E.G.S. PILLAY ENGINEERING COLLEGE

(Autonomous)

Approved by AICTE, New Delhi | Affiliated to Anna University, Chennai

Accredited by NAAC with „A" Grade | Accredited by NBA (CSE, EEE, MECH)

NAGAPATTINAM – 611 002

B.E. Electronics and Communication Engineering

Full Time Curriculum and Syllabus

Second Year – Fourth Semester

Course Code	Course Name	L	T	P	C	Maximum Marks		
						CA	ES	Total
Theory Course								
1701MA403	Probability and Random Processes	3	2	0	4	40	60	100
1702EC402	Signals and Systems	3	2	0	4	40	60	100
1702EC403	Analog Integrated Circuits	3	0	0	3	40	60	100
1702EC404	Microprocessors and Microcontrollers	3	0	0	3	40	60	100
1702EC405	Transmission Lines and Waveguides	3	0	0	3	40	60	100
1702EC406	Control Systems	3	0	0	3	40	60	100
Laboratory Course								
1702EC451	Analog Integrated Circuits Laboratory	0	0	4	2	50	50	100
1702EC452	Microprocessors and Microcontrollers Laboratory	0	0	4	2	50	50	100
1704GE451	Life Skills: Verbal Ability	0	0	2	-	100	-	100

L – Lecture | T – Tutorial | P – Practical | C – Credit | CA – Continuous Assessment | ES – End Semester

1701MA401	PROBABILITY AND RANDOM PROCESSES (B.E- ECE)	L	T	P	C
		3	2	0	4

Course Objectives:

1. To analyze the concepts of probability, random variables and distribution functions.
2. To acquire skill in handling situation with more than one random variable with time function.
3. To analyze the concept of signals and system.

Unit I	PROBABILITY	9+3Hours

Probability- Theorems on Probability- Conditional Probability – Baye's Theorem- Discrete and continuous random variables – Moments – Moment generating functions –Real Time Problems

Unit II	ONE DIMENSIONAL RANDOM VARIABLE	9+3 Hours

Discrete Distributions: Binomial, Poisson, Geometric - Continuous Distributions: Uniform, Exponential, Normal distributions- Application of Distribution in Engineering Problems

Unit III	TWO - DIMENSIONAL RANDOM VARIABLES	9+3 Hours

Joint distributions – Marginal and conditional distributions – Covariance – Correlation and Linear regression

Unit IV	MARKOV PROCESSES AND MARKOV CHAINS	9+3 Hours

Classification – Stationary process – Markov process – Markov chains – transition probabilities – Limiting distributions – Poisson process.

Unit V	SPECTRAL DENSITIES AND LINEAR SYSTEMS WITH RANDOM INPUTS	9+3 Hours

Auto correlation-cross correlation-power spectral density-cross spectral density-Properties-Wiener-Khintchine relation-relationship between cross power spectrum and corre lation function. Linear time invariant system-system transfer function-Linear system with random inputs-White noise.

Total:	45 + 15 Hours

Further Reading:

Probabilistic manner which evolve with time

Discrete time Markov chains in modeling Electronic systems.

Course Outcomes:

After completion of the course, Student will be able to

1. To apply basic probability techniques to analyze the performance of Electronic systems.(K3)
2. To apply standard distributions in describing real life phenomena.(K3)
3. To solve problems involving more than one random variable.(K3)
4. To apply probability technique which evolve with respect to time.(K3)
5. To interpret the response of random input to linear time invariant systems. (K3)

References:

1. O.C. Ibe, Fundamentals of Applied Probability and Random Processes, Elsevier, 1st Indian Reprint, 2007
2. D. Gross and C.M. Harris, Probability and random processes, WileyStudent edition, 2004.
3. Peebles. P.Z., "Probability, Random Variables and Random Signal Principles", Tata Mc Graw Hill, 4th Edition, New Delhi, 2002.
4. Yates. R.D. and Goodman. D.J., "Probability and Stochastic Processes", 2nd Edition, Wiley India Pvt. Ltd., Bangalore, 2012.
5. Stark. H., and Woods. J.W., "Probability and Random Processes with Applications to Signal Processing", 3rd Edition,Pearson Education, Asia, 2002.
6. Miller. S.L. and Childers. D.G., "Probability and Random Processes with Applications to Signal Processing and Communications", Academic Press, 2004.
7. www.indiastudychannel.com
8. nptel.ac.in/courses/111105035, www.nptelvideos.in/2012/11/Mathematics.html
9. www.learnerstv.com/Free-maths-video lectures - ltv348-page1.html

1702EC402	SIGNALS AND SYSTEMS	L	T	P	C
		3	1	0	4

Course Objectives:

1. To understand the basic properties of Signals and Systems and the various methods of Classification
2. Tolearn Laplace Transform &Fourier transform and their properties
3. To know Z transform & DTFT and their properties.
4. To characterize LTI systems in the Time domain and various Transform domains

Unit I **CLASSIFICATION OF SIGNALS AND SYSTEMS** **9+3 Hours**

Classification of Signals- Continuous time signals - Discrete time signals - Periodic and Aperiodic signals - Even and odd signals - Energy and power signals -Deterministic and random signals -Complex exponential and Sinusoidal signals. Classification of Systems: Continuous time systems- Discrete time systems - Linear system - Time Invariant system – causal system - BIBO system - Systems with and without memory - LTI system Classification of Systems

Unit II **ANALYSIS OF CONTINUOUS TIME SIGNALS** **9+3 Hours**

Fourier series analysis-spectrum of Continuous Time (CT) signals- Fourier and Laplace Transforms in CT Signal Analysis - Properties.

Unit III **LTI CT SYSTEM** **9+3 Hours**

Impulse response - Frequency response – Convolution Integral - Analysis and characterization of LTI system using Laplace transform Solution of Differential equation with initial conditions – zero state response and zero input response.

Unit IV **ANALYSIS OF DISCRETE TIME SIGNALS** **9+3 Hours**

Baseband Sampling - DTFT – Properties of DTFT - Z Transform – Properties of Z Transform –Inverse Z transform

Unit V **LTI DISCRETE TIME SYSTEMS** **9+3 Hours**

Impulse response - Convolution sum- Analysis and characterization of DT system using Z transform Difference Equations-Block diagram

Total: 45+15 Hours

Further Reading:

Programs using mathematical computing tool for CT and DT system analysis using LT and ZT

Course Outcomes:

After completion of the course, Student will be able to

1. Analyze the properties of signals & systems
2. Apply Laplace transform, Fourier transform in signal analysis
3. Apply Z transform and DTFT in signal analysis for Discrete time signals
4. Analyze continuous time LTI systems using Fourier and Laplace Transforms
5. Analyze discrete time LTI systems using Z transform.

References:

1. Allan V.Oppenheim, S.Wilsky and S.H.Nawab, “Signals and Systems”, Pearson, 2007.
2. B. P. Lathi, “Principles of Linear Systems and Signals”, Second Edition, Oxford, 2009.
3. R.E.Zeimer, W.H.Tranter and R.D.Fannin, “Signals & Systems - Continuous and Discrete”, Pearson, 2007.
4. John Alan Stuller, “An Introduction to Signals and Systems”, Thomson, 2007.
5. Hwei. P.Hsu, Schaum’s Outlines: Signals and Systems**,** Pearson Education, 2002.

1702EC403	ANALOG INTEGRATED CIRCUITS	L	T	P	C
		3	0	0	3

Course Objectives:

1. To Learn the fundamental concepts behind transistor biasing and to differentiate small signal and large signal circuit models
2. To Learn the concepts of Analog to digital and Digital to Analog converters for microelectronics
3. To Study the performance metrics of Multistage and Power amplifiers
4. To Understand the working of signal generating and wave shaping circuits

Unit I **BASICS OF OPERATIONAL AMPLIFIERS** **9 Hours**

Operational Amplifiers, DC and AC characteristics, Typical op-amp parameters: Finite gain, finite bandwidth, Offset voltages and currents, Common-mode rejection ratio, Power supply rejection ratio, Slew rate, Applications of Op-amp: Precision rectifiers. Summing amplifier, Integrators and differentiators, Log and antilog amplifiers. Instrumentation amplifiers, voltage to current converters

Unit II **ACTIVE FILTERS** **9 Hours**

Second order filter transfer function (low pass, high pass, band pass and band reject), Butterworth, Chebyshev and Bessel filters. Switched capacitor filter. notch filter, All pass filters, self-tuned filters

Unit III **ANALOG TO DIGITAL AND DIGITAL TO ANALOG CONVERTERS** **9 Hours**

Opamp as a comparator, Schmitt trigger, Astable and monostable multivibrators, Triangular wave generator, Multivibrators using 555 timer, Data converters: A/D and D/A converters

Unit IV **PHASE LOCKED LOOP** **9 Hours**

PLL- basic block diagram and operation, Four quadrant multipliers. Phase detector, VCO, Applications of PLL:Frequency synthesizers, AM detection, FM detection and FSK demodulation

Unit V **CMOS DIFFERENTIAL AMPLIFIERS** **9 Hours**

DC analysis and small signal analysis of differential amplifer with Restive load, current mirror load and current source load, Input common-mode range and Common-mode feedback circuits. OTAs vs Opamps. Slew rate, CMRR, PSRR. Two stage amplifiers, Compensation in amplifiers (Dominant pole compensation).

Total: 45 Hours

Further Reading:

Collector Emitter Feedback Bias, Bootstrap Darlington Circuit, Effect of Emitter or a Source Bypass Capacitor on Low frequency response, Comparison of Power Amplifiers, BJT Digital Logic Inverter, CMOS Digital Logic Inverter, BiCMOS Cascade Amplifier, Current Mirror Circuits, CMOS Logic Gate Circuits, Power BJTs, Power MOSFETs.

Course Outcomes:

After completion of the course, Student will be able to

1. Infer the DC and AC characteristics of operational amplifiers and its effect on output and their compensation techniques
2. Elucidate and design the linear and non linear applications of an opamp and special application Ics.
3. Explain and compare the working of multi vibrators using special application IC 555 and general purpose opamp
4. Classify and comprehend the working principle of data converters
5. Illustrate the function of application specific ICs such as Voltage regulators, PLL and its application in communication.

References:

1. *S.Franco, Design with Operational Amplifiers and Analog Integrated Circuits (3/e) TMH, 2003*
2. *Sedra and Smith, Microelectronics Circuits, Oxford Univ. Press, 2004*
3. *Coughlin, Driscoll, OP-AMPS and Linear Integrated Circuits, Prentice Hall, 2001.*
4. John D Ryder, ―Electronic fundamentals and Applications: Integrated and Discrete systems‖ 5th Edition, PHI, 2003
5. Donald .A. Neamen, Electronic Circuit Analysis and Design –2nd edition, Tata McGraw Hill, 2009

1702EC404	Microprocessors and Microcontrollers (Common to B.E / B.Tech – ECE,CSE & IT)	L	T	P	C
		3	0	0	3

Course Objectives:

1. To understand the architecture and functions of 8085 processor
2. To understand the Architecture of 8086 microprocessor
3. To understand the concepts of 8051 microcontroller
4. To learn the design aspects of I/O and Memory Interfacing circuits.
5. To gain the basic knowledge about advanced processors

Unit I	INTRODUCTION TO MICROPROCESSORS	9 Hours

Evolution Of Microprocessors - 8-Bit Processor - 8085 Architecture – Register Organization - Instruction Set – Timing Diagram- Addressing Modes – Interrupts- Interrupt Service Routines- Assembly Language Programming Using 8085.

Unit II	THE 8086 MICROPROCESSOR	9 Hours

Introduction to 8086 – Microprocessor architecture – Addressing modes - Instruction set and assembler directives – Assembly language programming – Modular Programming - Linking and Relocation - Stacks - Procedures – Macros – Interrupts and interrupt service routines - 8086 signals.

Unit III	MICROCONTROLLER	9 Hours

Architecture of 8051 – Special Function Registers(SFRs) - I/O Pins Ports and Circuits - Instruction set - Addressing modes - Assembly language programming.

Unit IV	I/O INTERFACING	9 Hours

Memory Interfacing and I/O interfacing - Parallel communication interface – Serial communication interface – D/A and A/D Interface - Timer – Keyboard /display controller – Interrupt controller – DMA controller – Programming and applications Case studies: Traffic Light control, LED display , LCD display, Keyboard display interface and Alarm Controller.

Unit V	ARCHITECTURE OF ADVANCED PROCESSORS	9 Hours

Multiprocessor configurations – Intel 80286 – Internal Architectural – Register Organization – Internal Block Diagram – Architectural features and Register Organization of i386, i486 and Pentium processors. ARM architecture.

Total:	45 Hours

Further Reading:

Intel Core i3, i5 and i7

Course Outcomes:

After completion of the course, Student will be able to

1. Design and implement the functionality of 8085 microprocessor
2. Design and implement the functionality of 8086 microprocessor
3. Design and implement 8051 microcontroller based systems
4. Design I/O circuits. Design Memory Interfacing circuits
5. Acquire the architecture concepts of advanced processors.

References:

1. Ramesh Gaonkar "Microprocessor Architecture, Programming, and Applications with the 8085"- 5th edition Penram International Publishing-2000.
2. A. K. Ray & K. M. Bhurchandi, “Advanced Microprocessors and peripherals- Architectures, Programming and Interfacing”, TMH, 2002 reprint.
3. Mohamed Ali Mazidi, Janice Gillispie Mazidi, Rolin McKinlay, “The 8051 Microcontroller and Embedded Systems: Using Assembly and C”, Second Edition, Pearson education, 2011.
4. Barry B. Brey, “The Intel Microprocessors, 8086/8088, 80186/80188, 80286, 80386, 80486, Pentium, PentiumPro Processor, PentiumII, PentiumIII, PentiumIV, Architecture, Programming & Interfacing”, 6th Edition, Pearson Education/PHI, 2002.
5. https://www.intel.in
6. https://www.arm.com

1702EC405	TRANSMISSION LINES AND WAVEGUIDES	L	T	P	C
		3	0	0	3

Course Objectives:

1. To introduce the various types of transmission lines and to discuss the losses associated.
2. To give thorough understanding about impedance transformation and matching.
3. To use the Smith chart in problem solving.
4. To impart knowledge on filter theories and waveguide theories.
5. To introduce the various types of transmission lines and to discuss the losses associated.

Unit I **TRANSMISSION LINE THEORY** **9 Hours**

General solution of transmission line – The two standard forms for voltage and current of a line terminated by an impedance – Physical significance of the equation and the infinite line – Reflection coefficient – Wavelength and velocity of propagation – Waveform distortion – Distortion less transmission line – The telephone cable – Inductance loading of telephone cables – Input impedance of lossless lines – Reflection on a line not terminated by Z_O – Transfer impedance – Reflection factor and reflection loss.

Unit II **IMPEDANCE MATCHING IN TRANSMISSION LINES** **9 Hours**

Standing waves and standing wave ratio on a line – One eighth wave line – Quarter wave line and impedance matching – The half-wave line –Smith chart – Application of the smith chart – Conversion from impedance to reflection co-efficient and vice-versa – Impedance to admittance conversion and vice-versa – Input impedance of a lossless line terminated by an impedance – Single stub matching and double stub matching.

Unit III **FILTERS AND GUIDED WAVES** **9 Hours**

Constant K Filters - Low pass, High pass band, pass band elimination filters - m -derived sections Waves between parallel planes of perfect conductors – Transverse electric and transverse magnetic waves – Characteristics of TE and TM waves – Transverse electromagnetic waves – Velocities of propagation – Component uniform plane waves between parallel planes – Attenuation of TE and TM waves in parallel plane guides –Wave impedances.

Unit IV **RECTANGULAR WAVEGUIDES** **9 Hours**

Transverse magnetic waves in rectangular wave guides – Transverse electric waves in rectangular waveguides – Characteristics of TE and TM waves – Cutoff wavelength and phase velocity – Impossibility of TEM waves in waveguides – Dominant mode in rectangular waveguide – Attenuation of TE and TM modes in rectangular waveguide – Wave impedance – Characteristic impedance – Excitation of modes.

Unit V **CIRCULAR WAVE GUIDES AND RESONATORS** **9 Hours**

Bessel functions – Solution of field equations in cylindrical co-ordinates – TM and TE waves in circular guides – Wave impedances and characteristic impedance – Dominant mode in circular waveguide – Excitation of modes – Microwave cavities – Rectangular cavity resonators – Circular cavity resonator – Semicircular cavity resonator – Q factor of a cavity resonator for TE_{101} mode.

Total: 45 Hours

Further Reading:

Transmission line equations at radio frequencies - Characteristic impedance of symmetrical networks- The circle diagram for the dissipation less line –composite filters.

Course Outcomes:

After completion of the course, Student will be able to

1. Discuss the propagation of signals through transmission lines.
2. Analyze signal propagation at Radio frequencies.
3. Explain radio propagation in guided systems.
4. Classify the Guided Wave solutions -TE, TM, and TEM.
5. Utilize cavity resonators.

References:

1. J. D. Ryder, "Networks, Lines and Fields", PHI, 2nd Edition, 2010.
2. E.C. Jordan & K.G. Balmain "Electromagnetic Waves and Radiating Systems" Prentice Hall of India 2nd edition 2003.
3. Ramo, Whineery and Van Duzer, “Fields and Waves in Communication Electronics”, John Wiley, 2003.
4. David M.Pozar: Microwave Engineering – 2nd Edition – John Wiley 2000.
5. David K. Cheng, “Field and Waves in Electromagnetism”, Pearson Education, 1989.
6. B.Somanathan Nair, Transmission Lines and Wave guides, Sanguine Technical publishers, 2006.

1702EC406	CONTROL SYSTEMS	L	T	P	C
		3	0	0	3

Course Objectives:

1. In this course it is aimed to introduce to the students the principles and applications of control systems.
2. To the basic concepts of block diagram reduction, time domain analysis solutions to time invariant systems.
3. In deals with the different aspects of stability analysis of systems in frequency domain and time domain.
4. To understand the application of control system.
5. In this course it is aimed to introduce to the students the principles and applications of control systems.

Unit I	INTRODUCTION OF CONTROL SYSTEMS	9 Hours

Basic concept of control systems - Open loop and closed loop control systems and their differences - Block diagram algebra - Representation by signal flow graph - Reduction using Mason's gain formula - Feedback characteristics and effect of feedback

Unit II	TIME RESPONSE ANALYSIS	9 Hours

Time response analysis - Time response of first order system - Transient response of second order system - Time domain specification - steady state response - Steady state error - Effect of proportional derivatives - Proportional integral system

Unit III	FREQUENCY RESPONSE ANALYSIS	9 Hours

Frequency response - Frequency domain specification - stability analysis from bode plot , polar plot , nyquist plot - Compensation techniques - Lag , Lead , lead-lag controllers design in frequency domain .

Unit IV	STABILITY ANALSIS AND ROOT LOCUS TECHNIQUES	9 Hours

Concept of stability - Routh Hurwitz criterion - Nyquist stability criterion - Routh locus concept - construction of root locus

Unit V	APPLICATIONS OF CONTROL SYSTEMS	9 Hours

Aircraft flight control systems - Director(military) - Embedded instrumentation - Fire control system - Guidance , navigation and control - Laser ignition - Weight shift control

Total:	45 Hours

Further Reading:

Modern control systems.

Course Outcomes:

After completion of the course, Student will be able to

1. Knowledge on open loop and closed loop control system, concept of feedback in control systems.
2. Transfer function representation through block diagram algebra and signal flow graph , time response analysis .
3. Frequency response analysis through bode plot, polar plot , nyquist plot and basics of state space analysis.

References:

1. Automatic control systems, third edition, Benjamin C. Kuo.
2. Control and Dynamical Systems, Karl Johan Aström ˚ Richard M. Murray, Version v2.10c (March 4, 2010), PRINCETON UNIVERSITY PRESS.
3. Modern Control Systems, TWELFTH EDITION, Richard C. Dorf University of California, Davis, Robert H. Bishop Marquette University.

1702EC451	ANALOG INTEGRATED CIRCUITS LABORATORY	L	T	P	C
		0	0	3	2

Course Objectives:

1. To expose the students to linear and integrated circuits
2. To understand the basics of linear integrated circuits and available ICs
3. To understand characteristics of operational amplifier
4. To apply operational amplifiers in linear and nonlinear applications.
5. To acquire the basic knowledge of special function IC
6. To use PSPICE software for circuit design

List of Experiments:

1. Inverting, Non inverting and Differential amplifiers.
2. Integrator and Differentiator.
3. Instrumentation Amplifier
4. Active low-pass, High-pass and band-pass filters.
5. Astable & Monostable multivibrators and Schmitt Trigger using op-amp
6. Phase shift and Wien bridge oscillators using op-amp.
7. Astable and monostable multivibrators using NE555 Timer
8. PLL characteristics and its use as Frequency Multiplier
9. DC power supply using LM317 and LM723
10. Mini project using Op-Amp and Specialized IC's

SIMULATION USING SPICE

11. Analog multiplier
12. CMOS Inverter, NAND and NOR

Total: 45 Hours

Additional Experiments:

1. Buck-Boost Converter
2. Design a circuit for Lisajious Figure

Course Outcomes:

After completion of the course, Student will be able to

1. Design oscillators and amplifiers using operational amplifiers
2. Design filters using Opamp and perform experiment on frequency response
3. Analyse the working of PLL and use PLL as frequency multiplier
4. Design DC power supply using ICs
5. Analyse the performance of oscillators and multivibrators using SPICE

References:

1. Adel. S. Sedra, Kenneth C. Smith, Microelectronic Circuits Theory an Applications ,5th Edition, Oxford University, 2006.
2. Jacob Millman, C. Halkias and Satyabrata Jit, Electronic Devices and Circuits, 3rd Edition, Tata McGraw-Hill, 2011.

1702EC452	Microprocessors and Microcontrollers Laboratory (Common to B.E / B.Tech – ECE,CSE & IT)	L	T	P	C
		0	0	4	2

Course Objectives: **The student should be made to:**

1. Write ALP for arithmetic and logical operations in 8085, 8086 and 8051
2. Differentiate Serial and Parallel Interface
3. Interface different I/Os with Microprocessors& Microcontrollers
4. Be familiar with MASM

List of Experiments:

8085 Programs using kits

1. Basic arithmetic and Logical operations
2. Sorting and Searching the given data.

8086 Programs using kits with MASM

3. Floating point operations

8051 Experiments using kits

4. Basic arithmetic and Logical operations
5. Square and Find 2's complement of a number
6. Code conversion

Peripherals and Interfacing Experiments

7. Traffic light control
8. Stepper motor and DC Motor control
9. Key board and Display
10. Serial interface and Parallel interface
11. Printer Interfacing
12. A/D and D/A interface and Waveform Generation

Total: 45 Hours

Additional Experiments: https://www.intel.in

Basic experiments using Arduino processor

Course Outcomes:

After completion of the course, Student will be able to

1. Write ALP Programmes for fixed and Floating Point and Arithmetic
2. Interface different I/Os with processor
3. Generate waveforms using Microprocessors&Execute Programs in 8051
4. Explain the difference between simulator and Emulator

References:

1. Ramesh Gaonkar "Microprocessor Architecture, Programming, and Applications with the 8085"- 5th edition Penram International Publishing-2000.
2. A. K. Ray & K. M. Bhurchandi, "Advanced Microprocessors and peripherals- Architectures, Programming and Interfacing", TMH, 2002 reprint.

1704GE451	LIFE SKILLS: VERBAL ABILITY	L	T	P	C
		0	0	2	-

Course Objectives:

1. To help students comprehend and use vocabulary words in their day to day communication.
2. To apply appropriate reading strategies for interpreting technical and non-technical documents used in job-related settings.
3. To ensure students will be able to use targeted grammatical structures meaningfully and appropriately in oral and written production.
4. To enable the students to arrange the sentences in meaningful unit and to determine whether constructions rely on active or passive voice
5. To Apply the principles of effective business writing to hone communication skills

Unit I	**VOCABULARY USAGE**	**9 Hours**

Introduction - Synonyms and Antonyms based on Technical terms – Single word Substitution – Newspaper, Audio and video listening activity.

Unit II	**COMPREHENSION ABILITY**	**9 Hours**

Skimming and Scanning – Social Science passages – Business and Economics passages – latest political and current event based passages – Theme detection – Deriving conclusion from passages

Unit III	**BASIC GRAMMAR AND ERROR DETECTION**	**9 Hours**

Parallelism – Redundancy – Ambiguity – Concord - Common Errors – Spotting Errors – Sentence improvement – Error Detection FAQ in Competitive exams.

Unit IV	**REARRANGEMENT AND GENERAL USAGE**	**9 Hours**

Jumble Sentences – Cloze Test - Idioms and Phrases – Active and passive voice – Spelling test.

Unit V	**APPLICATION OF VERBAL ABILITY**	**9 Hours**

Business Writing - Business Vocabulary - Delivering Good / Bad News - Media Communication - Email Etiquette – Report Writing - Proposal writing – Essay writing– Indexing –Market surveying.

Total:	**45 Hours**

Further Reading:

Modern control systems.

Course Outcomes:

After completion of the course, Student will be able to

1. Students are enabled to use new words in their day to day communication.
2. Students are capable to gather information swiftly while reading passages
3. Students are proficient during their oral and written communication.
4. Students are equipped to rearrange the sentences and able to identify the voice of the sentence
5. Students use their knowledge of the best practices to craft effective business documents

References:

1. Arun Sharma and Meenakshi Upadhyav, How to Prepare for Verbal Ability and Reading Comprehension for CAT, McGrawHill Publication, Seventh Edition 2017
2. R S Aggarwal and Vikas Aggarwal , Quick Learning Objective General English ,S.Chand Publishing House, 2017
3. Dr.K.Alex , Soft Skills, S.Chand Publishing House, Third Revise Edition, 2014
4. Raymond Murphy, Essential English Grammar in Use, Cambridge University press, New Delhi, Third Edition , 2007