I/0 Ports, Memory Organization, Addressing Modes and instruction set of 8051

UNIT-5:
8051 Real Time Control: Interrupts, Timers/Counters, and Serial Communication, Programming Timer Interrupts, Programming external Hardware Interrupts, Programming the Serial Communication interrupts, Programming 8051 Timers and Counters

TEXT BOOKS:

1. D. V. Hall, Microprocessors and Interfacing. TMGH, 2nd Edition 2006
2. Kenneth. J. Ayala, The 8051 Mlcrocontroller , 3rd Ed., CengageLearning

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REFERENCE BOOKS:

1. Advanced Microprocessors and Peripherals - A. K. Ray and K.M. Bhurchandani, TMH, 2nd Edition 2006.
2. The 8051 Microcontrollers, Architecture and Programming and Applications -K.Uma Rao, Andhe Pallavi, Pearson, 2009
3. Micro Computer System 8086/8088 Family Architecture, Programming and Design - Liu and GA Gibson, PHI, 2nd Ed.

Course Outcomes:

At the end of the course the student should be able to

CO1: Acquire knowledge about Microprocessors, Microcontroller and its need.
CO2: Ability to identify basic architecture of different Microprocessors & Microcontroller
CO3: Develop systems for interfacing of different peripheral devices microprocessor & Microcontrollers
CO4: Compose a program to interface microprocessor and microcontroller for different applications.

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Department of Electronics and Communication Engineering

LINEAR AND DIGITAL IC APPLICATIONS

III B.Tech I Semester

L	T	P	C
3	0	0	3

Pre Requisites

- Electronic Devices and Circuits
- Switching Theory and Logic Design
- Network theory and Transmission Lines

Course Objectives

In this course it is aimed to introduce

- Basic concepts of Operational amplifier, Special functions IC & its applications.
- Topics related to the Digital Integrated circuits used for system design.

UNIT-I

Operational Amplifier: Introduction, Advantages & Classification of IC's, IC chip size and circuit complexity, Ideal and Practical Op-Amp, Op-Amp Characteristics-DC and AC Characteristics and their compensations, Features of 741 Op-Amp

Applications of Op-Amp: Inverting, Non-Inverting, Adder, Subtractor , Instrumentation, Sample and Hold Circuit, Differentiator and Integrator, Comparator & its applications, Schmitt Trigger, waveform Generators – Astable multivibrator, Monostable multivibrator, Triangular.

UNIT-II

Active filters: Introduction, Butterworth filters-1st order, 2nd order, LPF,HPF filters(VCVS), Characteristics of Band pass, Band rejects and All Pass Filters.

D to A and A to D Converters: Introduction, Basic DAC techniques, Different types of DACs-Weighted resistor DAC, R-2R ladder DAC, Inverted R-2R DAC, Different Types of ADCs - Parallel Comparator Type ADC, Counter Type ADC, Successive Approximation ADC and Dual Slope ADC, DAC and ADC Specifications

UNIT-III

Timer and Phase Locked Loops: IC555 Timer - Functional Diagram, Monostable and Astable Operations, Applications. IC565 PLL - Block Schematic, Description of Individual Blocks and Applications.

Voltage regulator: Introduction to Voltage Regulators, Features & Internal Operation of 723 Regulator, Design of low voltage and high voltage regulators using IC723 VR.

UNIT-IV

Digital Integrated Circuits: Parameters of logic families, Comparison of Various Logic Families, TTL Logic ,CMOS Logic TTL Driving CMOS & CMOS Driving TTL, Combinational Logic ICs - Specifications and Applications of TTL-74XX Series ICs - Code Converters, Decoders, Demultiplexers, LED & LCD decoders with drivers , Encoder, Multiplexer, Demultiplexer, Parallel Binary Adder/ Subtractor, Magnitude Comparators.

UNIT-V

Sequential Logic IC's: 74XX Series ICs - All Types of Flip-flops, Conversion between Flip-flops, Synchronous and Asynchronous Counters, Mod-N Counters, Shift Registers, Applications of Shift Registers

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TEXT BOOKS

1. D. Roy Choudhury, Shail B. Jain (2012), Linear Integrated Circuit, 4th edition, New Age International Pvt. Ltd.,
2. Floyd, Jain (2009), Digital Fundamentals, 8th edition, Pearson Education

REFERENCES

1. Ramakant A. Gayakwad, (2012), OP-AMP and Linear Integrated Circuits, 4th edition,.
2. Sergio Franco (1997), Design with Operational Amplifiers and AnalogIntegrated Circuits, McGraw Hill.
3. Gray, Meyer (1995), Analysis and Design of Analog Integrated Circuits, Wiley International.
4. John F. Wakerly (2007), Digital Design Principles and practices, Prentice Hall / Pearson Education.

Course Outcomes

At the end of the course the student should be able to

CO1: Demonstrate the functioning of OP-AMP, Special function and Digital ICs
CO2: Analyze the operation, characteristics of OP-AMP, Special Function and Digital ICs
CO3: Design a logic circuits using digital ICs
C04: Devising filters, multivibrators, waveform generators & arithmetic circuits using OP-AMP and Special Function ICs.

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Department of Electronics and Communication Engineering

III B.Tech I semester

ANTENNA AND PROPAGATION

L	T	P	C
3	0	0	3

Pre Requisites

- Network Theory and Transmission lines
- Electromagnetic Waves

Course Objectives

In this course it is aimed to introduce

- Basic concept of radiation, antenna definitions and significance of antenna parameters and to derive and analyze the radiation characteristics various types of Antennas.
- The different phenomenon of wave propagation (ground wave, space wave and sky wave), their frequency dependence, and estimate their characteristics, identifying their profiles and parameters involved.

UNIT I

Antenna Basics

Basic Antenna Parameters – Patterns, Beam Area, Radiation Intensity, Beam Efficiency, Directivity-Gain-Resolution, Antenna Apertures, Effective Height. Fields from Oscillating Dipole, Field Zones, Front - to-back Ratio, Antenna Theorems, Radiation, Retarded Potentials – Helmholtz Theorem.

Thin Linear Wire Antennas

Radiation from Small Electric Dipole, Quarter Wave Monopole and Half Wave Dipole – Current Distributions, Field Components, Radiated Power, Radiation Resistance, Beam Width, Directivity, Effective Area and Effective Height, Natural Current Distributions, Far Fields and Patterns of Thin Linear Centre-fed Antennas of Different Lengths. Loop Antennas - Small Loop, Comparison of Far Fields of Small Loop and Short Dipole, Radiation Resistances and Directivities of Small Loops (Qualitative Treatment).

UNIT II

Antenna Arrays

Point Sources – Definition, Patterns, arrays of 2 Isotropic Sources - Different Cases, Principle of Pattern Multiplication, Uniform Linear Arrays – Broadside Arrays, End fire Arrays.

Antenna Measurements

Introduction, Concepts - Reciprocity, Near and Far Fields, Coordinate System, Sources of Errors. Patterns to be Measured, Directivity Measurement, Gain Measurements (by Comparison, Absolute and 3-Antenna Methods).

UNIT III

VHF, UHF and Microwave Antennas - I

Arrays with Parasitic Elements, Yagi-Uda Array, Folded Dipoles and their Characteristics, Helical Antennas – Helical Geometry, Helix Modes, Horn Antennas – Types, Fermat's Principle, Optimum Horns.

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VHF, UHF and Microwave Antennas – II

Microstrip Antennas – Introduction, Features, Advantages and Limitations, Rectangular Patch Antennas – Geometry and Parameters, Characteristics of Microstrip Antennas. Reflector Antennas – Introduction, Flat Sheet and Corner Reflectors, Paraboloidal Reflectors – Geometry, Pattern Characteristics, Feed Methods, Reflector Types – Related Features.

UNIT IV

Wave Propagation

Definitions, Categorizations and General Classifications, Different Modes of Wave Propagation, Ray/Mode Concepts.

Ground Wave Propagation

Plane Earth Reflections, Space and Surface Waves, Wave Tilt, Curved Earth Reflections.

Space Wave Propagation

Field Strength Variation with Distance and Height, Effect of Earth's Curvature, Absorption, Super Refraction, M-Curves and Duct Propagation, Scattering Phenomena, Troposphere Propagation.

UNIT V

Sky Wave Propagation

Structure of Ionosphere, Refraction and Reflection of Sky Waves by Ionosphere, Ray Path, Critical Frequency, MUF, LUF, OF, Virtual Height and Skip Distance, Relation between MUF and Skip Distance, Multi-hop Propagation.

TEXT BOOKS

1. Antennas and Wave Propagation – J.D. Kraus, R.J. Marhefka and Ahmad S. Khan, TMH, New Delhi, 4th ed., (Special Indian Edition), 2010.
2. Electromagnetic Waves and Radiating Systems – E.C. Jordan and K.G. Balmain, PHI, 2nd ed., 2000.

REFERENCES

1. Antenna Theory - C.A. Balanis, John Wiley & Sons, 3rd Ed., 2005.
2. Antennas and Wave Propagation – K.D. Prasad, SatyaPrakashan, Tech India Publications, New Delhi, 2001.
3. Radio Engineering Handbook- Keith henney, 3rd edition TMH.
4. Antenna Engineering Handbook –John Leonidas Volakis, 3rd edition,2007

Course Outcomes

At the end of the course the student should be able to

CO1: Understand different antennas, field analysis and their applications to antenna elements.

CO2: Distinguish the mechanism of radiation, different antenna characteristics, mathematical relations their estimates in practical cases.

CO3: Analyze and design the working of different antenna's and to interpret the radiation pattern of planar arrays from the knowledge of linear arrays.

CO4: Obtain the capability to differentiate and report the electromagnetic radiation levels in the Atmosphere and any radio transmissions.

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Department of Electronics and Communication Engineering

COMPUTER ARCHITECTURE
(Professional Elective-1)

III B.Tech I Semester

L	T	P	C
3	0	0	3

Pre Requisites

- Switching theory & Logic Design

Course Objectives

In this course it is aimed to introduce

- The basic structure and operation of a digital computer and Interpret the various memory system and input / output organization involved in system design
- To explain the various features of Micro programmed control, arithmetic operations, parallelism and the process involved in Multiprocessor for system design.

UNIT-I

Structure of Computers:
Computer types, functional units, basic operational concepts, VonNeumann architecture, bus structures, software, performance, multiprocessors and multicomputer, data representation, fixed and floating point and error detecting codes.
Register Transfer and Micro Operations: Register transfer language, register transfer, bus and memory transfers, arithmetic micro operations, shift micro operations, arithmetic logic shift unit

UNIT-II

Basic Computer Organization and Design: Instruction codes, computer registers, computer instructions, instruction cycle, timing and control, memory reference instructions, input, output and interrupt.
Central Processing Unit: stack organization, instruction formats, addressing modes, data transfe r and manipulation, program control, reduced instruction set computer (RISC).

UNIT-III

Computer Arithmetic: Addition and subtraction, multiplication and division algorithms, floating point arithmetic operation, decimal arithmetic unit, and decimal arithmetic operations.

UNIT-IV

The Memory System: Basic concepts, semiconductor RAM types of read only memory (ROM), cache memory, performance considerations, virtual memory, secondary storage raid, direct memory access (DMA).
Processor And Control Unit: Basic MIPS implementation – Building data path – Control Implementation scheme – Pipelining – Pipelined data path and control – Handling Data hazards & Control hazards – Exceptions.

UNIT-V

Parallelism: Instruction-level-parallelism – Parallel processing challenges – Flynn's classification – Hardware multithreading, Multicore processors, Array Processors: Attached Array Processor- SIMO Array Processor .
Multiprocessors:
Characteristics of multiprocessors, interconnection structures, Inter Processor arbitration, Inter pr ocessor communication and synchronization, cache Coherence, shared memory multiprocessors.

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TEXT BOOKS

1.M. Moris Mano (2006), Computer System Architecture, 3rd edition, Pearson/PHI, India
2.Carl Hamacher, Zvonks Vranesic, SafeaZaky (2002), Computer Organization, 5th edition McGraw Hill, New Delhi, India.

REFERENCES

1.William Stallings (2010), Computer Organization and Architecture- designing for performance, 8th edition, Prentice Hall, New Jersy.
2.Andrew S. Tanenbaum (2006), Structured Computer Organization, 5th edition, Pearson Education Inc, New Jersey.
3.Sivarama P. Dandamudi (2003), Fundamentals of Computer Organization and DesignSpringer Int. Edition, USA.

Course Outcomes

At the end of the course the student should be able to

CO1: Recall the structure and organization involved in computer design.
CO2: Identify the different memory and input- output system involved in system design.
CO3: Analyze computer parallelism and its design on program control and computer arithmetic operations.
CO4: Comprehend the various details of multiprocessor and multi-core processors in computer design

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Department of Electronics and Communication Engineering

INFORMATION THEORY AND CODING
(Professional Elective-1)

III B.Tech I Semester

L	T	P	C
3	0	0	3

Pre Requisites

- Switching theory and logic design, Analog and Digital Communications

Course Objective:

This course is aimed to introduce

- Basics of Information theory and different source coding techniques in communication systems
- Techniques for detecting and correcting errors in communication systems.

Unit-1: Basics of Information Theory: Entropy, Entropy for discrete ensembles, Information rate, source coding: Shannon's noiseless coding theorem, Shannon's noisy coding theorem, Mutual Information, Shannon- Hartley law

Unit-2: Source Coding: Encoding of the Source Output, Shannon's Encoding Algorithm. Shannon-Fano Encoding Algorithm, Huffman codes, Extended Huffman coding, Arithmetic Coding, Lempel – Ziv Algorithm, Calculations of Channel capacity and bounds for Discrete Channel, Applications to continuous channels

Unit-3: Information Channels: Communication Channels, Channel Models, Channel Matrix, Joint probability Matrix, Binary Symmetric Channel, System Entropies, Mutual Information, Channel Capacity, Channel Capacity of : Binary Symmetric Channel, Binary Erasure Channel, Morgan's Theorem, Continuous Channels

Unit-4: Error Control Coding: Examples of Error control coding, methods of Controlling Errors, Types of Errors, Linear Block Codes: matrix description of Linear Block Codes, Error Detection and Error Correction Capabilities of Linear Block Codes, Single Error Correcting hamming Codes, Binary Cyclic Codes: Algebraic Structure of Cyclic Codes, Encoding using an (n-k) Bit Shift register, Syndrome Calculation, Error Detection and Correction

Unit-5: Convolution Arithmetic Codes: Convolution Encoder, Time domain approach, Transform domain approach, Code Tree, Trellis and State Diagram, The Viterbi Algorithm.

TEXT/REFERENCE BOOKS:

1. N. Abramson, Information and Coding, McGraw Hill, 1963.
2. M. Mansurpur, Introduction to Information Theory, McGraw Hill, 1987.
3. R.B. Ash, Information Theory, Prentice Hall, 1970.
4. Shu Lin and D.J. Costello Jr., Error Control Coding, Prentice Hall, 1983.

Course Outcomes:

At the end of the course, students will be able to:

CO1: Understand the concept of information theory, coding techniques and errors related to it.

CO2: compare the different coding techniques.

CO3: Formulate codes using different coding techniques

CO4: Apply different coding techniques to develop an error free communication system.

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Department of Electronics and Communication Engineering

INTRODUCTION TO MEMS
(Professional Elective-1)

III B.Tech I Semester

L	T	P	C
3	0	0	3

Pre Requisites:

- Electronic Devices and Circuits

Course Objective:

In this course it is aimed to introduce

- Fabrication of MEMS devices, its role in sensing and actuation and use of MEMS materials on different medium

UNIT-1 INTRODUCTION TO MEMS AND MICROFABRICATION
History of MEMS Development, Characteristics of MEMS-miniaturization - micro electronics integration - Mass fabrication with precision. Micro fabrication - microelectronics fabrication process- silicon based MEMS processes- new material and fabrication processing-points of consideration for processing.

UNIT-2 ELECTRICAL AND MECHANICAL PROPERTIES OF MEMS MATERIALS Conductivity of semiconductors, crystal plane and orientation, stress and stain – definition – relationship between tensile stress and stain- mechanical properties of silicon and thin films, Flexural beam bending analysis under single loading condition- Types of beam- deflection of beam-longitudinal stain under pure bending spring constant, torsional deflection, intrinsic stress, resonance and quality factor.

UNIT-3 SENSING AND ACTUATION
Electrostatic sensing and actuation-parallel plate capacitor – Application-Inertial, pressure and tactile sensor parallel plate actuator- comb drive. Thermal sensing and Actuations-thermal sensors-Actuators- Applications- Inertial, Flow and Infrared sensors. Piezo resistive sensors- piezo resistive sensor material- stress in flexural cantilever and membrane Application-Inertial, pressure, flow and tactile sensor. Piezoelectric sensing and actuation-piezoelectric material properties-quartz-PZT-PVDF –ZnO Application-Inertial, Acoustic, tactile, flow-surface elastic waves Magnetic actuation- Micro magnetic actuation principle-deposition of magnetic materials-Design and fabrication of magnetic coil.

UNIT-4 BULK AND SURFACE MICROMACHINING
Anisotropic wet etching, Dry etching of silicon, Deep reactive ion etching (DRIE), Isotropic wet etching, Basic surface micromachining process- structural and sacrificial material, stiction and antistiction methods, Foundry process.

UNIT-5 POLYMER AND OPTICAL MEMS
Polymers in MEMS- polymide-SU-8 liquid crystal polymer(LCP) - PDMS-PMMA – Parylene – Fluro corbon, Application-Acceleration, pressure, flow and tactile sensors. Optical MEMS - passive MEMS optical components – lenses – mirrors - Actuation for active optical MEMS.

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TEXT BOOKS:

1. Chang Liu, "Foundations of MEMS", Pearson International Edition, 2006. References:
2. Gaberiel M.Rebiz, "RF MEMS Theory,Design and Technology", John Wiley & Sons,2003

REFERENCE BOOKS:

1. Charles P.Poole, Frank J.Owens, "Introduction to nanotechnology" John Wiley & sons, 2003.
2. Julian W.Gardner, Vijay K Varadhan, "Microsensors, MEMS and Smart devices", John Wiley & sons, 2001.

Course Outcomes:

After this course students will be able to

CO1: Understand the basic concepts involved in the design of MEMS devices.

CO2: Interpret the different properties of MEMS materials

CO3: Enumerate role of MEMS devices on sensing and Actuation through different mediums.

CO4: Contrast the types of MEMS devices on different materials through different mediums.

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Department of Electronics and Communication Engineering

INTRODUCTION TO MICROCONTROLLERS

(Open Elective – 1)

III B.Tech I Semester

L	T	P	C
3	0	0	3

Course Objectives:

In this course it is aimed to introduce to the students with

- To understand the architecture of 8051 with its special function registers, interfacing techniques pertaining to system design.
- To develop and analyze the programming concepts of 8051.
- To express and infer advanced architectures using ARM Controllers.

UNIT-I

Overview Microcontroller: Microprocessors & microcontrollers- Comparison -Types – Selection criteria –Architecture – resources – Memory (RAM, ROM, DMA)- Watch dog timer, PWM– Buses- power down modes – EPROM – Interrupts- Serial communication

UNIT-II

8051 Family Microcontrollers: Architecture- 8051 microcontroller – Pins- Ports- Registers- Special function registers (SER's) - Memory Organization- Counters and Timers.

UNIT-III

Programming the Microcontrollers : Addressing modes- Instruction Formats- Instruction set- Data transfer -Bit-manipulation – Arithmetic – Logical – Program flow control – Interrupt control flow – Simple Programs illustrating instruction set.

UNIT-IV

Systems Design and Interfacing Methods: Switch- Matrix Keypad – LED -7 Segment – LCD – Serial Interface – RS232- Parallel interface – IEEE1284 - IEEE 488 – ADC (0808) - DAC(0800) – Optical motor shaft encoders – Industrial control – Industrial process control system.

UNIT-V

ARM 32 Bit MCUs: Introduction to 16/32 Bit processors – ARM architecture and organization – ARM / Thumb programming model – ARM / Thumb instruction set – Development tools.

TEXT BOOKS

1. Microcontrollers Architecture, Programming, Interfacing and System Design – Raj Kamal, Pearson Education, 2005.
2. The 8051 Microcontroller and Embedded Systems – Mazidi and Mazidi, PHI, 2000.

REFERENCES

1. Microcontrollers (Theory & Applications) – A.V. Deshmuk, WTMH, 2005.
2. 8051 Microcontrollers – Jenneth J Ayala, 3rd Ed., Cenage Learning, 2005.

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Course Outcomes

At the end of the course the student should be able to

CO1: Interpret the internal organization of 8051 with its unique features.

CO2: Infer and give examples about the various addressing modes, instruction formats and instructions of 8051.

CO3: Construct the hardware and software interaction with each other using programming.

CO4: Summarize the features of the advanced architecture using ARM controller.

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Department of Electronics and Communication Engineering

BASIC ELECTRONICS

(Open Elective – 1)

III B.Tech I Semester

L	T	P	C
3	0	0	3

Course Objectives:

This is a fundamental course, basic knowledge of which is required by all the circuit branch engineers. This course focuses:

1. To familiarize the student with the principle of operation, analysis and design of Junction diode, BJT, FET and operational amplifier transistors circuits.
2. To understand applications of diode, operational amplifier and logic gates.
3. Circuit realizations using transistors such as large signal amplifiers, oscillators, multivibrators and Logic gates.

UNIT-I: SEMICONDUCTOR JUNCTION DIODES AND ITS APPLICATIONS

Diode: Introduction to Semiconductor - PN junction Diode – Construction and operation – VI Characteristics of PN Junction diode-Diffusion and Transition Capacitances - Zener diode - Tunnel Diode

Applications: Rectifier - Half Wave Rectifier, Full Wave Rectifier, Bridge Rectifier, Clippers and Clampers- Zener diode as voltage regulator.

UNIT-II: SEMICONDUCTOR JUNCTION TRANSISTOR

Bipolar Junction Transistor (BJT): Construction and Operation of NPN and PNP transistors – CE, CB and CC configurations - Input and output characteristics of CE, CB and CC - Transistor biasing – Transistor as an Amplifier - Qualitative explanation of voltage gain, current gain, power gain, input impedance, output impedance, frequency response and bandwidth - Tuned amplifier – Introduction to power amplifier

UNIT-III: FIELD EFFECT TRANSISTOR AND OPERATIONAL AMPLIFIERS

Field Effect Transistor (FET): Classification of FETs-JFET, MOSFET, operating principle of JFET. Drain and transfer characteristics of JFET (n-channel and p-channel), CS, CG, CD configurations.

Operational Amplifiers (OP-Amp): Ideal OPAMP, Inverting and Non Inverting OPAMP circuits, OPAMP applications: voltage follower, addition, subtraction, integration, differentiation; Numerical examples as applicable.

UNIT-IV: ELECTRONIC CIRCUITS:

RC differentiator and integrators - Oscillators, RC Phase Shift Oscillator, Wien Bridge Oscillator, Hartley Oscillator and Colpitts Oscillator, Applications - Multivibrators, Types, Operation, Waveforms, Applications.

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UNIT-V: LOGIC GATES AND ITS APPLICATIONS

Logic Gates: Basic gates AND, OR, NOT, NAND, NOR, EX-OR, EX-NOR - Building of AND, OR and NOT Gate with diodes.

Applications: Half adder, Full adder, Half Subtractor, Full Subtractor and Binary parallel adder.

Course Outcomes:

After going through this course the student will be able to:

1. Understand and analyze the different types of diodes, operation and its characteristics Design and analyze the DC bias circuitry of BJT and FET Design.
2. To analyze and design diode application circuits, amplifier circuits and oscillators employing BJT, FET devices.
3. Understand the different applications based on operational amplifier
4. Analyze different types of oscillators and multivibrators.
5. Design and analyze any digital logic gate circuits

TEXT BOOKS:

1. Millman's Electronic Devices and Circuits – J. Millman, C.C.Halkias, and Satyabrata Jit, 2 Ed.,1998, TMH.
2. Millman's Pulse, Digital and Switching Waveforms –J. Millman, H. Taub and Mothiki S. Prakash Rao, 2 Ed., TMH, 2008.
3. Choudhury B Roy, Sahil B Jain, Linear Integrated Circuits, 3rd Revised edition, NEW AGE Publication ,2010.
4. Floyd T.L, Digital Fundamentals , 10/e, Pearson Education, 2011

REFERENCES:

4. Electronic Devices and Circuits – R.L. Boylestad and Louis Nashelsky, 9 Ed., 2006, PEI/PHI.
5. Electronic Devices and Circuits - K. Lal Kishore, 2 Ed., 2005, BSP.
6. Pulse, Switching and Digital Circuits –David A. Bell, 5th Ed, Oxford, 2015.
7. Electronic Devices and Circuits – S.Salivahanan, N.Suresh Kumar, A.Vallavaraj, 2 Ed., 2008, TMH
8. Mano M.M, Logic and Computer Design Fundamentals, 4/e, , Pearson Education.

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Department of Electronics and Communication Engineering

MICRO PROCESSORS AND MICRO CONTROLLERS LABORATORY

III B.Tech I Semester

L	T	P	C
0	0	2	1

Course objective:
The aim of the course is to simulate the art of writing the ALP for 8086 and 8051 microcontroller to interface peripheral devices for simple applications
Note: Minimum 12 Experiments have to be conducted

1. Introduction to MASM.
2. Programs for 16 bit Arithmetic Operations for 8086.
3. Program for sorting an array for 8086.
4. Program for searching a number or character in a string for 8086.
5. Programs for String Manipulations for 8086.
6. Interfacing to 8086 and programming to control Stepper Motor.
7. Interfacing ADC to 8086.
8. Interfacing DAC to 8086.
9. Serial Communication between Two Microprocessors using 8255.
10. Programming using Arithmetic, Logical and Bit Manipulation Instructions of 8051.
11. Program and verify timer/counter in 8051
12. Program and verify interrupt handling in 8051
13. UART operation in 8051
14. Interfacing LCD to 8051.
15. Data transfer from peripheral to memory through DMA Controller 8237/8257

Course Outcomes:
After going through this course the student will be able to:
CO1. Apply the fundamentals of assembly level programming of microprocessors and microcontrollers.
CO2. Build a program on a microprocessor using instruction set of 8086 and 8051.
CO3. Evaluate Assembly language program for 8086 and 8051 microcontroller to interface peripheral devices for simple applications

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Department of Electronics and Communication Engineering

LINEAR & DIGITAL IC APPLICATIONS LABORATORY

III B.Tech I Semester

L	T	P	C
0	0	2	1

Note: Minimum 12 Experiments have to be conducted (six from each part)

Course Objectives
The aim of the course is to

- Experiment the applications of OPAMP 741, 555 and 723.
- Design the combinational and sequential circuits using digital IC's

Part – A: Linear IC Applications

1. OP AMP Applications-Adder, Subtractor, Comparator Circuits.
2. Integrator and Differentiator Circuits using IC741
3. Active Filter Applications- LPF, HPF [Second Order]
4. IC741 Waveform Generators-Square wave and Triangular waves.
5. Weighted/R-2R Ladder type DAC(Digital to analog converter)
6. IC 555 Timer Astable Multivibrator Circuit.
7. Calculation of Capture Range & Lock Range Using IC 565 PLL
8. Voltage Regulator using IC 723.

Part – B: Digital IC Applications

1. Design of all logic gates using NAND/NOR gates and verify the truth tables.
2. Design full adder & full subtractor using NAND/NOR gates and verify the truth table.
3. Design T & D flip flops using JK flip flop and verify the truth table.
4. Design any 4 variable functions using 8:1 Multiplexer and verify.
5. Verification of 4-bit Magnitude comparator
6. Design full adder using 3*8 Decoder and verify.
7. Verification of 4-bit Decade counter
8. Verification of Universal Shift Register

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Department of Electronics and Communication Engineering

DIGITAL SIGNAL PROCESSING

III B.Tech II Semester

L	T	P	C
2	1	0	3

Pre Requisite

- Signals and Systems
- Mathematics-II

Course objectives

By the end of the course the student will be able to

- Understand the concepts of transforms, multirate systems and effect of errors in signal processing.
- Illustrate the realization of digital filters using design.

UNIT-I

Introduction to DSP- applications-advantages

Discrete Fourier Transform: DTFT, DFT-Complexity calculation- Properties of DFT- linear convolution- Circular convolution- Sectioned convolution- Relation between DTFT, DFS, DFT and Z-Transform.

UNIT-II

Fast Fourier Transform: Fast Fourier Transform (FFT), Radix-2 decimation-in-time and decimation-in-frequency FFT Algorithms, Inverse FFT- Convolution of sequences using FFT.

UNIT-III

IIR Digital Filters: Analog filter approximations –Butterworth and Chebyshev- Design of IIR digital filters from analog filters- Impulse invariant technique – warping effect- bilinear transformation method - Spectral transformations, realization of IIR filters- direct, canonic, cascade and parallel forms.

UNIT-IV

FIR Digital Filters: Characteristics of FIR Digital filters - frequency response – Gibbs Phenomenon- Design of FIR filters - window techniques – Frequency Sampling - Comparison of IIR and FIR filters, realization of FIR filters- direct& cascade forms

UNIT-V

Finite Word Length Effects: Quantization- Quantization error- Types- Limit cycles- Overflow oscillations -Scaling

Multirate Signal Processing: Introduction - down sampling- Decimation – up sampling – Interpolation -Sampling Rate Conversion

TEXT BOOKS

1. Digital Signal Processing_Tarun Kumar Rawat,Oxford Publications-2015
2. Digital Signal Processing, Principles, Algorithms, and Applications: John G. Proakis, Dimitris G. Manolakis, Pearson Education / PHI, 2007.
3. Discrete Time Signal Processing – A.V.Oppenheim and R.W. Schaffer, PHI

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REFERENCES

1. Digital Signal Processing: Andreas Antoniou, TATA McGraw Hill , 2006
2. Digital Signal Processing: Ashok Ambardar , Satya Prasad , Cenage Learning.
3. Fundamentals of Digital Signal Processing using Mat lab – Robert J. Schilling, Sandra L. Harris, Thomson, 2007.

Course Outcomes

At the end of the course the student should be able to

CO1: Define the concepts of Fourier transforms, digital filters with their effect of errors.
CO2: Illustrate speed and memory requirements of Fourier transforms on signals.
CO3: Relate the effects of finite word length on systems.
CO4: Formulate frequency filtering, impulse response filters with its structure.

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Department of Electronics and Communication Engineering

MICROWAVE ENGINEERING

III B.Tech II Semester

L	T	P	C
2	1	0	3

Pre Requisites

- Network Theory and Transmission Lines
- Electro Magnetic Waves
- Electronic Measurement and Instrumentation

Course Objectives

In this course it is aimed to introduce

- Generation and Transmission of EM Waves in Microwave transmission lines and Devices.
- Topics related to the designing of Microwave components and Transmission lines.

UNIT I: Microwave Tubes

Limitations and Losses of conventional Tubes at Microwave Frequencies, Microwave Tubes – O Type and M Type Classifications, O-type Tubes : 2 Cavity Klystrons – Structure, Reentrant Cavities, Velocity Modulation Process and Applegate Diagram, Bunching Process and Small Signal Theory – Expressions for O/P Power and Efficiency. Reflex Klystrons – Structure, Velocity Modulation and Applegate Diagram, Mathematical Theory of Bunching, Power Output, Efficiency, Oscillating Modes and O/P Characteristics.

UNIT II: Helix TWTs and M-Type Tubes

Helix TWTs: Types and Characteristics of Slow Wave Structures; Structure of TWT and Amplification Process (qualitative treatment), Suppression of Oscillations, Gain Considerations.

M-Type Tubes: Introduction, Cross-field Effects, Magnetrons – Different Types, Cylindrical Traveling Wave Magnetron – Hull Cut-off and Hartree Conditions, Modes of Resonance and PI-Mode Operation, Separation of PI-Mode, o/p characteristics,

UNIT III: Microwave Solid State Devices

Introduction, Classification, Applications. TEDs – Introduction, Gunn Diodes – Principle, RWH Theory, Characteristics, Modes of Operation - Gunn Oscillation Modes, Principle of operation of IMPATT and TRAPATT Devices.

UNIT IV: Waveguide Components

Coupling Mechanisms – Probe, Loop, Aperture types. Waveguide Discontinuities – Waveguide Windows, Tuning Screws and Posts, Matched Loads. Waveguide Attenuators – Different Types, Resistive Card and Rotary Vane Attenuators; Waveguide Phase Shifters – Types, Dielectric and Rotary Vane Phase Shifters, Waveguide Multiport Junctions - E plane and H plane Tees. Ferrites– Composition and Characteristics, Faraday Rotation, Ferrite Components – Gyrator, Isolator

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UNIT V: Scattering matrix and Microwave Measurements

Scattering matrix

Scattering Matrix Properties, Directional Couplers – 2 Hole, Bethe Hole, [s] matrix of Magic Tee and Circulator.

Microwave Measurements

Description of Microwave Bench – Different Blocks and their Features, Errors and Precautions, Measurement of Attenuation, Frequency. Standing Wave Measurements, measurement of Low and High VSWR, Cavity Q, Impedance Measurements.

TEXT BOOKS

1. Microwave Devices and Circuits – Samuel Y. Liao, Pearson, 3rd Ed., 2003.
2. Microwave Principles- Herbert J. Reich, J. G. Skalnik, P. F. Ordung and H. L. Krauss, CBS Publishers and distributers, 2004.

REFERENCES

1. Microwave Engineering - David M. Pozar, John Wiley & Sons (Asia) Pvt Ltd., 1989, 3rd Ed., 2011 Reprint.
2. Microwave Engineering - G.S. Raghuvanshi, Cengage Learning India Pvt. Ltd., 2012.
3. Microwave Engineering Passive Circuits- Peter A. Rizzi, PHI, 1999.

Course Outcomes:

At the end of the course the student should be able to

CO1: Understands the application of 3-D coordinate geometry, calculus and vector geometry to analyze the EM wave transmission at microwave frequencies.

CO2: Analyze the problem within the Microwave Transmission line by considering the parameters at transmitter and receiver.

CO3: Design the microwave components and different transmission lines with the given characteristics at microwave frequencies.

CO4: Apply the knowledge of microwave components and devices in RADAR communication and satellite communication.

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Department of Electronics and Communication Engineering

DATA COMMUNICATION AND NETWORKS

III B.Tech II Semester

L	T	P	C
2	1	0	3

Pre Requisites

- Switching Theory and Logic Design
- Analog and Digital Communications

Course Objectives:

In this course it is aimed to

- Understand basic concepts of various types of computer networks, TCP/IP and OSI models.
- Design and implement a computer network utilizing application layer protocols and transportation layer protocol.

UNIT – I: Introduction to Networks: Internet, Protocols and Standards, The OSI Model, Layers in OSI Model, TCP/IP Suite, Addressing.
Physical Layer: Multiplexing, Transmission Media, Circuit Switched Networks, Datagram Networks, and Virtual Circuit Networks.

UNIT – II: Data Link Layer: Introduction, Checksum, Framing, Flow and Error Control, Noiseless Channels, Noisy Channels, Random Access Controlled Access, Channelization, IEEE Standards, Ethernet, Giga-Bit Ethernet, Wireless LANs, SONET-SDH, Frame Relay and ATM.

UNIT – III: Network Layer: Logical Addressing, Internetworking, Tunneling, Address Mapping, ICMP, IGMP, Forwarding, Routing-Flooding, Bellman& Ford, Disjkstra's routing protocols, RIP, OSPF, BGP,- and Multicast Routing Protocols. Connecting Devices-Passive Hubs, Repeaters, Active Hubs, Bridges, Routers.

UNIT – IV: Transport Layer: Process to Process Delivery, UDP, TCP and SCTP Protocols, Congestion, Congestion Control, Quality of Service
Application Layer: Domain Name Space, DNS in Internet, Electronic Mail, File Transfer Protocol, WWW, HTTP, SNMP, Multi-Media.

UNIT – V: Network Security: Security services, mechanisms and attacks, IPSec, SSL, VPN, Firewall, IPv4, IPv6.

TEXT BOOKS:

- Computer Networking: A Top-Down Approach Featuring the Internet, James F. Kurose, K. W. Ross, 3rd Edition, Pearson Education.
- Data Communications and Networking – Behrouz A. Forouzan, 4th Edition Mc Graw Hill Education, 2006.
- Computer Networks — Andrew S Tanenbaum, 4th Edition, Pearson Education.

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REFERENCES:

- Data communications and Networks by william stallings
- Data communication and Networks – Bhusan Trivedi, Oxford university press 2016.
- An Engineering Approach to Computer Networks-S.Keshav, 2nd Edition, Pearson Education.
- Understanding Communications and Networks, 3rd Edition, W.A.Shay, Cengage Learning

Course Outcomes:

At the end of the course the student should be able to

CO1: Demonstrate concepts of various types of computer networks, TCP/IP and OSI models.

CO2: Analyze different LLC multiplexing mechanisms, node-to-node flow and error control Analyze different MAC mechanisms (Aloha, Slotted Aloha, TDMA, FDMA) and understand their pros and cons.

CO3: Identify and design the different types of network devices and shortest path in a given network & Enable to interconnect various heterogeneous networks.

CO4: Implement a peer to peer file sharing application utilizing application layer protocols and transportation layer protocol.

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Department of Electronics and Communication Engineering

DIGITAL SIGNAL PROCESSORS AND ARCHITECTURES
(Professional Elective-2)

III B.Tech II Semester

L	T	P	C
3	0	0	3

Pre Requisites:

- Digital Signal Processing

Course Objectives

In this course it is aimed to introduce

- architectural features of different DSP Processors and peripherals for system design

UNIT –I

Introduction to Digital Signal Processing:
Digital signal processing system, the sampling process, discrete time sequences. Discrete Fourier Transform (DFT) and Fast Fourier Transform (FFT), LTI systems, Digital filters, Decimation and interpolation.
Computational Accuracy in DSP Implementations: Number formats for signals and coefficients in DSP systems, Dynamic Range and Precision, Sources of error in DSP implementations, A/D Conversion errors, DSP Computational errors, D/A Conversion Errors, Compensating filter.

UNIT —II

Architecture for Programmable DSP Devices: Basic Architectural features, DSP Computational Building Blocks, Bus Architecture and Memory, Data Addressing Capabilities, Address Generation Unit, Programmability and Program Execution, Speed Issues, Features for External interfacing.

UNIT –III

Programmable Digital Signal Processors: Commercial Digital signal- processing Devices, Data Addressing modes of TMS32OC54XX DSPs, TMS32OC54XX Processors- Data Addressing modes, Memory space, Program Control, instructions and Programming, On-Chip Peripherals, Interrupts, Pipeline Operation.

UNIT –IV

Analog Devices Family of DSP Devices: Analog Devices Family of DSP Devices —ALU and MAC block diagram, Shifter Instruction, Base Architecture of ADSP 2100, ADSP-2181 high performance Processor.
Introduction to Blackfin Processor – The Blackfin Processor, Introduction to Micro Signal Architecture, Overview of Hardware Processing Units and Register files, Address Arithmetic Unit, Control Unit, Bus Architecture and Memory, Basic Peripherals.

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UNIT –V

Interfacing Memory and I/O Peripherals to Programmable DSP Devices: Memory space organization, External bus interfacing signals, Memory interface, Parallel I/O interface, Programmed I/O, Interrupts and I/O, Direct memory access (DMA).

TEXT BOOKS:

1. Digital Signal Processing - Avatar Singh and S. Srinivasan, Thomson Publications, 2004.
2. A Practical Approach To Digital Signal Processing - K Padmanabhan, R Vijayarajeswaran, Ananthi. S, New Age International, 2006/2009
3. Embedded Signal Processing with the Micro Signal Architecture Publisher: Woon-Seng Gan, Sen M. Kuo, Wiley-IEEE Press, 2007

REFERENCE BOOKS:

1. Digital Signal Processors, Architecture, Programming and Applications — B. Venkataramani and M. Bhaskar, 2002, TMH.
2. Digital Signal Processing - Jonatham Stein, 2005, John Wiley.
3. DSP Processor Fundamentals, Architectures & Features - Lapsleyet al. 2000, S. Chand & Co.
4. Embedded Media Processing by David J. Katz and Rick Gentile of Analog Devices, Newnes, ISBN- 0750679123, 2005.

Course Outcomes:

Upon completion of the course, the student be able to

CO1: Understand signal processing principles, interfacing strategies and the different architectural features of DSP processors.
CO2: Differentiate the architectural features of various DSP processors.
CO3: Illustrate the methodology of writing programs for TMS32OC54xx.
CO4: Explain the system development using DSP Processors for various applications.

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Department of Electronics and Communication Engineering

MODELING AND SIMULATION USING MATLAB AND SIMULINK
(Professional Elective-2)

III B.Tech II Semester

L	T	P	C
3	0	0	3

Pre Requisite

- Programming in C
- Engineering Mathematics
- Probability Theory and Stochastic Process

Course Objective

In this course it is aimed to introduce to the students with

- To illustrate the various parameters for programming in MATLAB
- To elaborate the various loop and control statements involved in MATLAB Programming.
- To interpret the graphical representation, file handling and advanced commands of MATLAB.
- To Understand the need for Simulink in various domains of Electronics and Communication.

UNIT-I

Introduction to MATLAB: Components of MATLAB desktop-Types of files- Variables and Arrays–Handling Arrays–Operators and Special Characters- Input / Output commands-File handling-Data types- Functions –Built-in and user defined functions - passing arguments - Cell arrays &Structures - Strings - 2D strings-String comparing - Concatenation.

UNIT- II

Programming : Introduction - Control Flow Conditional Control — if, else, switch -Loop Control — for, while, continue, break , Program Termination — return- TRY & CATCH - Error trapping - Writing programs with logic and flow control - Differentiation & Integration using MATLAB-, Debugging methods -

UNIT-III

Plotting in MATLAB & GUI: Introduction-The plot command-Formatting Plot-Multiple Plots-Adding legend to the plot-Subplot-Plotting complex data-Basic 2D plots, Labels, Line style, Markers,Grid axis- Log, Log-Log, Semilog-Polar, fplot, ezplot, ezpolar, Hold, Stem, Bar, Hist, Interactive plotting - 3D plots – Mesh - Contour - Example programs-Fundamentals of GUI Creation

UNIT-IV

Application Programs: Diode Characteristics-BJT characteristics-Half wave and Full wave Rectifier-Open Loop gain of OPAMP-Signal generation-Frequency response of FIR & IIR filters

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UNIT-V

SIMULINK & APPLICATIONS: Introduction-Getting Simulink-Creating and Simulating a Simulink model-Creating a subsystem in Simulink- Data import and export-Simulink solution of Differential equations- Using Simulink generating an AM, PCM, DPCM-Designing of FWR & HWR using Simulink.

TEXT BOOKS

1. RudraPratap, "Getting Started with MATLAB 6.0" ,1st Edition, Oxford University Press-2004.
2. Sanjeevan Kapshe, Shailendra Jain " Modeling and Simulation Using Matlab - Simulink: for ECE",Wiley India; 1st edition , 2016.
3. Duane Hanselman ,BruceLittleField, "Mastering MATLAB 7" , Pearson Education Inc, 2005

REFERENCES

1. William J.Palm, "Introduction to MATLAB 6.0 for Engineers", McGraw Hill & Co, 2001
2. M.Herniter, "Programming in MATLAB", Thomson Learning, 2001
3. John OkyereAltla, "Electronics and circuit analysis using MATLAB" - CRC press, 1999.
4. K.K.Sharma, "MATLAB Demustifyied" -Vikas Publishing House Pvt Ltd.

Course Outcomes

At the end of the course the student should be able to

CO1: Develop codes on various domains of Electronics and Communication Engineering
CO2: Handle the advanced commands in appropriate fields of engineering
CO3: Visualize the impact of parameters during simulation
CO4: Cater the industrial needs pertaining to the semiconductor technologies.

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Department of Electronics and Communication Engineering

OPTICAL COMMUNICATIONS
(Professional Elective-2)

III B.Tech II Semester

L	T	P	C
3	0	0	3

Pre-Requisites:

- Applied Physics
- Electronic Devices and Circuits
- Analog and Pulse circuits
- Analog and Digital Communications.

Course Objectives

In this course it is aimed to introduce

- Basic concepts of optics, wave guides, sources, detectors and links on single channel and multichannel systems

UNIT-I: INTRODUCTION TO OPTICAL FIBER WAVEGUIDES

Introduction, vector nature of light: linear polarization-elliptical polarization and circular polarization - the quantum nature of the light, optical fiber modes and configurations: fiber types-rays and modes- step index fiber structure-ray optic representation – wave representation

UNIT-II: OPTICAL FIBERS AND FIBER LOSSES

Optical Fibers: Types of optical fibers: Step-Index Fibers - Graded-Index Fibers, Fiber Modes: Single-Mode Fiber, Dispersion in Single-Mode Fibers - Group-Velocity Dispersion - Material Dispersion - Waveguide Dispersion - Higher-Order Dispersion - Polarization-Mode Dispersion.

Fiber Losses: Attenuation, absorption, scattering losses, bending losses, core and cladding losses.

UNIT III: OPTICAL SOURCES AND DETECTORS

Optical Sources

Light Emitting Diodes: Structures - Light Source Materials - Quantum Efficiency and LED Power - Modulation of LED, Laser Diodes: Laser Diode Modes and Threshold Conditions - Laser Diode Rate Equations - External Quantum Efficiencies - Resonant Frequencies.

Optical Detectors

Physical Principles of Photo Diodes, Photo Detector Noise, Detector Response Time, Avalanche Multiplication Noise, Structures for InGaAs & APDs, Temperature Effect on Avalanche Gain, Comparisons of Photo Detectors.

UNIT-IV: OPTICAL LINKS

Fundamental receiver operation: Digital signal transmission – Error Sources – Receiver Configuration, Digital Links: Point-to-Point Links: System consideration – Link power budget –Rise time budget – Line coding: NRZ Codes – RZ Codes – Block Codes, Noise effect on system Performance: Modal Noise – Mode-Partition Noise – Chirping – Refection Noise, Analog Links: Overview, Carrier to Noise Ratio: Carrier Noise – Photo-detector nose & Preamplifier noise – Relative Intensity Noise (RIN) – Reflection Effects on RIN, Multi-

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channel Transmission Techniques: Multichannel Amplitude Modulation - Multichannel Frequency Modulation – Subcarrier Multiplexing.

UNIT-V: OPTICAL AMPLIFIERS AND MULTICHANNEL SYSTEMS

Optical Amplifiers: Basic Concepts: Gain Spectrum and-Gain Saturation-Amplifier Noise Amplifier Applications, Raman Amplifiers: Raman Gain and Bandwidth - Amplifier Characteristics - Amplifier Performance, Erbium-Doped Fiber Amplifiers: Pumping Requirements - Gain Spectrum - Simple Theory - Amplifier Noise - Multichannel Amplification - Distributed-Gain Amplifiers.

Multichannel Systems: WDM Light wave Systems: High-Capacity Point-to-Point Links - Wide-Area and Metro-Area Networks - Multiple-Access WDM Networks, WDM Components: Tunable Optical Filters - Multiplexers and Demultiplexers - Add–Drop Multiplexers - Star Couplers - Wavelength - Optical Cross - Wavelength Converters - WDM Transmitters and Receivers

TEXT BOOKS:

1. J. Keiser, Fibre Optic communication, McGraw-Hill, 5th Ed. 2013 (Indian Edition).
2. T. Tamir, Integrated optics, (Topics in Applied Physics Vol.7), Springer-Verlag, 1975.
3. J. Gowar, Optical communication systems, Prentice Hall India, 1987.
4. S.E. Miller and A.G. Chynoweth, eds., Optical fibres telecommunications, Academic Press, 1979.
5. G. Agrawal, Nonlinear fibre optics, Academic Press, 2nd Ed. 1994.
6. G. Agrawal, Fiber optic Communication Systems, John Wiley and sons, New York, 1997
7. F.C. Allard, Fiber Optics Handbook for engineers and scientists, McGraw Hill, New York(1990).

REFERENCE BOOKS:

1. Max Ming-Kang Liu, Principles and Applications of Optical Communications, TMH,2010.
2. S. C. Gupta, Optical Fiber Communication and its Applications, PHI, 2005.

Course Outcomes:

At the end of the course the student should be able to

CO1: Gain Knowledge in optical communication, components, Mode theory, sources & detectors and Losses in optical fibers.

CO2: Analyze single & multimode fibers and analog & digital links.

CO3: Design and develop Optical sources, Detectors and links

CO4: Develop Multi-Channel Optical Systems

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Department of Electronics and Communication Engineering

BASIC ELECTRONIC INSTRUMENTATION
(Open Elective – 2)

III B.Tech II Semester

L	T	P	C
3	0	0	3

Course Objectives

- To discuss the basics of instrumentation system and its characteristics.
- To understand the fundamentals of electronic Instruments and bridges for measuring basic parameters.
- To demonstrate the principle of operation of oscilloscopes and signal generators
- To describe the principle of operation, construction and characteristics of resistance, inductance and capacitance & other transducers.
- To demonstrate the various types of basic transducers.

Unit I: Basics of Instrumentation and Its Characteristics

Functional Elements of Measurement Systems - Classification of errors, Limiting error and probable error –Error analysis –Static characteristics– accuracy, precision, sensitivity, linearity, resolution, hysteresis, threshold, input impedance, loading effect etc– generalized mathematical model of measurement systems – dynamic characteristics.

Unit II: Electronic Instruments and Bridges

Electronic Instruments for Measuring Basic Parameters: DC Volt meter, AC Voltmeter, DC Ammeter, Ohm meter, Electronic multi-meter, Digital voltmeter.

Bridge Measurement: DC bridges- Wheatstone, Kelvin Bridge, AC bridges –Hay, Maxwell, Schering and Wien bridges.

Unit III: Oscilloscopes

Oscilloscopes: Block diagram of CRO, Cathode Ray Tube, Vertical and Horizontal Deflection Systems, Delay lines, Probes, Specification of an Oscilloscope. Oscilloscope measurement Techniques, Special Oscilloscopes – Storage Oscilloscope, Sampling Oscilloscope.

Unit IV: Signal Generators and Analyzers

Signal Generators: Sine wave generator, Frequency – Synthesized Signal Generator, Sweep frequency Generator. Pulse and square wave generators. Function Generators.

Signal Analysis: Wave Analyzer, Spectrum Analyzer. Frequency Counters: Simple Frequency Counter; Distortion Analyzer.

Unit V: Transducers

Transducers: Definition-classification-characteristics-Selection Principle of operation, construction, characteristics and application of semiconductor strain gauge, LVDT, Capacitive transducer- Digital transducers- Introduction to Smart sensors and MEMS.

Text Books:

1. Modern Electronics Instrumentation & Measurement Techniques, by Albert D.Helstrick and William D. Cooper, Pearson Education.
2. Elements of Electronics Instrumentation and Measurement-3rd Edition by Joshph J.Carr. Pearson Education.

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References:

1. E.A. Doebelin, „Measurement Systems – Applications and Design", Tata Mc Graw Hill, New York, 2012
2. John P. Bentley, „Principles of Measurement Systems", 4th Edition,Pearson Education, 2005.
3. S. Ranganathan, „Transducer Engineering", Allied Publishers Pvt. Ltd.,2003.
4. D.V.S. Murthy, „Transducers and Instrumentation", Prentice Hall of India, 2011.
5. D.Patranabis, „Sensors and Transducers", Prentice Hall of India, 2004.

Course Outcomes:

After successful completion of this course, the students should be able to

- Comprehend the basics of instrumentation system and its static and dynamic characteristics.
- Classify and describe resistive, inductive, capacitive and other transducers which are used for measuring various parameters.
- Understand the working principles of oscilloscopes, signal generators and analysers.

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Department of Electronics and Communication Engineering

CONSUMER ELECTRONICS
(Open Elective – 2)

III B.Tech II Semester

L	T	P	C
3	0	0	3

Course Objectives
The course intends to:

- To introduce the concepts of consumer electronics
- To identify and solve engineering problems in consumer electronics
- To use techniques, skills and modern engineering tools used in consumer electronics

Unit -1 Audio systems

Audio System : Microphones, loudspeakers baffle and enclosure, Acoustics, mono, stereo, Quad, Amplifying System, Equalizers and Mixers Synthesizers, Commercial Sound, Theater Sound System.

Unit -2: Video Systems

Video Systems and Displays: Monochrome, Color TV standards, TFT, Plasma, HDTV, LCD, LED TV, Direct-To-Home (DTH- Set Top Box), Video Telephone and Video Conferencing

Unit – 3 Domestic & Consumer Appliances I

Washing machines, Microwave Oven, Air-conditioners and Refrigerators, Computers office System, Telephone & Mobile Radio System

Unit-4 Domestic & Consumer Appliances II

Power Supplies SMPS/UPS and Preventive Maintenance and others systems such as Remote controls, Bar codes, RFID Product

Unit-5 Safety & Liability Issues

Product Compliance: Product safety and liability issues; standards related to electrical safety and fire hazards, EMI/EMC requirements, design techniques for ESD, RF interference and immunity, line current harmonics and mains voltage surge.

TEXT BOOKS

1. Consumer Electronics; SP Bali; Pearson Education.
2. Consumer Electronics; J.S. Chitode; Technical Publications, Pune

Course Outcomes:
At the end of the course the student should be able to

CO1: Understand electronics engineering concepts used in consumer electronics systems.
CO2: Identify the need of preventive maintenance in various electronic appliances.
CO3: Evaluate and analyze different electronic products and systems based on specifications.
CO4: Use different product safety, compliance standards and techniques associated with electronic products.

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Department of Electronics and Communication Engineering

DIGITAL SIGNAL PROCESSING LABORATORY

III B.Tech II semester

L	T	P	C
0	0	2	1

Note: Minimum 12 Experiments have to be conducted

Course Objectives:

The aim of the course is to simulate and verify transform on signals, design of Filters and implementation of Multirate systems

1. Generation of Sinusoidal Waveform / Signal based on Recursive Difference Equations.
2. To find DFT / IDFT of given DT Signal.
3. To find Frequency Response of a System given in Transfer Function/ Differential equation form.
4. Implementation of FFT of given Sequence.
5. Determination of Power Spectrum of a given Signal(s).
6. Implementation of LP FIR Filter for a given Sequence/Signal.
7. Implementation of HP IIR Filter for a given Sequence/Signal.
8. Generation of Narrow Band Signal through Filtering.
9. Generation of DTMF Signals.
10. Implementation of Decimation Process.
11. Implementation of Interpolation Process.
12. Implementation of I/D Sampling Rate Converters.
13. Step and Ramp Response of First order and Second Order Systems.

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Department of Electronics and Communication Engineering

CONTROL SYSTEMS

(B.Tech. Electronics and Communication Engineering)

III B.Tech I semester

L	T	P	C
3	0	0	3

Prerequisite: Linear Algebra and Calculus, Ordinary Differential Equations and Multivariable Calculus Laplace Transforms , Numerical Methods and Complex variables

Course objectives:

- To understand the different ways of system representations such as Transfer function representation and state space representations and to assess the system dynamic response
- To assess the system performance using time domain analysis and methods for improving it
- To assess the system performance using frequency domain analysis and techniques for improving the performance
- To design various controllers and compensators to improve system performance

UNIT - I

Introduction to Control Problem: Industrial Control examples. Mathematical models of physical systems. Control hardware and their models. Transfer function models of linear time-invariant systems. Feedback Control: Open-Loop and Closed-loop systems. Benefits of Feedback. Block diagram algebra.

UNIT - II

Time Response Analysis of Standard Test Signals: Time response of first and second order systems for standard test inputs. Application of initial and final value theorem. Design specifications for second-order systems based on the time-response. Concept of Stability. Routh-Hurwitz Criteria. Relative Stability analysis. Root-Locus technique. Construction of Root-loci.

UNIT - III

Frequency-Response Analysis: Relationship between time and frequency response, Polar plots, Bode plots. Nyquist stability criterion. Relative stability using Nyquist criterion – gain and phase margin. Closed-loop frequency response.

UNIT - IV

Introduction to Controller Design: Stability, steady-state accuracy, transient accuracy, disturbance rejection, insensitivity and robustness of control systems. Root-loci method of feedback controller design. Design specifications in frequency-domain. Frequency-domain methods of design. Application of Proportional, Integral and Derivative Controllers, Lead and Lag compensation in designs. Analog and Digital implementation of controllers.

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UNIT - V

State Variable Analysis and Concepts of State Variables: State space model. Diagonalization of State Matrix. Solution of state equations. Eigen values and Stability Analysis. Concept of controllability and observability. Pole-placement by state feedback. Discrete-time systems. Difference Equations. State-space models of linear discrete-time systems. Stability of linear discrete-time systems.

TEXT BOOKS:

1. M. Gopal, "Control Systems: Principles and Design", McGraw Hill Education, 1997.
2. B. C. Kuo, "Automatic Control System", Prentice Hall, 1995.

REFERENCE BOOKS:

1. K. Ogata, "Modern Control Engineering", Prentice Hall, 1991.

Course Outcomes: At the end of this course, students will demonstrate the ability to

CO 1: Understand the modeling of linear-time-invariant systems using transfer function and state space representations.

CO 2: Understand the concept of stability and its assessment for linear-time invariant systems.

CO3: Design simple feedback controllers.

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Department of Electronics and Communication Engineering

PERSONALITY DEVELOPMENT AND BEHAVIOURAL SKILLS
(Common to all branches)

III B.Tech I semester

L	T	P	C
2	0	0	1

Course Objectives

The course intends to:

- Enable students to practice optimistic attitude
- Develop effective non-verbal communication
- Build team dynamics for professional accomplishments
- Improve Interpersonal Skills for professional needs
- Endow students with essential, effective & intelligible correspondence

Unit – I Personality Development:

Definition - Various Aspects of Personality Development - Behavioural Traits. Importance of Soft Skills for personal and professional development - Success stories

Unit – II Non Verbal Communication:

Kinesics, Haptics, Proxemics, Vocalics, Oculesics Body Language in formal contexts such as Group Discussions, Presentations and Interviews

Unit - III Team Dynamics:

Different Types of Teams – Role of an individual – Communicating as a group or team leader Individual Presentations/Team Presentation - Project Presentations- Case Studies

UNIT-IV Interpersonal Skills:

Time Management - Stress Management - Emotional Intelligence - Conflict Management - Relationship Management

UNIT-V Digital Correspondence:

Role of Multimedia in Communication - Communication in a Digital Edge (Video Conference Etc.) Social Networking: Importance and Effects.

Reference Books

1. Barun, K Mitra, Personality Development and Soft Skills, Oxford University Press, 2nd Edition, 2016.
2. Gopalaswamy Ramesh, the Ace of Soft Skills: Attitude, Communication and Etiquette for Success, Pearson Education, 2013.
3. Krishna Mohan & Meera Banerji, Developing Communication Skills, Macmillan India Ltd, 2008.
4. Krishna Mohan & Meenakshi Raman, Effective English Communication, Tata McGraw- Hill Publishing Company Ltd, 2008.

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Department of Electronics and Communication Engineering

MANAGERIAL ECONOMICS AND FINANCIAL ANALYSIS

III B.Tech II semester

L	T	P	C
3	0	0	3

Course Objective:

- To learn the basic Business types, impact of the Economy on Business and Firms specifically.
- To analyze the Business from the FinancialPerspective.

UNIT – I Introduction to Business and Economics:

Business: Structure of Business Firm, Theory of Firm, Types of Business Entities, Limited Liability Companies, Sources of Capital for a Company, Non-Conventional Sources of Finance.

Economics: Significance of Economics, Micro and Macro Economic Concepts, Concepts and Importance of National Income, Inflation, Money Supply in Inflation, Business Cycle, Features and Phases of Business Cycle. Nature and Scope of Business Economics, Role of Business Economist, Multidisciplinary nature of Business Economics.

UNIT – II Demand and Supply Analysis:

Elasticity of Demand: Elasticity, Types of Elasticity, Law of Demand, Measurement and Significance of Elasticity of Demand, Factors affecting Elasticity of Demand, Elasticity of Demand in decision making, Demand Forecasting: Characteristics of Good Demand Forecasting, Steps in Demand Forecasting, Methods of Demand Forecasting.

Supply Analysis: Determinants of Supply, Supply Function & Law of Supply.

UNIT- III Production, Cost, Market Structures & Pricing:

Production Analysis: Factors of Production, Production Function, Production Function with one variable input, two variable inputs, Returns to Scale.

Cost analysis: Types of Costs. Market Structures: Nature of Competition, Features of Perfect competition, Monopoly, Oligopoly, and Monopolistic

Competition. Pricing: Types of Pricing, Product Life Cycle based Pricing, Break Even Analysis, and Cost Volume Profit Analysis

UNIT - IV Financial Accounting:

Accounting concepts and Conventions, Accounting Equation, Double-Entry system of Accounting, Rules for maintaining Books of Accounts, Journal, Posting to Ledger, Preparation of Trial Balance, and Preparation of FinalAccounts.

UNIT - V Financial Analysis through Ratios:

Concept of Ratio Analysis, Liquidity Ratios, Turnover Ratios, Profitability Ratios, Proprietary Ratios, Solvency, Leverage Ratios (simple problems)

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TEXT BOOKS:

1. D. D. Chaturvedi, S. L. Gupta, Business Economics - Theory and Applications,International Book House Pvt. Ltd.2013.
2. Dhanesh K Khatri, Financial Accounting, Tata McGraw Hill, 2011.
3. Geethika Ghosh, Piyali Gosh, Purba Roy Choudhury, Managerial Economics, 2e,Tata McGraw Hill Education Pvt. Ltd.2012.

REFERENCES:

1. Paresh Shah, Financial Accounting for Management 2e, Oxford Press,2015.
2. S. N. Maheshwari, Sunil K Maheshwari, Sharad K Maheshwari, Financial Accounting,5e, Vikas Publications,2013

Course Outcomes:

- The students will understand the various Forms of Business and the impact of economic variables on the Business.
- The Demand, Supply, Production, Cost, Market Structure, Pricing aspects are learnt. The Students can study the firm's financial position by analyzing the Financial Statements of aCompany

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Department of Electronics and Communication Engineering

ADVANCED COMMUNICATION SKILLS LABORATORY

III B.Tech II semester

L	T	P	C
0	0	2	1

The introduction of the Advanced Communication Skills Lab is considered essential at 3rd year level. At this stage, the students need to prepare themselves for their careers which may require them to listen to, read, speak and write in English both for their professional and interpersonal communication in the globalised context.

Course Objectives:

This Lab focuses on using multi-media instruction for language development to meet the following targets:

- To improve the students' fluency in English, through a well-developed vocabulary and enable them to listen to English spoken at normal conversational speed by educational English speakers and respond appropriately in different socio-cultural and professional contexts.

1. **Activities on Fundamentals of inter-personal Communication and Building Vocabulary**
   – Starting a conversation – responding appropriately and relevantly – using the right body language - Role Play in different situations & Discourse Skills – using visuals – Synonyms and antonyms, word roots, one word substitutes, prefixes and suffixes, study of word origin, business vocabulary, analogy, idioms and phrases, collocations & usage of vocabulary.

2. **Activities on Reading Comprehension** – General Vs Local comprehension, reading for facts, guessing meanings from context, scanning, skimming, inferring meaning, critical reading & effective googling.

3. **Activities on Writing Skills** – Structure and presentation of different types of writing – letter writing/ Resume writing/ Statement of purpose - E-correspondence/ Technical report writing
   / Portfolio writing – planning for writing – improving one's writing.

4. **Activities on Presentation Skills** – Oral presentations (individual and group) through JAM sessions/seminars/PPTs and written presentations through posters/projects/reports/e- mails/assignments etc.

5. **Activities on Group Discussion and interview Skills** – Dynamics of group discussion, intervention, summarizing, modulation of voice, body language, relevance, fluency and organization of ideas and rubrics for evaluation. Concept and process, pre-interview planning, opening strategies, answering strategies, interview through tele-conference & video
   – conference and Mock Interviews.

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Books Recommended:

1. Technical Communication by Meenakshi Raman & Sangeeta Sharma, Oxford University 2009.
2. Advanced Communication Skills Laboratory Manual by Sudha Rani, D. Pearson Education 2011.
3. Technical Communication by Paul V. Anderson. 2007. Cengage Learning pvt. Ltd. New Delhi.
4. Business and Professional Communication: Keys for Workplace Excellence. Kelly M. Quintanilla & Shawn T. Wahl. Sage South Asia Edition. Sage Publications. 2011.
5. The Basics of Communication: A Relational Perspective. Steve Duck & David T. Mc Mahan. Sage South Asia Edition. Sage Publications. 2012.
6. English Vocabulary in Use series, Cambridge University Press. 2009
7. Management Shapers Series by Universities Press (India) Pvt. Ltd. Himayatnagar, Hyderabad. 2008.
8. Handbook for Technical Communication by David A. McMurrey & Joanna Buckley. 2012. Cengage Learning.
9. Communication Skills by Leena Sen.PHI Learning Pvt. Ltd. New Delhi. 2009.
10. Handbook for Technical Writing by David A McMurrey & Joanna Buckley Cengage Learning. 2008.
11. Job Hunting by Colm Downess, Cambridge University Press 2008.
12. Master Public Speaking by Anne Nicholls, JAICO Publishing House, 2006.
13. English for Technical Communication for Engineering Students, Aysha Vishwamohan, Tata Mc Graw-Hill. 2009.
14. Books on TOEFL/GRE/GMAT/ICAT/IELTS by Barron's/DELTA/Cambridge University Press.
15. International English for Call Centres by Barry Tomalin and Suhashini Thomas Macmillan Publishers. 2009.

Course Outcomes:

The proposed course should be a laboratory course to enable students to use _good' English and perform the following:

- Gathering ideas and information to organize ideas relevantly and coherently.
- Engaging in debates.
- Participating in group discussions.
- Facing interviews.
- Writing project/research reports/technical reports.
- Making oral presentations.
- Writing formal letters.
- Transferring information from non-verbal to verbal texts and vice-versa.

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Department of Electronics and Communication Engineering

QUANTITATIVE METHODS & LOGICAL REASONING
(From Training and Placement Dept.)

III B.Tech II semester

L	T	P	C
2	0	0	1

Course Objectives:

1. The objective of this course is to enhance the problem solving skills in the areas of **„Quantitative Aptitude"** and **„Reasoning"** which will enable the students to better preparation for **Campus Placements** and competitive examinations.
2. To improve the logical thinking and mathematical ability of the students

Unit – I

Number System:
Speed maths, Numbers, Factors, prime & Co primes, LCM & HCF, Divisibility rules, finding unit place digit and last two digits of an expression

Ratio, Proportion and Variations:
Definition of ratio, ratio of Proportion, Comparison of ratios, Compound ratio, Direct and indirect proportion

Percentages:
Converting fractions and decimal into percentages, successive percentage, populations, expenditure and savings

Profit and loss:
Relation between Cost price and selling price, Discount and Marked price, Gain or Loss percentages on selling price

Simple and Compound Interest:
Problems on interest (**I**), amount (**A**), Principal (**P**) and rate of interest(**R**) difference between the simple interest and compound interest for 2 and 3 years.

Unit-II

Partnership:
Relation between partners, period of investment and shares

Averages, Ages and Allegation
Average of different groups, change in averages by Adding, deleting and Replacement of objects, problems on ages. Allegation rule, mean value of the mixture, Replacement of equal amount of quantity.

Time and Work:
Men and Days, Work and Wages, pipes and cisterns, hours and work, Alternate days concept,

Time and Distance:
Difference between the average and Relative speeds, reaching the destination late and early, Stoppage time per hour, time and distance between two moving bodies Train crossing man, same and opposite directions, Speed of boat and stream,

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Unit-III

Progressions and Quadratic Equations

Arithmetic, Geometric and Harmonic Progressions, Arithmetic Mean, Geometric Mean and Harmonic Mean and their relations. General form of Quadratic equation, finding the roots of Quadratic equation, Nature of the Roots.

Permutation and Combination:

Fundamental rules, problems on permutations & combinations.

Probability

Definition of probability, notations and formulae, problems on probability.

Data Interpretation and Data Sufficiency:

Tabular and Pie-charts, Bar and Line graphs, Introduction to data sufficiency, problems on data sufficiency.

Unit-IV Deductions:

Statements and conclusions using Venn diagram and Syllogism method

Series completion:

Number series, Alphabet series, letter series.

Coding and Decoding:

Letter coding, Number coding, Number to letter coding, Matrix coding, Substitution, Mixed letter coding, Mixed number coding, Deciphering individual letter codes by analysis.

Analytical Reasoning Puzzles:

Problems on Linear, Double line-up and Circular arrangements, Selections and Comparisons.

Blood Relations:

Defining the various relations among the members of a family, Solving Blood Relation Puzzles by using symbols and notations. Problems on Coded relations.

Unit-V

Direction sense test:

Sort of directions in puzzles distance between two points, problems on shadows, Application of triangular triplets.

Clocks:

Relation between minute-hour hands, angle vs time, exceptional cases in clocks

Calendars:

Definition of a Leap Year, Finding the Odd days, Finding the day of any random calendar date, repetition of calendar years.

Cubes and Dices:

Finding the minimum and maximum number of identical pieces and cuts, painting of cubes and cuts, problems on dice.

Venn diagrams:

Circular representation of given words, Geometrical representation of certain class, set theory based problems.

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SYLLABUS IV YEAR

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Department of Electronics and Communication Engineering

EMBEDDED SYSTEM DESIGN

IV B.Tech I-Semester

L	T	P	C
3	1	0	3

Prerequisite

- Microprocessor and Microcontrollers

Course Objectives

- To provide an overview of design principles of Embedded System.
- To provide clear understanding about the role of firmware, operating systems in correlation with hardware systems.

UNIT I: Introduction to Embedded Systems

Definition of Embedded System, Embedded Systems Vs General Computing Systems, History of Embedded Systems, Classification, Major Application Areas, Purpose of Embedded Systems, Characteristics and Quality Attributes of Embedded Systems.

UNIT II: Typical Embedded System

Core of the Embedded System: General Purpose and Domain Specific Processors, ASICs, PLDs, Commercial Off-The-Shelf Components (COTS), Memory: ROM, RAM, Memory according to the type of Interface, Memory Shadowing, Memory selection for Embedded Systems, Sensors and Actuators, Communication Interface: Onboard and External Communication Interfaces.

UNIT III: Embedded Firmware

Reset Circuit, Brown-out Protection Circuit, Oscillator Unit, Real Time Clock, Watchdog Timer, Embedded Firmware Design Approaches and Development Languages.

UNIT IV: RTOS Based Embedded System Design

Operating System Basics, Types of Operating Systems, Tasks, Process and Threads, Multiprocessing and Multitasking, Task Scheduling.

UNIT V: Task Communication

Shared Memory, Message Passing, Remote Procedure Call and Sockets, Task Synchronization: Task Communication/Synchronization Issues, Task Synchronization Techniques, Device Drivers, How to Choose an RTOS.

TEXTBOOKS

1. Introduction to Embedded Systems - Shibu K.V, Mc Graw Hill.

REFERENCES

1. Embedded Systems - Raj Kamal, TMH.
2. Embedded System Design - Frank Vahid, Tony Givargis, John Wiley.
3. Embedded Systems – Lyla, Pearson, 2013
4. An Embedded Software Primer - David E. Simon, Pearson Education.

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Course Outcomes:

CO1: Expected to understand the selection procedure of Processors in the embedded domain.
CO2: Design Procedure for Embedded Firmware.
CO3: Expected to visualize the role of Real time Operating Systems in Embedded Systems
CO4: Expected to evaluate the Correlation between task synchronization and latency issues

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Department of Electronics and Communication Engineering

VLSI DEISGN

IV B.Tech I-Semester

L	T	P	C
3	1	0	3

Prerequisites

- Electronic devices &circuits
- Switching Theory and logic design

Course Objectives

In this course it is aimed to introduce to the students with

- To enumerate different steps involved in Integrated Circuits technology for MOS transistor and explain the primary and secondary effects of MOSFET and BICMOS.
- To outline the design process involved in VLSI design flow for design of MOS transistors.
- Provide an understanding in to the concepts and types of memories and design of memory circuits.
- To study and design digital circuits using Verilog HDL.

UNIT-I

Introduction: Introduction to IC Technology — MOSFET – CMOS - BiCMOS

Basic Electrical Properties: Electrical Properties- MOS- primary characteristics - threshold Voltage – Secondary characteristics- Ratioed Circuits- CMOS, BiCMOS Inverter – analysis-design.

UNIT-II

VLSI Circuit Design Processes: VLSI Design Flow - MOS Layers - Stick Diagrams - Design rules - wires – Contacts – Transistors- Layout Diagrams – NMOS – PMOS - CMOS Inverters – Gates - Scaling of MOS circuits.

UNIT-III

Gate Level Design: Logic Gates – Pass transistors, Transmission gate- Switch logic - Alternate gate circuits, Latches- Time delays - Driving large capacitive loads - Wiring capacitance, Fan — in, Fan — out, Choice of layers.

Programmable Logic Devices: ROM – PLA - PAL-Design Approach - CPLDs – FPGA - Parameters influencing low power design.

UNIT-IV

Introduction to Verilog HDL:

Overview of Digital Design with Verilog HDL, typical HDL-flow, Concurrency, Simulation and Synthesis, Functional verification;

Gate Level Modeling: Introduction, Modeling using basic Verilog gate primitives, description of AND, OR, NOT type gates, Design of Flip – Flops with Gate Primitives, Delays

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UNIT-V

Dataflow Modeling:
Continuous assignments, delay specification, expressions, operators, operands, operator types; **Behavioral Modeling:** Structured procedures, initial and always, blocking and non-blocking statements, The Case Statement, for Loop, While Loop, Design of Flip flop, Shift register

TEXT BOOKS

1. Essentials of VLSI Circuits and Systems — Kamran Eshraghian, EshraghianDougles and A. Pucknell, PHI, 2005 Edition.
2. CMOS VLSI Design — A Circuits and Systems Perspective, Neil H. E Weste, David Harris, Ayan Banerjee, 3rd Ed, Pearson, 2009.
3. Modern VLSI Design - Wayne Wolf, Pearson Education, 3rd Edition, 1997.
4. T R Padmanabhan, B.Bala Tripura Sundari, Design Through Verilog HDL,2009, Wiley.

REFERENCES

1. CMOS logic circuit Design – John .P. Uyemura, Springer, 2007.
2. VLSI Design- K. Lal Kishore, V. S. V. Prabhakar, I.K International, 2009.
3. Introduction to VLSI — Mead & Convey, BS Publications 2010.
4. Stephen Brown, Zvonkoc Vranesic, "Fundamentals of Digital Logic with Verilog Design", 2nd Edition, 2010, TMH

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Department of Electronics and Communication Engineering

DIGITAL IMAGE PROCESSING
(Professional Elective-3)

IV B.Tech I Semester

L	T	P	C
3	0	0	3

Pre Requisites:

- Signals Systems
- Probability theory and stochastic processes
- Digital Signal Processing

Course Objectives:

In this course it is aimed to introduce

- The basic operations involved in various changes of digital image processing

UNIT-I: Fundamentals of Image Processing

Elements of Digital Image Processing Systems – Image sensing and Acquisition- Elements of Visual Perception – structure of human eye – light- luminance- brightness and contrast- image formation- Basic steps of image processing- Sampling -Quantization and Digital Image representation - Basic relationships between pixels– neighborhood, adjacency, connectivity, distance measures..

UNIT-II: Image Enhancement in Spatial & frequency domain

Image Enhancement in Spatial domain: Introduction-Point Processing-Histogram processing- Arithmetic and logical operations-Fundamentals of Spatial filtering-masking-Spatial filters for Smoothing - Spatial filters for Sharpening.

Image Enhancement in Frequency domain: Need for transform-Basics of filtering in frequency domain-Image smoothing in frequency domain-Image sharpening in frequency domain

UNIT-III: Image Restoration

Introduction- Degradation model –Noise models-Spatial domain filtering for restoration- Mean Filters – Order Statistics filters – Adaptive filters –frequency domain filtering for noise removal - Band reject Filters – Band pass Filters – Notch Filters –Degradation function estimation– Inverse filtering – Wiener filter.

UNIT-IV: Image Segmentation and Morphological processing

Image Segmentation: Segmentation concepts - Point - Line - Edge Detection-Thresholding based segmentation- Local- Global and Adaptive Thresholding- Region based segmentation-Region growing-Region splitting and merging.

Morphological processing: Introduction- structuring element – erosion – dilation – Opening - closing.

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UNIT-V: Image Compression

Image Compression: Introduction-Redundancy in images-Fidelity Criteria-Image compression model-Lossless compression-Huffman coding -Lossless Predictive coding- Lossy compression– lossy predictive coding- Transform coding –Image compression standards- JPEG and JPEG 2000.

TEXT BOOKS

1. Rafael C. Gonzales- Richard E. Woods- "Digital Image Processing"- Third Edition- Pearson Education- 2010.
2. Anil K. Jain- Fundamentals of Digital Image Processing- PHI Learning Private Limited- New Delhi- 2002.

REFERENCES

1. Rafael C. Gonzalez- Richard E woods and Steven L.Eddins- "Digital Image processing using MATLAB"- Tata McGraw Hill- Second Edition- 2010.
2. William K Pratt- "Digital Image Processing"- 3rd Edition- John Wiley & Sons- 2002.
3. Jayaramann S- S Esakkirajan- T Veerakumar- "Digital Image processing"- Tata McGraw Hill Education- 2011.
4. Greenberg A.D. and S.Greenberg- "Digital Images: A Practical Guide"- 1st Edition- McGraw Hill- 1995.
5. Edward R Dougherty- "Electronic Imaging Technology"- 1st Edition- PHI- 2005.
6. John C. Russ- The Image Processing Handbook- 6th Edition- CRC Press- Taylor & Francis Group- 2011.
7. Bernd Jähne- Digital Image Processing- 5th Revised and Extended Edition- Springer- 2002.
8. Malay K. Pakhira- "Digital Image Processing and Pattern Recognition"- First Edition- PHI Learning Pvt. Ltd- 2011.

Course Outcomes:

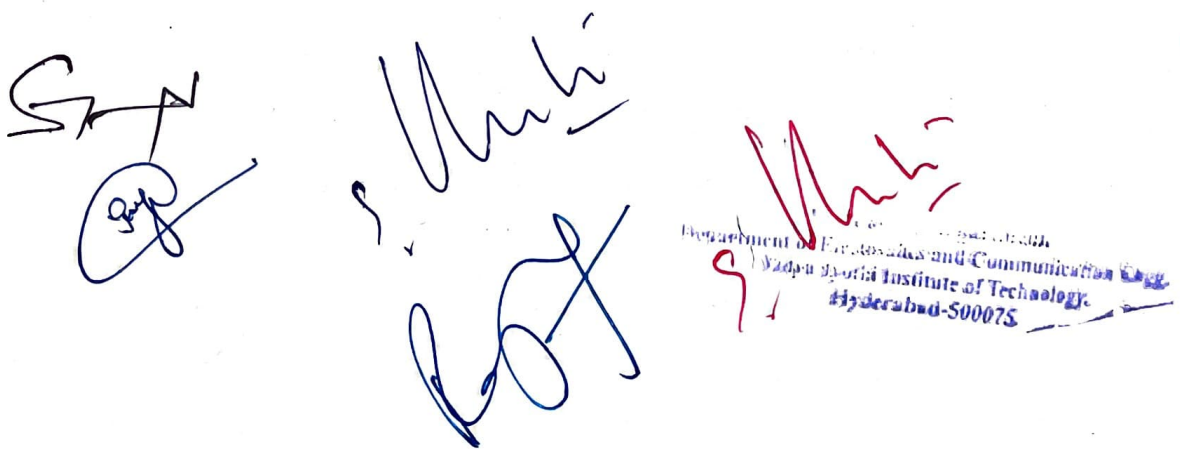
At the end of the course the student should be able to

CO1: State the Digital Image Fundamentals and operation associated with various stages of image processing.

CO2: Illustrate the mathematics involved in various stages of image processing.

CO3: Demonstrate the operations various stages of image processing.

CO4: Contrast the different types of operation and its impact on images.



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Department of Electronics and Communication Engineering

CELLULAR AND MOBILE COMMUNICATIONS
(Professional Elective-3)

IV B.Tech I semester

L	T	P	C
3	0	0	3

Pre Requisites

- Analog and Digital Communication
- Computer Networks

Course Objectives

By the end of the course the student will be able to

- Understand the concepts of mobile communication, Radio Models, antennas, Equalization and applications

UNIT I

Introduction to Cellular Mobile Radio Systems:

Limitations of Conventional Mobile Telephone Systems, Basic Cellular Mobile System, First, Second, Third and Fourth Generation Cellular Wireless Systems, Uniqueness of Mobile Radio Environment- Fading -Time Dispersion Parameters, Coherence Bandwidth, Doppler Spread and Coherence Time.

Fundamentals of Cellular Radio System Design:

Concept of Frequency Reuse, Co-Channel Interference, Co-Channel Interference Reduction Factor, Desired C/I From a Normal Case in a Omni Directional Antenna System, System Capacity Improving Coverage and Capacity in Cellular Systems- Cell Splitting, Sectoring, Microcell Zone Concept.

UNIT II

Co-Channel Interference:

Measurement Of Real Time Co-Channel Interference, Design of Antenna System, Antenna Parameters and Their Effects, Diversity Techniques-Space Diversity, Polarization Diversity, Frequency Diversity, Time Diversity.

Non-Co-Channel Interference:

Adjacent Channel Interference, Near End Far End Interference, Cross Talk, Effects on Coverage and Interference by Power Decrease, Effects of Cell Site Components.

UNIT III

Cell Coverage for Signal and Traffic:

Signal Reflections in Flat And Hilly Terrain, Effect of Human Made Structures, Phase Difference Between Direct and Reflected Paths, Constant Standard Deviation, Straight Line Path Loss Slope, General Formula for Mobile Propagation Over Water and Flat Open Area, Near and Long Distance Propagation, Path Loss From a Point to Point Prediction Model in Different Conditions, Merits of Lee Model.

Cell Site and Mobile Antennas:

Space Diversity Antennas, Umbrella Pattern Antennas, Minimum Separation of Cell Site Antennas, Mobile Antennas.

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UNIT IV

Frequency Management and Channel Assignment:

Numbering And Grouping, Setup Access And Paging Channels, Channel Assignments to Cell Sites and Mobile Units, Channel Sharing and Borrowing, Sectorization, Overlaid Cells, Non Fixed Channel Assignment.

UNIT V

Handoffs and Dropped Calls

Handoff Initiation, Types of Handoff, Delaying Handoff, Advantages of Handoff, Power Difference Handoff, Forced Handoff, Mobile Assisted and Soft Handoff, Intersystem Handoff, Introduction to Dropped Call Rates and their Evaluation.

TEXT BOOKS

1. Mobile Cellular Telecommunications – W.C.Y. Lee, Mc Graw Hill, 2nd Ed., 1989.
2. Wireless Communications - Theodore. S. Rapport, Pearson Education, 2nd Ed., 2002.

REFERENCES

1. Principles of Mobile Communications – Gordon L. Stuber, Springer International, 2nd Ed., 2001.
2. Modern Wireless Communications-Simon Haykin, Michael Moher, Pearson Eduction, 2005.
3. Wireless Communications and Networking, Vijay Garg, Elsevier Publications, 2007.
4. Wireless Communications – Andrea Goldsmith, Cambridge University Press, 2005.

CourseOutcomes:

At the end of the course, students will demonstrate the ability to:

CO1: Understand the principles of mobile communications, radio models, Antennas for Mobile communication, Equalization and applications.

CO2: Interpret the propagation models of Mobile and its effect on Antenna, Diversity and applications.

CO3: Relate the concepts of propagation models with channel interference

CO4: Explain the propagation models, channel interference, antenna design for the recent mobile systems

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Department of Electronics and Communication Engineering

RADAR ENGINEERING
(Professional Elective-3)

IV B.Tech I Semester

L	T	P	C
3	0	0	3

Pre Requisites

- Signal and Systems
- Analog and Digital Communications
- Antennas and Propagation

Course Objectives:

In this course it is aimed to introduce

- Radar Fundamentals, types, systems and noise analysis based on application

UNIT – I

Basics of Radar: Introduction- Maximum Unambiguous Range- Radar Waveforms-- Radar Block Diagram and Operation- Radar Frequencies and Applications. Prediction of Range Performance- Minimum Detectable Signal- Receiver Noise.

Radar Equation: Simple and Modified form of Radar Range Equation with Illustrative Problems - SNR- Envelop Detector-False Alarm Time and Probability- Integration of Radar Pulses- Radar Cross Section of Targets (simple targets - sphere- cone-sphere)- Transmitter Power- PRF and Range Ambiguities- System Losses (qualitative treatment)- Illustrative Problems.

UNIT – II

CW and Frequency Modulated Radar: Doppler Effect- CW Radar – Block Diagram- Isolation between Transmitter and Receiver- Non-zero IF Receiver- Receiver Bandwidth Requirements- Applications of CW radar- Illustrative Problems.

FM-CW Radar: Range and Doppler Measurement- Block Diagram and Characteristics- FM-CW altimeter- Measurement Errors- Multiple Frequency CW Radar.

UNIT – III

MTI and Pulse Doppler Radar: Introduction- Principle- MTI Radar with Power Amplifier Transmitter and Power Oscillator Transmitter- Delay Line Cancellers – Filter Characteristics- Blind Speeds- Double Cancellation- Staggered PRFs- Range Gated Doppler Filters- MTI Radar Parameters- Limitations to MTI Performance- MTI versus Pulse Doppler Radar.

UNIT – IV

Tracking Radar: Tracking With Radar- Sequential Lobing- Conical scan-Mono pulse Tracking Radar-Amplitude Comparison Mono pulse (One-And Two-Coordinates)-Phase Comparison Monopulse- Tracking In Range- Acquisition and Scanning Patterns- Comparison Of Trackers.

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UNIT – V

Detection of Radar Signals in Noise: Introduction- Matched Filter Receiver-Response Characteristics and Derivation- Correlation Function and Cross-Correlation Receiver-Efficiency of Non-Matched Filters- Matched Filter with Non-White Noise.

Radar Receivers-Noise Figure and Noise Temperature- Display-Types- Duplexers-Branch types And Balanced type- Circulators as Duplexers. Introduction to Phased Array Antennas-Basic concepts- Radiation Pattern- Beam Steering and Beam Width changes- Advantages and Limitations- Applications.

TEXT BOOKS

1. Introduction to radar systems-Merrill I.Skolnik- TMH special Indian edition-2nd ed.-2007.

REFERENCES

1. Radar: Principles- Technology- Applications-Byron Edde- Pearson Education- 2004.
2. Radar Principles- Peebles- Jr.- P.Z.- Wiley- New York- 1998.
3. Principles Of Modern Radar: Basic Principles-Mark A. Richards- James A.Scheer-William A.Holm-Yesdee-2013.
4. Electronic Communication Systems: Kennedy; TMH – 4th edition

Course Outcomes

At the end of the course the student should be able to

CO1: Understand the concepts of radar fundamentals, noise analysis and evaluation of radar.
CO2: Differentiate various types of radar transmitters and receivers.
CO3: Relate the different types of radar transmitter and receiver.
CO4: Categorize the type of radar system and noise analysis based on applications.

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Department of Electronics and Communication Engineering

BIOMEDICAL INSTRUMENTATION
(Professional Elective-4)

IV B.Tech I Semester

L	T	P	C
3	0	0	3

Pre Requisites

- Electronic Measurement and Instrumentation
- Analog and Pulse Circuits
- Linear and Digital IC Applications

Course Objectives

In this course it is aimed to introduce

- The need for biomedical instrumentation, electrode theory and telemetry associated with it.
- The various measurements involved in human cardiovascular and respiratory system.

UNIT-I: Introduction

The age of Biomedical Engineering, Development of Biomedical Instrumentation, Man–Instrumentation system, Components, Physiological system of the body, Problem encountered in measuring a living system. Transducers & Electrodes: The Transducers & Transduction principles, Active transducers, Passive Transducers, Transducer for Biomedical Applications.

UNIT-II: Sources of Bioelectric potentials

Resting & Action potentials, propagation of active potential, The Bioelectric potentials-ECG, EEG, EMG, and Invoked responses Electrodes: Electrode theory, Biopotential Electrodes–Microelectrodes Body surface electrodes, Needle Electrodes, Biochemical Transducers, Reference electrodes, PH electrodes, Blood Gas electrodes.

UNIT-III: Cardiovascular Measurements

Electrocardiography – ECG amplifiers, Electrodes & leads, ECG recorders - Three channel, Vector Cardiographs, ECG system for stress testing, Continuous ECG recording (Holter recording), Blood pressure measurement, Blood flow measurement, Heart sound measurements. Patient Care & Monitoring- Elements of Intensive Care monitoring, patient monitoring displays, Diagnosis, Calibration & Reparability of patient monitoring equipment, pacemakers & Defibrillators.

UNIT-IV: Measurements in Respiratory system

Physiology of respiratory system Measurement of breathing mechanics- Spiro meter, Respiratory Therapy equipment's: Inhalators ventilators & Respirators, Humidifiers, Nebulizers & Aspirators. Diagnostic Techniques: Ultrasonic Diagnosis Echocardiography, Echo Encephalography, Ophthalmic scans, X-Ray & Radio-isotope Instrumentation, Computerized Axial Tomography Scanners

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UNIT-V: Bio Telemetry

The components of Biotelemetry system Implantable units, Telemetry for ECG measurements during exercise, for Emergency patient monitoring. Physiological Effects of Electric Current Safety of Medical Electronic Equipments, Shock hazards from Electrical equipment and prevention against them.

TEXT BOOKS

1. Cormwell / "Biomedical Instrumentation and Measurements"/ Prentice Hall (India).

REFERENCES

1. Khandpur R.S./ "Biomedical Instrumentation"/ Tata McGraw-Hill.
2. Tompkins / "Biomedical DSP: C Language Examples and Laboratory Experiments for the IBM PC"/ Prentice Hall (India).

Course Outcomes

At the end of the course the student should be able to

CO1: Summarize the requirement of biomedical instrumentation and adversity involved in human measurement.
CO2: Utilize the concept of electrode and its responses used in real time.
CO3: Outline the divergent responses involved in cardiovascular and respiratory system.
CO4: Compare the various processes involved in bio telemetry.

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Department of Electronics and Communication Engineering

SATELLITE COMMUNICATIONS
(Professional Elective-4)

IV B.Tech I Semester

L	T	P	C
3	0	0	3

Prerequisites

- Antenna And Wave Propagation
- Analog & Digital Communication
- Computer Networks

Course Objectives

In this course it is aimed to

- Excel in basic knowledge of satellite communication principles and different multiple access systems.
- Design a satellite link with specified CNR and apply to telemetry, tracking, command and monitor power systems etc.

UNIT-I:

Introduction to Satellite Communication: Principles and architecture of satellite Communication, Brief history of Satellite systems, advantages, disadvantages, applications and frequency bands used for satellite communication.

Orbital Mechanics: Orbital equations, Kepler's laws, Apogee and Perigee for an elliptical orbit,

evaluation of velocity, orbital period, angular velocity etc. of a satellite, concepts of Solar day and Sidereal day. Placement of Satellite in a Geo-stationary orbit

UNIT-II:

Satellite sub systems: Attitude and orbit control system, TT& C subsystem, control subsystem, power systems, communication subsystems, satellite antenna equipment

Satellite link: Basic Transmission Theory, System noise temperature and G/T ratio, Basic link analysis, Interference analysis , Design of satellite links for a specified C/N (with and without frequency reuse), Link budget

UNIT – III:

Propagation effects: Introduction, Atmospheric Absorption, Cloud attenuation, Tropospeheric and Ionospheric scintillation, and low angle fading , Rain induced attenuation, Rain induced cross polarization interference.

Multiple Access: Frequency division multiple access(FDMA), inter modulation, calculation of C/N, Time division multiple access(TDMA) – frame structure, Burst structure, Satellite switched TDMA, on-board processing, Demand Assignment multiple Access (DAMA), CDMA spread spectrum transmission and reception.

UNIT – IV

Earth station Technology: Transmitters, Receivers, Antenna, Tracking systems, Terrestrial interface, Power test methods, Lower orbit considerations. Satellite Navigation and Global Positioning systems: radio and satellite navigation, GPS position location principles, GPS receivers

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UNIT – V

Typical Phenomena in Satellite Communication: Solar Eclipse on satellite and its effects, Remedies for Eclipse, Sun Transit Outage phenomena, its effects and remedies, Doppler frequency shift phenomena and expression for Doppler shift.

TEXT BOOKS

1. Satellite communications- Timothy pratt, Charles Bostian, Jeremy Allnutt 2nd edition, 2003, John wiley & sons
2. Satellite communications engineering – Wilbur , L Pritchand , Robert A. Nelson and Heuri, G suyderhoud 2nd edition Pearson publications
3. Digital satellite communications – Tri T.He 2nd edition MGH 1990

REFERENCE BOOKS

1. Satellite communications: Design principles, - M Richaria, 2nd edithon
2. Digital satellite communications – Tri T.He 2nd edition MGH 1990
3. Fundamentals of satellite communications - K N Raja Rao PHI 2004
4. Satellite communications - Dennis Roddy, 2nd editioin, 1996. McGraw Hill

Course Outcomes

At the end of the course the student should be able to

CO1: Demonstrate the historical background, basic concepts and frequency allocations for satellite communications.

CO2: Compare and contrast between various multiple access systems for satellite communication system.

CO3: Design of satellite links for specified CNR.

CO4: Visualize satellite subsystems like telemetry, tracking, command and monitor power systems etc.

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Department of Electronics and Communication Engineering

TELECOMMUNICATION SWITCHING SYSTEMS AND NETWORKS

(Professional Elective-4)

IV B.Tech I semester

L	T	P	C
3	0	0	3

Pre Requisites

- Probability theory and Stochastic Processes
- Switching theory and logic Design
- Analog and Digital Communications

Course Objectives:

By the end of the course the student will be able to

- Provide basic concepts of switching systems and traffic issues in networks.
- Apply various concepts of switching in modern communication.

UNIT – I Telecommunication Switching Systems:

Introduction, Elements of switching systems, switching network configuration, Rotary switches, Uni selector, Two motion selector, Trucking principle ,principles of cross bar switching, Crossbar Switch Configuration, Cross point Technology, Crossbar Exchange Organization

UNIT - II Electronic Space Division Switching:

Stored Program Control, Centralized SPC, Distributed SPC, Software Architecture, Application Software, Enhanced services, Two-Stage Networks, Three-Stage Networks, n-Stage Networks.

Time Division Switching:

Basic Time Division Space Switching, Basic Time Division Time Switching, Time Multiplexed Space Switching. Time Multiplexed Time Switching, Combination Switching, Three Stage Combination Switching, n - Stage Combinational Switching.

UNIT - III Telecommunications Traffic:

Introduction, The Unit of Traffic, Congestion, Traffic Measurement, A Mathematical Model, Lost-Call Systems-Theory, Traffic Performance, Loss Systems in Tandem, Use of Traffic Tables, Queuing Systems-The Second Erlang Distribution, Probability of Delay, Finite Queue Capacity, Systems with a Single Server, Queues in Tandem, Delay Tables, Applications of Delay Formulae.

UNIT - IV Telephone Networks:

Subscriber loop systems, switching hierarchy and routing, transmission plan, transmission systems, numbering plan, charging plan, Signaling techniques: In channel signaling, common channel signaling, Cellular mobile telephony.

Data Networks:

Data transmission in PSTNs, Switching techniques for data transmission, data communication architecture, link to link layers, end to end layers, satellite based data networks, LAN, MAN, Internetworking

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UNIT - V Integrated Services Digital Network (ISDN):
Introduction, motivation, new services, Network and protocol architecture, Transmission channels, User-Network interfaces, functional grouping, reference points, signaling, numbering, addressing, BISDN.
SONET: Devices, Frame, Frame Transmission, Synchronous Transport Signals, STS I, Virtual Tributaries, and Higher rate of service.

Text Books

1. Thiagarajan Viswanathan (2010)- Telecommunication Switching Systems and Networks- Prentice Hall of India- New Delhi- India.
2. J. E. Flood (2016)- Telecommunications Switching- Traffic and Networks- Pearson Education- New Delhi.

References

1. John. C. Bellamy (2010)- Digital Telephony- 3rd edition- John Wiley- India.
2. Roger L. Freeman (2010)- Telecommunication System Engineering- 4th edition- John Wiley & Sons- India.
3. Achyut S. Godbole (2005)- Data Communications & Networks- Tata McGraw Hill- New Delhi.
4. Bosse J G van- Bosse John G (1997) "Signaling in Telecommunication Networks"- Wiley John & Sons.
5. T.N.Saadawi- M.H.Ammar- A.E.Hakeem (1994)- "Fundamentals of Telecommunication Networks"- Wiley Interscience.

Course outcomes:
At the end of the course the student should be able to
CO1: understand different switching system methodologies, network traffic, networks and its applications.
CO2: Explain different signaling methods used in Telecommunication Networks.
CO3: Relate different data communication networks.
CO4: Demonstrate the applications of modern telecommunication concepts.

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Department of Electronics and Communication Engineering

AUTOMOTIVE ELECTRONICS
(Open Elective-3)

IV B.Tech I semester

L	T	P	C
3	0	0	3

AUTOMOTIVE ELECTRONICS

Course Objectives: The aim of the course is

- To understand the configuration and working principles of various automotive subsystems and engine control
- To familiarize the working principles of various sensors and actuators in automotive sensors and actuators
- To analyze the digital engine control system and automotive networking

Unit -1: Automotive Fundamentals Overview

Automotive Fundamentals Overview –

Evolution of Automotive Electronics, Automobile Physical Configuration, Survey of Major Automotive Systems, The Engine – Engine Block, Cylinder Head, Four Stroke Cycle, Engine Control, Ignition System - Spark plug, High voltage circuit and distribution, Spark pulse generation, Ignition Timing, Diesel Engine, Drive Train - Transmission, Drive Shaft, Differential, Suspension, Brakes, Steering System , Starter Battery –Operating principle

The Basics of Electronic Engine Control –

Motivation for Electronic Engine Control – Exhaust Emissions, Fuel Economy, Concept of an Electronic Engine control system, Definition of General terms, Definition of Engine performance terms, Engine mapping, Effect of Air/Fuel ratio, spark timing and EGR on performance, Control Strategy, Electronic Fuel control system, Analysis of intake manifold pressure, Electronic Ignition.

Unit-II: Automotive Control System applications of Sensors and Actuators

Automotive Control System applications of Sensors and Actuators –

Typical Electronic Engine Control System, Variables to be measured

Automotive Sensors

Airflow rate sensor, Strain Gauge MAP sensor, Engine Crankshaft Angular Position Sensor, Magnetic Reluctance Position Sensor, Hall effect Position Sensor, Shielded Field Sensor, Optical Crankshaft Position Sensor, Throttle Angle Sensor (TAS), Engine Coolant Temperature (ECT) Sensor, Exhaust Gas Oxygen (O2/EGO) Lambda Sensors, Piezoelectric Knock Sensor.

Automotive Actuators

Solenoid, Fuel Injector, EGR Actuator, Ignition System

Unit –III: Digital Engine Control Systems

Digital Engine Control Systems

Digital Engine control features, Control modes for fuel Control (Seven Modes), EGR Control, Electronic Ignition Control - Closed loop Ignition timing, Spark Advance Correction Scheme, Integrated Engine Control System - Secondary Air Management, Evaporative Emissions Canister Purge, Automatic System Adjustment, System Diagnostics.

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Control Units
Operating conditions, Design, Data processing, Programming, Digital modules in the Control unit, Control unit software.

Unit –IV: Automotive Networking
Automotive Networking –
Bus Systems – Classification, Applications in the vehicle, Coupling of networks, Examples of networked vehicles , Buses - CAN Bus, LIN Bus, MOST Bus, Bluetooth, Flex Ray, Diagnostic Interfaces

Vehicle Motion Control –
Typical Cruise Control System, Digital Cruise Control System, Digital Speed Sensor, Throttle Actuator, Digital Cruise Control configuration, Cruise Control Electronics (Digital only), Antilock Brake System (ABS)

Unit –V: Automotive Diagnostics
Automotive Diagnostics
Timing Light, Engine Analyzer, On-board diagnostics, Offboard diagnostics, Expert Systems, Occupant Protection Systems – Accelerometer based Air Bag systems.

Future Automotive Electronic Systems
Alternative Fuel Engines, Electric and Hybrid vehicles, Fuel cell powered cars, Collision Avoidance Radar warning Systems, Low tire pressure warning system, Heads Up display, Speech Synthesis, Navigation – Navigation Sensors - Radio Navigation, Signpost navigation, dead reckoning navigation, Voice Recognition Cell Phone dialing, Advanced Cruise Control, Stability Augmentation, Automatic driving Control

Text Books:

1. William B. Ribbens, —Understanding Automotive Electronics‖, 6th Edition, Elsevier Publishing.

2. Robert Bosch Gmbh (Ed.) Bosch Automotive Electrics and Automotive Electronics Systems and Components, Networking and Hybrid Drive, 5th edition, John Wiley& Sons Inc., 2007.

Course Outcomes:
After going through this course the student will be able to:
CO1: Understand the working principles, characteristics and troubleshoot of automotive subsystem and its electronic engine control
CO2: Recite the basic idea behind Sensors and Actuators in Automotive Control System
CO3: Realization of Digital Engine Control Systems and control units in automotive systems
CO4: Interpret the concepts of Automotive Networking and Automotive Diagnostics

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Department of Electronics and Communication Engineering

INTRODUCTION TO COMMUNICATION ENGINEERING

Course Objectives: The aim of the course is

- To understand the characteristics and applications of different modulation techniques in communication engineering
- To familiarize the concepts and techniques behind the satellite and mobile communication
- To analyze various WLAN technologies which support for wireless communication

UNIT- I Basics of Communication Engineering

Introduction to communication systems – Need for modulation – AM – FM - PM modulation – Digital modulation fundamentals – PCM-DPCM- Delta Modulation – properties - PSK,FSK,ASK –types techniques –properties

UNIT -II Satellite communication

Satellite Orbits and Trajectories: Definition, Basic Principles, Orbital parameters, Types of Satellite orbits, Orbital perturbations, Satellite stabilization, Orbital effects on satellite's performance, Eclipses, Look angles: Azimuth angle, Elevation angle.

Satellite subsystem: Power supply subsystem, Attitude and Orbit control, Tracking, Telemetry and command subsystem, Payload.

Earth Station: Types of earth station, Architecture, Design considerations, Testing, Earth station Hardware, Satellite tracking.

UNIT-III Cellular and Mobile communications

The cellular concept – Frequency reuse – Interference and system capacity – Trunking and Grade of service – Improving coverage and capacity in cellular systems - Handoff - Roaming management - Handoff detection – channel Assignment techniques - GSM Network signaling - GSM Mobility management GSM short message service - International roaming for GSM - GSM operation, Mobile number Mobile number portability's, VoIP service for mobile networks.

UNIT-IV Radar Engineering

Introduction, Maximum Unambiguous Range, Radar Waveforms, Definitions with respect to pulse waveform - PRF, PRI, Duty Cycle, Peak Transmitter Power, Average transmitter Power, Simple form of the Radar Equation, Radar Block Diagram and Operation, Radar Frequencies, Applications of Radar, The Origins of Radar,

UNIT –V Wireless Networks

Introduction-WLAN technologies: Infrared, UHF narrowband, spread spectrum -IEEE802.11: System architecture, protocol architecture, physical layer, MAC layer, 802.11b, 802.11a – Hiper LAN: WATM, BRAN, HiperLAN2 – Bluetooth: Architecture - IEEE802.16-WIMAX: Physical layer, MAC, Spectrum allocation

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Reference Books:

1. Satellite Communications, by Dennis Roddy(Fourth edition),McGraw Hill.
2. Yi-Bing Lin and Imrich chlantae, "Wireless and Mobile Network Architecture", John Wiley 2006
3. S. Haykin, "Digital Communications", John Wiley, 2005
4. Communication Systems by Simon Haykins John Wiley & Sons, 4th Edition.

Course Outcomes:

After going through this course the student will be able to:

CO1: Understand the working principles, characteristics and applications of different modulation techniques

CO2: Recite the basic concepts behind the satellite and mobile communication

CO3: Realization of the principle of operation and its applications of radar systems

CO4: Interpret the concept of Wireless LAN technologies which support for wireless communication

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Department of Electronics and Communication Engineering

Embedded & VLSI LABORATORY

IV B.Tech I Semester

L	T	P	C
0	0	2	1

Emebedded System Design Lab:

Course Objectives:

1. To illustrate the basic programming concepts of ARM cortex M0+ processor using simple programs.
2. To transfer programs into FRDM kit.
3. To communicate among different processors with FRDM kit
4. To interface I/O devices with FRDM kit.

List of Experiments

1. Blinking of LED : Hello World
2. Breath out 2 LEDs
3. Color Circle
4. ADC Potentiometer
5. Analog serial plotter
6. Interface to Accelerometer sensor using FRDM kit
7. Serial port communication using FRDM kit
8. Interface to touch sensor using FRDM kit
9. Radio frequency transmission operation using FRDM kit
10. LED intensity control using touch sensor using FRDM kit
11. Interface and plot LDR using FRDM kit
12. Interface and plot temperature sensor using FRDM kit

Course Outcomes:

Students can able to

1. Write programs using ARM cortex M0+ processor instruction set.
2. Transfer programs into FRDM kit.
3. Communicate among different processors with FRDM kit.
4. Interface I/O devices with FRDM kit.

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VLSI System Design Lab:

Course Objectives:

The aim of the course is to simulate, synthesis and implement combinational and sequential circuits on CPLD /FPGA kits using Verilog HDL

Perform any 12 Experiments (Design and Implement following sequential and combinational circuits on CPLD /FPGA kits using Verilog HDL.

1. Verification of Logic Gates
2. Verification of Demorgon's Law
3. Design of 8 to 1 multiplexer
4. Design of 1 to 8 Demultiplexer
5. Design of 2 to 4 Encoder
6. Design of 4-bit comparator
7. Design of 4 bit binary to gray converter
8. Design of full adder using 3 modeling styles
9. Design of flip flops SR, D, JK, and T
10. Design Ripple Counter
11. Design Modulo Counter
12. Design Shift Register
13. Design Inverter using PMOS / NMOS
14. Design of full adder using decoder and multiplexer
15. Design System using finite state Machine

Course Outcomes:

After going through this course the student will be able to:

1. Simulate and synthesize the Verilog program for digital circuits.
2. Implementation of the developed Verilog program on the CPLD/FPGA Hardware for digital circuits.

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Department of Electronics and Communication Engineering

ANTENNA AND MICROWAVE ENGINEERING LABORATORY

IV B.Tech I Semester

L	T	P	C
0	0	2	1

Course Objectives:
The aim of the course is to understand the measurement of antenna parameters and characteristics of microwave components.

Part — A: (Software) (Any 6 Experiments):

1. Measurement of Radiation pattern and gain of simple Dipole antenna
2. Measurement of Radiation pattern and gain of Half wave Dipole antenna
3. Measurement of Radiation pattern and gain of folded dipole antenna
4. Measurement of Radiation pattern and gain of horn antenna
5. Measurement of Radiation pattern and gain of microstrip patch antenna
6. Measurement of Radiation pattern and gain of Yagi - Uda antenna
7. To study and plot the radiation pattern of cut parabolic antenna with simpledipole feed
8. To study various types of parabolic reflectors and their feed systems

Part — B: (Hardware) (Any 6 Experiments):

1. Reflex Klystron Characteristics
2. Gunn Diode Characteristics
3. Directional Coupler Characteristics
4. VSWR Measurement
5. Measurement of Waveguide Parameters
6. Measurement of Scattering parameters of a Magic Tee
7. Measurement of Scattering parameters of a Circulator
8. Attenuation Measurement

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Department of Electronics and Communication Engineering

ELECTRONIC MEASUREMENTS AND INSTRUMENTATION

IV B.Tech II semester

L	T	P	C
3	0	0	3

Pre-Requisites:

- Electronic Devices and Circuits
- Network Theory and transmission lines
- Signal and Systems
- Switching theory and logic design
- Analog and Digital Communications.

Course objectives

By the end of the course the student will be able to

Perform Characteristics of Instruments, measurement on non electrical quantities

UNIT-I: MEASUREMENTS AND MEASURING SYSTEMS

Functional Diagram of Instrumentation System, Static characteristics: Accuracy - Precision – Resolution – Sensitivity – measurement Errors, Dynamic Characteristics: Speed of response – fidelity – Lag - Dynamic error - Statistical Analysis, Basic meter movement, Ammeters: Multi-range - Universal Shunt, DC voltmeters: Multi-range - Range extension – Loading - Transistorized Voltmeter, AC voltmeters: Rectifier type - Thermocouple Type, Ohmmeters: Series type and Shunt type, Multimeter: Voltage - Current - Resistance measurements.

UNIT-II: OSCILLOSCOPES AND SIGNAL GENERATORS

Oscilloscopes: Oscilloscope block diagram, Cathode Ray Tube, Vertical Deflection System, Delay Line, Horizontal Deflection System: Triggered Sweep - Delayed sweep, CRO Probes, Dual Beam CRO, Dual Trace CRO, Measurements with CRO: Amplitude – Time period - Frequency – Phase, Lissajous patterns, Sampling Oscilloscope, Analog Storage Oscilloscope, Digital Storage Oscilloscope.

Signal Generators: Fixed and variable AF generators, AF Sine & Square wave generator, Function generators, Fixed and variable RF signal generators, Sweep frequency generator.

UNIT-III: SIGNAL ANALYZERS

Wave analyzers: Frequency Selective Wave Analyzer - Heterodyne Wave Analyzer - Application of Wave Analyzers, Harmonic Distortion Analyzers: Total Harmonic Distortion, Spectrum Analyzer.

UNIT-IV: BRIDGES AND TRANSDUCERS

Bridges: Wheat Stone Bridge, Kelvin Bridge, Maxwell Bride, Schering Bridge and Wien Bridge.

Transducers: Classification of Transducers, Potentiometers, Strain gauges, Capacitive Transducers, Linear Variable Differential Transducer (LVDT), Piezoelectric Transducer, Thermocouple, Thermistor, Resistance Thermometer.

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UNIT-V: Measurement Of Non Electrical Quantities Data Acquisition Systems
Measurement of Displacement, Velocity, Acceleration, Vibration, Force, Pressure, Fluid Flow, Liquid Level and Temperature. Data Acquisition System: Generalized Data Acquisition System - Configuration of DAS – Single Channel & Multi Channel DAS, Strip Chart Recorder, X-Y Recorder

TEXT BOOKS:

8. A.D. Helfrick and W.D. Cooper, "Modern Electronic Instrumentation and Measurement Techniques", PHI, 5th Edition, 2006.
9. A.K. Sawhney, "A Course in Electrical & Electronic Measurement and Instrumentation", Dhanpat Rai & Company Private Limited, New Delhi, 18th Edition, 2007.

REFERENCE BOOKS:

1. David A. Bell, "Electronic Instrumentation & Measurements", PHI, 2nd Edition, 2003.
2. H.S. Kalsi, "Electronic instrumentation", TMH, 3rd Edition, 2015.

Course Outcomes
On successful completion of this course the students will able to
CO1: Acquire knowledge in Characteristics of Instruments, measurement on non electrical quantities
CO2: Analyze the performance of various measuring systems based on the response to the given inputs.
CO3: Design electronic instrumentation systems according the required specifications
CO4: Apply different principles to measure a quantity and to provide wide range of solutions for the problems in real time world

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Department of Electronics and Communication Engineering

WIRELESS COMMUNICATIONS AND NETWORKS

IV B.Tech II Semester

L	T	P	C
3	0	0	3

Pre Requisites

- Analog and Digital Communications,
- Computer Networks
- Telecommunication switching networks

Course Objectives

In this course it is aimed to introduce

- Different Access techniques, data service, technology and standards associated with wireless communication networks.

UNIT –I: Cellular Concept-System Design Fundamentals

Introduction, Frequency Reuse, Channel Assignment Strategies, Handoff Strategies-Prioritizing Handoffs, Practical Handoff Considerations, Interference and system capacity – Co channel Interference, Channel planning for Wireless Systems, Adjacent Channel interference , Power Control for Reducing interference, Trunking and Grade of Service, Improving Coverage & Capacity in Cellular Systems- Cell Splitting, Sectoring .

UNIT –II: Mobile Radio Propagation and Large-Scale Path Loss

Introduction to Radio Wave Propagation, Free Space Propagation Model, Relating Power to Electric Field, The Three Basic Propagation Mechanisms, Reflection-Reflection from Dielectrics, Brewster Angle, Reflection from prefect conductors, Ground Reflection (Two-Ray) Model, Log-distance path loss model

UNIT –III: Mobile Radio Propagation

Small –Scale Fading and Multipath Small Scale propagation-Factors influencing small scale fading, Doppler shift, Impulse Response Model of a multipath channel- Relationship between Bandwidth and Received power, Direct RF Pulse System, Spread Spectrum Sliding Correlator Channel Sounding, Flat fading, Frequency selective fading, Fading effects Due to Doppler Spread-Fast fading, slow fading,

UNIT –IV: Equalization and Diversity

Introduction, Fundamentals of Equalization, Training A Generic Adaptive Equalizer, Equalizers in a communication Receiver, Linear Equalizers, Non linear Equalization-Decision Feedback Equalization (DFE), Maximum Likelihood Sequence Estimation (MLSE) Equalizer, Least Mean Square Algorithm, Recursive least squares algorithm. Diversity Techniques-Derivation of selection Diversity improvement, Derivation of Maximal Ratio Combining improvement, Practical Space Diversity Consideration- Selection Diversity, Feedback or Scanning Diversity, Frequency Diversity, Time Diversity.

UNIT –V: Wireless Networks

Introduction to wireless Networks, Advantages and disadvantages of Wireless Local Area Networks, WLAN Topologies, WLAN Standard IEEE 802.11,IEEE 802.11 Medium Access Control, Comparision of IEEE 802.11 a,b,g and n standards, IEEE 802.16 and its enhancements, Wireless PANs, Hiper LAN, WLL.

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