CURRICULUM

FOR

ELECTRICAL & COMMUNICATION ENGINEERING

SEMESTER - V (ELECTRICAL COMMUNICATION & ENGINEERING)

S.No	Paper Code	Paper Title	L	T	P	Credits
1	EC109	Digital Signal Processing	3	0	0	3
2	EC109P	Digital Signal Processing Lab	0	0	2	1
3	EC110	Microprocessors And Microcontrollers	3	0	0	3
4	EC111	Linear Control Systems	3	1	0	4
5	EC112	Linear Integrated Circuits And Applications	3	0	0	3
6	EC113	Probability Theory And Stochastic Processes	3	0	0	3
7	ES114	Computer Networks And Security	3	0	0	3

PAPER CODE - 103202

EC109	Digital Signal Processing	L:3	T:0	P:0	Credit:3

Detailed contents:

Module 1

Overview Of Dsp, Basic Elements Of Dsp System, Advantages Of Dsp Over Analog,Classification Of Signals, Concept Of Frequency In Continuous Time And Discrete Time,Continuous Time And Discrete Time Sinusoidal Signals.

Module 2

Discrete Time Systems: Linear Time Invariant, Response Of Lti System Convolution Sum, Description Of Discrete Time System By Difference Equation And

Complete Solution Of Difference Equation, Implementation Of Discrete Time Systems, Correlation Of Discrete Time Signals

Module 3

Transform And Its Applications To The Analysis Of LTI Systems .

Module 4

Transform And Its Applications To The Analysis Of LTI Systems

Module 5

Frequency Domain Representation Of LTI Systems.

Module 6

Sampling And Reconstruction Of Analog

Signals **Module 7**

Discrete Fourier Series, Discrete Fourier Transform, Properties

Of Dft, Fft **Module 8**

Digital Filter Structure: Fir And Iir Designs

Suggested Text Books:

➔ "Digital Signal Processing" By Proakis And Manolakis, Pearson.
➔ "Digital Signal Processing" By Ingle And Proakis, Thomson.
➔ "Digital Time Signal Processing" By Oppenheim And Schafer, Pearson.
➔ "Digital Signal Processing : Computer Based Approach" By Mitra, Tmh.

PAPER CODE – 103202

	Digital Signal Processing Lab	L:0	T:0	P:2	Credit:1

List Of Experiments:

➔ To Represent Basic Signals (Unit Step, Unit Impulse, Ramp, Exponential, Sine And Cosine).
➔ To Develop Program For Discrete Convolution
➔ To Develop Program For Discrete Correlation
➔ To Understand Stability Test
➔ To Understand Sampling Theorem

- → To Design Analog Filters (Low-Pass, High Pass, Band Pass, Band Stop)
- → To Design Digital Filters (Low-Pass, High Pass, Band Pass, Band Stop)
- → To Design Fir Filters Using Windows Techniques

PAPER CODE - 103202

EC110	Microprocessors And Microcontrollers	L:3	T:0	P:0	Credit:3

Module 1

Introduction To Microprocessor Systems: Architecture And Pin Diagram Of 8085,
Timing Diagram, Memory Organization, Addressing Modes, Interrupts. Assembly Language
Programming, 8085 Interrupts, Additional I/O Concepts And Processes

Module 2

Interfacing Of 8085 With 8255, 8254/ 8253, 8251, 8259: Introduction,
Generation Of I/O Ports, Programmable Peripheral Interface (Ppi)-Intel 8255,
Sample-And-Hold Circuit And Multiplexer, Keyboard And Display Interface, Keyboard And
Display Controller (8279), Programmable Interval Timers (Intel 8253/8254), Usart (8251), Pic (8259), Dac, Adc, Lcd, Stepper Motor.

Module 3

Introduction To 8086, 80286, 80386 And 80486 Microprocessor: 8086 Architecture, Generation Of Physical Address, Pin Diagram Of 8086, Minimum Mode And
Maximum Mode, Bus Cycle, Memory Organization, Memory Interfacing, Addressing Modes,
Assembler Directives, Instruction Set Of 8086, Assembly Language Programming, Hardware And Software Interrupts. Introduction Of 80286, 80386, And 80486 Microprocessor.

Module 4

Overview Of Microcontroller 8051: Introduction To 8051 Microcontroller,
Architecture, Memory Organization, Special Function Registers, Port Operation, Memory

Interfacing, I/O Interfacing, Programming 8051 Resources, Interrupts, Programmer's
Model Of 8051, Operand Types, Operand Addressing, Data Transfer Instructions,
Arithmetic Instructions, Logic Instructions, Control Transfer Instructions, Timer And Counter Programming, Interrupt Programming.

Suggested Text Books:

- ➔ "Microprocessors And Microcontrollers", Muhammad Ali Mazidi, Pearson, 2006
- ➔ "Microprocessors And Interfacing, Programming And Hardware", Douglas V Hall, Tata Mcgraw Hill, 2006
- ➔ "Microprocessor Architecture, Programming And Applications With The 8085", Ramesh Gaonkar, Phi
- ➔ "The 8051 Microcontroller And Embedded Systems", Muhammad Ali Mazidi, Janice Gillispie Mazidi, Rolin D. Mckinlay, 2nd Edition, Pearson Education, 2008 ➔ "The 8086 Microprocessor: Programming And Interfacing The Pc", Kenneth J. Ayala, Delmar Publishers, 2007
- ➔ "Advanced Microprocessors And Peripherals", A K Ray, K M Bhurchandi, Tata Mcgraw Hill, 2007.

PAPER CODE - 103201

EC111	Linear Control System	L:3	T:1	P:0	Credit:3

Detailed contents:

Module 1

Control Systems: Basics & Components, Introduction To Basic Terms,
Classifications And Types Of Control Systems, Block Diagrams & Signal Flow Graphs.
Transfer Function, Determination Of Transfer Function Using Block Diagram Reduction
Techniques And Mason's Gain Formula. Control System Components: Electrical,
Mechanical, Electronic, Ac/Dc Servo Motors, Stepper Motors, Tacho Generators,
Synchros, Magnetic Amplifiers, Servo Amplifiers

Module 2

Time-Domain Analysis: Time Domain Performance Specifications, Transient

Response Of First And Second Order Systems, Steady State Errors And Static Error
Constants In Unity Feedback Control Systems, Response With P, Pi And Pid Controllers, Limitations Of Time Domain Analysis.

Module 3

Frequency Domain Analysis: Polar And Inverse Polar Plots, Frequency Domain
Specifications And Performance Of Lti Systems, Logarithmic Plots (Bode Plots), Gain
And Phase Margins, Relative Stability. Correlation With Time Domain Performance,
Closed Loop Frequency Responses From Open Loop Response. Limitations Of Frequency Domain Analysis, Minimum/Non-Minimum Phase Systems.

Module 4

Stability And Compensation Techniques: Concepts, Absolute, Asymptotic,
Conditional And Marginal Stability, Routh-Hurwitz And Nyquist Stability Criterion,
Root Locus Technique And Its Application. Concepts Of Compensation, Series / Parallel / Series-Parallel / Feedback Compensation, Lag/Lead/Lag- Lead Networks For Compensation, Compensation Using P, Pi, Pid Controllers.

Module 5

Control System Analysis Using State Variable Methods Control Systems
Engineering Syllabus State Variable Representation-Conversion Of State Variable
Models To Transfer Functions-Conversion Of Transfer Functions To State Variable
Models - Solution Of State Equations-Concepts Of Controllability And Observability
Stability Of Linear Systems-Equivalence Between Transfer Function And State Variable Representations-State Variable Analysis Of Digital Control System-Digital Control Design Using State Feedback.

Suggested Text Books:

➔ "Automatic Control System", B. C. Kuo, Prentice Hall Of India, 7th Edition, 2001

→ "Control Systems Engineering -Principles And Design", Nagrath And Gopal New Age
→ Publishers
→ "Control Systems Engineering", Norman S. Nise, John Wiley And Sons (Asia) Singapore
→ "Design Of Feedback Control System", Raymond T. Stefani, Oxford University Press
→ "Modern Control Engineering", K. Ogata, Pearson, 2002

PAPER CODE - 100104

EC112	Linear Integrated Circuits And Applications	L:3	T:1	P:0	Credit:3

Detailed contents:

Module 1

IC Fabrication: IC Classification, Fundamental Of Monolithic Ic Technology, Epitaxial Growth, Masking And Etching, Diffusion Of Impurities. Realization Of
Monolithic Ics And Packaging. Fabrication Of Diodes, Capacitance, Resistance And Fets

Module 2

Characteristics Of Op-Amp: Ideal OP-Amp Characteristics, DC Characteristics,
AC Characteristics, Differential Amplifier; Frequency Response Of OP-Amp; Basic
Applications Of OP-Amp – Inverting And Non-Inverting Amplifiers, V/I And I/V Converters, Summer, Differentiator And Integrator

Module 3

Applications Of OP-Amp : Instrumentation Amplifier, Log And Antilog
Amplifiers, First And Second Order Active Filters, Comparators, Multivibrators, Wave-
Form Generators, Clippers, Clampers, Peak Detector, S/H Circuit, D/A Converter (R- 2r Ladder And Weighted Resistor Types), A/D Converters Using Op-Amps.

Module 4

Special ICs: Functional Block, Characteristics And Application Circuits With

555 Timer Ic-566 Voltage Controlled Oscillator IC; 565-Phase Lock Loop IC, Ana- Log Multiplier Ics.

Module 5

Application ICs: IC Voltage Regulators –LM78xx, 79xx Fixed Voltage RegulatorsLM317, 723 Variable Voltage Regulators, Switching Regulator- SMPs- LM 380 Power Amplifier- ICL 8038 Function Generator IC.

Suggested Text/Reference Books:

→ "Op-Amp And Linear Ics", David A. Bell, Oxford, 2013
→ "Linear Integrated Circuits", D. Roy Choudhary, Sheil B. Jani, Ii Edition, New Age, 2003
→ "Op-Amps And Linear Integrated Circuits", Ramakant A. Gayakward, Iv Edition, Pearson
→ Education, Phi, 2000
→ "Opamps And Linear Integrated Circuits Concepts And Applications", Fiore, Cengage, 2010
→ "Fundamentals Of Analog Circuits", Floyd And Buchla, Pearson, 2013
→ "Integrated Electronics - Analog And Digital Circuits System", Jacob Millman, Christos
→ C.Halkias, Tata Mcgraw Hill, 2003
→ "Op-Amp And Linear Ics", Robert F. Coughlin, Fredrick F. Driscoll, Phi Learning, 6th Edition,2012.

PAPER CODE - EC113

EC113	Probability Theory And Stochastic Processes	L:3	T:0	P:0	Credit:3

Detailed contents:

Module 1

Sets And Set Operations; Probability Space; Conditional Probability And Bayes Theorem; Combinatorial Probability And Sampling Models.

Module 2

Discrete Random Variables, Probability Mass Function, Probability Distribution Function, Example Random Variables And Distributions; Continuous Random Variables,

Probability Density Function, Probability Distribution Function, Example Distributions; **Module 3**

Joint Distributions, Functions Of One And Two Random Variables, Moments Of
Random Variables; Conditional Distribution, Densities And Moments; Characteristic Functions Of A Random Variable; Markov, Chebyshev And Chernoff Bounds.

Module 4

Random Sequences And Modes Of Convergence (Everywhere, Almost Everywhere,Probability, Distribution And Mean Square); Limit Theorems; Strong And Weak Laws Of Large Numbers, Central Limit Theorem.

Module 5

Random Process. Stationary Processes. Mean And Covariance Functions. Ergodicity. Transmission Of Random Process Through Lti. Power Spectral Density, Markov Chain And Markov Processes.

Suggested Text Books:

→ "Probability And Random Processes With Applications To Signal Processing," H. Stark And J. Woods, Third Edition, Pearson Education
→ "Probability, Random Variables And Stochastic Processes", A.Papoulis And S.
→ Unnikrishnan Pillai, Fourth Edition, Mcgraw Hill.
→ "Introduction To Probability Theory With Stochastic Processes", K. L. Chung, Springer International

PAPER CODE - 103202

EC114	Computer Networks And Security	L:3	T:0	P:0	Credit:3

Module 1

Data Communication Components: Representation Of Data And Its Flow Networks
,Various Connection Topology, Protocols And Standards, Osi Model, Transmission Media, Lan: Wired Lan, Wireless Lans, Connecting Lan And Virtual Lan, Techniques For
Bandwidth Utilization: Multiplexing - Frequency Division, Time Division And Wave Division, Concepts On Spread Spectrum

Module 2

Data Link Layer And Medium Access Sub Layer: Error Detection And Error
Correction Fundamentals, Block Coding, Hamming Distance, Crc; Flow Control And Error
Control Protocols - Stop And Wait, Go Back - N Arq, Se- Lective Repeat Arq, Sliding
Window, Piggybacking, Random Access, Multiple Access Protocols -Pure Aloha, Slotted
Aloha, Csma/Cd, Cdma/Ca.

Module 3

Network Layer: Switching, Logical Addressing – Ipv4, Ipv6;
Address Mapping –Arp, Rarp, Bootp And Dhcp-Delivery, Forwarding And
Unicast Routing Protocols.
Transport Layer: Process To Process Communication, User Datagram
Proto- Col (Udp),
Transmission Control Protocol (Tcp), Sctp Congestion Control; Quality
Of Service, Qos Improving Techniques: Leaky Bucket And Token Bucket
Algorithm.

Module 4

Application Layer: Domain Name Space (Dns), Ddns, Telnet, Email, File
Transfer
Protocol (Ftp), Www, Http, Snmp, Bluetooth, Firewalls, Basic Concepts
Of Cryptography

Module 5

Network Security: Passive And Active Attacks, Symmetric
Encryption, Encryption Algorithms, Key Distribution, Traffic Padding,
Message Authen- Tication, Hash
Function, Secure Hash Function, Public-Key Encryption, Digital
Signature, Rsa Public
Key Encryption Algorithm, Key Management, Secure Socket Layer And
Transport Layer
Security, Ssl Architecture, Ssl Record Pro- Tocol, Change Cipher Spec
Protocol, Alert
Protocol, Handshake Protocol, Ip Level Security Ipsec, Application
Layer Security Pgp, Firewall, Virtual Private Networks.

Suggested Text Books:

➔ "Data Communication And Networking", 4th Edition, Behrouz A.
   Forouzan, Mcgraw-Hill

- → "Data And Computer Communication", 8th Edition, William Stallings, Pearson Prentice Hall India
- → "Computer Networks", 8th Edition, Andrew S. Tanenbaum, Pearson New International Edition.
- → "Internetworking With Tcp/Ip", Volume 1, 6th Edition Douglas Comer, Prentice Hall Of India.
- → "Tcp/Ip Illustrated", Volume 1, W. Richard Stevens, Addison-Wesley, United States Of America
- → "Network Security Bible", By Cole, Krutz And Conley, Wiley Dreamtech

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