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 (CIVIL, CSE, ECE, EEE, IT, 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			Category
						CA	ES	Total	
Theory Course									
1901MA402	Probability Theory and Stochastic Processes	3	0	0	3	40	60	100	BSC
1902EC401	Electronics Circuits	3	0	0	3	40	60	100	PCC
1902EC402	Signals and Systems	2	2	0	3	40	60	100	PCC
1902EC403	Electromagnetic Fields	3	0	0	3	40	60	100	ESC
1902EC404	Analog Integrated Circuits	3	0	0	3	40	60	100	PCC
1902EC405	Microprocessors and Microcontrollers	3	0	0	3	40	60	100	PCC
Laboratory Course									
1902EC451	Electronics and Integrated Circuits Laboratory	0	0	2	1	50	50	100	PCC
1902EC452	Microprocessors and Microcontrollers Laboratory	0	0	2	1	50	50	100	PCC
1904GE451	Life Skills: Verbal Reasoning	2	0	0	1	100	-	100	EEC
1901MCX01	Environmental Studies	2	0	0	0	100	-	100	MC
Total		**21**	**2**	**4**	**21**	**540**	**460**	**1000**	

L–Lecture|T–Tutorial|P–Practical|C–Credit|CA –ContinuousAssessment| ES–EndSemester

1901MA402		**PROBABILITY THEORY AND STOCHASTIC PROCESSES**	**L**	**T**	**P**	**C**
			3	**1**	**0**	**4**

PREREQUISITE :

1. Advanced and multivariate differential calculus and integral calculus.
2. Linear algebra and matrices

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.

Module 1	**PROBABILITY THEORY**	**9+3Hours**

Sets and set operations; Probability, Conditional probability and Bayes theorem; Discrete and continuous random variables – Moments – Moment generating functions –Real Time Problems.

Module 1I	**DISCRETE AND CONTINUOUS RANDOM VARIABLES**	**9+3 Hours**

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

Module III	**TWO - DIMENSIONAL RANDOM VARIABLES**	**9+3 Hours**

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

Module IV	**STOCHASTIC PROCESSES**	**9+3 Hours**

Stationary process – Markov process – Markov chains – transition probabilities – Limiting distributions – Poisson process. Stochastic processes, Stochaststically larger-preposition, coupling-stochastic monotonicity properties of birth and death processes-exponential convergence in Markov chains.

Module V	**RANDOM PROCESSES**	**9+3 Hours**

Auto correlation-cross correlation-power spectral density-cross spectral density-Properties-Wiener-Khintchine relation- Linear time invariant system- system transfer function-Linear system with random inputs-White noise.

	TOTAL:	**60 HOURS**

FURTHER READING / CONTENT BEYOND SYLLABUS / SEMINAR :

COURSE OUTCOMES:

After completion of the course, Student will be able to

CO1	To apply probability techniques to analyze the performance of Electronic systems.(K3)
CO2	To apply standard distributions in describing real life phenomena.(K3)
CO3	To solve problems involving two dimensional random variable.(K3)
CO4	Make use of theorems related to random signals(K3)
CO5	To understand propagation of random signals in linear time invariant systems.(K2)

REFERENCES:

1. H. Stark and J. Woods, ``Probability and Random Processes with Applications to Signal Processing," Third Edition, Pearson Education
2. A.Papoulis and S. Unnikrishnan Pillai, ``Probability, Random Variables and Stochastic Processes," Fourth Edition, McGraw Hill.
3. K. L. Chung, Introduction to Probability Theory with Stochastic Processes, Springer International
4. P. G. Hoel, S. C. Port and C. J. Stone, Introduction to Probability, UBS Publishers,
5. P. G. Hoel, S. C. Port and C. J. Stone, Introduction to Stochastic Processes, UBS Publishers
6. S. Ross, Introduction to Stochastic Models, Harcourt Asia, Academic Press.
7. www.indiastudychannel.com

1902EC401		**ELECTRONIC 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 study the performance metrics of Tuned amplifiers, Power amplifiers and oscillators.
	3. To discuss various applications of analog circuits

Unit I	**ANALYSIS OF MOSFET**	**9 Hours**
Biasing,Large and Small signal analysis CS, CG and source follower, miller effect, frequency response of CS, CG and source follower, Current Sources, Current Mirrors		

Unit II	**DIFFERENTIAL AMPLIFIERS AND FEEDBACK AMPLIFIERS**	**9 Hours**
Differential Amplifiers, CMRR, Differential amplifiers with active load, Two stage amplifiers,Feedback amplifiers - Current Series, Voltage Shunt, Current shunt and Voltage Series		

Unit III	**TUNED AMPLIFIERS AND POWER AMPLIFIERS**	**9 Hours**
Small signal tuned amplifiers – Analysis of capacitor coupled single tuned amplifier – double tuned amplifier – Stagger tuned amplifiers. Power amplifiers- class A, class B, class AB, Biasing circuits, class C and class D		

Unit IV	**OSCILLATORS**	**9 Hours**
Sinusoidal oscillators, General form of oscillator circuit (Hartley & Colpitts), Barkhausen Criterion, Design and analysis of RC phase shift oscillator, Wien bridge oscillators, Resonant circuit oscillators, Crystal oscillator.		

Unit V	**APPLICATIONS OF ANALOG ELECTRONICS**	**9 Hours**
Selection of Components and Circuit Elements in an Application - Automatic Switch on of Lamp in the Dark/Presence of Light – Humidity and Smoke Detection - Future Advances – Case study: Revival in the Music Industry.		

	Total:	45 Hours

Further Reading:	
	Role of analog circuits in biomedical applications
	Analog electronics applications in nanotechnology fields

Course Outcomes:	
	After completion of the course, Student will be able to
	1. Determine various parameters of transistor amplifier circuits using signal analysis
	2. Examine about differential amplifiers.
	3. Design power amplifiers and tuned amplifiers
	4. Design different types of oscillators.
	5. Discuss the various applications of analog circuits

References:

1. A. Sedra and K. Smith, Microelectronic Circuits, 7th edition. Oxford Univ. Press, 2016

2. Hernando Lautaro Fernandez-Canque by Taylor & Francis Group, LLC, 2017

3.Jacob Millman, C. Halkias and Satyabrata Jit Electronic Devices and Circuits, 4TH Edition, Tata McGraw-Hill, 2015.

4. Salivahanan, N. Suresh Kumar and A. Vallava Raj, “Electronic Devices and circuits”, TMH, 2nd Edition 2008

1902EC402		**SIGNALS AND SYSTEMS**	**L**	**T**	**P**	**C**
			3	**1**	**0**	**4**

CourseObjectives:

1. To study and analyze the continuous and discrete-time signals and systems, their Properties and representations.
2. To have Knowledge of time-domain representation and analysis concepts as they relate to differential equations, difference equations, impulse response and convolution, etc.
3. To familiarize the concepts of frequency-domain representation and analysis using Fourier Analysis tools, Z-transform.
4. To understand the conceptsof the sampling process and to identify and Solve engineering problems.
5. To analyze the systems by examining their input and output signals.

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

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.

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

Fourier series analysis-Trigonometric Fourier series, Cosine Fourier series, Exponential Fourier series, Fourier Spectrum of continuous time signals, Fourier transform, Laplace transform.

Unit III	**LTI CONTINUOUS TIME SYSTEM**	**9+3Hours**

Analysis of differential equation - Transfer function-Impulse response - Frequency response - Convolution integral - Fourier Methods - Laplace transforms analysis - Block diagram representation – Cascade, Parallel and Direct Form - State variable equation and Matrix.

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

Discrete Time Fourier Transform (DTFT) – Properties of DTFT – Discrete Fourier Transform (DFT) - Z-Transform – Properties of Z-Transform and Inverse Z-Transform.

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

Analysis of differential equation – Transfer function – Impulse response – Convolution sum – Analysis and Characterization of DT system using Z-transform Difference Equations – Block diagram.

	Total:	**45+15Hours**

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. Analyze continuous time LTI systems using Fourier and Laplace Transforms
4. Apply Z-transform and DTFT in signal analysis for Discrete time signals
5. Analyze discrete time LTI systems using Z-transform.

References:

1. Allan V.Oppenheim, Allan S.Wilskywith S. Hamid Nawab, “Signals and Systems”, Pearson, Second Edition 2015.

2.Rodger E.Ziemer, William H.Tranter and D.Ronald Fannin, “Signals and Systems Continuous and Discrete”, Fourth Edition

3.Simon Haykin and Barry Van Veen, “Signals and Systems”, John Willey & Sons, Inc., Second Edition, 2004.

4.B.P.Lathi, “Principles of Linear Systems and Signals”, Second Edition, Oxford, 2009.

5.John Alan Stuller, “An Introduction to Signals and Systems”, Thomson, 2007.

6.Hwei.P.Hsu, Schaum, “Outlines: Signals and Systems”, Pearson Education, 2002.

7.Anand Kumar A, “Signals and Systems”, PHI learning Pvt. Ltd., Second Edition, 2012.

8.Michael Roberts, “Fundamentals of Signals & Systems”, 2nd Edition, Tata Mc Graw-Hill, 2010.

1902EC403		ELECTROMAGNETIC FIELDS	L	T	P	C
			3	0	0	3

Course Objectives:

1. To impart knowledge on the basics of static electric and magnetic field and the associated laws.
2. To give insight into the propagation of EM waves and also to introduce the methods in computational electromagnetic.
3. To analyze the time varying fields.

UNIT I	STATIC ELECTRIC FIELDS	9 Hours

Co-ordinate system – Rectangular – Cylindrical and spherical co-ordinate system – Meaning of stokes theorem and divergence theorem –Coulomb's law in vector form – Definition of electric field intensity– Electric field due to charges distributed uniformly on an infinite and finite line – Electric field on the axis of a uniformly charged circular disc – Electric flux Density – Gauss law – Proof of gauss law – Applications.

UNIT II	STATIC MAGNETIC FIELDS	9 Hours

The Biot-Savart law in vector form –Magnetic field intensity due to a finite and infinite wire carrying a current I – Magnetic field intensity on the axis of a circular and rectangular loop carrying a current I – Ampere's circuit all a wand simple applications – Magnetic flux density –The Lorentz force equation for a moving charge and applications – Force on a wire carrying a current I place dinamagnetic field.

UNIT III	ELECTRIC AND MAGNETIC FIELDS IN MATERIALS	9 Hours

Poisson's and Laplace's equation – Electric polarization – Nature of dielectric materials – Definition of capacitance – Electrostatic energy and energy density – Boundary conditions for electric fields – Electric current – Current density – Continuity equation for current – Definition of inductance – Inductance of loops and solenoids – Definition of mutual inductance – Energy density in magnetic fields.

UNIT IV	TIME VARYING ELECTRIC AND MAGNETIC FIELDS	9 Hours

Faraday's law – Maxwell's equations in integral form and point form – Displacement current – Ampere's circuital law in integral form –Modified form of ampere's circuital law as Maxwell's first equation in integral form – Pointing vector and the flow of power – Power flow in a co-axial cable – Instantaneous average and complex pointing vector.

UNIT V	ELECTROMAGNETIC WAVES	9 Hours

Derivation of wave equation–Wave equation in phasor form – Plane waves in freespace and in a homogenous material – Wave equation for a conducting medium – Plane waves in lossy dielectrics– Propagation in good conductors – Skin effect – Linear elliptical and circular polarization – Reflection of plane wave from a conductor–Normal incidence - Dependence on polarization – Brewster angle.

	Total:	45 Hours

Further Reading:

Vector analysis - Vector Calculus -Principle of Superposition theorem-Nature of magnetic materials – Magnetization and permeability – Magnetic boundary conditions.

Course Outcomes:

After completion of the course, Student will be able to

1. Explain the fundamentals of electromagnetic.
2. Analyze field potentials due to static changes and static magnetic fields.
3. Explain how materials affect electric and magnetic fields.
4. Analyze the relation between the fields under time varying situations.
5. Discuss the principles of propagation of uniform plane waves.

References:

1. Hayt, WH and Buck, J.A., "Engineering Electromagnetics", 7th Edition, TMH, 2007.
2. Jordan, E.C, and Balmain, K. G., "Electromagnetic Waves and Radiating Systems", 4th Edition, Pearson Education / PHI, 2006.
3. Mathew N.O. Sadiku, "Elements of Engineering Electromagnetics", 4th Edition, Oxford University Press, 2007.
4. Narayana Rao, N., "Elements of Engineering Electromagnetics", 6th Edition, Pearson Education, 2006.
5. Ramo, Whinnery and Van Duzer., "Fields and Waves in Communication Electronics", 3rd Edition, John Wiley and Sons, 2003.

1902EC404		ANALOG INTEGRATED CIRCUITS	L	T	P	C
			3	0	0	3

Course Objectives:

1. To learn the fundamental concepts behind Operational Amplifiers and to differentiate small signal and large signal circuit models.
2. To learn the concepts of Active filters, Analog to Digital and Digital to Analog converters for microelectronics.
3. To study the performance metrics of Phase Locked Loop and CMOS differential amplifiers.

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, Integrator and Differentiator, 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 and self-tuned filters.

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

Op-amp as a comparator, Schmitt trigger, Astable and Monostable multivibrators, Triangular wave generator, Multivibrators using 555timer, 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 amplifier with Resistive load, current mirror load and current source load, Input common-mode range and Common-mode feedback circuits, OTAs vs Op-amps, Slew rate, CMRR, PSRR, Two stage amplifiers, Compensation in amplifiers (Dominant pole compensation).

Total:	**45 Hours**

Further Reading:

Collector Emitter Feedback Bias.

Course Outcomes:

After completion of the course, Student will be able to

1. Implement basic applications of Op-amp using IC 741.
2. Interpret the concept of Active filter for Analog integrated circuits.
3. Construct an Multi vibrators using IC 555 and Data Converters for Analog integrated circuits.
4. IllustratethefunctionofapplicationspecificICssuchasVoltageregulators,PLL and its application in communication.
5. Describe the working of CMOS Differential amplifier in Analog integrated circuits.

References:

1. S.Franco, Design with Operational Amplifiers and Analog Integrated Circuits, Third edition, TMH, 2003.
2. Sedra and Smith, Micro electronics Circuits, First Edition, Oxford Univ. Press, 2004.
3. Coughlin, Driscoll, OP-AMPS and Linear Integrated Circuits, First Edition, 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 –Second edition, Tata McGraw Hill, 2009

1902EC405	MICROPROCESSOR AND MICROCONTROLLER	L	T	P	C
		3	0	0	3

Course Objectives:

1. To teach the architecture and functions of 8085 and 8086 Microprocessors.
2. To impart the concepts of 8051 microcontroller.
3. To convey aspects of I/O and Memory Interfacing circuits.

UNIT I	INTRODUCTION TO MICROPROCESSORS	9 Hours

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

UNIT II	8086 MICROPROCESSORS	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	MICROCONTROLLERS	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

UNIT V	ADVANCED MICROPROCESSOR & MICROCONTROLLER	9 Hours

Advanced coprocessor Architectures- 286, 486, Pentium -RISC Processors- RISC Vs CISC, RISC properties and evolution- ARM Processor fundamentals, ARM Architecture – Register, CPSR, Pipeline, exceptions and interrupts interrupt vector table, ARM instruction set – Data processing, Branch instructions, load store instructions.

	Total:	45 Hours

Further Reading:

1. Raspberry pi
2. Machine learning using raspberry pi

Course Outcomes:

After completion of the course, Student will be able to

1. Construct hardware, software and programming concepts of Microprocessor
2. Summarize architecture, instructions and addressing modes of 8086 Microprocessor
3. Describe addressing modes, Architecture, pins of 8051 Microcontroller
4. Illustrate interfacing of Serial, parallel, Keyboard, Display with Microcontroller
5. Use the programming concepts to write assembly language programs

References:

1.R. S. Gaonkar, “Microprocessor Architecture: Programming and Applications with the 8085/8080A”, Penram International Publishing, Third Edition, 1996

2. D A Patterson and J H Hennessy, "Computer Organization and Design The hardware and software interface” Morgan Kaufman Publishers, Fourth Edition, 2011.

3. Douglas Hall, “The Microprocessors and its Interfacing”, Tata McGraw Hill, Third Edition, 2012.

4. Kenneth J. Ayala, “The 8051 Microcontroller: Architecture Programming & Applications”, Penram International Publishing, Second Edition, 1996

5. Yu-Cheng Liu, Glenn A. Gibson, “Microcomputer Systems: The 8086 / 8088 Family - Architecture, Programming and Design”, Second Edition, Prentice Hall of India, 2011.

6. Mohamed Ali Mazidi, Janice Gillispie Mazidi, Rolin McKinlay, “The 8051 Microcontroller and Embedded Systems: Using Assembly and C”, Second Edition, Pearson education, 2011.

7. Doughlas V. Hall, “Microprocessors and Interfacing, Programming and Hardware”, Second Edition, TMH, 2012.

8. John P. Hayes, “Computer Architecture and Organization”, Third illustrated Edition, Tata McGraw Hill, 2007.
E-References:
https://www.coursera.org/learn/raspberry-pi-interface (University of California)
https://www.coursera.org/learn/raspberry-pi-platform (University of California)

LABORATORY COURSE

1902EC451		**ELECTRONICS AND INTEGRATED CIRCUITS LABORATORY**	**L**	**T**	**P**	**C**
			0	**0**	**2**	**1**

Course Objectives:	
	1. To understand the basics of Analog integrated circuits and available Ics.
	2. To gain hands on experience in designing Analog integrated circuits.
	3. To learn PSPICE software used in circuit design.
	4. To apply operational amplifiers in linear and non-linear applications.

LIST OF EXPERIMENTS:
DESIGN, SIMULATION AND IMPLEMENTATION OF
1. Inverting, Non inverting and Differential amplifiers.
2. Integrator and Differentiator.
3. Instrumentation amplifier
4. Active low-pass, High-pass,band-pass, and Band stop filters.
5. Astable& Monostable multivibrators and Schmitt Trigger
6. Phase shift and Wien bridge Oscillator
7. Astable and monostable multivibrators using NE555 Timer.
8. PLL characteristics and its use as Frequency Multiplier.
9. RPS power supply using LM317 and LM723.
MINI PROJECT:
Mini project using Op-Amp and Specialized IC's.
List of Hardware/Software Required
1.CRO (Min 30MHz) – 15 Nos.
2. Signal Generator /Function Generators (2 MHz) – 15 Nos.
3. Dual Regulated Power Supplies (0 – 30V) – 15 Nos.

4. Digital Multimeter – 15 Nos IC tester - 2 Nos.		
5. Standalone desktops PC – 15 Nos.		
6. SPICE Circuit Simulation Software: (any public domain or commercial software) Components and Accessories: - 50 Nos.		
7. Transistors, Resistors, Capacitors, diodes, Zener diodes, Bread Boards, Transformers, wires, Power transistors, Potentiometer, A/D and D/A convertors, LEDs. Note: Op-Amps uA741, LM 301, LM311, LM 324, LM317, LM723, 7805, 7812, 2N3524, 2N3525, 2N3391, AD 633, LM 555, LM 565 may be used.		
	TOTAL	**45 HOURS**

Course Outcomes:	
	After completion of the course, Student will be able to
	1. Design oscillators and amplifiers using operational amplifiers.
	2. Design filters using Op-amp and perform experiment on frequency response.
	3. Analyse the working of PLL and use PLL as frequency multiplier.
	4. Design Regulated power supply using ICs.
	5. Analyse the performance of oscillators and multivibrators using PSPICE

1902EC452		**Microprocessors and Microcontrollers Laboratory**	**L**	**T**	**P**	**C**
			0	**0**	**4**	**2**
		(Common to B.E / B.Tech – ECE,CSE & IT)				
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 operations						
2. Basic Logical operations						
3. Ascending and descending						
4. Maximum and minimum number						
8086 Programs using kits						
5. Move a data block without overlap						
6. Floating point operations, string manipulations						
7. Code conversion.						
8. sorting and searching						
8051 Experiments using kits						
9. Basic arithmetic and Logical operations						
10. Square and Cube program, Find 2's complement of a number						
Peripherals and Interfacing Experiments						
11. Traffic light control						
12. Stepper motor control						
13. Key board Display						
14. Serial interface and Parallel interface and Printer status.						

15. 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	

1904GE451	**LIFE SKILLS - REASONING**	**L**	**T**	**P**	**C**
		0	**0**	**2**	**0**

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
	6. To apply the principles of business etiquettes and Market surveying.

UNIT I	**VOCABULARY USAGE**	**6 Hours**
Introduction - Synonyms and Antonyms based on Technical terms – Single word Substitution – Newspaper, Audio and video listening activity.		
UNIT II	**COMPREHENSION ABILITY**	**6 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**	**6 Hours**
Parallelism– Redundancy – Ambiguity – Concord - Common Errors – Spotting Errors – Sentence improvement– Error Detection FAQ in Competitive exams.		
UNIT IV	**REARRANGEMENT AND GENERAL USAGE**	**6 Hours**
Jumble Sentences – Cloze Test - Idioms and Phrases – Active and passive voice – Spelling test.		
UNIT V	**APPLICATION OF VERBAL ABILITY**	**6 Hours**
Business Writing - Business Vocabulary - Delivering Good / Bad News - Media Communication - Email Etiquette – Report Writing - Proposal writing – Essay writing– Indexing –Market surveying.		
	Total:	**30 Hours**

Course Outcomes:	
	After completion of the course, Student will be able to
	1. Construct new words in their day to day communication.
	2. Predict the information swiftly while reading passages.
	3. Elaborate their oral and written communication.

	4. Rephrase the sentences and able to identify the voice of the sentence.
	5. Summarize their knowledge of the best practices to craft effective business documents
	6. Make use of the etiquettes in business.

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

	ENVIRONMENTAL SCIENCE	L	T	P	C
	(Common to all Branches of B.E/ B.Tech) Common to CSE,IT,EEE,ECE,Civil ,Mech &BME branches	3	0	0	0

PREREQUISITE:

1. Basic knowledge about the valuable environment
2. Basic knowledge to conserve this precious environment

COURSE OBJECTIVES:

1. Realize the interdisciplinary and holistic nature of the environment.
2. Understand how natural resources and environment affect the quality of life and stimulate the quest for sustainable development
3. Recognize the socio-economic, political and ethical issues in environmental science.

MODULE I ECOSYSTEMS AND BIODIVERSITY — **10 Hours**

Concept of an ecosystem – structure and function of anecosystem – producers, consumers and decomposers- Oxygen cycle and Nitrogen cycle – energy flow in the ecosystem – ecological succession processes – Introduction, types, characteristic features, structure and function of the (a) forest ecosystem (b) grassland ecosystem (c) desert ecosystem (d) aquatic ecosystems (ponds, streams, lakes, rivers, oceans, estuaries) – Introduction to biodiversity definition: genetic, species and ecosystem diversity – value of biodiversity: consumptive use, productive use, social, ethical, aesthetic and option values – hot-spots of biodiversity – threats to biodiversity: habitat loss, poaching of wildlife, man-wildlife conflicts – endangered and endemic species of India – conservation of biodiversity: In-situ and ex-situ conservation of biodiversity.
Documentation of the medicinal plants in your native place

MODULE II NATURAL RESOURCES — **10 Hours**

Forest resources: Use and over-exploitation, deforestation, case studies- timber extraction, mining, dams and their effects on forests and tribal people – Water resources: Use and overutilization of surface and ground water, dams-benefits and problems – Mineral resources: Use and exploitation, environmental effects of extracting and using mineral resources, case studies – Food resources: World food problems, changes caused by agriculture and overgrazing, effects of modern agriculture, fertilizer-pesticide problems, water logging, salinity, case studies – Energy resources: Growing energy needs, renewable and nonrenewable energysources, use of alternate energy sources. Energy Conversion processes – Biogas – production and uses, anaerobic digestion; case studies – Land resources: Land as a resource, land degradation, man induced landslides, soil erosion and desertification – role of an individual in conservation of natural resources – Equitable use of resources for sustainable lifestyles.
Documentation of the effect of modern Agriculture in your nearby Village

MODULE III ENVIRONMENTAL POLLUTION — **9 Hours**

Definition – Source, causes, effects and control measures of: (a) Air pollution - Mitigation procedures- Control of particulate and gaseous emission, Control of SO_X, NO_x, CO and HC) -Technology for capturing CO_2 (metallo organic frame works)(b) Water pollution – Waste water treatment processes. (c) Soil pollution - soil waste management: causes, effects and control measures of municipal solid wastes – (d) Marine pollution (e) Noise pollution (f) Thermal pollution (g) Nuclear hazards–role of an individual in prevention of pollution – pollution case studies.
Documentation study of local polluted site – Urban / Rural / Industrial / Agricultural.

MODULE IV SOCIAL ISSUES AND THE ENVIRONMENT — **8 Hours**

From unsustainable to sustainable development – urban problems related to energy – water conservation, rain water harvesting, watershed management -environmental ethics: Issues and possible solutions – 12 Principles of green chemistry – consumerism and waste products – environment protection act – Air act – Water act – Wildlife protection act – Forest conservation act – The Biomedical Waste (Management and Handling) Rules; 1998 and amendments- scheme of labeling of environmentally friendly products (Ecomark) central and state pollution control boards- disaster management: floods, earthquake- Public awareness.

The Syllabus is approved.

12/06/2020

Analyze the recent steps taken by government of India to prevent pollution (Green India and Clean India)		
MODULE V	**HUMAN POPULATION AND THE ENVIRONMENT**	**8 Hours**
Population growth, variation among nations – population explosion – family welfare programme – environment and human health – human rights – value education – HIV / AIDS – women and child welfare – Environmental impact analysis (EIA) -GIS-remote sensing-role of information technology in environment and human health – Case studies. Documentation study of the Human health and the environment in nearby Hospital (Statistical report)		
		TOTAL: 45 HOURS
FURTHER READING / CONTENT BEYOND SYLABUS / SEMINAR :		
	Human rights violation	
	E - waste and biomedical waste -Identification of adulterants in food materials	
REFERENCES:		
1. 1 Trivedi.R.K., "Handbook of Environmental Laws, Rules, Guidelines, Compliances and Standards", Vol. I and II, Enviro Media, 3rd edition, BPB publications, 2010.		
2. 2. Cunningham, W.P. Cooper, T.H. Gorhani, "Environmental Encyclopedia", Jaico Publ., House, Mumbai, 2001.		
3. Dharmendra S. Sengar, "Environmental law", Prentice hall of India PVT LTD, New Delhi, 2007.		
4. Rajagopalan, R, "Environmental Studies-From Crisis to Cure", Oxford University Press, 2005.		
5. Benny Joseph, "Environmental Science and Engineering", Tata McGraw-Hill, New Delhi, 2006		
6. Ravikrishnan"Environmental Science and Engineering" Sri Krishna Hi-tech Publishing Company Pvt .		
7https://en.wikipedia.org/wiki/Carbon_capture_and_storage		

The syllabus is approved.

12/06/2020