1901MA105 **DISCRETE MATHEMATICS**

L	T	P	C
3	0	0	3

MODULE I BOOLEAN ALGEBRA **09 Hours**

Propositions- Logical connectives-Compound propositions-Conditional and bi conditional propositions- Truth tables - Tautologie and Contradictions - Logical and equivalences and implications - De Morgan"s Laws- Normal forms-Principal conjunctive and disjunctive normal forms Rules of inference-Arguments-Validity of arguments - Karnaugh map.

MODULE II ABSTRACT ALGEBRA **09 Hours**

Set Operations - Properties - Power set -Relations - Graph and matrix of a relation - Partial Ordering - Equivalence relations - Group - Ring – Field.

MODULE III COMBINATORICS **09 Hours**

Basics of Counting-Counting arguments- Pigeonhole Principle-Permutations and Combinations- Recursion and recurrence relations-Generating Functions-Mathematical Induction- Inclusion -Exclusion.

MODULE IV CALCULUS **09 Hours**

Limits of functions -Continuity -Derivatives: Derivatives -Differentiability - Rules - Properties - Differentiation of transcendental functions - Higher order derivatives - Implicit differentiation - Integration: Anti-derivatives - Riemann sum -Indefinite and Definite integration - Mean value theorem for definite integral - Fundamental theorem of calculus.

MODULE V MULTIPLE INTEGRALS **09 Hours**

Double integration with constant and variable limits-Region of integration -Change the order of integration - Area as double integral in Cartesian coordinates - Triple integral in Cartesian coordinates

TOTAL: 45 HOURS

REFERENCES:

1. N. Herstein, Topics in Algebra, John Wiley and Sons, 2015
2. B. S. Grewal, Higher Engineering Mathematics, Khanna Publication, 2017
3. Gilbert Strang, Introduction to linear algebra, Fifth Edition, Wellesley Cambridge Press, 2017
4. Peter V. O"Neil, Advanced Engineering Mathematics, Seventh Edition, Thomson Learning, 2011

Course outcomes :

Module 1 – Skill development

Module 2 – Skill development

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1901MA106 **PROBABILITY AND STATISTICS**

L	T	P	C
3	0	0	3

MODULE I PROBABILITY AND RANDOM VARIABLE **9 Hours**

Probability: Concepts of experiments, Sample space, event - Combinatorial probability - Conditional probability - Baye's theorem. Random variable: Probability mass function - Probability density function Properties - Mathematical expectation and its properties-Moments and its properties - Moment generating functions.

MODULE II PROBABILITY DISTRIBUTIONS **9 Hours**

Discrete Probability distributions: Binomial distribution -Poisson distribution - Geometric distribution. Continuous Probability distributions: Uniform distribution - Exponential distribution - Normal distribution.

MODULE III TWO DIMENSIONAL RANDOM VARIABLES **9 Hours**

Joint Distribution - Discrete and continuous distributions - Marginal and Conditional Distributions - Correlation- Rank correlation - Linear Regression

MODULE IV INTRODUCTION TO STATISTICS **9 Hours**

Definition of Statistics - Basic Objectives - Collection of Data - Population - Sample - Representative Sample - Classification and Tabulation of Univariate data - Graphical representation - Frequency curves - Central tendency and Dispersion - Applications.

MODULE V TESTING OF HYPOTHESIS **9 Hours**

Sampling - Large sample test: Tests for Single mean- Test for difference between two means. Small sample test: Tests for mean (t test), F- test - Chi-square test for Goodness of fit and Independence of attributes.

TOTAL: 45 HOURS

REFERENCES:

1. S. M. Ross, Introduction of Probability Models, Academic Press, springer Publication, 2000
2. A. Goon, M. Gupta and B. Dasgupta, Fundamentals of Statistics, Vol. I & II, World Press, 2013
3. I. R. Miller, J.E. Freund and R. Johnson, "Probability and Statistics for Engineers". Fourth Edition, PHI, 2011.
4. A. M. Mood, F.A. Graybill and D.C. Boes, "Introduction to the Theory of Statistics", McGraw Hill Education, 2010.

Course outcomes:

Module I : Skill development

Module IV : Skill development

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1901GE102 PRINCIPLES OF ELECTRICAL ENGINEERING

L	T	P	C
2	0	2	3

MODULE I INTRODUCTION **7 Hours**

Concept of Potential difference, voltage, current, Fundamental linear passive and active elements to their functional current-voltage relation, Terminology and symbols in order to describe electric networks, Concept of work, power, energy and conversion of energy.

MODULE II DC CIRCUITS **10 Hours**

Current-voltage relations of electric network by mathematical equations to analyse the network (Thevenin's theorem, Norton-s Theorem, Maximum Power Transfer theorem) voltage source and current sources, ideal and practical, Kirchhoff-s laws and applications to network solutions using mesh analysis, Simplifications of networks using series- parallel, Star/Delta transformation. Superposition theorem.

MODULE III AC CIRCUITS **9 Hours**

AC waveform definitions, form factor, peak factor, study of R-L, R-C,RLC series circuit, R-L-C parallel circuit, phasor representation in polar and rectangular form, concept of impedance, admittance, active, reactive, apparent and complex power, power factor, 3 phase Balanced AC Circuits.

MODULE IV ELECTROSTATICS AND ELECTRO-MECHANICS **10 Hours**

Electrostatic field, electric field intensity, electric field strength, absolute permittivity, relative permittivity, permittivity, capacitor composite, dielectric capacitors, capacitors in series& parallel, energy stored in capacitors, charging and discharging of capacitors, Electricity and Magnetism, magnetic field and faraday's law, self and mutual inductance, Ampere's law, Magnetic circuit, Single phase transformer, principle of operation, EMF equation, voltage ratio, current ratio, KVA rating, efficiency and regulation, Electromechanical energy conversion,

MODULE V MEASUREMENTS AND SENSORS **9 Hours**

Introduction to measuring devices/sensors and transducers related to electrical signals, Elementary methods for the measurement of electrical quantities in DC and AC systems and their practical application. Electrical Wiring and Illumination system: Basic layout of distribution system, Types of Wiring System &Wiring Accessories, Necessity of earthing, Types of earthing, Different types of lamps (Incandescent, Fluorescent, Sodium Vapour, Mercury Vapour, Metal Halide, CFL, LED)

EXPERIMENT 1:	Familiarization of electrical Elements, sources, measuring devices and transducers related to electrical circuits	**4 hours**
EXPERIMENT 2:	Determination of resistance temperature coefficient	**4 hours**
EXPERIMENT 3:	Verification of Network Theorem (Superposition, Thevenin, Norton, Maximum Power Transfer theorem)	**4 hours**
EXPERIMENT 4:	Simulation of R-L-C series circuits for XL>XC , XL< XC	**4 hours**
EXPERIMENT 5:	Simulation of Time response of RC circuit	**5 hours**
EXPERIMENT 6:	Verification of relation in between voltage and current in three phase balanced star and delta connected loads.	**4 hours**
EXPERIMENT 7:	Demonstration of measurement of electrical quantities in DC and AC systems.	**5 hours**

TOTAL: 75 HOURS

REFERENCES:

1. T. K. Nagsarkar and M. S. Sukhija, Basic of Electrical Engineering, Oxford University Press, 2011.
2. Smarjith Ghosh, Fundamentals of Electrical and Electronics Engineering, Prentice Hall (India) Pvt. Ltd., 2010
3. A. Sudhakar, Shyammohan S Palli, Circuits and Networks Analysis and Synthesis, Tata McGraw Hill, 2010
4. Muthusubramanian&Salivahanan, Basic Electrical and Electronics Engineering and Communication Engineering, Seventh Edition, Tata MCGraw Hill Education Private Limited, 2011
5. William H. Hayt, Jr. John A. Buck, Engineering Electromagnetics, McGraw Hill Higher Education, 8th revised Edition, 2011.
6. K. A. Gangadhar, P.M. Ramanathan, Electromagnetic Field Theory, Khanna Publishers, Sixteenth Edition, 2011

Modale III & V – Skill development Employability

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1901PH103 **FUNDAMENTALS OF PHYSICS**

L	T	P	C
2	0	2	3

MODULE I OSCILLATIONS **9 Hours**

Periodic motion-simple harmonic motion-characteristics of simple harmonic motion-vibration of simple springs mass system. Resonance-definition., damped harmonic oscillator - heavy, critical and light damping, energy decay in a damped harmonic oscillator, quality factor, forced mechanical and electrical oscillators damping, energy decay in a damped harmonic oscillator, quality factor, forced mechanical and electrical oscillators

MODULE II CLASSICAL OPTICS **9 Hours**

Theory of interference fringes-types of interference- Fresnel-s prism- Newton- rings. Diffraction-Two kinds of diffraction-Difference between interference and diffraction Fresnel's half period zone and zone plate-Fraunhofer diffraction at single slit-plane diffraction grating. Temporal and Spatial Coherence, Polarization - Concept of production of polarized beam of light from two SHM acting at right angle; plane, elliptical and circularly polarized light, Brewster's law, double refraction.

MODULE III QUANTUM PHYSICS **9 Hours**

Dual nature of matter - development of quantum theory- de-Broglie wavelength - Schrodinger's wave equation: time dependent and time independent wave equations - physical significance of wave function - application: particle in one dimensional box.

MODULE IV CRYSTAL PHYSICS **9 Hours**

Crystalline and amorphous materials - lattice - space lattice point - basis - MODULE cell - crystal systems - Bravais lattices - Miller indices - "d" spacing in cubic lattice - calculation of number of atoms per MODULE cell, atomic radius, coordination number and packing density for SC, BCC, FCC and HCP structures.

MODULE V MODERN OPTICS **9 Hours**

Energy levels - Principle of laser - Characteristics of laser radiation -Einstein's coefficients- Population inversion - Optical pumping - Pumping mechanisms - Types of laser - CO2 laser - Homo junction GaAs laser. Fiber optics- Principle -Structure of an optical fiber- Types of optical fibers -Applications.

EXPERIMENT 1	Magnetic field along the axis of current carrying coil -Stewart and Gee	**9 Hours**
EXPERIMENT 2	Determination of Hall coefficient of semi-conductor	**9 Hours**
EXPERIMENT 3	Determination of Plank constant	**9 Hours**
EXPERIMENT 4	Determination of wavelength of light by Laser diffraction method	**9 Hours**
EXPERIMENT 5	Determination of wavelength of light by Newton's Ring method	**9 Hours**
EXPERIMENT 6	Determination of laser and optical fiber parameters	**9 Hours**
EXPERIMENT 7	Determination of Stefan's constant	**9 Hours**

TOTAL: 75 HOURS

REFERENCES:

1. Basics of laser physics: for students of science and engineering http://www.springer.com/978-3- 319- 50650-
AjoyGhatak, Optics, 5th Ed., Tata McGraw Hill, 2012
2. Arthur Beiser, Shobhit Mahajan and S Rai Choudhury, Concepts of Modern Physics, 6th Edition, Tata McGraw Hill Education Pvt. Ltd., New Delhi, 2014
3. B. K. Pandey and S. Chaturvedi, Engineering Physics, 1st edition, Cengage Learning India Pvt Ltd., New Delhi, 2017.
4. Halliday and Resnick, Fundamentals of Physics, 11 th edition, John Wiley and Sons, Inc, 2018

Course Outcomes:
Module II, Module V – Skill development
Employability

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1901EN101 BUSINESS COMMUNICATION AND VALUE SCIENCE - I

L	T	P	C
2	0	0	2

The course is a unified approach to enhance language skills of learners with an aim to hone their social skills and to increase their employability. The course is designed to acquaint the learners with the necessary LSRW (Listening/ Speaking / Reading/ Writing) skills needed either for recruitment or further studies abroad for which they attempt international exams like TOEFL, IELTS and GRE. It enables the learners improve their communication skills which are crucial in an academic environment as well as professional and personal lives. It aims to prepare students for careers requiring global business awareness and to develop skills required to work in internationally operating companies and organizations.

Course Objectives

- Understand what life skills are and their importance in leading a happy and well-adjusted life.
- Motivate students to look within and create a better version of self.
- Introduce them to key concepts of values, life skills and business communication.

COURSE CONTENTS

- Overview of the course with immersion activity.
- Overview of biz communication.
- Self-awareness, confidence and communication.
- Essentials of Business communication.
- Application of communication skills.
- Application of Life Skills.
- Assignment.

Module I: **6 hrs**

Essential Grammar – I:

Refresher on Parts of Speech – Listen to an audio clip and note down the different parts of speech followed by discussion. Tenses-Applications of tenses in Functional Grammar (Take a quiz and then discuss) Sentence formation (general & Technical), Common errors, Voices. Show sequence from film where a character uses wrong sentence structure (e.g. Zindagi Na Milegi Dobara where the characters use 'the' before every.

Module II: **6 hrs**

Listening Skills:

Law of nature- Importance of listening skills, Difference between listening and hearing, Types of listening, listen to recording and answer questions based on them.

Module III: **7 hrs**

Speaking Skills:

Presentation on favorite cricket captain in IPL and the skills and values they demonstrate -
Overview of LOL (include activity on introducing self).- presentation on favorite cricket captain in IPL and the skills and values they demonstrate -
Record a conversation between a celebrity and an interviewer.

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Module IV : **7 hrs**

Communication Skills:

Over view of Communication Skills , Barriers of communication Skills, Effective Communication Skills - verbal and non – verbal, Pronunciation, clarity of speech skills, – Role, Importance of Questioning , Skit based on communication skills , Write a newspaper report on an IPL match.

Module V: **6 hrs**

Recognize own strengths and opportunities:

Self-awareness – identity, body awareness, stress management

Expressing self, connecting with emotions, visualizing and experiencing purpose

TOTAL: 32 Hours

Course Outcomes

After completion of the course, the student will be able to

- Recognize the need for life skills and values: (U)
- Recognize own strengths and opportunities: (U) – Skill development
- Apply the life skills to different situations: (AP) – Skill development
- Understand the basic tenets of communication: (U)
- Apply the basic communication practices in different types of communication: (AP)

Text Book(s)

1. There are no prescribed texts for Semester 1 – there will be handouts and reference links shared.

References

1. English vocabulary in use – Alan Mc'carthy and O'dell.
2. APAART: Speak Well 1 (English language and communication)
3. APAART: Speak Well 2 (Soft Skills)
4. Business Communication – Dr. Saroj Hiremath

Web References

1. Train your mind to perform under pressure- Simon sinek https://curiosity.com/videos/simon-sinek-on-training-your-mind-to-perform-under-pressure-capture- your-flag/
2. Brilliant way one CEO rallied his team in the middle of layoffs https://www.inc.com/video/simon-sinek-explains-why-you-should-put-people-before-numbers.html
3. Will Smith's Top Ten rules for success https://www.youtube.com/watch?v=bBsT 9omTeh0

Online Resources

1. https://www.coursera.org/learn/learning-how-to-learn
2. https://www.coursera.org/specializations/effective-business-communication

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1901GE103	FUNDAMENTALS OF COMPUTER SCIENCE	L	T	P	C
		3	0	4	5

MODULE I GENERAL PROBLEM SOLVING CONCEPTS AND IMPERATIVE LANGUAGE **6 Hours**

Algorithm, and Flowchart for problem solving with Sequential Logic Structure, Decisions and Loops. Imperative languages: Introduction to imperative language; syntax and constructs of a specific language (ANSI C) .Types Operator and Expressions with discussion of variable naming and Hungarian Notation: Variable Names, Data Type and Sizes (Little Endian Big Endian), Constants, Declarations, Arithmetic Operators, Relational Operators, Logical Operators, Type Conversion, Increment Decrement Operators, Bitwise Operators, Assignment Operators and Expressions, Precedence and Order of Evaluation, proper variable naming and Hungarian Notation

MODULE II CONTROL FLOW WITH DISCUSSION ON STRUCTURED AND UNSTRUCTURED PROGRAMMING **6 Hours**

Statements and Blocks, If-Else-If, Switch, Loops - while, do, for, break and continue, Goto Labels, structuredand un- structured programming.

MODULE III FUNCTIONS AND PROGRAM STRUCTURE WITH DISCUSSION ON STANDARD LIBRARY **6 Hours**

Basics of functions, parameter passing and returning type, C main return as integer, External, Auto, Local, Static, Register Variables, Scope Rules, Block structure, Initialization, Recursion, Preprocessor, Standard Library Functions and return types.

MODULE IV POINTERS AND ARRAYS **6 Hours**

Pointers and address, Pointers and Function Arguments, Pointers and Arrays, Address Arithmetic, character Pointers and Functions, Pointer Arrays, Pointer to Pointer, Multi-dimensional array and Row/column major formats, Initialization of Pointer Arrays, Command line arguments, Pointer to functions, complicated declarations and how they are evaluated.

MODULE V STRUCTURES **6 Hours**

Basic Structures, Structures and Functions, Array of structures, Pointer of structures, Self-referral Structures, Table look up, Typedef, Unions, Bit-fields Input and Output: Standard I/O, Formatted Output printf, Formated Input scanf, Variable length argument list, file access including FILE structure, fopen, stdin, sdtout and stderr, Error Handling including exit, perror and error.h, Line I/O, related miscellaneous functions.

COURSE OUTCOMES:

Module -II - SKILL development

Module - III - SKILL development

Module IV - SKILL development

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1901MA205 **LINEAR ALGEBRA**

L	T	P	C
3	1	0	4

MODULE I MATRICES **09 Hours**

Determinants - Properties of determinants - Matrices - Operations in matrices -Hermitian and Unitary matrices - Rank of a matrix - Solution of system of Linear equations: Cramer's rule - Matrix Inversion method - Rank method.

MODULE II EIGEN VALUES AND EIGEN VECTORS **09 Hours**

Eigen Values and Eigen Vectors of a real matrix - Properties of Eigen Values- Cayley - Hamilton Theorem.

MODULE III MATRIX DECOMPOSITION **09 Hours**

Positive definite matrix -Gauss Elimination method - Gauss Jordan method - LU decomposition -Singular value decomposition.

MODULE IV VECTOR SPACES **09 Hours**

Vector spaces - Subspaces - Linear combinations and linear system of equations - Linear independence and linear dependence - Linear Transformations - Basis and dimensions.

MODULE V INNER PRODUCT SPACES **09 Hours**

Inner products - Norms - Orthogonality of vectors - Projections - Gram-Schmidt orthogonalization - QR decomposition.

TOTAL: 45 HOURS

REFERENCES:

1. Kreyszig Erwin, Advanced Engineering Mathematics, 7th Edition, John Wiley, 1993.
2. B. S. Grewal, Higher Engineering Mathematics, Khanna Publication, 2017
3. Peter V. O'Neil, Advanced Engineering Mathematics, Seventh Edition, Thomson Learning, 2011
4. Michael. D. Greenberg, Advanced Engineering Mathematics, Second Edition, Pearson, 2002.
5. Gilbert Strang, Introduction to linear algebra, Fifth Edition, ANE Books, 2016.
6. https://machinelearningmastery.com/introduction-matrices-machine-learning/

Course outcomes:

Module-I – Skill development

Module-IV – Skill development

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1901MA206 **STATISTICAL MODELING**

L	T	P	C
3	1	0	4

MODULES I LINEAR STATISTICAL MODELS **9 Hours**

Multiple Correlation Ã¢?? Multiple Regression-Analysis of variance: Completely randomized design - Randomized block design.

MODULES II ESTIMATION **9 Hours**

Point estimation - criteria for good estimates (Un-biasedness & Consistency) - Methods of estimation including maximum likelihood estimation. Sufficient Statistic: Concept & examples - Complete sufficiency - Application in estimation.

MODULES III NON-PARAMETRIC INFERENCE **9 Hours**

Comparison with parametric inference - Use of order statistics - Sign test - Wilcoxon signed rank test - Mann-Whitney test - Run test - Kolmogorov-Smirnov test - Spearman's and Kendall's test - Tolerance region.

MODULES IV TIME SERIES ANALYSIS **9 Hours**

Basics of Time Series Analysis - Forecasting - Stationary - ARIMA Models: Identification - Estimation – Forecasting.

MODULES V R PROGRAMMING **9 Hours**

Introduction to R - Functions - Control flow and Loops - Working with Vectors and Matrices - Reading in Data - Writing Data - Working with Data - Manipulating Data - Simulation - Linear model - Data Frame - Graphics in R.

TOTAL: 45 HOURS

REFERENCES:

1. R. Miller, J.E. Freund and R. Johnson, Probability and Statistics for Engineers, Fourth Edition, Pearson, 2015.
2. A. Goon, M. Gupta and B.Dasgupta, Fundamentals of Statistics (Vol. II), The Word Press, 1933.
3. A. Goon, M. Gupta and B.Dasgupta, Fundamentals of Statistics (Vol. I), The Word Press, 1933
4. D.C. Montgomery and E.Peck , Introduction to Linear Regression Analysis, Third Edition, Wiley, 2010.
5. Garrett Grolemund, Hands-on Programming with R, Shroff Publishers & Distributors Pvt Ltd, 2018.

Course outcomes:

Module III, Module V - Skill development

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1901GE202 **DATA STRUCTURES AND ALGORITHMS**

L	T	P	C
2	1	2	4

MODULES I BASIC TERMINOLOGIES **9 Hours**

Algorithm specification, Recursion, Performance analysis, Asymptotic Notation - The Big-O, Omega and Theta notation, Programming Style, Refinement of Coding - Time-Space Trade Off, Testing, Data Abstraction

MODULES II LINEAR DATA STRUCTURE **9 Hours**

Array, Stack, Queue, Linked-list and its types, Various Representations, Operations & Applications of LinearData Structures

MODULES III NON-LINEAR DATA STRUCTURE **9 Hours**

Trees (Binary Tree, Threaded Binary Tree, Binary Search Tree, B & B+ Tree, AVL Tree, Splay Tree) and Graphs (Directed, Undirected), Various Representations, Operations (search and traversal algorithms and complexity analysis) & Applications of Non-linear Data Structures.

MODULES IV SEARCHING AND SORTING ON VARIOUS DATA STRUCTURES **9 Hours**

Sequential Search, Binary Search, Breadth First Search, Depth First Search, Insertion Sort, Selection Sort, ShellSort, Divide and Conquer Sort, Merge Sort, Quick Sort, Heap Sort, Introduction to Hashing

MODULES V FILES **9 Hours**

Definition, File Organization: Sequential file Organization, Direct file Organization, Indexed Sequential, Hashed and accessing schemes.

TOTAL: 45 HOURS

Course Outcomes:

Module I : Skill development
Employability

Module III : Skill development

Module IV : Skill development,
Employability

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1901GE203 **PRINCIPLES OF ELECTRONICS**

L	T	P	C
2	0	2	3

MODULES I ELECTRIC CIRCUITS **9 Hours**

Definition of Voltage, Current, Power & Energy, Ohms law, Kirchoffs Law & its applications simple problems, Simple mesh and Node problems, Generation of Alternative EMF, Average value of current and voltage, Form Factor, Peak Factor.

MODULES II SEMICONDUCTOR DIODE AND ITS APPLICATION **9 Hours**

Conductor, Semiconductors & Insulators, Semiconductors: intrinsic & extrinsic, energy band diagram, P&N-type semiconductors, drift & diffusion carriers. Characteristics of PN Junction Diode and Zener diode, Rectifier Circuits Half wave, Full wave circuits, Efficiency, PIV, Ripple factor and AC and DC current and voltage in rectifier.

MODULES III BIPOLARJUNCTION AND FIELDEFFECTTRANSISTOR **9 Hours**

Structure and working of bipolar junction transistor, CB, CC, CE configurations, relation between alpha and beta, Concept of transistor as an amplifier and transistor as a switch, Field Effect Transistors: Construction and characteristics of JFET-parameters of JFET-MOSFET – Depletion and enhancement modes Construction and characteristics.

MODULES IV FEED BACK AMPLIFIER, AND OPERATIONAL AMPLIFIERS **9 Hours**

Concept (Block diagram), properties, positive and negative feedback, loop gain, open loop gain, feedback factors, Introduction to integrated circuits: operational amplified and its terminal properties; Application of operational amplifier; inverting and non-inverting mode of operation, Adders, Subtractors, Voltage follower, Comparator, Integrator, Differentiator.

MODULES V DIGITAL ELECTRONICS FUNDAMENTALS **9 Hours**

Difference between analog and digital signals, Boolean algebra, Basic and Universal Gates, Symbols, Truth tables, logic expressions, Logic simplification using K- map, Logic ICs, half and full adder/subtractor, multiplexers, demultiplexers, flip-flops, shift registers, counters.

TOTAL: 45 HOURS

LIST OF EXPERIMENTS:

EXPERIMENT 1:	To plot V-I characteristics of PN junction diode.	**3 Hours**
EXPERIMENT 2:	To plot regulation characteristics of half wave rectifier	**3 Hours**
EXPERIMENT 3:	To plot regulation characteristics of Full wave rectifier	**3 Hours**
EXPERIMENT 4:	To plot input-output characteristics of CE configuration of BJT.	**3 Hours**
EXPERIMENT 5:	To study Biasing techniques of BJT- to find stability factor of self-bias, collector to base bias, fixed bias circuits.	**3 Hours**
EXPERIMENT 6:	To plot frequency response of single stage FET amplifier (CS/CD configuration) and find its bandwidth.	**3 Hours**
EXPERIMENT 7:	To study Colpitts Oscillator.	**3 Hours**
EXPERIMENT 8:	Study of OP-AMP circuits: Inverting and Non-inverting Amplifier.	**3 Hours**
EXPERIMENT 9:	Study of basic logic gates and De-Morgan's Theorem.	**3 Hours**
EXPERIMENT 10:	Study of half adder and full adder	**3 Hours**

TOTAL: 30 HOURS

REFERENCES:

1. William Hayt, JVJack, EKemmerly and Steven M Durbin, Engineering Circuits Analysis, Tata McGraw-Hill, 2013
2. L Robert Boylestead, Louis Nashelsky, Electronic Devices and Circuit Theory Pearson Education,2012.
3. J Millman, C. Halkias & Satyabratajit, Electronic Devices and Circuits, Tata McGraw- Hill,2010
4. RamakantA.Gayakwad, OP-AMP and Linear IC's , Prentice Hall of India, 2002.
5. Thomas L.Floyd, Digital Fundamentals, Prentice Hall, 11th Edition, 2015.

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Coworse outcomes: Module - I – Skill development
Module - II – Employability
Module V – Skill development

1901HS201 **FUNDAMENTALS OF ECONOMICS**

L	T	P	C
2	0	0	2

MODULES I MICRO ECONOMICS **6 Hours**

Principles of Demand and Supply - Supply Curves of Firms - Elasticity of Supply; Demand Curves of Households - Elasticity of Demand; Equilibrium and Comparative Statics (Shift of a Curve and Movement along the Curve);

MODULES II WELFARE ANALYSIS **6 Hours**

Consumers and Producers Surplus- Price Ceilings and Price Floors; Consumer Behaviour - Axioms of Choice- Budget Constraints and Indifference Curves; Consumers Equilibrium Effects of a Price Change, Income and Substitution Effects Derivation of a Demand Curve

MODULES III APPLICATIONS **6 Hours**

Tax and Subsidies - Inter temporal Consumption -Suppliers- Income Effect; Theory of Production - Production Function and Isoquants - Cost Minimization; Cost Curves - Total, Average and Marginal Costs - Long Run and Short Run Costs; Equilibrium of a Firm Under Perfect Competition; Monopoly and Monopolistic Competition

MODULES IV MACRO ECONOMICS **6 Hours**

National Income and its Components - GNP, NNP, GDP, NDP Consumption Function; Investment; Simple Keynesian Model of Income Determination and the Keynesian Multiplier; Government Sector - Taxes and Subsidies; External Sector - Exports and Imports; Money -Definitions; Demand for Money Transaction and Speculative Demand; Supply of Money - Banks Credit Creation Multiplier; Integrating Money and Commodity Markets - IS, LM Model

MODULES V BUSINESS CYCLES AND STABILIZATION **6 Hours**

Monetary and Fiscal Policy - Central Bank and the Government; the Classical Paradigm - Price and Wage Rigidities - Voluntary and Involuntary Unemployment.

MODULES VI BUSINESS CYCLES AND STABILIZATION **6 Hours**

Monetary and Fiscal Policy - Central Bank and the Government; the Classical Paradigm - Price and Wage Rigidities - Voluntary and Involuntary Unemployment.

TOTAL: 36 HOURS

REFERENCES:

1. Pindyck, Robert S and Daniel L. Rubinfeld , Microeconomics, Eighth Edition, 2013 .
2. Dornbusch, Fischer and Startz, Macroeconomics, Tenth Edition, Tata Mcgraw Hill, 2012.
3. Paul Anthony Samuelson, William D. Nordhaus, Economics, Nineteenth Edition, McGraw-Hill Education, 2010.
4. Hal R, Varia, Intermediate Microeconomics: A Modern Approach, Eighth Edition Affiliated East- West Press, 2006
5. N. Gregory Mankiw, Principles of Macroeconomics, Seventh Edition, Cengage Learning, 2018.

Course outcomes:

Module - II - Skill development

Module - IV - Skill development

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1901EN201 BUSINESS COMMUNICATION AND VALUE SCIENCE - II

The course is a unified approach to enhance language skills of learners with an aim to hone their social skills and to increase their employability. The course is designed to acquaint the learners with the necessary LSRW (Listening/ speaking / Reading/ Writing) skills needed either for recruitment or further studies abroad for which they attempt international exams like TOEFL, IELTS and GRE. It enables the learners improve their communication skills which are crucial in an academic environment as well as professional and personal lives. It aims to prepare students for careers requiring global business awareness and to develop skills required to work in internationally operating companies and organizations.

Course Objectives

- Understand what life skills are and their importance in leading a happy and well-adjusted life.
- Motivate students to look within and create a better version of self.
- Introduce them to key concepts of values, life skills and business communication.

COURSE CONTENTS

- Overview of the course with immersion activity.
- Overview of biz communication.
- Self-awareness, confidence and communication.
- Essentials of Business communication.
- Application of communication skills.
- Application of Life Skills.
- Assignment.

Module I: **6 hrs**

Essential Grammar – II : Parts of Speech – Listen to an audio clip and note down the different parts of speech followed by discussion.
Tenses-Applications of tenses in Functional Grammar (Take a quiz and then discuss) Sentence formation (general & Technical), Common errors, Voices. Show sequence from film where a character uses wrong sentence structure (e.g. Zindagi Na Milegi Dobara where the characters use 'the' before every

Module II: **6 hrs**

Vocabulary Enrichment: Exposure to words from General Service List (GSL) by West, Academic word list (AWL) technical specific terms related to the field of technology, phrases, idioms, significant abbreviations formal business vocabulary – Read Economic Times, Reader's Digest, National Geographic and take part in a GD, using the words you learnt/liked from the articles.
Group discussion using words learnt- Toastmaster style Table Topics speech with evaluation

Module III : **7 hrs**

Written Communication:
Summary writing- story writing -Email writing: Formal and informal emails, activity- Build your CV – start writing your comprehensive CV including every achievement in your life, no format, no page limit- Create a podcast on a topic that will interest college students

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Module IV: **7 hrs**

Life Skills : Stress management, working with rhythm and balance, colours, and teamwork- Movie based learning – Pursuit of Happiness. What are the skills and values you can identify, what can you relate to?- Introduction to life skills What are the critical life skills- Multiple Intelligences Embracing diversity – Activity on appreciation of diversity- Community service – work with an NGO and make a presentation- Create a musical using the learning from unit

Module V: **6 hrs**

Soft Skills:

Join a trek – Values to be learned: Leadership, teamwork, dealing with ambiguity, managing stress, motivating people, creativity, result orientation

TOTAL: 32 Hours

Course Outcomes

After completion of the course, the student will be able to

- Recognize the need for life skills and values: (U)
- Recognize own strengths and opportunities: (U)
- Apply the life skills to different situations: (AP)
- Understand the basic tenets of communication: (U)
- Apply the basic communication practices in different types of communication: (AP)

Text Book(s)

1. There are no prescribed texts for Semester 1 – there will be handouts and reference links shared.

References

1. English vocabulary in use – Alan Mc'carthy and O'dell.
2. APAART: Speak Well 1 (English language and communication)
3. APAART: Speak Well 2 (Soft Skills)
4. Business Communication – Dr. SarojHiremath

Web References

1. Train your mind to perform under pressure- Simon sinek https://curiosity.com/videos/simon-sinek-on-training-your-mind-to-perform-under-pressure-capture- your-flag/
2. Brilliant way one CEO rallied his team in the middle of layoffs https://www.inc.com/video/simon-sinek-explains-why-you-should-put-people-before-numbers.html
3. Will Smith's Top Ten rules for success https://www.youtube.com/watch?v=bB sT9omTeh0

Online Resources

1. https://www.coursera.org/learn/learning-how-to-learn
2. https://www.coursera.org/specializations/effective-business-communication

Course outcomes:

Module III: Skill development

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