KOLHAPUR INSTITUTE
OF TECHNOLOGY'S
**COLLEGE OF
ENGINEERING**
(AUTONOMOUS),
KOLHAPUR

Kolhapur Institute of Technology's

College of Engineering, Kolhapur

Department of Computer Science and Business Systems

Sem-I-Syllabus

Course Code:	UCBPC0101	L	T	P	Credit
Course Name:	Fundamentals of Computer Science	3	-	-	3

Course Prerequsites:

Fundamental Knowledge of Computers

Course Description:

This course aims to provide exposure to problem solving through programming. It also aims to train the students with basic programming skills.

Course Objectives:

1. Develop problem solving skills using basic Sequential Logic Structure, Decisions and Loops.
2. Enable students to implement complex problems using the knowledge of Arrays, Functions, Structures and Poin

Course Outcomes:

COs	After completion of the course, students shall have ability to	Blooms Level	Descriptor
CO1	Distinguish programming paradigms, different data types and operators used in C language.	II	Understanding
CO2	Write algorithms and draw flowcharts for the given Mathematical and Engineering problems.	I	Remembering
CO3	Construct C program for solving simple/moderate mathematical and logical	III	Applying
CO4	Illustrate Unix interface and perform file handling.	III	Applying

CO-PO Mapping:

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	2												1	
CO2	1	2												
CO3		2	1											
CO4	2													

Assessment Scheme:

Two components of In Semester Evaluation (ISE), One Mid Semester Examination (MSE) and one End Semester Examination (ESE) having 20%, 30% and 50% weightage respectively.

Assessment Component	Marks
ISE 1	10
MSE	30
ISE 2	10
ESE	50

ISE 1 and **ISE 2** are based on Assignment/Declared test/Quiz/Seminar/Group discussions/presentation, etc.

MSE is based on 50% of course content (first three units).

ESE is based on 100% course content with 60-70% weightage for course content (last three units) covered after MS

Course Contents:

Unit 1	Data Types and Operators	6 Hours

Levels of programming language, Introduction to Programming Paradigms, Algorithm, Flowchart, for problem solving with Sequential Logic Structure, Introduction to imperative language; syntax and constructs of a specific language. Types Operator and Expressions: 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, variable naming, Hungarian Notation

Unit 2	Branching and Loop Statements	8 Hours

Control Flow with discussion on structured and unstructured programming: Statements and Blocks, If-Else-If, Switch, Loops: while, do, for, break and continue, Go to Labels, structured and un- structured programming

Unit 3	Functions	7 Hours

Functions and Program Structure, standard library: 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

Unit 4	Pointers and Array	8 Hours

Pointers and Arrays: 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.

Unit 5	Structures and File System	8 Hours

Structures: Basic Structures, Structures and Functions, Array of structures, Pointer of structures, Self- referral Structures, Table look up, typed ef, 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, p error and error. h, Line I/O, related miscellaneous functions

Unit 6	Unix System Interface	5 Hours

Unix system Interface: File Descriptor, Low level I/O – read and write, Open, create, close and unlink, Random access – l seek, Discussions on Listing Directory, Storage allocator. Programming Method: Debugging, Macro, User Defined Header, User Defined Library Function, make file utility.

Textbooks:

Sr.No.	Title	Edition	Author/s	Publisher
1	The C Programming Language	Second	B.W.Kernighan and	PHI
2	Programming in C	Second	B.Gottfried	Schaum Outline

Reference Books:

Sr.No.	Title	Edition	Author/s	Publisher
1	C: The Complete Reference	Fourth	Herbert Schidt	McGraw Hill
2	Let Us C	Fourteen	Yashvant Kanetkar	BPB Publications

Course Code:	UCBES0102			L	T	P	Credit
Course Name:	Discrete Mathematics			3	-	-	3

Course Pre-Requsite:

Basic concepts of Set, functions, Basic Properties of algebraic operations, Permutations& Combinations

Course Description:

This course contains study of logic, various algebraic structures like Poset, Lattice, Boolean algebra, Group, Ring, I.D, field, Graph theory & Combinatorics.

Course Objectives:

To make the students equipped with the tools and techniques of discrete mathematics that would help them in designing and developing new latest technology.

Course Outcomes:

COs	After the completion of the course the student should be able to	Blooms Level	Descriptor
CO1	Use the concept of logic and logical inferences in various application areas.	III	Applying
CO2	Use the basic algebraic structures, concepts of lattice, Boolean algebra in development of software.	III	Applying
CO3	Use the concept of Graph theory and trees in network theory applications.	III	Applying
CO4	Apply the concept of combinatorics to solve problems related to computer based systems.	III	Applying

CO-PO Mapping:

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	3		3			3								
CO2	3		3			3								
CO3	3		3			3								
CO4	3		3			3								

Assessment Scheme:

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MSE	30
ISE 2	10
ESE	50

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ESE is based on 100% course content with 60-70% weightage for course content (last three units) covered after MS

Course Contents:

Unit 1	Logic	7 Hours

Propositional calculus - propositions and connectives, syntax; Semantics – truth assignments and truth tables, Validity and satisfiability tautology; adequate set of connectives; Equivalence and normal forms; Compactness and resolution; Formal reducibility - natural deduction system and axiom system; Soundness and completeness.

Unit 2	Lattice & Boolean Algebra	7 Hours

Sets & Relations, Poset, Lattice, Boolean algebra, principle of duality, Canonical form, Karnaugh map.

Unit 3	Abstract Algebra	6 Hours

Algebraic structures: Semi group, Monoids, Groups, Subgroups, Abelian groups, cyclic group, Rings, Integral domain, Fields

Unit 4	Graph theory	6 Hours

Graphs and digraphs, complement, isomorphism, adjacency matrix, Connectedness and reachability, Eulerian paths and circuits in graphs and digraphs, Hamiltonian paths and circuits in graphs and tournaments

Unit 5	Trees	6 Hours

Trees, Planar graphs, Euler's formula, dual of a planer graph, Independence number and Clique number, Chromatic number, Graph coloring, Rooted tree, Prefix code and Huffman coding method.

Unit 6	Combinatorics	8 Hours

Introduction to Basic Counting Principles, Formulae behind nPr, nCr - Balls and Pins problems, Pigeonhole Principle, Recurrence relations, Generating Functions, Introduction to Proof Techniques-Mathematical Induction

Textbooks:

Sr.No.	Title	Author/s	Publisher
1	Discrete Mathematics and its applications	Keneth H.Rosen	Khanna Publishers
2	Modern Algebra	A.R.Vashistha	Krishna Prakashan
3	Applied Combinatorics	Alan Tucker	Wiley
4	A text book on discrete Mathematics	C.V.Sastry, Rakesh Naik	Wiley

Reference Books:

Sr.No.	Title	Author/s	Publisher
1	Elements of Discrete Mathematics	C.Liu	Tata MacGraw Hill
2	Graph Theory with Applications to Engineering and Computer Science	Narsing Deo	Prentice Hall of India
3	Topics in Algebra	N. Herstein	John Wiley and Sons
4	Discrete Mathematics	T.Veerarajan	Tata MacGraw
5	Digital Logic & Computer Design	M. Morris Mano	Pearson

Course Code:	UCBES0103		L	T	P	Credit
Course Name:	Principles of Electrical Engineering		2	-	-	2

Course Prerequsites:

Basic Electrical Engineering, Electrical Circuit Elements, Modern Physics, Electro-magnetism.

Course Description:

Basic knowledge of Electrical Engineering is very essential for all the Engineers. In this course the analysis of DC Electric Circuits, fundamentals of Electrostatics and AC electric circuits are dealt. A comprehensive study of widely used devices such as Transformer is included. Also, this course has been designed to introduce students with Sensors, Measuring devices and Wiring Systems.

Course Objectives:

1. To impart the basic knowledge of electrical quantities.
2. To deliver the basics of DC Circuit & AC circuits for solving the network by applying various laws & theorems.
3. To impart the knowledge of electrostatics.
4. To explain principle & theory of single phase transformer.
5. To introduce measuring devices and electrical wiring systems.

Course Outcomes:

COs	After the completion of the course the student should be able to	Blooms Level	Descriptor
CO1	Explain terms and parameters specific to electrical engineering.	II	Understand
CO2	Analyze AC & DC electric circuits.	III	Apply
CO3	Select devices and systems used in electrical engineering.	II	Understand
CO4	Explain the performance of electrical devices using electrostatics and electro mechanic principles.	II	Understand

CO-PO Mapping:

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	2				1									
CO2	3	3		2										
CO3	2		1											
CO4	1		1											

Assessment Scheme:

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Course Contents:		
Unit 1	Introduction	4 Hours

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

Unit 2	DC Circuits	7 Hours

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

Unit 3	Electrostatics	4 Hours

Electrostatic field, electric field strength, concept of permittivity in dielectrics, capacitor composite, dielectric capacitors, capacitors in series & parallel, energy stored in capacitors, charging and discharging of capacitors, Principle of batteries, types, construction and application.

Unit 4	AC Fundamentals	4 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 (Star- Delta & Star-Star).

Unit 5	Electro mechanics	4 Hours

Electricity and Magnetism, magnetic field and Faraday's law, self and mutual inductance, Ampere's law, Magnetic circuit, Magnetic material and B-H Curve, Single phase transformer, principle of operation, EMF equation, voltage ratio, current ratio, KVA rating, efficiency and regulation, Electromechanical energy conversion.

Unit 6	Sensors, Measurements and Wiring Systems	5 Hours

Introduction to measuring devices/sensors and transducers (Piezoelectric & Thermo-couple) related to electrical signals, Basic concept of indicating and integrating instruments, Elementary methods for the measurement of electrical quantities in DC and AC systems (Current & Single-Phase power). Basic layout of distribution system, Types of Wiring System & Wiring Accessories, Necessity of earthing, Types of earthing, Safety devices and

Textbooks:

Sr.No.	Title	Edition	Author/s	Publisher
1	Electric Machinery	VI	A.E. Fitzgerald, Kingsely Jr.Charles, D.Unmans	Tata McGraw Hill
2	A Textbook of Electrical Technology, vol.I.	I	B.L.Theraja	S. Chand and Company Ltd., New Delhi
3	Basic Electrical Engineering	I	V.K.Mehta	S. Chand and Company Ltd., New Delhi
4	Theory and problems of Basic Electrical Engineering	II	J. Nagrath and Koth	Prentice Hall of India Pvt. Ltd

Reference Books:

Sr.No.	Title	Edition	Author/s	Publisher
1	Basic of Electrical Engineering	III	T. K. Nagsarkar and M. S. Sukhija	Oxford University Press 2011
2	Introduction to Electrodynamics	IV	D. J. Griffiths	Cambridge University Press

3	Engineering Circuit Analysis	VIII	William H. Hayt& Jack E. Kemmerly	McGraw-Hill Book Company Inc
4	Fundamentals of Electrical and Electronics Engineering	II	Smarjith Ghosh	Prentice Hall (India) Pvt. Ltd.

Course Code:	UCBBS0104	L	T	P	Credit
Course Name:	Physics for Computing Science	2	-	-	2

Course Prerequsites:

1. Basics of wave, wave motion, wave equation etc.
2. Basic properties of light, crystallography, semiconductor theory and quantum theory.

Course Description:

In this course principles of oscillation, wave optics, electromagnetic theory, Laser-optical Fiber, Quantum and Thermodynamics with significance discussed in brief.

Course Objectives:

1. To study about periodic motion: oscillation, its characteristics, and practical existence
2. To study phenomena of light: interference, diffraction, polarization and their engineering applications.
3. To explain various characteristics viz monochromaticity, coherence, directionality of laser and their applications in Medical, industrial field and to study concept of virtual reality.
4. To study principles of quantum mechanics, properties of matter waves and derive Schrödinger equations and discuss applications of quantum mechanics in modern technology.
5. To discuss various advanced engineering materials and working principles of different analytical instruments.

Course Outcomes:

| COs	After the completion of the course the student should be able to	Blooms Level	Descriptor
CO1	Define and state concepts related to oscillation, SHM, Resonance, damped oscillation, fundamental properties of light and principles of quantum mechanics	I	Remember
CO2	Write algorithms and draw flowcharts for the given Mathematical and Engineering problems.	II & IV	Understand & Analyze
CO3	Construct C program for solving simple/moderate mathematical and logical	III	Apply
CO4	Illustrate Unix interface and perform file handling.	V	Evaluate

CO-PO Mapping:

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	3	3												
CO2	3	3												
CO3	3	3	1		1									
CO4	3	3	1		1									

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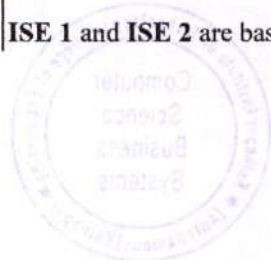
MSE is based on 50% of course content (first three units).

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Course Contents:		
Unit 1	Oscillation	6 Hours
Periodic motion-simple harmonic motion-characteristics of simple harmonic motion, vibration of simple spring 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.		
Unit 2	Interference, Diffraction and Polarization	7 Hours
Theory of interference fringes, types of interference-Division of wavefront and Division of Amplitude Fresnel's prism-Newton's 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 and its application. 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.		

Unit 3	Laser and Fiber optics	4 Hours

Einstein's theory of matter radiation interaction and A and B coefficients; amplification of light by population inversion, different types of lasers: Ruby Laser, CO2 and Neodymium lasers; Properties of laser beams, applications of lasers in engineering. Fiber optics: Structure, Principle, Advantages and Applications, Types of

Unit 4	Crystallography, Semiconductor Physics, and Quantum Mechanic	7 Hours

Basic terms-types of crystal systems, Bravais lattices, miller indices, d spacing, Atomic packing factor for SC, BCC, FCC and HCP structures. Basic concept of Band theory Conductor, Semiconductor and Insulator; Planck's quantum theory- de-Broglie hypothesis, Matter waves properties, , Heisenberg's Uncertainty principle, time independent and time dependent Schrödinger's wave equation, Physical significance of wave function, Particle in a one dimensional potential box.

Unit 5	Basic Idea of Electromagnetisms	6 Hours

Scalar and Vector Fields, Del operator- concept of gradient divergence & curl. Maxwell's equations in differential and integral forms for different media. Equation of continuity, Maxwell's modification in Ampere's law, concept of displacement current. Concept of electromagnetic waves and light - classical wave equation, speed of light.

Unit 6	Thermodynamics	4 Hours

Introduction, System -surrounding, Heat Capacity and Work, Zeroth law of thermodynamics, first law of thermodynamics, brief discussion on application of 1st law, second law of thermodynamics and concept of Engine, entropy, change in entropy in reversible and irreversible processes.

Textbooks:

Sr.No.	Title	Edition	Author/s	Publisher
1	A textbook of Engineering Physics	11	M.N. Avadhanalu & Kshirsagar	S. Chand & Comp. Ltd. Delhi
2	Engineering Physics	1	Shailendra Sharma	Pearson Publicatio
3	Physics Principles & Applications	7	Douglus Giancoli	Pearson Publicatio
4	Concepts of Physics	5	A Beiser	McGraw Hill International
5	Fundamentals of Physics	3	David Halliday, Robert Resenick & J. Walker	Wiley Plus

Reference Books:

Sr.No.	Title	Edition	Author/s	Publisher
1	Modern Engineering Physics	4	A.S.Vasudeva	S.Chand
2	Engineering Physics	1	Dattu R Joshi	Tata Mc. Graw Hills Pub. Co. Ltd
3	Basic Quantum Mechanics	1	Ajoy Ghatak	Laxmi
4	Optics	5	Ajoy Ghatak	Tata McGraw
5	University Physics	13	Sears & Zemansky	Addison-Wesley

Course Code:	UCBBS0105	L	T	P	Credit
Course Name:	Statistics Probability and Sampling	3	1	-	4

Course Prerequsites:

Nil

Course Description:

In this course students will learn topics from Probability, Statistics and Sampling.

Course Objectives:

1. To provide students with a framework that will help them choose the appropriate descriptive methods in various data analysis situations.
2. To analyze distributions and relationships of real-time data.
3. To apply estimation and testing methods to make inference and modeling techniques for decision making.

Course Outcomes:

COs	Upon completion of the course, students shall have ability to	Blooms Level	Descriptor
CO1	Understand concepts of the statistics and probability.	II	Understand
CO2	Solve the problems connected with statistics.	III	Apply
CO3	Examine how to make the transition from a real problem to a probability model for that problem. (Analyze)	IV	Analyze
CO4	Make use of statistical techniques to practical applications.(Apply)	III	Apply

CO-PO Mapping:

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	3	2	-	-	-	-	-	-	-	-	-	-	-	-
CO2	3	2	=	=	=	=	=	=	=	=	=	=	=	=
CO3	3	2	-	-	-	-	-	-	-	-	-	-	-	-
CO4	3	2	-	-	-	-	-	-	-	-	-	-	-	-

Assessment Scheme:

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Course Contents:		
Unit 1	**Introduction to statistics**	**8 Hours**

1.1 Definition, Data, various types of data.
1.2 Graphical Representation of data.
1.3 Measures of Location: Mean, Median, Mode and simple properties
1.4 Measures of Dispersion: Variance, Standard Deviation, Coefficient of Variation.
1.5 Bivariate data, Marginal and Conditional frequency distribution.

Unit 2	**Probability**	**6 Hours**

2.1 Statistical Probability with Properties.
2.2 Conditional probability.
2.3 Bayes Theorem.

Unit 3	Random Variables	7 Hours

3.1 Random Variable and types of Random Variable.
3.2 Two - dimensional random Variable.
3.2 Probability Distribution, Discrete and Continuous Probability Distribution.
3.2 Expected values, moments and its properties.
3.4 Moment generating function and their properties.

Unit 4	Probability Distributions - I	7 Hours

4.1 Binomial Distribution.
4.2 Poisson Distribution.
4.3 Geometric Distribution.
4.4 Normal Distribution.

Unit 5	Probability Distributions - II	8 Hours

5.1 Uniform Distribution.
5.2 Exponential Distribution.
5.3 Chi-square Distribution.
5.4 t – Distribution.
5.5 F Distribution.

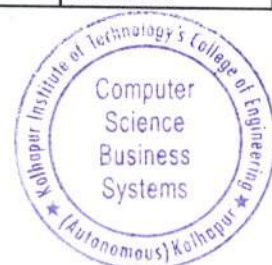| Unit 6	Sampling Techniques (Theory Only)	6 Hours

6.1 Random sampling.
6.2 Random Sampling from Finite and Infinite populations.
6.3 Standard Error.
6.4 Simple random sampling with and without replacement.
6.5 Stratified sampling.

Textbooks:

Sr.No.	Title	Edition	Author/s	Publisher
1	Introduction of Probability Models	-	S. M. Ross	Academic Press, N.Y.
2	Fundamentals of Statistics	I & II	A. Goon, M. Gupta and B. Dasgupta	World Press
3	Higher Engineering Mathematics	-	B. S. Grewal	Khanna Publication, Delhi

Reference Books:

Sr.No.	Title	Edition	Author/s	Publisher
1	A first course in Probability	-	S. M. Ross	Prentice Hall
2	Probability and Statistics for Engineers	IV	I. R. Miller, J.E. Freund and R. Johnson	PHI
3	Introductions to the Theory of Statistics	-	A. M. Mood, F.A. Graybill ,D.C. Boes	McGraw Hill Education
4	Advanced Engineering Mathematics	VII	Peter V. O'Neil	Thomson

5	Advanced Engineering Mathematics	II	M. D. Greenberg	Pearson
6	Applied Mathematics	I & II	P. N. Wartikar and J. N. Wartikar	Vidyarthi Prakashan

Course Code:	UCBAE0106	L	T	P	Credit
Course Name:	Business Communication & Value Science - I	1	-	-	1

Course Pre-Requsite:	
English subject at HSC	

Course Description:

The course intends to make learners understand the importance of life skills and develop various communication skills required in day today life as well as in business contexts.

Course Objectives:

1. Understand what life skills are and their importance in leading a happy and well-adjusted life
2. Motivate students to look within and create a better version of self
3. Introduce them to key concepts of values, life skills and business communication
4. To make students better in English grammar to perform best in verbal aptitude assessment
5. To hone their listening and speaking skills

Course Outcomes:

COs	After the completion of the course the student should be able to	Blooms Level	Descriptor
CO1	Recognize the need for life skills and values (R)	I	Knowledge
CO2	Recognize own strengths and opportunities (U)	I	Knowledge
CO3	Apply the life skills to different situations (AP)	III	Apply
CO4	Understand the basic tenets of communication (U)	II	Understand
CO5	Apply the basic communication practices in different types of communication	III	Apply

CO-PO Mapping:

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1								-	-	1		-		
CO2								2	2	3		1		
CO3								2	2	2		1		
CO4								1	-	2		-		
CO5								1	2	2				

Assessment Scheme:

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MSE	30
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ESE is based on 100% course content with 60-70% weightage for course content (last three units) covered after MS

Course Contents:		
Unit 1	**Communication and Values**	**3 Hours**

•Introduction to Values - Importance and necessity
•Communication basics: Importance, process, levels
•Forms/methods: verbal and non-verbal
•Barriers and solutions

Unit 2	**Communication in Business Context**	**1 Hours**

•Overview of Business Communication: Flow/channels of business communication (Internal, External, Vertical, Horizontal, Diagonal, Grapevine), Problems and Solutions

Unit 3	Verbal Aptitude	3 Hours

•Grammar: parts of speech-using articles, conjunctions and prepositions; using appropriate tenses, degree, voice
•Vocabulary: Affixation, synonyms and antonyms, idioms, confusables-homophones and homonyms

Unit 4	Enhancing Listening, Speaking, and Thinking Skills	3 Hours

•Effective listening: Law of nature- Importance of listening skills, Difference between listening and hearing, process and advantages of listening, poor listening habits, types of listening, strategies for effective listening, listening barriers
•Effective speaking: Importance, various oral business contexts/situations, preparing effective public speeches, expressing oneself clearly
•Thinking as a learning skill

Unit 5	Formal Business Correspondence-1	2 Hours

•Principles, structure (elements)
•Layout (complete block, modified block, semi-block)

Unit 6	Formal Business Correspondence-2	2 Hours

•Types of letters (leave application, enquiry and replies, claim and adjustment)

Textbooks:

Sr.No.	Title	Edition	Author/s	Publisher
1	Communication Skills	III	Meenakshi Raman and Sangeeta Sharma	Oxford University Press (OUP)
2	Communication Skills	II	Sanjay Kumar and Pushpa Lata	Oxford University Press (OUP)

Reference Books:

Sr.No.	Title	Author/s	Publisher
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=bBsT9omTeh0

Online Resources:

1. https://www.coursera.org/learn/learning-how-to-learn

2. https://www.coursera.org/specializations/effective-business-communication

Course Code:	UCSBS0107									L	T	P	Credit
Course Name:	Fundamentals of Computer Science Lab									-	-	2	1

Course Prerequsites:

Fundamental Knowledge of Computers

Course Description:

This course aims to provide exposure to problem solving through programming. It also aims to train the students with basic programming skills.

Course Objectives:

1. To understand C programming environment.
2. To write, compile and debug programs in C language.
3. To Implement C programs for various problem statements.

Course Outcomes:

COs	After completion of the course, students shall have ability to	Blooms	Descriptor
CO1	Grasp fundamental Programming concepts & methodologies	II	Understand
CO2	Apply C fundamental constructs, decision making and looping structures	III	Applying
CO3	Construct C programs involving functions, recursion, pointers, and structures	III	Applying

CO-PO Mapping:

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	2												1	
CO2		2			1									
CO3			2										1	

Assessment Scheme:

Assessment Component	Mark
ISE (Programming Assignments, Internal Viva, Internal	25

Assessment Scheme:

SN	Assessment	Weightage	Remark
1	In Semester Evaluation 1 (ISE1)	10%	Assignment, Test, Quiz, Seminar, Presentation, etc.
2	Mid Semester Examination (MSE)	30%	50% of course contents
3	In Semester Evaluation 2 (ISE2)	10%	Assignment, Test, Quiz, Seminar, Presentation, etc.
4	End Semester Examination (ESE)	50%	100% course contents

Course Contents:

Practical No.	Practical/Experiment Title and Contents	Hours
1	Write a C program to display a given pattern using loops.	4
2	Write a C program to print source code as program output.	4
3	Write a C program to demonstrate use of array and function (simple and recursive function).	4
4	Write a C program to count the lines, words and characters in a given text.	4
5	Write a C program to demonstrate the use of structure and pointers.	4
6	Write a program to demonstrate Multi file program and user defined libraries.	4

7	Write a program that accepts only single alphabetical characters. On encountering an non-alphabet it terminates after printing all the alphabets entered so far in sorted order.	4
8	Write a program to check a C program for rudimentary syntax errors like unbalanced parentheses, brackets and braces, quotes, both single and double, escape sequences and comments.	4
9	Write a complete well documented C program that accepts an integer from the command line and prints the prime factorization on screen and a file with filename as the input integer and extension as .txt.eg. If input number is 123, the file name should be 123.txt .For any invalid input, it should be able to print an error message and quit	4

Textbooks:

Sr.No.	Title	Edition	Author/s	Publisher
1	The C Programming Language	Second Edition	B.W.Kernighan and D.M.Ritchi	PHI
2	Programming in C	Second Edition	B.Gottfried	Schaum Outline Series

Reference Books:

Sr.No.	Title	Edition	Author/s	Publisher
1	C: The Complete Reference	Fourth	Herbert Schidt	McGraw Hill
2	Let Us C	Fourteen Edition	Yashvant Kanetkar	BPB Publications

Course Code:	UCBES0108		L	T	P	Credit
Course Name:	Principles of Electrical Engineering Lab		-	-	2	1

Course Prerequsites:

Modern Physics, Electro-magnetism, Electrical Circuit Elements

Course Description:

The course is designed to provide students hands on experiment to build electrical circuits and verify their performance that is learnt in theory. This including experiment with DC & AC circuit and measurement of

Course Objectives:

1. To impart the use of electrical Elements, sources, measuring devices and transducers related to electrical circuits experimentally.

2. To determine the resistance temperature coefficient experimentally.

3. To verify the network theorems for the electric circuit using hardware

4. To verify series resonance phenomena in a RLC circuit using simulation software .

5. To analyze the transient behaviour of the given RC circuit using simulation software.

6. To verify the relationship between voltage and current in three phase balanced star and delta connected loads experimentally.

7. To enable electrical quantities measurement in DC and AC systems experimentally.

Course Outcomes:

COs	After completion of the course, students shall have ability to	Blooms	Descriptor
CO1	Demonstrate use of important electrical equipment.	II	Understand
CO2	Verify DC circuits theorems through experiments.	III	Applying
CO3	Verify performance features of R,L,C in AC circuits.	III	Applying
CO4	Familiarize with three phase AC circuit.	I	Remember

CO-PO Mapping:

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	1	1	1						1					
CO2	2	3		1					1					
CO3	1	2		1					1					
CO4	2	2	1						1					

Assessment Scheme:

Assessment Component	Mark
ISE (Journal Writing, Practical Performance, Oral)	25

Course Contents:

Practical No.	Practical/Experiment Title and Contents	Hours
1	Familiarization of electrical Elements, sources, measuring devices and transducers	2
2	Determination of resistance temperature coefficient.	2
3	Verification of Superposition Theorem.	2
4	Verification of Thevenin Theorem.	2
5	Verification of Norton Theorem.	2
6	Verification of Maximum Power Transfer Theorem.	2

7	Simulation of R-L-C series circuits for XL>XC , XL< XC	2
8	Simulation of Time response of R-C circuit.	2
9	Verification of relation in between voltage and current in three phase balanced	2
10	Demonstration of measurement of electrical quantities in DC and AC systems.	2

Textbooks:

Sr.No.	Title	Edition	Author/s	Publisher
1	Electrical Technology Volume-I	I	B. L. Theraja	S. Chand
2	Elements of Electrical Engineering	X	P. V. Prasad	Cengage Learning

Reference Books:

Sr.No.	Title	Edition	Author/s	Publisher
1	Laboratory courses in Electrical Engineering	--	S G Tarnekar and	S. Chand
2	Basic Electrical Engineering	III	D.P. Kothari, I.J. Nagrath	TMH Publishing Co. Ltd., New

Course Code:	UCBBS0109	L	T	P	Credit
Course Name:	Physics for Computing Science Lab	-	-	2	1

Course Prerequsites:

1. To calculate least count of measuring instrument
2. Requisite theoretical concepts related to a particular experiment

Course Description:

This course includes Experiments to verify the laws, study the optics phenomenon practically, observe and evaluate the data for calculation and conclusion.

Course Objectives:

1. To find the relation between electric and magnetic field.
2. To study phenomenon of light like interference, diffraction, polarization
3. To understand properties of laser and optical fiber
4. To study Rayleigh's criteria and determine resolving power diffraction grating.
5. To demonstrate use of optical bench for various optics experiments.
6. To analyze and obtain various crystal parameters from the XRD pattern.

Course Outcomes:

COs	After completion of the course, students shall have ability to	Blooms	Descriptor
CO1	Demonstrate different phenomenon of light and their applications	II	Understand
CO2	Analyze motion of body under influence of gravity and applications of pendulum.	III	Applying
CO3	Analyze properties of material using modern techniques.	III	Applying
CO4	Demonstrate experimental set up and models applicable for engineering	III	Remember

CO-PO Mapping:

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	3	2												
CO2	3	2												
CO3	3	2		1										
CO4	3	2		2				2	3	3		1		

Assessment Scheme:

Assessment Component	Mark
Practical Performance	5
Journal	10
Group Discussion/Seminar/ Phet / Tinker CAD Activity	10
Total	25

Course Contents:

Practical No.	Practical/Experiment Title and Contents	Hours
1	Katers' Pendulum	2
2	Torsional Pendulum	2
3	Inverse square Law in photometry	2
4	Divergence of LASER	2

5	Diffraction Grating	2
6	Resolving Power of Diffraction Grating	2
7	Study of crystal structure and Miller Indices	2
8	Determination of Hall coefficient of semi-conductor.	2
9	Determination of Plank constant.	2
10	Determination of laser and optical fiber parameters.	2
11	Magnetic field along the axis of current carrying coil – Stewart and Gee	2
12	Determination of specific rotation of sugar solution using polarimeter.	2
13	Determination of Stefan's Constant.	2

Textbooks:

Sr.No.	Title	Edition	Author/s	Publisher
1	An Advance course in Practical Physics	VIII	D. Chattopadhaya & P.C. Rakshit	New central Book Agency.

Reference Books:

Sr.No.	Title	Edition	Author/s	Publisher
1	Experiments in Engineering Physics	I	Avadhanalu, Dhani & Pokley	S.Chand
2	Principles and Practice of Analytical Chemist	V	F.W. Fifield, D. Kealey	Blackwell Science Ltd.

Course Code:	UCBAE0110										L	T	P	Credit
Course Name:	Business Communication & Value Science - I Lab										-	-	2	1

Course Prerequsites:

Business Communication and Value Science-I Theory

Course Description:

This is a practice-oriented course, laying importance on application of various skills being learnt in the Business Communication and Value Science-I course.

Course Objectives:

1. To acquaint students with English phonology and make them practice correct pronunciation
2. To provide them ample practice for developing their listening and speaking skills
3. To strengthen their grammatical competence through practice
4. To provide them platform to experience life skills

Course Outcomes:

COs	After completion of the course, students shall have ability to	Blooms	Descriptor
CO1	Comprehend English Sounds, stress patterns and intonation and English grammar to perform better professionally (U)	IV	Analyze
CO2	Use listening comprehension techniques in day today life (AP)	III	Apply
CO3	Construct effective public speeches (CR)	III	Apply
CO4	Use life skills in real life situations (AP)	II	Apply

CO-PO Mapping:

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1					1			1	1	1		1		
CO2					1			-	1	3		2		
CO3								1	2	3		-		
CO4								1	2	3		1		

Assessment Scheme:

Assessment Component	Mark
ISE: ISE is based on practical performance/ Quiz/ Presentation/ Group Discussion/Role plays/Assignments/Demonstration, etc. Distribution of Marks: • Lab Activities • Lab Tests and Practical Performance • Public Speech (extempore and prepared) • Attendance	
Total Marks	50

Course Contents:

Practical No.	Practical/Experiment Title and Contents	Hours

1	Ice breaking: Introducing self and others Adjectives, phrases and clauses to describe oneself and others Introducing oneself and others-demonstration	2
2	Recognize the need for life skills and values Presentation on favourite cricket captain in IPL/any sports and the skills and values they demonstrate	2
3	Phonetics Introduction to Phonetics-Consonants, Vowels and Diphthongs in English with videos samples, Stress, tone and intonation, pronunciation practice with audio-video samples	2
4	Verbal Aptitude -1 Vocabulary building games, practicing affixation, confusables, homonyms, homophones, using idioms, newspaper reading	2
5	Verbal Aptitude -2 Using proper tenses, correct use of articles, conjunctions and prepositions Types of sentences and conversion, active and passive voice, spotting errors in sentences with justification, word order, punctuation marks	2
6	Listening practice Listening comprehension, Strategies for effective listening with audio/video samples	2
7	Speaking practice-1 Video samples of effective and ineffective public speeches, Extempore (JAM), prepared speeches practice-1	2
8	Speaking practice-2 Prepared speeches for ISE	2
9	Experiencing Life Skills Community service-work with an NGO and make share experience -Roleplay	2
10	Understanding Life Skills: Movie based learning – Pursuit of Happiness. What are the skills and values you can identify, what can you relate to?	2

*Any 8 practical/experiments will be completed

Textbooks:

Sr.No.	Title	Edition	Author/s	Publisher
1	Orell Talk Digital Language Lab Software – Professional Version with 1+50 users subscription	-	-	-

Reference Books:

Sr.No.	Title	Edition	Author/s	Publisher
1	Better English Pronunciation	II	J.D. O'Connor	OUP
2	A Practical Course in Spoken English	I	J.K. Gangaj	PHI Learning Pvt. Ltd
3	English Language Laboratories	II	Nira Konar	PHI Learning

Course Code:	UCBVS0111		L	T	P	Credit
Course Name:	Desktop Publishing		0	0	2	1

Course Prerequsites:

Knowledge of Basic Computer Concepts

Course Description:

The objective of the course is to provide the participants understanding of the techniques essential to build their career in desktop publishing using suitable hardware and software tools. This course offers a range of topics of immediate relevance to industry and makes the participants exactly suitable for DTP Industry.

Course Outcomes:

CO	After the completion of the course the student should be able to	Blooms Level	Descriptor
CO1	Create professional quality reports, documents, presentations and apply mathematical functions using Microsoft word,powerpoint and excel applications.	VI	Create
CO2	Apply Photoshop as a premier graphic design and image editing tools.	III	Apply
CO3	Create Documents and Templates using page makers, add text into documents using various methods, and apply different formatting styles to characters and paragraphs.	VI	Create
CO4	Conceptualize and create Logos, various types of print designs, Design Pamphlets, Posters, Invitation cards, Greeting cards, Wrappers, Advertisements, Banners and Package using coral draw.	VI	Create

CO-PO Mapping:

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1			2		3	1						2	1	
CO2	1		3		3							2	1	
CO3	1		3		3	1						2	1	
CO4	1		3		3	1						2	1	

Assessment Scheme:

SN	Assessment	Weightage	Remark
1	End Semester Examination (ESE)	100%	Practical Oral Examination (POE)

Course Contents

Practical No.	Practical Title and Contents	Hours
1	**Fundamentals of Computers:** (Understanding the functions, characteristics & basic components of a computer system, various peripherals, storage devices & understand their physical structure & working, Understand Login, Logout, file, directories & sub directories.	2
2	**MS Office-Part-1:** (Creation, edition, & printing a document/ page/ presentation/ excel sheet in MS Office, Incorporate & use advanced features in MS Word. Inserting word art, shapes, Clipart, Charts, Smart arts, symbols, Graphs etc. in a document/slide. Calculations using various formulas, Function in Excel, Representing data as chart in MS Word, Excel & PowerPoint)	2

3	**MS-Ofice-Part-2:** (Design presentations using text, graphics, images, tables and charts. Design presentations with advance features using animations & objects. Importing & exporting excel sheets to/from various formats, Adding Headers/Footers & use macros.)	2
4	**Photoshop Part-1:** Getting Acquainted with Photoshop, Basic Image Manipulation, Color Basics, Painting Tools, Brush Settings, Making Selections	2
5	**Photoshop Part-2:** Filling and stroking, Layers, Advanced Layers, Text drawing Using Channels and Masking, Manipulating images, Getting to know the work area, Using Adobe Bridge	2
6	**Photoshop Part-3:** Basic Photo Corrections, Retouching and Repairing, Working with selections, Layer Basics, Masks and channels, Correcting and enhancing digital photographs, Topographic design	2
7	**PageMaker Part-1:** Introduction to Page Maker-Introduction to various versions, concepts and applications of PageMaker	2
8	**PageMaker Part-2:** Getting Started with PageMaker, PageMaker Interface, Creating a New Document, Managing Document Layer, Creating & Editing Text, Working with Edit Story	2
9	**Coral Draw Part-1:** Getting started with Corel Draw, Introduction to Corel Draw, Features of Corel Draw, Corel Draw Interface, Tool Box, Moving from Adobe Illustrator to Corel Draw, Common Tasks	2
10	**Coral Draw Part-2:** Drawing and Coloring, Selecting Objects, Creating Basic Shapes, Reshaping Objects, Organizing objects, Applying color fills and Outlines	2
11	**Project work:** Design Process, Designing Aids, Printing and presentation	2

Textbooks:

1. Bittu Kumar (2013). Desktop Publishing: Practical Guide To Publish Anything On Your Desktop. V&S Publishers

2. Satish Jain, M. Geetha (2018). CorelDRAW Training Guide. BPB

Reference Books:

1. Simon Mitchell (1999). Mastering Desktop Publishing. Palgrave Macmillan

KOLHAPUR INSTITUTE
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**COLLEGE OF
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(AUTONOMOUS),
KOLHAPUR**

Kolhapur Institute of Technology's

College of Engineering, Kolhapur

Department of Computer Science and Business Systems

Sem-II-Syllabus

Course Code:	UCBPC0201	L	T	P	Credit
Course Name:	Data Structures and Algorithms	3	0	0	3

Course Prerequsites:

Fundamentals of Programming language

Course Description:

Introduces linear and non-linear data structures such as lists, stack, queues, trees, and graphs. Discusses about the implementations and applications of these data structures on real time applications. Examines algorithms for sorting, searching and some graph algorithms. Algorithm analysis and efficient code design is introduced.

Course Outcomes:

COs	Upon completion of the course, students shall have ability to	Blooms	Descriptor
CO1	Understand basic terminologies related to algorithms analysis.	II	Understand
CO2	Select and apply suitable linear and non-linear data structures.	III	Apply
CO3	Apply different searching/sorting techniques and analyze their time complexities.	IV	Analyse
CO4	Represent and implement various file organizations and graphs.	III	Apply

CO-PO Mapping:

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	2	2	2									2	2	
CO2	2	2			2							2	2	
CO3	2	3	2		2							2	2	
CO4	3	2	3		2							2	2	

Assessment Scheme:

SN	Assessment	Weightage	Remark
1	In Semester Evaluation 1 (ISE1)	10%	Assignment, Test, Quiz, Seminar, Presentation, etc.
2	Mid Semester Examination (MSE)	30%	50% of course contents
3	In Semester Evaluation 2 (ISE2)	10%	Assignment, Test, Quiz, Seminar, Presentation, etc.
4	End Semester Examination (ESE)	50%	100% course contents

Course Contents:

Unit 1	Basic Terminologies and Introduction to Algorithm & Data Organization	5 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.

Unit 2	Linear Data Structure	7 Hours

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

Unit 3	Non-linear Data Structure	8 Hours

Trees (Binary Tree, Threaded Binary Tree, Binary Search Tree, B & B+ Tree, AVL Tree, Splay Tree), Applications of Non-Linear Data Structures

Unit 4	Searching and Sorting on Various Data Structures	5 Hours

Sequential Search, Binary Search, Comparison Trees, Breadth First Search, Depth First Search Insertion Sort, Selection Sort, Shell Sort, Divide and Conquer Sort, Merge Sort, Quick Sort, Heapsort, Introduction to Hashing

Unit 5	Files	7 Hours

Organization (Sequential, Direct, Indexed Sequential, Hashed) and various types of accessing schemes.

Unit 6	Graphs	8 Hours

Basic Terminologies and Representations, Graph search and traversal algorithms and complexity analysis.

Text Books:

1. E. Horowitz, S. Sahni, S. A-Freed (2008). Fundamentals of Data Structures. Universities Press.
2. A. V. Aho, J. E. Hopcroft, J. D. Ullman (1982). Data Structures and Algorithms. Pearson.

Reference Books:

1. Donald E. Knuth (1997). The Art of Computer Programming: Volume 1: Fundamental Algorithms. Addison-Wesley
2. Thomas, H. Cormen, Charles E. Leiserson, R L. Rivest, Clifford Stein (2009). Introduction to Algorithms. PHI Learning Pvt. Ltd.
3. Pat Morin (2013). Open Data Structures: An Introduction (Open Paths to Enriched Learning). UBC Press.

Course Code:	UCBES0202		L	T	P	Credit
Course Name:	Principles of Electronics		2	-	-	2

Course Prerequsites:

Fundamentals of physics, semiconductor physics, basics of electronic devices.

Course Description:

The course aims to provide knowledge of different electronic component and its operation.

Course Objectives:

1. To learn the fundamentals of semiconductors.
2. To understand the principles of diodes and diode circuits.
3. To learn the principles of bipolar junction transistors and field effect Transistors and working of feedback amplifi
4. To learn the working of operational amplifiers and digital electronic.

Course Outcomes:

COs	Upon completion of the course, students shall have ability to	Blooms Level	Descriptor
CO1	Understand the basic of semiconductors.	Cognitive	Apply
CO2	Explain operation of diode and it applications.	Cognitive	Knowledge
CO3	Understand the concept of BJT and FET & it applications.	Cognitive	Apply
CO4	Understand the concept of operational amplifiers and digital electronic.	Cognitive	Apply

CO-PO Mapping:

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	3	2	-	1	2	-	-	-	-	-	-	-	-	-
CO2	3	1	3	2	2	-	-	-	-	-	-	-	-	-
CO3	3	-	-	1	3	-	-	-	-	-	-	-	-	-
CO4	3	2	1	2	2	-	-	-	-	-	-	-	-	-

Assessment Scheme:

Two components of In Semester Evaluation (ISE), One Mid Semester Examination (MSE) and one End Semester Examination (ESE) having 20%, 30% and 50% weightage respectively.

Assessment Component	Marks
ISE 1	10
MSE	30
ISE 2	10
ESE	50

ISE 1 and ISE 2 are based on Assignment/Declared test/Quiz/Seminar/Group discussions/presentation, etc.
MSE is based on 50% of course content (Normally first three modules).
ESE is based on 100% course content with 60-70% weightage for course content (Normally last three modules) cov

Course Contents:

Unit 1	Semiconductors	3 Hours

Crystalline material: Mechanical properties, Energy band theory, Fermi levels; Conductors, Semiconductors & Insulators: electrical properties, band diagrams. Semiconductors: intrinsic & extrinsic, energy band diagram, P&N-type semiconductors, drift & diffusion carriers.

Unit 2	Diodes and Diode Circuits	5 Hours
	Formation of P-N junction, energy band diagram, built-in-potential, forward and reverse biased P-N junction, formation of depletion zone, V-I characteristics, Zener breakdown, Avalanche breakdown and its reverse characteristics; Junction capacitance and Varactor diode. Simple diode circuits, load line, linear piecewise model; Rectifier circuits: half wave, full wave, PIV, DC voltage and current, ripple factor, efficiency, idea of regulation.	

Unit 3	Bipolar Junction Transistors	5 Hours

Formation of PNP / NPN junctions, energy band diagram; transistor mechanism and principle of transistors, CE, CB, CC configuration, transistor characteristics: cut-off active and saturation mode, transistor action, injection efficiency, base transport factor and current amplification factors for CB and CE modes. Biasing and Bias stability: calculation of stability factor

Unit 4	Field Effect Transistors	4 Hours

Concept of Field Effect Transistors (channel width modulation), Gate isolation types, JFET Structure and characteristics, MOSFET Structure and characteristics, depletion and enhancement type; CS, CG, CD configurations; CMOS: Basic Principles

Unit 5	Feed Back Amplifier, Oscillators and Operational Amplifiers	7 Hours

Concept (Block diagram), properties, positive and negative feedback, loop gain, open loop gain, feedback factors; topologies of feedback amplifier; effect of feedback on gain, output impedance, input impedance, sensitivities (qualitative), bandwidth stability; effect of positive feedback: instability and oscillation, condition of oscillation, Barkhausen criteria. Introduction to integrated circuits, operational amplified and its terminal properties; Application of operational amplifier; inverting and non-inverting mode of operation, Adders, Subtractors, Constant-gain multiplier, Voltage follower, Comparator, Integrator, Differentiator

Unit 6	Digital Electronics Fundamentals	5 Hours

Difference between analog and digital signals, Logic ICs, half and full adder/subtractor, multiplexers, demultiplexers, flip-flops, shift registers, counters.

Textbooks:

Sr.No.	Title	Edition	Author/s	Publisher
1	Electronic Devices and Circuits	VIII, 2005	R. Boylestad & L. Nashelsky	Prentice Hall International
2	Electronic devices & circuits	-	Allen Mottershed	Prentice-Hall India
3	Fundamentals of Digital Circuits	-	Anand Kumar	PHI

Reference Books:

Sr.No.	Title	Edition	Author/s	Publisher
1	Electronic devices & circuits	IV	David A. Bell	Prentice- Hall India
2	Electronic devices & circuits	II	Millman &	Tata McGraw
3	An Engineering Approach to Digital Design	-	Willim I. Fletcher	PHI/ Pearson

Course Code:	UCBBS0203	L	T	P	Credit
Course Name:	Linear Algebra	3	-	-	3

Course Prerequsites:

Basic concepts of linear equations, Basic Properties of algebraic operations, vector algebra, matrix algebra.

Course Description:

This course contains study of system of linear equations, Eigen values and Eigen vectors , Vector Spaces, Linear Transformation, Quadratic forms & Inner product spaces.

Course Objectives:

To make the students equipped with the tools and techniques of linear algebra and its applications.

Course Outcomes:

COs	After completion of the course, students shall have ability to	Blooms Level	Descriptor
CO1	Use system of linear equations in various application areas.	III	Applying
CO2	Use matrix algebra and quadratic forms in graphics designing.	III	Applying
CO3	Use vector space & inner product space concepts in their programming.	III	Applying
CO4	Use linear transformation concepts in software development.	III	Applying

CO-PO Mapping:

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	3	-	3	-	-	3	-	-	-	-	-	-	-	-
CO2	3	-	3	-	-	3	-	-	-	-	-	-	-	-
CO3	3	-	3	-	-	3	-	-	-	-	-	-	-	-
CO4	3	-	3	-	-	3	-	-	-	-	-	-	-	-

Assessment Scheme:

Two components of In Semester Evaluation (ISE), One Mid Semester Examination (MSE) and one End Semester Examination (ESE) having 20%, 30% and 50% weightage respectively.

Assessment Component	Marks
ISE 1	10
MSE	30
ISE 2	10
ESE	50

ISE 1 and **ISE 2** are based on Assignment/Declared test/Quiz/Seminar/Group discussions/presentation, etc.
MSE is based on 50% of course content (first three units).
ESE is based on 100% course content with 60-70% weightage for course content (last three units) covered after MS

Course Contents:

Unit 1	System of Linear Equations	6 Hours

Rank of a Matrix, System of Linear Equations, Gauss Elimination, LU Decomposition method.

Unit 2	Vector Space	7 Hours

Vectors , n-Vectors , linear combination, Linear Dependence & Independence of vectors, Vector space, Subspace, Spanning Set, Basis & Dimension.

Unit 3	Linear Transformations	7 Hours

Linear Transformations, Matrix of Linear transformation, Range and Kernel, Non-singular linear transformation, Rank-Nullity Theorem, Orthogonal transformation.

Unit 4	Eigen Values and Eigen Vectors	6 Hours

Eigen Values and Eigen Vectors, Cayley-Hamilton theorem and its Applications, Diagonalization, Inverse and power of matrix by modal matrix.

Unit 5	Quadratic Forms and Applications	7 Hours

Quadratic forms, Symmetric Matrices, Reduction of Quadratic forms to anonical form, Definite & Semi- definite forms, Linear and Orthogonal transformation, Singular value decomposition (SVD) and Principal Component Analysis(PCA), Applications to Image Processing and Machine Learning.

Unit 6	Inner Product Space	7 Hours

Inner Product Space, Norm of a Vector, Orthogonality, Orthogonal Projection, Gram-Schmidt orthonormalization, QR decomposition.

Textbooks:

Sr.No.	Title	Edition	Author/s	Publisher
1	Elementary Linear Algebra	-	Larson, Edwards, Falvo	Houghton Mifflin
2	Introduction to linear algebra	-	Gilbert Strang	Wellesley
3	Linear Algebra	-	Kenneth Hoffman, Ray Kunze	Pearson

Reference Books:

Sr.No.	Title	Edition	Author/s	Publisher
1	Linear Algebra	-	Seymour	McGraw Hill
2	Linear Algebra and its Applications	-	David C Lay	Pearson
3	Linear Algebra	-	Kenneth M Hoffman	Prentice Hall

Course Code:	UCBBS0204		L	T	P	Credit
Course Name:	Statistical Methods		3	-	-	3

Course Prerequsites:

Basic statistics and Probability

Course Description:

In this course students will learn topics from Regression, Statistical Inference and Time Series.

Course Objectives:

1. To explain the role of regression in business.
2. To impart knowledge on collection, analysis and presentation of data.
3. To analyze distributions and relationships of real-time data.
4. To apply estimation and testing methods to make inference and modeling techniques for decision making.

Course Outcomes:

COs	After completion of the course, students shall have ability to	Blooms Level	Descriptor
CO1	Interpret several statistical methods for the given data to infer the relation among the given variables.		Understanding
CO2	Analyze the right test statistic to test the hypothesis formulated from the given data.		Analyzing
CO3	Make use of the appropriate non parametric hypothesis testing procedures based on inferences.		Applying
CO4	Develop the model for the given time series and estimate the required forecasting.		Applying

CO-PO Mapping:

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	3	2	-	-	-	-	-	-	-	-	-	-	-	-
CO2	3	2	-	-	-	-	-	-	-	-	-	-	-	-
CO3	3	2	-	-	-	-	-	-	-	-	-	-	-	-
CO4	3	2	-	-	-	-	-	-	-	-	-	-	-	-

Assessment Scheme:

Two components of In Semester Evaluation (ISE), One Mid Semester Examination (MSE) and one End Semester Examination (ESE) having 20%, 30% and 50% weightage respectively.

Assessment Component	Marks
ISE 1	10
MSE	30
ISE 2	10
ESE	50

ISE 1 and ISE 2 are based on Assignment/Declared test/Quiz/Seminar/Group discussions/presentation, etc.

MSE is based on 50% of course content (first three units).

ESE is based on 100% course content with 60-70% weightage for course content (last three units) covered after MS

Course Contents:		
Unit 1	**Linear Statistical Models**	**7 Hours**
Correlation and Scatter diagram, Linear regression and Least squares method, Multiple regressions & multiple correlations, Rank correlation.		

Unit 2	**Statistical Inference – I (Estimation)**	**6 Hours**
Point estimation, Criteria for good estimates (un-biasedness, consistency and sufficiency), Methods of estimation including maximum likelihood estimation.		

Unit 3	Statistical Inference – II (Test of Significance)	8 Hours

Test of hypothesis, Sampling distribution of mean and standard error, Large sample tests: Test for an assumed mean and equality of two population means, Small sample tests: t-test for an assumed mean and equality of means of two populations, Paired t-test, Neyman Pearson lemma.

Unit 4	Analysis of Variance	8 Hours

Test for single variance by using Chi – square distribution, Test for two variance by using F- distribution, Analysis of variance (one way, two ways with as well as without interaction)

Unit 5	Non-parametric Inference	8 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.

Unit 6	Basics of Time Series Analysis & Forecasting	5 Hours

Stationary ARIMA Models: Identification, Estimation and Forecasting

Textbooks:

Sr.No.	Title	Edition	Author/s	Publisher
1	Probability and Statistics for Engineers	IV	LI.R. Miller, J.E. Freund and R. Johnson	
2	Fundamentals of Statistics	Vol. I & II	Goon, M. Gupta	World Press
3	The Analysis of Time Series: An Introduction	-	Chris Chatfield	

Reference Books:

Sr.No.	Title	Edition	Author/s	Publisher
1	Introduction to Linear Regression Analysis	-	D.C. Montgomery & E.Peck	
2	Introduction to the Theory of Statistics	-	A.M. Mood, F.A. Graybill & D.C. Boes	
3	Applied Regression Analysis	-	N. Draper & H. Smith	
4	Hands-on Programming with R	-	Garrett Grolemund	
5	R for Everyone: Advanced Analytics and Graphics	-	Jared P. Lander	

Course Code:	UCBAE0205		L	T	P	Credit
Course Name:	Fundamentals of Economics		2	-	-	2

Course Prerequsites:	
Nil	

Course Description:

Basic knowledge of Micro and Macro Economics is essential for the Engineers studying the Computer Science and Business Systems Programme. In this course the analysis of basics of Microeconomics, studying theory of demand, elasticity of demand, theory of supply, consumers's surplus, analysis of consumer behavior through Indifference analysis are introduced to understand the consumer's behavior. Production function, cost analysis and study of competitive markets is taught to provide insights into the significance of competitive markets in business decisions. Analysis of national income, Keynesian theory of consumption function, theory of multiplier, supply of and demand for money, bank credit, theory of business cycles, monetary and fiscal policies are discussed to help engineering students to understand the behavior of business enterprise based on these macro economic concepts.

Course Objectives:

1. To impart the basic knowledge of theory of demand and supply.
2. To educate on consumer behavior based on indifference analysis.
3. Analyse the significance of production function and cost analysis and understand competitive markets.
4. Explain the concepts of national income and their significance.
5. Bring out the significance of Keynes' theory of multiplier, supply of money and bank credit on business decision
6. To examine the business cycles, monetary and fiscal policies and their effect on business decisions.

Course Outcomes:

COs	After completion of the course, students shall have ability to	Blooms Level	Descriptor
CO1	Describe the concept of price elasticity of demand and elasticity of supply Explain and calculate consumer's and producer's surplus. Understand Budget constraint, price effect, income effect and substitution effect.	III	Analyze
CO2	Evaluate the concepts of production function and short run and long run cost curves. Classify the competitive markets viz; perfect competition, monopoly and monopolistic competition and understand how price is determined in these market conditions	II	Evaluate
CO3	Analyze National Income and its components. Analyze Keynes Consumption function and theory of multiplier and Significance of taxes and subsidies imposed by the Government.	III	Analyze
CO4	Explain money and demand for money, credit multiplier theory of banks and integration of money and commodity markets through IS and LM curves.	II	Understand

CO-PO Mapping:

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	2	-	-	-	1	-	-	-	-	-	-	-	-	-
CO2	3	3	-	2	-	-	-	-	-	-	-	-	-	-
CO3	2	-	1	-	-	-	-	-	-	-	-	-	-	-
CO4	1	-	1	-	-	-	-	-	-	-	-	-	-	-

Assessment Scheme:	

Two components of In Semester Evaluation (ISE), One Mid Semester Examination (MSE) and one End Semester Examination (ESE) having 20%, 30% and 50% weightage respectively.

Assessment Component	Marks
ISE 1	10
MSE	30
ISE 2	10
ESE	50

ISE 1 and ISE 2 are based on Assignment/Declared test/Quiz/Seminar/Group discussions/presentation, etc.
MSE is based on 50% of course content (first three units).
ESE is based on 100% course content with 60-70% weightage for course content (last three units) covered after MS

Course Contents:	

Unit 1	Microeconomics	4 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)

Unit 2	Welfare Analysis	7 Hours

Consumers' and Producers' Surplus - Price Ceilings and Price Floors; Consumer Behaviour - Axioms of Choice - Budget Constraints and Indifference Curves; Consumer's Equilibrium - Effects of a Price Change, Income and Substitution Effects -Derivation of a Demand Curve; Applications - Tax and Subsidies - Intertemporal Consumption - Suppliers' Income Effect;

Unit 3	Theory of Production	4 Hours

Production Function and Iso-quants - 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

Unit 4	Macroeconomics	5 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.

Unit 5	Money	4 Hours

Definitions; Demand for Money -Transactionary and Speculative Demand; Supply of Money - Bank's Credit Creation Multiplier; Integrating Money and Commodity Markets - IS, LM Model.

Unit 6	Business Cycles and Stabilization	4 Hours

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

Textbooks:

Sr.No.	Title	Edition	Author/s	Publisher
1	Microeconomics	8	Pindyck, Robert S., and Daniel L. Rubinfeld	Pearson
2	Microeconomics	12	Dornbusch, Fischer	McGraw Hill.
3	Economics	20	P.A.Samuelson, W.D.Nordhaus	McGraw Hill.
4	Micro Economics	8	M.L.Jingan	Vrinda Publications, New Delhi.

Reference Books:

Sr.No.	Title	Edition	Author/s	Publisher
1	Intermediate Microeconomics: A Modern Approach	8	Hal R, Varian	Springer India Pvt. Ltd. India.
2	Principles of Macroeconomics	7	N.Gregory Mankiw	Cengage India Pvt. Ltd.

Course Code:	UCBAE0206		L	T	P	Credit
Course Name:	Business Communication and Value Science-II		1	-	-	1

Course Prerequsites:

Basic Knowledge of English (verbal and written)
Completion of all units from Semester 1 course: BCVS-I

Course Description:

The current course will definitely help the learners to increase their employability and foster various indispensable soft skills.

Course Objectives:

1. To develop effective writing, reading, presentation and group discussion skills
2. To help students identify personality traits and evolve as a better team player
3. To introduce them to key concepts of morality, behaviour & beliefs and diversity & inclusion

Course Outcomes:

COs	After completion of the course, students shall have ability to	Blooms Level	Descriptor
CO1	Integrate electronic/social media to share concepts and ideas (AP)	IV	Analysis
CO2	Apply different tools for quick reading (AP)	III	Apply
CO3	Articulate opinions on a topic with the objective of influencing others (AP)	II	Understand
CO4	Demonstrate the basics of presentation and effective writing skills (U)	III	Apply

CO-PO Mapping:

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	-	-	-	-	-	-	-	-	-	1	-	-	-	-
CO2	-	-	-	-	-	-	-	2	2	3	-	1	-	-
CO3	-	-	-	-	-	-	-	2	2	2	-	1	-	-
CO4	-	-	-	-	-	-	-	1	-	2	-	-	-	-
CO5	-	-	-	-	-	-	-	1	2	2	-	-	-	-

Assessment Scheme:

Two components of In Semester Evaluation (ISE), One Mid Semester Examination (MSE) and one End Semester Examination (ESE) having 20%, 30% and 50% weightage respectively.

Assessment Component	Marks
ISE 1	10
MSE	30
ISE 2	10
ESE	50

ISE 1 and **ISE 2** are based on Assignment/Declared test/Quiz/Seminar/Group discussions/presentation, etc.
MSE is based on 50% of course content (Normally first three modules).
ESE is based on 100% course content with 60-70% weightage for course content (Normally last three modules) covered after MSE.

Course Contents:	
Unit 1 **Enhancing Reading and Writing Skills**	**Hours**

Effective reading: Importance, types, overcoming common obstacles, tips and strategies
Effective writing: Importance, paragraph writing techniques, journal/blog writing, Catherine Morris and Joanie Mcmahon's writing techniques.

Unit 2 Employment Communication	**Hours**

Covering letter and resume, Group discussion, Interviews

Unit 3	Presentation skills	Hours
	Techniques of effective professional presentations, collaborative/team presentations	

Unit 4	Business Meetings	Hours
	Types of meetings, strategies of conducting meetings effectively, Documentation (notice, agenda, minutes)	

Unit 5	Life Skills/Soft Skills-1	Hours
	Developing personality Self esteem: Know thyself	

Unit 6	Life Skills/Soft Skills-2	Hours
	Emotional Intelligence, Leadership and Teamwork, Time management	

Textbooks:

Sr.No.	Title	Edition	Author/s	Publisher
1	Communication Skills	2013	Meenakshi Raman and Sangeeta Sharma	Oxford University Press (OUP)
2	Business Communication	2015	S. Kalia and S. Agarwal	Wiley
3	An Introduction to Professional English and Soft Skills	2012	Das et al	Cambridge University Press

Reference Books:

Sr.No.	Title	Edition	Author/s	Publisher
1	Guiding Souls: Dialogues on the purpose of Life	2015	Kalam A.A.	Prabhat Prakashan
2	Handbook of Technical Writing	10th	Alred, G. J., Brusaw, C. T., & Oliu, W. E.	St. Martin's Press Sherman
3	Skimming and Scanning Techniques	2014	Barbara	Liberty University

Web References:

1.ETHICS FUNDAMENTALS AND APPROACHES TO ETHICS
   https://www.eolss.net/Sample-Chapters/C14/E1-37-01-00.pdf

2.A Framework for Making Ethical Decisions
   https://www.brown.edu/academics/science-and-technology-studies/framework-making-ethical-decisions

3.Five Basic Approaches to Ethical Decision
   http://faculty.winthrop.edu/meelerd/docs/rolos/5_Ethical_Approaches.pdf

Online Resources:

1.https://youtu.be/CsaTslhSDI
2.https://m.youtube.com/watch?feature=youtu.be&v=IIKvV8_T95M
3.https://m.youtube.com/watch?feature=youtu.be&v=e80BbX05D7Y
4.https://m.youtube.com/watch?v=dT_D68RJ5T8&feature=youtu.be
5.https://m.youtube.com/watch?v=7sLLEdBgYYY&feature=youtu.be

Course Code:	UCBPC0207		L	T	P	Credit
Course Name:	Data Structures and Algorithms lab		0	0	2	1

Course Prerequisites:
Fundamentals of Programming

Course Description:

In this laboratory course, the students will develop problem solving skills using C programming. This course helps the students to understand, select and apply appropriate data structures to solve the real world problems. Additionally, the students will also learn various searching and sorting techniques. The course teaches the students to implement various abstract data structures such as lists, graphs and trees.

Course Outcomes:

CO	After the completion of the course the student should be able to	Blooms Level	Descriptor
CO1	Select appropriate data structures to solve real world problems	I	Remember
CO2	Implement linear and non-linear data structure operations using C programs	III	Apply
CO3	Implement searching and sorting algorithms using suitable data structures.	III	Apply
CO4	Implement ADTs such as lists, graphs, search trees to solve computational problems	III	Apply

CO-PO Mapping:

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	2	3			2								1	
CO2	2	2	3	1	2									
CO3	2	1	2	1	2									2
CO4	2	3	3	1	2								1	2

Assessment Scheme:

SN	Assessment	Weightage	Remark
1	In Semester Evaluation	50%	Lab Assignments, Internal POE, Lab Book, Attendance
2	End Semester Examination (ESE)	50%	Practical Oral Examination (POE)

Course Contents

Practical No.	Practical Title and Contents	Hours
1	Write a menu driven & modular program for database management of any Restaurant. Based on a customer's consumption of food items, the program should generate the bill.	2
2	Design, develop and execute a program in C to input N integer numbers in ascending order into a single dimension array, and then to perform a binary search for a given key integer number and report success or failure in the form of a suitable message.	2

3	Design, Develop and Implement a menu driven Program in C for the following operations on STACK of Integers (Array Implementation of Stack with maximum size MAX). 1. Push an Element on to Stack 2. Pop an Element from Stack 3. Demonstrate how Stack can be used to check Palindrome 4. Demonstrate Overflow and Underflow situations on Stack 5. Display the status of Stack 6. Exit Support the program with appropriate functions for each of the above	2
4	Design, Develop and Implement a Program in C for converting an Infix Expression to Postfix Expression. Program should support for both parenthesizedand free parenthesized expressions with the operators: +, -, *, /, %(Remainder), ^(Power) and alphanumeric operands.	2
5	Design, Develop and Implement a menu driven Program in C for the following operations on Circular QUEUE of Characters (Array Implementation of Queue with maximum size MAX) 1. Insert an Element on to Circular QUEUE 2. Delete an Element from Circular QUEUE 3. Demonstrate Overflow and Underflow situations on Circular QUEUE 4. Display the status of Circular QUEUE 5. Exit Support the program with appropriate functions for each of the above	2
6	Design, Develop and Implement a menu driven Program in C for the following operations on Singly Linked List (SLL) of Student Data with the fields: USN, Name, Branch, Sem, PhNo 1. Create a SLL of N Students Data by using front insertion. 2. Display the status of SLL and count the number of nodes in it 3. Perform Insertion / Deletion at End of SLL 4. Perform Insertion / Deletion at Front of SLL(Demonstration of stack) 5. Exit	2
7	Design, Develop and Implement a menu driven Program in C for the following operations on Doubly Linked List (DLL) of Employee Data with the fields: SSN, Name, Dept, Designation, Sal, PhNo 1. Create a DLL of N Employees Data by using end insertion. 2. Display the status of DLL and count the number of nodes in it 3. Perform Insertion and Deletion at End of DLL 4. Perform Insertion and Deletion at Front of DLL 5. Demonstrate how this DLL can be used as Double Ended Queue 6. Exit	2
8	Write a C program that implements Selection Sort algorithm to arrange the following list of integers in ascending order. 23, -2, 56, 1, 78, 8, 34, 23, 42, -31, 0	2

9	Design, Develop and Implement a menu driven Program in C for the following operations on Binary Search Tree(BST) of Integers 1. Create a BST of N Integers: 6, 9, 5, 2, 8, 15, 24, 14, 7, 8, 5, 2 2. Traverse the BST in Inorder, Preorder and Post Order 3. Search the BST for a given element (KEY) and report the appropriate message 4. Exit	2
10	Given a File of N employee records with a set K of Keys(4-digit) which uniquely determine the records in file F. Assume that file F is maintained in memory by a Hash Table(HT) of m memory locations with L as the set of memory addresses (2-digit) of locations in HT. Let the keys in K and addresses in L are Integers. Design and develop a program in C that uses Hash function H: K → L as H(K)=K mod m (remainder method), and implement hashing technique to map a given key K to the address space L. Resolve the collision (if any) using linear probing.	2
11	Write a C++ program that uses functions to perform the following: 1. Create a binary search tree of integers. 2. Traverse the above Binary search tree recursively in Preorder, Inorder, Postorder	2
12	Design, Develop and Implement a Program in C for the following operations on Graph(G) of Cities 1. Create a Graph of N cities using Adjacency Matrix. 2. Print all the nodes reachable from a given starting node in a digraph using DFS/BFS method	2

Textbooks:

1. Bjarne Stroustrup (2005). The C++ Programming Language. Pearson Education.

2. Debasish Jana (2004). C++ and Object-Oriented Programming Paradigm. PHI Learning Pvt. Ltd.

Reference Books:

1. Yashavant Kanetkar (2019). Let us C++. BPB publications.

2. Peter Prinz and Una Prinz (2001). A Complete Guide to Programming in C++. Jones and Bartlett Publishers, India

Course Code:	UCBES0208	L	T	P	Credit
Course Name:	Principles of Electronics Engineering Lab	-	-	2	1

Course Prerequsites:

Fundamentals of physics, semiconductor physics, basics of electronic devices.

Course Description:

The course aims to provide knowledge of different electronic component and its operation

Course Objectives:

1. To learn the fundamentals of semiconductors.
2. To understand the principles of diodes and diode circuits.
3. To learn the principles of bipolar junction transistors and field effect Transistors and working of feedback amplifiers and oscillators.
4. To learn the working of operational amplifiers and digital electronic.

Course Outcomes:

COs	After completion of the course, students shall have ability to	Blooms	Descriptor
CO1	Understand the basic of semiconductors.	III	Apply
CO2	Explain operation of diode and it applications.	I	Knowledge
CO3	Understand the concept of BJT and FET & it applications.	III	Apply
CO4	Understand the concept of operational amplifiers and digital electronic.	III	Apply

CO-PO Mapping:

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	3	2	-	1	2	-	-	-	-	-	-	-	-	-
CO2	3	1	3	2	2	-	-	-	-	-	-	-	-	-
CO3	3	-	-	1	3	-	-	-	-	-	-	-	-	-
CO4	3	2	1	2	2	-	-	-	-	-	-	-	-	-

Assessment Scheme:

ISE are based on practical performed/ Quiz/ Mini-Project assigned / Presentation/ Group Discussion/ Internal oral

Assessment Component	Mark
Lab Test	20
Practical Performance	20
Attendance	10

Course Contents:

Practical No.	Practical/Experiment Title and Contents	Hours
1	Study of V-I Characteristics of a PN junction diode	2
2	Study of Half Wave Rectifier.	2
3	Study of Full Wave Rectifier.	2
4	Study of transistor characteristics.	2
5	Study of Oscillator.	2
6	Study of Integrator and Differentiator using operational Amplifier	2

7	Study of Basic Gates.	2
8	Study of Half/Full Adder.	2
9	Study of Multiplexers and Demultiplexers.	2
10	Study of Shift Registers.	2

Textbooks/Software:

Sr.No.	Title	Edition	Author/s	Publisher
1	Electronic Devices and Circuits	8th Edition, 2005	R. Boylestad & L. Nashelsky	Prentice Hall International
2	Electronic devices & circuits	-	Allen Mottershed	Prentice- Hall India
3	Fundamentals of Digital Circuits	-	Anand Kumar	PHI

Reference Books:

Sr.No.	Title	Edition	Author/s	Publisher
1	Electronic devices & circuits	IV	David A. Bell	Prentice- Hall Indi
2	Electronic devices & circuits	II	Millman & C.Halkias	Tata McGraw Hill Publication
3	An Engineering Approach to Digital Design	-	Willim I. Fletcher	PHI/ Pearson

Course Code:	UCBBS0209	L	T	P	Credit
Course Name:	Statistical Methods Lab	-	-	2	1

Course Prerequsites:

Course Description:

Course Objectives:

Course Outcomes:

COs	After completion of the course, students shall have ability to	Blooms	Descriptor
CO1			
CO2			
CO3			
CO4			

CO-PO Mapping:

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	-	-	-	-	-	-	-	-	-	-	-	-	-	-
CO2	-	-	-	-	-	-	-	-	-	-	-	-	-	-
CO3	-	-	-	-	-	-	-	-	-	-	-	-	-	-
CO4	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Assessment Scheme:

ISE is based on practical performance/ Quiz/ Presentation/ Group Discussion/Role

Assessment Component	Mark
Lab Activities	20
Practical Performance	10
Oral	10
Attendance	10
Total Marks	**50**

Course Contents:

Practical No.	Practical/Experiment Title and Contents	Hours
1	Introduction to R software: Understanding Data types; importing/exporting data.	2
2	Representation of data: Computing Summary Statistics /plotting and visualizing data using Tabulation and Graphical Representations.	2

3	Applying correlation and simple linear regression model to real dataset; computing and interpreting the coefficient of determination.		2
4	Applying multiple linear regression models to real dataset; computing and interpreting the multiple coefficient of determination.		2
5	Testing of hypothesis for One sample mean and proportion from real-time		2
6	Testing of hypothesis for Two sample mean and proportion from real-time		2
7	Performing ANOVA for real dataset for Randomized Block design.		2
8	Latin square Design		2
9	Non parametric Sign test and Wilcoxon signed rank test.		2
10	Non parametric Mann-Whitney test.		2

Textbooks/Software:

Sr.No.	Title	Edition	Author/s	Publisher
1	R- Software – Professional Version with 1+25 users subscription	-	-	-

Reference Books:

Sr.No.	Title	Edition	Author/s	Publisher
1	Hands-on Programming with R	-	Garrett Grolemund	-
2	R for Everyone: Advanced Analytics and Graphics	-	Jared P. Lander	-
3	Data Source: www.rbi.org.in	-	-	-

Course Code:	UCBAE0210	L	T	P	Credit
Course Name:	Business Communication and Value Science-II Lab	-	-	2	1

Course Prerequsites:	
Business Communication and Value Science-II Theory	

Course Description:

This practice and application oriented course provides ample scope for practicing essential employment skills, such as group discussion and interview, and strengthening learners' interpersonal skills. It also focuses on various business communication forms such as meetings and professional presentations. With this course, the learners will understand the core communication areas in business/professional context, grasp them and start increasing their employability by cultivating them through practice.

Course Objectives:

1. To motivate the learners to take part in various spoken and team activities Enhance their GDPI skills
2. To develop professionalism in them
3. Acquire technical writing skills

Course Outcomes:

COs	After completion of the course, students shall have ability to	Blooms	Descriptor
CO1	Comprehend essentials of GDPI for better performance (U)	II	Understand
CO2	Show various interpersonal skills (AP)	I	Knowledge
CO3	Organise effective written business communication and presentations (CR)	III	Apply
CO4	Organize an event to generate awareness and get support for a cause (AP)	III	Apply

CO-PO Mapping:

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	-	-	-	-	1	-	-	1	1	1	-	1	-	-
CO2	-	-	-	-	1	-	-	-	1	3	-	2	-	-
CO3	-	-	-	-	-	-	-	1	2	2	-	-	-	-
CO4	-	-	-	-	-	-	-	1	2	2	-	1	-	-

Assessment Scheme:

Assessment Component	Mark
ISE (Programming Assignments, Internal Viva, Internal	25

Assessment Scheme:

SN	Assessment Component	Marks
1	ISE: ISE is based on practical performance/ Quiz/ Presentation/ Group Discussion/Role plays/Assignments/Demonstration, etc.	

	Distribution of Marks:		
2	• Practical Performance • Group Discussion • Team activities • Presentations • Attendance	10 10	 10 10
3	**Total Marks**	50	

Course Contents:

Practical No.	Practical/Experiment Title and Contents	Hours
1	**Group Discussion-Beginners** Group discussion tips, Do's and Don'ts, video samples Mock GD-1, analysis and comments on individual performances	2
2	**Group Discussion-Masters** Mock GD-2, evaluation, progress check and suggestions - ISE	2
3	**Mock Interview- Beginners** Discussing interview FAQs in detail, video samples Mock interviews	2
4	**Mock Interview- Masters** Mock interviews (prepared and formal)-ISE	2
5	**Forming an NGO** Each group will form an NGO. Create Vision, Mission, Value statement, tagline and Design a logo.	
6	**Presentation Skills-1** Teams to present their NGOs. Apply the learning gathered from the course. Presentation to be recorded by the groups. feedback from the audience/ faculty	2
7	**Presentation Skills-2** Team presentations on social issues and values using ICT tools	2
8	**Business meetings** Drafting documentations for a business meeting, mock meetings on business related issues	2
9	**Business Proposals** Forming teams, preparing and presenting business proposals (teamwork)	2
10	Movie session: Any good movie based on Life Skills and Values	2

Important note: All the practical sessions will focus on developing various interpersonal/life skills.

Textbooks/Software:

Sr.No.	Title	Edition	Author/s	Publisher
1	Orell Talk Digital Language Lab Software – Professional Version with 1+50 users subscription			

Reference Books:

Sr.No.	Title	Edition	Author/s	Publisher

1	Better English Pronunciation	II	J.D. O'Connor	OUP
2	A Practical Course in Spoken English	I	J.K. Gangaj	PHI Learning Pvt. Ltd
3	English Language Laboratories	II	Nira Konar	PHI Learning

Course Code:	UCBVS0212		L	T	P	Credit
Course Name:	WebDesigning		0	0	2	1

Course Prerequsites

Basic understanding of programming.

Course Description:

This course contains basic concepts related to designing and development of webpages. Also this course gives brief knowledge on various tools and technologies used for web designing.

Course Outcomes: After the completion of the course the student will be able to -

CO	After the completion of the course the student should be able to	Blooms Level	Descriptor
CO1	Apply basic knowledge of HTML and CSS to design web pages	L3	Applying
CO2	Make use of bootstrap to develop responsive website	L3	Applying
CO3	Create attractive static web pages	L6	Creating
CO4	Design and host websites using javascript and jquery	L6	Creating

CO-PO Mapping:

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1			2		3	1						2	2	1
CO2			2		3	1						2	2	1
CO3			2		3	1						2	2	1
CO4			2		3	1						2	2	1

Assessment Scheme:

SN	Assessment	Weightage	Remark
1	In Semester Evaluation (ISE)	100%	Practical Performance, Oral

Course Contents:

Unit 1	HTML	4 Hours

Introduction to HTML5, Features of HTML5, HTML5 DocType, New Structure Tags, Header, Footer, Designing a HTML Structure of Page, New Media Tags, Audio Tag, Video Tag, Canvas and Svg Tag, Introduction to HTML5 Forms, New Attributes, Placeholder Attribute, Require Attribute.

Unit 2	CSS	4 Hours

Introduction to CSS 3, New CSS 3 Selectors, Attribute Selectors, First-of-type, Last- of-type, New CSS3 Properties, Custom Fonts, Text- Shadow Property, Text-Stroke Property, Rounded Corners, Box Shadows, Transition effect, Transform effect, Animation effects,

Unit 3	BootStrap	4 Hours

Introduction to Responsive Design, Mobile first design concepts, Common device dimensions, View-port tag, Using css media queries, Menu conversion script, Basic Custom Layout, Introduction to Bootstrap, Installation of Bootstrap, Grid System, Forms, Buttons, Icons Integration, Using CSS3 in Practical Layout

Unit 4	JavaScript	4 Hours

Introduction to Client Side Scripting, Introduction to Java Script, Javascript Types, Variables in JS, Operators in JS, Conditions Statements, JS Popup Boxes, JS Events, JS Arrays, JS Objects, JS Functions, Validation of Forms, Related Examples

Unit 5	jQuery and jQuery UI	4 Hours

Introduction to jQuery, jQuery Features, Installing jQuery, jQuery Syntax, jQuery Ready Function, jQuery Selectors, jQuery Actions, jQuery plugins, jQuery Validation plugin, jQuery Slideshow, jQuery Dropdown, jQuery UI, Working with jQueryUI

Unit 6	Web Hosting	4 Hours

Web Hosting Basics, Types of Hosting Packages, Registering domains, Defining Name Servers, Using Control Panel, Creating Emails in Cpanel, Using FTP Client, Maintaining a Website, Introduction to Joomla & Wordpress CMS

Text Books:

1. Thomas Powell, 2017, HTML & CSS: THE COMPLETE REFERENCE, McGraw Hill Education.
1. David Flanagan, 2020, JavaScript: The Definitive Guide, OREILLY.

Reference Books:

1. Jonathan Chaffer; Karl Swedberg,2011,Learning jQuery, Packt Pub Ltd.

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