BACHELOR OF COMPUTER APPLICATIONS

VISION

To inculcate technical knowledge, enrich intellectual skills and to become pioneers in automating the industries and society thereby, compete the current challenges in the modern computer industry.

MISSION

- To enhance the programming skills through better theoretical and practical training.
- To establish Institute Industry collaboration to provide need based courses for employability

PROGRAMME EDUCATIONAL OBJECTIVES (PEO)

PEO1: To grasp the ideas of key regions in Information Technology and proficient improvement in the field of Computer Applications.

PEO2: To make familiarity in quality standards of software solutions to meet the expectations in business solutions.

PEO3: To explain the latest technology that utilized in complex environment.

PROGRAMME OUTCOMES (PO)

After completion of the programme, the graduates will be able to

PO1: Apply the knowledge of problem solving techniques and scientific computing for finding solutions in different domains.

PO2: Realize and apply a viable computing method to the real-world problems.

PO3: Analyze the techniques, skills and recent tools necessary for innovations in IT field.

PO4: Evaluate the complex business scenario through integrated emerging technologies.

PO5: Develop smart software solutions for the upliftment of society.

PROGRAMME SPECIFIC OUTCOMES (PSO)

PSO 1: To provide individual practical experiences in a variety of programming languages and development solutions.

PSO 2: Ability to analyze the data and its structure to organize, explore and interpret in real time solutions.

PSO3: Understanding the working principles of the hardware and software systems.

PSO 4: Acquire accounting knowledge, scientific computing methods, multimedia, office automation tools and web based designing for online and offline programs.

PSO 5: Explore and apply recent technologies to solve problems in the areas of computer applications

REGULATIONS

ELIGIBILITY

A candidate who has passed in Higher Secondary Examination with Mathematics or Business Mathematics or Computer Science Statistics (Academic stream or Vocational stream) as one of the subject under Higher Secondary Board of Examination, Tamilnadu as per norms set by the Government of Tamilnadu or an Examination accepted as equivalent thereto by the syndicate, subject to such conditions as may be prescribed thereto are permitted to appear and quality for the Bachelor of Computer Application degree examination of this university after a course of study of three academic years.

DURATION OF THE COURSE

The course shall extend over a period of three years comprising of six semesters with two semesters in one academic year. There shall not be less than 90 working days for each semester. Examination shall be conducted at the end of every semester for the respective subjects.

MAXIMUM DURATION FOR THE COMPLETION OF THE UG PROGRAMME

The maximum duration for completion of the UG Programme shall not exceed 12 semesters.

SCHEME OF EXAMINATION

Course Code	Course	Hrs. of Instruction	Exam Duration (Hrs.)	Max Marks			Credits
				CA	CE	Total	
First Semester							
Part I							
18UTALB101/ 18UHILB101/ 18UFRLB101	Tamil-I/ Hindi-I/ French-I	5	3	25	75	100	3
Part II							
18UENLB101	General English I	5	3	25	75	100	3
Part III							
18UCAM101	Core I : Problem Solving Techniques	4	3	25	75	100	4
18UCAM102	Core II: Programming in C	4	3	25	75	100	4
18UMACAA101	Allied I: Mathematics for Computer Applications	4	3	25	75	100	4
18UCAMP101	Core Practical I: Office Package	3	3	40	60	100	2
18UCAMP102	Core Practical II: Programming in C	3	3	40	60	100	2
Part IV							
18UVE101	Value Education I: Yoga	2	3	25	75	100	2
		30				**800**	**24**
Second Semester							
Part I							
18UTALB201/ 18UHILB201/ 18UFRLB201	Tamil-II/ Hindi-II/ French-II	5	3	25	75	100	3
Part II							
18UENLB201	General English II	5	3	25	75	100	3
Part III							
18UCAM201	Core III: Object Oriented Programming with C++	4	3	25	75	100	4
18UCAM202	Core IV: Computer Organization and Architecture	4	3	25	75	100	4

18UMACAA201	Allied II: Scientific Computing Methods	4	3	25	75	100	4
18UCAMP201	Core Practical III: Scientific Computing using C++	3	3	40	60	100	2
18UCAMP202	Core Practical IV: Designing Tools	3	3	40	60	100	2
Part IV							
18UVE201	Value Education II: Environmental Studies	2	3	25	75	100	2
		30				**800**	**24**
Third Semester							
Part III							
18UCAM301	Core V: Programming in Java	4	3	25	75	100	4
18UCAM302	Core VI: Data Structures	5	3	25	75	100	4
18UCAM303	Core VII: Web Designing	4	3	25	75	100	4
18UCCCAA301	Allied III: Principles of Accountancy	4	3	25	75	100	4
18UCAMP301	Core Practical V: Programming in Java	3	3	40	60	100	2
18UCCCAAP301	Allied Practical I: Accounting Package	3	3	40	60	100	2
Part IV							
18UCASBP301	SBC Practical I: Web Designing Using HTML , CSS	2	3	40	60	100	2
18UCSNM301	NMEC I	2	3	25	75	100	2
Non Credit							
18ULS301	Career Competency Skills I	1	-	-	-	-	-
18UCAAC301 / 18UCAAC302	Add-on Course I	2	3	-	100	100	-
		30				**900**	**24**
Fourth Semester							
Part III							
18UCAM401	Core VIII: Relational Database Management System	4	3	25	75	100	4

18UCAM402	Core IX: Operating System Concepts	5	3	25	75	100	4
18UCAEL401/ 18UCAEL402/ 18UCAEL403	Elective I	4	3	25	75	100	3
18UCCCAA401	Allied IV: Cost and Management Accounting	4	3	25	75	100	4
18UCAMP401	Core Practical VI: RDBMS Package	3	3	40	60	100	2
18UCAMP402	Core Practical VII: Linux Programming	3	3	40	60	100	2
Part IV							
18UCASBP401	SBC Practical II: Data Structure using C	2	3	40	60	100	2
18UCSNM401	NMEC II	2	3	25	75	100	2
Non Credit							
18ULS401	Career Competency Skills II	1	-	-	-	-	-
18UCAAC401 / 18UCAAC402	Add-on Course II	2	3	-	100	100	-
		30				**900**	**23**
Fifth Semester							
Part III							
18UCAM501	Core X: Web Application Development	5	3	25	75	100	4
18UCAM502	Core XI: Computer Networks	5	3	25	75	100	4
18UCAM503	Core XII: Cloud Computing	5	3	25	75	100	4
18UCAEL501/ 18UCAEL502/ 18UCAEL503/	Elective II	4	3	25	75	100	3
18UCAMP501	Core Practical VIII: Web Application Development	3	3	40	60	100	2
18UCAMP502	Core Practical IX: Computer Networks Lab	3	3	40	60	100	2
Part IV							
18UCASBCP501	SBC Practical III: Web Services Using Python	2	3	40	60	100	2

Part V							
18UCAE501	Extension Activity	-	-	-	-	-	2
Non Credit							
18ULS501	Career Competency Skills III	1	-	-	-	-	-
18UCAPR601	Project & viva-voce	2					
		30				**700**	**23**
Sixth Semester							
Part III							
18UCAM601	Core XIII: Big Data Analytics	5	3	25	75	100	4
18UCAM602	Core XIV: Mobile Technology (**fifth unit as self study**)	5	3	25	75	100	4
18UCAM603	Core XV: E-Commerce	4	3	25	75	100	3
18UCAM604	Core XVI: Internet of Things	5	3	25	75	100	3
18UCAMP601	Core Practical X:R Programming	4	3	40	60	100	2
18UCAPR601	Project & Viva-Voce	4	3	40	60	100	4
Part IV							
18UCASBCP602	SBC Practical IV: Mobile Application Development	2	3	40	60	100	2
Non Credit							
18ULS601	Career Competency Skills IV	1	-	-	-	-	-
		30				**700**	**22**
					Grand Total	**4800**	**140**

- **Students have to undergo an Advanced Learner Course during the Second year of their course of study.**

- **Project hours can be divided into two such as 1. Problem presentation in theClass room 2. Problem implementation in the Lab**

ELECTIVE I

(Student shall select any one of the following subject as Elective in **fourth** semester)

S.No	Subject Code	Subject
1.	18UCAEL401	Principles of information security
2.	18UCAEL402	Client Server technology
3.	18UCAEL403	Software Engineering

ELECTIVE II

(Student shall select any one of the following subject as Elective in **Fifth** semester)

S.No	Subject Code	Subject
1.	18UCAEL501	Social and Business Etiquette
2.	18UCAEL502	Artificial Intelligence
3.	18UCAEL503	Social Media Data Analytics

NON MAJOR ELECTIVE COURSE

(The department offers the following two subjects as Non Major Elective Course for other than the computer science students for third and fourth semesters)

S.No	Semester	Subject Code	Subject
1	III	15UCSN301	Internet Technology
2	IV	15UCSN401	HTML and Web Designing

PROJECT DESCRIPTION

- The project work shall be carried out by group of students in the V semester and has to complete the work at the end of VI Semester.
- Upon completion of the project work/dissertation the candidate will be required to appear for a viva-voce conducted by an external examiner.
- The Student has to attend 3 reviews before completing his/her Project.
- All 3 reviews will be reviewed by External Resource Person.
- A candidate failing to secure the prescribed passing minimum in the dissertation shall be required to re-submit the dissertation with the necessary modifications.
- The assessment of students' performance in a semester is calculated by Continuous Internal Assessment (CA.) for 40 marks and External Assessment for 60 marks.

ADVANCED LEARNERS COURSE

(Student shall study the following Advanced Learner Course during their third semester and complete the course at the end of fourth semester)

S.No	Subject Code	Name of the Course
1	18UCAAL401	Software Testing

18UTALB101	**Tamil – I: படைப்பிலக்கியங்கள்**	**பருவம் – I**

இப்பாடத்திட்டத்தின் நோக்கங்களாவன:

1. தமிழ்க்கவிதைகளைஅறிமுகம் செய்தல் மற்றும்எழுதக் கற்றுக் கொடுத்தல்.
2. சிறுகதைகளின் வழி சமூகநிகழ்வுகளைக் கூறல்.
3. உரைநடை, இலக்கியவரலாறு, இலக்கணங்களைஅறிமுகம் செய்தல்.

Credits: 3 **Total Hours: 50**

UNIT	CONTENTS	Hrs	CO
I	**கவிதைகள்** அ. பொன்.கண்ணகி – வடிகால்கள் - காலம் மாறிப் போச்சு. ஆ. வைரமுத்து – தண்ணீர் தேசம் - கடல். இ. வெ.இறையன்பு – பூபாளத்திற்கொருபுல்லாங்குழல் - சருகுகள் சலசலக்கின்றன ஈ. ஏதேனும் ஒருதலைப்பின் கீழ் புதுக்கவிதைஎழுதக்கற்றுக்கொடுத்தல்.	10	**CO1**
II	**சிறுகதைகள்** அ. பாரததேவி – படிப்பேபடிக்கட்டுகளாகி ஆ. கு.அழகிரிசாமி – ராஜா வந்திருக்கிறார். இ. ஜெயகாந்தன் – பொம்மை ஈ. ஏதேனும் ஒருதலைப்பின் கீழ் சிறுகதைஎழுதக் கற்றுக்கொடுத்தல்.	10	**CO2**
III	**உரைநடை** அ. பா.ஆனந்தகுமார் – இலக்கியமும் பண்பாட்டுமரபுகளும் - உடற்கல்வி ஆ. கல்கி – எம்.எல்.ஏ. கைதிகள்,கல் சொன்னகதை.	10	**CO3**
IV	**இலக்கியவரலாறு** அ. கவிதைவரலாறு – மரபுக்கவிதை,புதுக்கவிதை,ஹைக்கூ கவிதை. ஆ. உரைநடையின் தோற்றம் வளர்ச்சி. இ. சிறுகதையின் தோற்றம் வளர்ச்சி. ஈ. புதினத்தின் தோற்றம் வளர்ச்சி.	10	**CO4**
V	**இலக்கணம்** அ. பகுபதஉறுப்பிலக்கணம் ஆ. யாப்பிலக்கணம் (அசை,சீர்,தளை,அடி - வகைகள்) இ. விண்ணப்பம்,அலுவலகம் சார்ந்தகடிதங்கள் எழுதக் கற்றுக்கொடுத்தல்.	10	**CO5**

TEXT BOOK(S):

1	தமிழ்த்துறை வெளியீடு, கே.எஸ்.ரங்கசாமி கலை அறிவியல் கல்லூரி (தன்னாட்சி), திருச்செங்கோடு – 637 215.

COURSE OUTCOMES (CO):

இப்பாடத்தைக் கற்பதன் வாயிலாக மாணவர்கள் பெறும் பயன்களாவன:

CO1	கவிதை எழுதக் கற்றல்.
CO2	சிறுகதைகள் வழி சமூகத்தினைப் புரிந்துகொள்ளுதல்.
CO3	உரைநடை அமைப்பைப் புரிந்துகொள்ளல்.
CO4	கவிதை, உரைநடை, சிறுகதை தோற்றம், வளர்ச்சி குறித்து அறிதல்.
CO5	பதத்தின் உறுப்புகள், செய்யுள் உறுப்புகள், கடித வகைகள் ஆகியவற்றை அறிதல்

18UENLB101	**GENERAL ENGLISH – I**	**SEMESTER – I**

COURSE OBJECTIVES:

The course aims

- To enhance the vocabulary of the students.
- To improve the language skills of the students.

Credits: 3 **Total Hours: 50**

UNIT	CONTENTS	Hrs	CO
I	**PROSE** A. G. Gardiner - On Habits **GRAMMAR** Noun - Singular or Plural Agreement of verb and subject Fairly and rather **COMMUNICATION SKILLS** Paragraph Writing	**10**	**CO1**
II	**SHORT STORY** Leo Tolstoy - How Much Land Does a Man Need? **GRAMMAR** The Articles Adverbial use of no, not and noun Negative verbs **COMMUNICATION SKILLS** Letter Writing	**10**	**CO2**
III	**PROSE** Stephen Leacock - With the Photographer **GRAMMAR** Concord of Nouns, Pronouns and Possessive Adjectives Difficulties with Comparatives and Superlatives **COMMUNICATION SKILLS** Dialogue Writing	**10**	**CO3**
IV	**POETRY** Sonnet CXVI **GRAMMAR** Confusion of Participles: Active voice and Passive voice Prepositions **COMMUNICATION SKILLS** Sentence Sequence	**10**	**CO4**
V	**SHORT STORY** O. Henry - The Gift of the Magi	**10**	**CO5**

	POETRY John Donne – A Hymn to God the Father **GRAMMAR** **Tenses** Simple and progressive(continuous) forms of present tense Simple and progressive (continuous) forms of past tense The perfect tense The progressive form of the perfect Tenses in adverb clauses referring to the future Tenses in adjective clauses referring to the future		
TEXT BOOK(S):			
1	*Mohammad Aslam and Tak A.H.* 2009. **Experience and Emotion, An Anthology of Prose, Poetry and Fiction.** Chennai Foundation Press Chennai.		
REFERENCE BOOKS:			
1	*Wood.F.D.* 2010. **A Remedial English Grammar for Foreign Students.** Macmillan Publishers India Ltd., Chennai**.**		
2	*Farhathullah T.M.* 2006. **Communication Skills for Undergraduates.** Publishers RBA Publications, Chennai.		

COURSE OUTCOMES (CO):

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

CO1	Know the different parts of genres in English
CO2	Trace the famous authors of English
CO3	Enrich grammar knowledge
CO4	Stimulate their writing skills
CO5	Deserve appreciation for their communication

18UCAM101	CORE I: PROBLEM SOLVING TECHNIQUES	SEMESTER – I

COURSE OBJECTIVES:

The Course aims

- Proficiently transform designs of problem solutions into a standard programming language.
- To express the solutions to computer oriented problems using pseudo code
- The functions of computer systems and interaction between hardware & software

Credits : 4 **Total Hours: 50**

UNIT	CONTENTS	Hrs	CO
I	**Introduction to Computer Problem-Solving:** Introduction – The Problem-solving Aspect – Top-down Design – Implementation of Algorithms – Program Verification – The Efficiency of Algorithms – The Analysis of Algorithms. **Fundamental Algorithms:** Introduction – Exchanging the Values of Two Variables – Counting – Summation of a Set of Numbers - Factorial Computation – Generation of Fibonacci Series.	10	CO1
II	**Factoring Methods:** Introduction – Finding the Square Root of a Number - The Smallest Divisor of an Integer – The Greatest Common Divisor of Two Integers-Generating Prime Numbers - Generation of Pseudo-random Numbers - Computing the nth Fibonacci Number.	10	CO2
III	**Array Techniques:** Introduction – Array Order Reversal – Array Counting or Histogramming - Finding the Maximum Number in a Set- Removal of Duplicates from an Ordered Array - Partitioning an Array - Finding the *k*th Smallest Element.	10	CO3
IV	**Data and Information:** Introduction – Types of Data - Simple Model of a Computer – Data Processing Using a Computer. **Data Storage:** Storage Cell – Physical Devices Used as Storage Cells – Random Access Memory – Read Only Memory – Secondary Storage – Compact Disk Read Only Memory (CDROM).	10	CO4
V	**Central Processing Unit:** Introduction – Structure of a Central Processing Unit – Specifications of a CPU. **Output Devices:** Introduction – Video Display Devices – Touch Screen Display – Printers. **Computer Software:** Introduction – Programming Languages – Classification of Programming Languages – Classification of Programming Languages Based on Applications.	10	CO5

TEXT BOOK(S):	
1	*Dromey R.G.*, 2011, **How to solve it by Computer**, [Ninth Impression]. PHI, New Delhi. **(Unit I to III)**
2	*Rajaraman. V*, 2016, **Introduction of Information Technology,** [Second Edition]. PHI, New Delhi. **(Unit IV and V)**
REFERENCE BOOKS:	
1	Handout: Problem Solving and C Programming, 2007, Version: PSC/Handout/0307/2.1, Cognizant.
2	*Nagpal, D. P*. 2010, **Computer Fundamentals**. [First Edition, Revised]. S. Chand & Company Ltd, New Delhi.
3	*Alexis Leon and Mathews Leon*.2009, **Fundamentals of Information Technology.** [Second Edition]. Leon TECH World, New Delhi.
WEB REFERENCES:	
1	https://www.programiz.com
2	https://www.geeksforgeeks.org
3	https://www.campuskarma.in

COURSE OUTCOMES (CO):

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

CO1	Solve problems through computer programming
CO2	Familiarity of Factoring methods
CO3	Understand Array Techniques
CO4	Grasp the knowledge about Data and its storage
CO5	Empathize the working principles of CPU and output devices

MAPPING

PSO / CO	**PSO1**	**PSO2**	**PSO3**	**PSO4**	**PSO5**
CO1	H	M	L	M	M
CO2	H	M	L	M	L
CO3	H	H	M	M	M
CO4	M	H	H	M	M
CO5	M	M	H	M	M

H-High; M-Medium; L-Low

18UCAM102	CORE II: PROGRAMMING IN C	SEMESTER – I

COURSE OBJECTIVES:

The Course aims

- To acquire basic knowledge in C programming
- In-depth understanding of functional and logical programming in C
- To provide exposure to problem-solving through programming

Credits : 4 **Total Hours: 50**

UNIT	CONTENTS	Hrs	CO
I	O**verview of C:** History of C - Importance of C – Sample Programs - Basic Structure of C Programs-Executing a 'C' Program. **Constants, Variables, and Data Types:** Introduction - Character Set - C Tokens - Keywords and Identifiers - Constants - Variables - Data Types - Declaration of Variables - Declaration of Storage Class - Assigning Values to Variables - Defining Symbolic Constants –Declaring a Variable as Volatile. **Operators and Expressions**: Introduction- Arithmetic Operators - Relational Operators - Logical Operators - Assignment Operators- Increment and Decrement Operators - Conditional Operator- Bitwise Operators - Special Operators - Arithmetic Expressions - Evaluation of Expressions – Precedence of Arithmetic Operators - Type Conversions in Expressions - Operator Precedence and Associativity	10	CO1
II	**Managing Input and Output Operations:** Introduction - Reading a Character -Writing a Character - Formatted Input- Formatted Output. **Decision Making and Branching:** Introduction - Decision Making with If Statement– Simple If Statement – The If…..Else Statement– Nesting of If…..Else Statements– The Else If Ladder - The Switch Statement – The ?: Operator – The goto Statement. **Decision Making and Looping:** Introduction - The While Statement– The Do Statement– The for Statement - Jumps in Loops.	09	CO2

III	**Arrays:** Introduction – One-Dimensional Arrays - Declaration of One-Dimensional Arrays - Initialization of One-Dimensional Arrays – Two-Dimensional Arrays - Initializing Two-dimensional Arrays – Multi-dimensional Arrays- Dynamic Arrays. **Character Arrays and Strings:** Introduction-Declaring and Initializing String Variables- Reading Strings from Terminal - Writing Strings to Screen - Arithmetic Operations on Characters - Putting Strings Together - Comparison of Two Strings – String-Handling Functions - Table of Strings.	**10**	**CO3**
IV	**User-defined Functions:** Introduction-Need for User-Defined Functions- A Multi-Function Program-Elements of User-Defined Functions - Definition of Functions - Return Values and Their Types - Function Calls - Function Declaration - Category of Functions - No Arguments and No Return Values – Arguments but No Return Values – Arguments with Return Values – No Arguments but Returns a Value – Functions that Return Multiple Values –Nesting of Functions-Recursion – Passing Arrays to Functions-Passing Strings to Functions - The Scope, Visibility and Lifetime of Variables.	**10**	**CO4**
V	**Structures and Unions:** Introduction - Defining a Structure - Declaring Structure Variables - Accessing Structure Members - Structure Initialization –Copying and Comparing Structuring Variables - Operation on Individual Members- Arrays of Structures - Arrays within Structures - Structures within Structures – Structures and Functions - Unions - Size of Structures - Bit Fields. **Pointers:** Introduction- Understanding Pointers- Accessing the Address of a Variable- Declaring Pointer Variables- Initialization of Pointer Variables- Accessing a Variable Through its Pointer –Chain of Pointers—Pointer Expressions-Pointers Increments and Scale Factor- Pointers and Arrays- Pointers and Character Strings-Array of Pointers- Pointers as Function Arguments- Functions Returning Pointers-Pointers to Functions-Pointers and Structures.	**11**	**CO5**

TEXT BOOK(S):

1	*Balagurusamy E*. 2017, **Programming in ANSI C.** [Seventh Edition]. Tata Mc-Graw Hill, New Delhi.

REFERENCE BOOKS:

1	*Yashavant Kanetkar,* 2004**. Let Us C**. [Fifth Edition]. BPB Publications, New Delhi.
2	*Jeyapoovan T.* 2007, **A First Course in Programming with C**. [Second Edition]. Vikas Publishing House Pvt. Ltd., New Delhi.
3	Deitel & Deitel. 2016, "**C How to Program**". [Eighth Edition]. Prentice Hall
4	Byron Gottfried. 2006, "**Programming in C**". [Second Edition]. Tata McGraw Hill

WEB REFERENCES:	
1	http://www.learn-c.org/
2	http://www.tutorialspoint.com/cprogramming/index.htm
3	http://www.geeksforgeeks.org

COURSE OUTCOMES (CO):

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

CO1	Understand the basic terminology of C Programming
CO2	Recognize Input / Output statements and control structures
CO3	Develop programs using Arrays
CO4	Grasp the concepts of Function and its types
CO5	Develop the program using Structures and Pointers

MAPPING

PSO / CO	**PSO1**	**PSO2**	**PSO3**	**PSO4**	**PSO5**
CO1	H	M	L	M	M
CO2	H	M	H	M	M
CO3	H	M	M	M	M
CO4	H	H	M	M	M
CO5	H	H	L	M	M

H-High; M-Medium; L-Low

18UMACAA101	ALLIED I: MATHEMATICS FOR COMPUTER APPLICATIONS	SEMESTER – I

Note: Proof of the theorem and proof of examples are excluded.

COURSE OBJECTIVES:

The Course aims

- To get knowledge about matrices and various method of solving algebraic equations
- To learn basic concepts of logic and Probability

Credits : 4 **Total Hours: 40**

UNIT	CONTENTS	Hrs.	CO
I	**Matrices:** Definition of a matrix – Importance – Notation – Order of a matrix – Types of matrices – Matrix operations-I – A System of Linear Equations - Determinants – Cramer's Rule. **(Part I: Chapter 4 Sections: 1-8)**	08	CO 1
II	**Set Theory:** Definition – Notations – Methods of description of sets – Types of sets – Venn diagram – Set operations – Laws and Properties of sets – Number of elements – Cartesian product. **(Part I: Chapter 3 Sections: 1-9)**	08	CO 2
III	**Logic:** Logic – Normal forms – Logical inferences – Predicate logic – Rules of Inferences. **(Chapter 1 Sections: 1.6 – 1.10)**	08	CO 3
IV	**Combinatorics and Recurrence relations:** Permutations – Combinations – Partitions – Binomial Coefficients – Recurrence relations. **(Chapter 3 Sections: 3.2 – 3.5, 3.7)**	08	CO 4
V	**Probability:** Mathematical probability – Relative frequency approach – Axiomatic approach – Addition theorem (Method II) – Multiplication theorem (Method III) – Both addition and multiplication theorem (Method IV) – Baye's theorem (Method VI).	08	CO 5

TEXT BOOK(S):	
1	*Navnitham, P.A.* 2011, **Business Mathematics and Statistics.** Jai Publishers, Trichy. (for Units I, II and V)
2	*Somasundaram, R.M.* 2009, **Discrete Mathematical Structures.** [Sixth Edition]. PHI Learning Private Limited, New Delhi. (for Units III and IV)
REFERENCE BOOKS:	
1	*Singaravelu. A.*2002, **Allied Mathematics.** Meenakshi Publishers, Chennai.
2	*Venkataraman, M.K. Sridharan, N. and Chandrasekaran, N,* 2000, **Discrete Mathematics,** The National Publish Company, New Delhi.

COURSE OUTCOMES (CO):

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

CO1	Calculate determinants and Inverse of a matrix
CO2	Gain Knowledge on Sets and operations on sets
CO3	Learn the concepts of logic and normal forms
CO4	Understand the concept of Combinatorics
CO5	Gain Knowledge on Probability theory

MAPPING

PSO / CO	**PSO1**	**PSO2**	**PSO3**	**PSO4**	**PSO5**
CO1	M	M	L	M	M
CO2	L	M	H	M	M
CO3	M	H	M	M	M
CO4	H	H	M	M	M
CO5	H	H	L	M	M

H-High; M-Medium; L-Low

18UCAMP101	**CORE PRACTICAL I: OFFICE PACKAGE**	**SEMESTER – I**

COURSE OBJECTIVES:

The Course aims

- Exploration of knowledge in office automation tools.

Credits: 2 **Total Hours: 30**

S.No.	**PROGRAMS**	**Hrs**	**CO**
	MS-WORD		
1.	Prepare a word document and do the following: Bold, Underline, Font size, Font style, Line spacing, Spell check, Alignments, Header & Footer, Page numbering and Find & Replace.	**3**	**CO1**
2.	Create and design Admission/Enquiry forms (Shapes, Textboxes, Colors , Tables)	**3**	**CO2**
3.	Design an invoice and account sales by using Drawing tools.	**3**	**CO2**
4.	Prepare an invitation for the college function using mail merge option.	**3**	**CO3**
	MS-EXCEL		
5.	Prepare a grade sheet of a student using formula, sorting and filtering, Conditional Formatting, Merge & Center.	**3**	**CO3**
6.	Create a pay slip using functions	**3**	**CO3**
7.	Prepare charts to show a company's sales performance report.	**3**	**CO4**
8.	Prepare Income and Expenses Statement and apply the options in Data Menu wherever necessary.	**3**	**CO4**
	MS – POWERPOINT		
9.	Creating and formatting slides presentations (template & blank slide)	**3**	**CO4**
10.	Prepare presentations using visual content	**3**	**CO5**
11.	Create a PowerPoint presentation using graphics and animation	**3**	**CO5**

12.	Prepare a PowerPoint presentation using wizard.	**3**	**CO5**
WEB REFERENCES:			
1.	https://www.tutorialspoint.com		
2.	https://www.investintech.com		
3	https://gcflearnfree.org		

COURSE OUTCOMES (CO):

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

CO1	Create personal, academic, and business documents in a professional way
CO2	Enhance word processing skills using the required tools
CO3	Understand the basic concepts of spreadsheets and usage of formulae
CO4	Create and manipulate simple slide shows with outline and notes
CO5	Create brilliant presentations

18UCAMP102	**CORE PRACTICAL II: PROGRAMMING IN C**	**SEMESTER – I**

COURSE OBJECTIVES:

The Course aims

- To acquire the knowledge in structured programming language

Credits: 2 **Total Hours: 30**

S.No.	PROGRAMS	Hrs	CO
1	Program to implement the formatted Input / Output Functions.	**3**	**CO1**
2	Program to illustrate the working of Branching Statements.	**3**	**CO2**
3	Program to illustrate the working of Looping Statements.	**3**	**CO2**
4	Program to highlight the Relational and Logical Operations.	**3**	**CO3**
5	Program to illustrate Array Concepts.	**3**	**CO3**
6	Program using String Handling Functions	**3**	**CO3**
7	Program using User Defined Function.	**3**	**CO4**
8	Program to illustrate the Concept of Recursion.	**3**	**CO4**
9	Program to implement the Structure Concept.	**3**	**CO4**
10	Program to implement Unions	**3**	**CO5**
11	Program to illustrate Pointer Concept.	**3**	**CO5**
12	Program using Pointers and Structures.	**3**	**CO5**

WEB REFERENCES:

1.	https://www.cprogramming.com/tutorial/c-tutorial.html
2.	https://www.learn-c.org/
3	https://www.geeksforgeeks.org

COURSE OUTCOMES (CO):

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

CO1	Implement various input and output functions
CO2	Develop program using control structures
CO3	Develop program using Arrays and String Handling concepts
CO4	Execute Function concepts
CO5	Implement Structure and Pointer concepts

18UVE101	VALUE EDUCATION I: YOGA	SEMESTER – I

COURSE OBJECTIVES:

The course aims

- To understand physical body and Health concepts
- To have the basic Knowledge on Simplified Physical Exercises and Asanas and Meditation
- To Introspect and improve the behaviors
- To inculcate cultural behavioral patterns

Credits: 2 **Total Hours: 30**

UNIT	CONTENTS	Hrs	CO
I	**Yoga and Physical Health:** Health - Meaning and Definition - Physical Structure - Three bodies - Five limitations - Simplified Physical Exercises - Hand, Leg, Breathing, Eye exercises - Kapalabathi, Makarasana 1, 2 , Massage, Acu pressure, Relaxation exercises - Yogasanas – Surya namaskar - Padmasana - Vajrasana - Ardha katti Chakrasana - Viruchasana - Yogamudra - Patchimothasana - Ustrasana - Vakkarasana – Salabasana	6	CO1
II	**Greatness of Life Force and Mind :** Maintaining youthfulness - Postponing the ageing process - Sex and spirituality - Significance of sexual vital fluid - Married life - Chastity - Development of mind in stages - Mental Frequencies - Methods for Concentration - Meditation and its Benefits	6	CO2
III	**Personality Development – Sublimation :** Purpose and Philosophy of Life - Introspection - Analysis of Thought - Moralization of Desire - Analysis and practice - Neutralization of Anger - Strengthening of will-power	6	CO3
IV	**Human Resources Development:** Eradication of Worries - Analysis and Eradication practice - Benefits of Blessings – Effect of good vibrations - Greatness of Friendship - Guidance for good Friendship – Individual Peace and world peace - Good cultural behavioral patterns	6	CO4
V	**Law of Nature:** Unified force - Cause and effect system - Purity of thought deed and Genetic Centre – Love and Compassion - Gratitude - Cultural Education - Fivefold culture.	6	CO5

TEXT BOOK(S):	
1	Value Education - World Community Service Centre, Vethathiri Publications, Erode.
REFERENCE BOOKS:	
1	*Vethathiri Maharishi*, 2011, Journey of Consciousness, Erode, Vethathiri Publications.
2	*Vethathiri Maharishi*, 2014, Simplified Physical Exercises, Erode, Vethathiri Publications.
3	*Vethathiri Maharishi*, 2004, Unified force, Erode, Vethathiri Publications
4	Yoga for Modern age - Thathuvagnani Vethathiri Maharishi
5	Sound Health through yoga – Dr. K. Chandrasekaran, November 1999 Prem Kalyan Publications, Madurai
6	Light on yoga - BKS.lyenger
7	Thathuvagnani Vethathiri Maharishi – Kayakalpa yoga – First Edition 2009 –Vethathiri Publications, Erode.
8	Environmental Studies - Bharathidasan University Publication Division

COURSE OUTCOMES (CO):

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

CO1	Understand the physical structure and simplified physical exercises.
CO2	Nurture the life force and mind
CO3	Introspect and improve the moral values
CO4	Realize the importance of human resources development
CO5	Enhance purity of thought and deed

18UTALB201	Tamil – II: பழந்தமிழ் இலக்கியங்கள்	பருவம் - II

இப்பாடத்திட்டத்தின் நோக்கங்களாவன:

1. தொகைநூல்களின் சிறப்பைஉணர்த்துதல்.
2. ஆயர்களின் வாழ்வியலைவெளிப்படுத்துதல்.
3. அறஇலக்கியங்கள்,நாட்டுப்புற இலக்கியங்களின்சிறப்பைஉணர்த்துதல்.

Credits: 3 **Total Hours: 50**

UNIT	CONTENTS	Hrs	CO
I	**எட்டுத்தொகை** அ. குறுந்தொகை – "காதலர் உழையர் ஆகப் பெரிதுஉவந்து" – பாடல் எண்.41. ஆ. கலித்தொகை – "சுடர்த்தொடீஇ! கேளாய்!தெருவில் நாம் ஆடும்" – குறிஞ்சிக்கலி – பாடல். எண்.15. இ. ஐங்குறுநூறு – நெய்தல் திணை - தாய்க்கு உரைத்தபத்து – "அன்னைவாழிவேண்டுஅன்னை!" – முதல் மூன்றுபாடல்கள். ஈ. புறநானூறு – "உற்றுழிஉதவியும்,உறுபொருள் கொடுத்தும்" – பாடல் எண்.183.	10	**CO1**
II	**பத்துப்பாட்டு** அ. நெடுநல்வாடை (முழுவதும்) 188 பாடல் அடிகள் – மதுரைக்கணக்காயனார் மகனார் நக்கீரனார்.	12	**CO2**
III	**அற இலக்கியங்கள்,நாட்டுப்புற இலக்கியங்கள்.** அ. திருக்குறள் – கல்விஅதிகாரம் முழுவதும். ஆ. முதுமொழிக்காஞ்சி – தண்டாப் பத்துமுழுவதும். இ. நாட்டுப்புறப்பாடல்கள் – தொழிற்பாடல் – களையெடுப்பு – ஆத்துக்குள்ளே ஏலேலோ. ஈ. நாட்டுப்புறவிளையாட்டுக்கள் – ➢ சிறுவர்,சிறுமியர் விளையாட்டுக்கள் (1.கிட்டிப்புள், 2.ஒத்தையா? இரட்டையா?) ➢ ஆடவர் விளையாட்டுக்கள் (1.சிலம்பாட்டம் 2.சடுகுடு) ➢ மகளிர் விளையாட்டுக்கள் (1.பல்லாங்குழி, 2. தட்டாங்கல்)	10	**CO3**
IV	**இலக்கியவரலாறு** அ. சங்க இலக்கியவரலாறு (எட்டுத்தொகை, பத்துப்பாட்டு) ஆ. சங்கம் மருவியகால இலக்கியவரலாறு (பதினெண்கீழ்க்கணக்கு நூல்கள்) இ. நாட்டுப்புறவியல், நாட்டுப்புறப்பாடல்கள், நாட்டுப்புற விளையாட்டுக்கள் அறிமுகம்.	10	**CO4**
V	**இலக்கணம்** அ. இலக்கணக் குறிப்புதருதல் – வியங்கோள் வினைமுற்று, ஈறுகெட்ட எதிர்மறைப் பெயரெச்சம், இரட்டைக்கிளவி, அடுக்குத்தொடர். ஆ. அகத்திணைகள், புறத்திணைகள் விளக்கம்.	08	**CO5**

TEXT BOOK(S):

1	தமிழ்த்துறை, கே.எஸ்.ரங்கசாமி கலை அறிவியல் கல்லூரி (தன்னாட்சி), திருச்செங்கோடு – 637 215.

COURSE OUTCOMES (CO):

இப்பாடத்தைக் கற்பதன் வாயிலாக மாணவர்கள் பெறும் பயன்களாவன:

CO1	தலைவன் தலைவிஅன்பின் சிறப்பை உணர்தல்.
CO2	சங்ககால மக்களின் உயர் சிந்தனை, தலைவியின் காதல் மேம்பாட்டை அறிதல்
CO3	அறஇலக்கியங்கள், நாட்டுப்புற இலக்கியங்களின் மேன்மையை உணர்தல்
CO4	தமிழ் இலக்கியங்களின் வளர்ச்சிநிலைகளை உணர்தல்
CO5	இலக்கணத்தின் சிறப்பை அறிதல்.

18UENLB201	**GENERAL ENGLISH – II**	**SEMESTER – II**

COURSE OBJECTIVES:

The course aims

- To enhance the vocabulary of the students.
- To improve language skills and communication skills of the students.

Credits: 3 **Total Hours: 50**

UNIT	CONTENTS	Hrs	CO
I	**PROSE** 1. Bertrand Russell – The Happy Man **GRAMMAR** 1. Pronouns and Prepositions in complex sentences 2. Conjunctions in complex sentences 3. Verb compounded with Adverbs	10	CO1
II	**SHORT STORY** 1. Satyajit Ray – The Guest **POETRY** 1. William Wordsworth – The Solitary Reaper **GRAMMAR** 1. The use of co-relatives 2. Who and Whom **COMPOSITION** 1. Note Making 2. Note Taking	10	CO2
III	**PROSE** 1. George Orwell – Shooting an Elephant **POETRY** 1. John Keats – La Belle Dams Sans Merci **GRAMMAR** 1. Introductory There 2. The Infinitive 3. Tag Questions 4. Appended Questions **COMPOSITION** 1. Resume Writing	10	CO3
IV	**SHORT STORY** 1. R .K. Narayan - Nitya **GRAMMAR** 1. Much and Many 2. Much and Very 3. Still and Yet **COMPOSITION**	10	CO4

	1. Hints Development		
V	**GRAMMAR** 1. Noun Clauses and Adjective Clauses 2. Indirect Questions 3. Indirect expression of Imperatives 4. Make and Do 5. The Verb Have 6. Shall and Will **COMPOSITION** 1. Comprehension	**10**	**CO5**
TEXT BOOK(S):			
1	*Mohammad Aslam and Tak. A.H. 2009*, **Experience and Emotion An Anthology of Prose, Poetry and Fiction.** Foundation press, Chennai.		
2	*Wood. F.D. 2010,* **A Remedial English Grammar for Foreign students**. Macmillan publishers India Ltd, Chennai.		
3	*Farhathuallah. T.M. 2006,* **Communication Skills for Undergraduates.** Publishers - RBA-Publications, Chennai.		

COURSE OUTCOMES (CO):

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

CO1	Grasp meaning of words, sentences and acquire the ability to use a dictionary.
CO2	Understand labels, simple notices and written instructions.
CO3	Master the mechanics of writing; the use of appropriate vocabulary, punctuation marks, and correct grammatical item.
CO4	Understand the total content and underlying meaning in the context.
CO5	Develop correct reading habits, silently, extensively and intensively.

18UCAM201	CORE III: OBJECT ORIENTED PROGRAMMING WITH C++	SEMESTER – II

COURSE OBJECTIVES:

The Course aims

- The improvements in C++ over C
- The Object Oriented Features in C++
- File Handling and Templates

Credits : 4 **Total Hours: 50**

UNIT	CONTENTS	Hrs	CO
I	**Principles of Object-Oriented Programming**: A look at Procedure-Oriented programming -Object Oriented Programming paradigm - Basic concepts of Object Oriented Programming – Benefits of Object Oriented Programming- Object Oriented Languages– Applications of OOP. **Beginning with C++:** What is C++? - More C++statements - structure of C++ program. **Tokens, Expressions and Control Structures**: Introduction – Tokens – Keywords - Identifiers and Constants –Basic Data Types – User Defined Data Types – Storage classes –Derived Data Types - Symbolic Constants – Operators in C++ - Scope Resolution Operator - Member Dereferencing Operators–Memory Management Operators – Manipulators - Expressions and their Types - Operator Overloading - Operator Precedence-Control Structures.	10	CO1
II	**Functions in C++**: Introduction - The Main Function– Function Prototyping– Call by Reference– Return by Reference—Inline functions– default Arguments- Const Arguments- Function Overloading- Friend and Virtual Functions. **Classes and Objects**: Introduction - Specifying a class-Defining Member functions– Making an Outside Function Inline - Nesting of member functions – Private Member Functions –Memory Allocation for Objects - Static Data Members – Static Member Functions – Arrays of Objects - Friendly functions – Const member functions.	10	CO2
III	**Constructors and Destructors**: Introduction– Constructors-Parameterized Constructor – Multiple constructors in a class– Constructor withDefault Arguments – Dynamic initialization of objects – Copy Constructor – Dynamic Constructors–Destructors. **Operator overloading and Type Conversions**: Introduction- Defining operator overloading - Overloading Unary Operators - Overloading Binary	10	CO3

	Operators – Rules for Overloading Operators.		
IV	**Inheritance: Extending Classes:** Introduction – Defining Derived classes - Single inheritance - Making a private member inheritable – Multilevel Inheritance – Multiple inheritance – Hierarchical inheritance – Hybrid inheritance – Virtual base classes – Abstract classes – Member classes: Nesting of classes. **Pointers, Virtual Functions and Polymorphism**: Introduction –Pointers - Pointers to objects - Virtual Functions - Pure Virtual Functions.	**10**	**CO4**
V	**Managing console I/O operations**: Introduction – C++streams – C++Stream classes – Unformatted I/O operations – Formatted console I/O operations – Managing output with manipulators. **Working with Files**: Introduction - classes for file stream operations – Opening and Closing a file – Detecting end of file – More about Open(): File modes - File Pointers and their Manipulations – Sequential input and output operations - Updating a File: Random Access - Error Handling During File Operations - Command line arguments. **Templates:** Introduction - Class Templates - Class Templates with Multiple Parameters – Function Templates - Function Templates with Multiple Parameters.	**10**	**CO5**
TEXT BOOK(S):			
1	*Balagurusamy, E.* 2013, **Object Oriented Programming with C++,** [Sixth Edition], McGraw Hill Education (India) Private Limited, New Delhi.		
REFERENCE BOOKS			
1	*Robert Lafore.* 1994, **Object Oriented Programming in C++**, [Third Edition], Galgotia Publications Pvt. Limited, New Delhi.		
2	*Ashok Kamthane, N.* 2008, **Object Oriented Programming with ANSI & Turbo C++**, [Fourth Impression], Pearson Education, India.		
WEB REFERENCES:			
1	https://www.tutorialspoint.com/cplusplus/		
2	https://www.cplusplus.com/doc/tutorial/		
3	https://www.javatpoint.com/cpp-tutorial		

COURSE OUTCOMES (CO):

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

CO1	Understand the difference between Procedure-oriented and Object-Oriented Programming
CO2	Create classes and objects with different types of functions
CO3	Use Constructor and Destructor functions in a proper way
CO4	Approach a program logically using Inheritance and Polymorphism
CO5	Understand I/O Streams, File Pointer concepts and Templates

MAPPING:

PSO / CO	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	H	H	M	H	L
CO2	H	H	M	H	M
CO3	H	M	L	H	M
CO4	H	M	L	H	M
CO5	H	M	L	M	M

H-High; M-Medium; L-Low

18UCAM202	**CORE IV: COMPUTER ORGANIZATION AND ARCHITECTURE**	**SEMESTER – II**

COURSE OBJECTIVES:

The Course aims

- To conceptualize the basics of organization and architectural issues of a digital computer
- To understand the working principles of various digital components and design of Digital Computers
- The Input-Output Organization and Memory Organization

Credits: 4 **Total Hours: 50**

UNIT	CONTENTS	Hrs	CO
I	**Digital Logic Circuits:** Digital Computers–Logic Gates–Boolean Algebra – Map Simplification–Combinational Circuits Flip-Flops. – Sequential Circuits.	10	CO1
II	**Digital Components**: Integrated Circuits-Decoders – Multiplexers – Registers -Shift Registers– Binary Counters - Memory Unit.	10	CO2
III	**Data Representation:** Data Types – Complements – Fixed-Point Representation- Floating-Point Representation–Other Binary Codes – Error Detection Codes. **Register Transfer and Micro operations:** Register Transfer Language – Register Transfer – Bus and Memory Transfers - Arithmetic Micro operations - Logic Micro operations - Shift Micro operations - Arithmetic Logic Shift Unit.	10	CO3
IV	**Central Processing Unit:** Introduction – General Register Organization – Stack Organization - Instruction Formats - Addressing Modes – Data Transfer and Manipulation – Program Control- Reduced Instruction Set Computer (RISC): CISC Characteristics - RISC Characteristics.	10	CO4
V	**Input–Output Organization:** Peripheral Devices - Input-Output Interface-Asynchronous Data Transfer - Modes of Transfer - Priority Interrupt - Direct Memory Access(DMA). **Memory Organization**: Memory Hierarchy – Associative Memory-Cache Memory-Virtual Memory.	10	CO5

TEXT BOOK(S):

1	*Morris Mano M.* 2017, **Computer System Architecture,** [Revised Third Edition], Pearson India Pvt. Ltd., New Delhi.

REFERENCE BOOKS:

1	*NavinKumar* 2005, **Computer Organization,** [First Edition], Galgotia Publications Pvt. Ltd.
2	*Chakraborty P.*2006, **Computer Organization and Architecture,** Jaico Publishing House.

3	*William Stallings* 2010, **Computer Organization and Architecture,** [Eighth Edition], Prentice-Hall India, New Delhi
4	*SmrutiRanjan Sarangi*. 2014, Computer Organization and Architecture, [First Edition], Tata Mc-Graw Hill, New Delhi.
WEB REFERENCES:	
1	https://www.geeksforgeeks.org/computer-organization-and-architecture-tutorials/
2	https://www.studytonight.com/computer-architecture/
3	http://www.tutorialsspace.com/Computer-Architecture-And-Organization

COURSE OUTCOMES (CO):

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

CO1	Able to understand the basic concepts of logic circuits
CO2	Understand the digital components
CO3	Acquire the knowledge about data representation and register transfer
CO4	Able to understand the working principles of CPU
CO5	Understand the types of memory organization

MAPPING

PSO / CO	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	M	M	H	M	M
CO2	L	M	H	M	M
CO3	M	H	H	M	M
CO4	L	L	H	M	M
CO5	M	M	H	M	H

H-High; M-Medium; L-Low

18UMACAA201	ALLIED II: SCIENTIFIC COMPUTING METHODS	SEMESTER – II

COURSE OBJECTIVES:

The Course aims

- To provide a basic knowledge in Numerical Solution for Algebraic and Transcendental Equations.
- Introducing the methods for Interpolation.
- To solve integration using Numerical methods.

Credits:4 **Total Hours:40**

UNIT	CONTENTS	Hrs.	CO
I	**The solution of Numerical Algebraic and Transcendental Equations**: Bisection Method –Iteration Method – Regula-Falsi Method – Newton-Raphson Method. **(Chapter – 3 Sections: 3.1 – 3.4)**	08	CO 1
II	**Solution of Simultaneous Linear Algebraic Equations**: Introduction - Gauss Elimination Methods - Gauss Jordan method – Iterative method – Gauss-Jacobi - Gauss Seidal method of iteration. **(Chapter – 4 Sections: 4.1 – 4.2, 4.7 - 4.9)**	08	CO 2
III	**Finite Differences**: Forward Difference – Backward Difference. **Interpolation (for Equal Intervals):** Newton forward interpolation formula and backward interpolation. **(Chapter – 5 Sections: 5.1 – 5.2) (Chapter – 6 Sections: 6.1 – 6.6)**	08	CO 3
IV	**Central Difference Interpolation Formulae (for Equal Intervals):** Central Differences and Central Differences Table – Central Difference Interpolation formula – Gauss forward interpolation formula – Gauss backward interpolation formula – Stirling's formula. **(Chapter – 7 Sections: 7.1 – 7.5)**	08	CO 4
V	**Numerical Integration:** Trapezoidal rule – Simpson's one-third rule – Simpson's three-eighth rule. **Numerical Solution of Ordinary Differential Equations:** Euler's method – Improved Euler Method – Modified Euler	08	CO 5

	method. **(Chapter – 9 Sections: 9.9, 9.13, 9.14, Chapter – 11 Sections: 11.9 – 11.11)**		
TEXT BOOK(S):			
1	*Kandasamy, P., Thilagavathy, K., Gunavathi, K.* 2008, **Numerical Methods,** [First Edition], S. Chand & Company Ltd, New Delhi.		
REFERENCE BOOKS:			
1	*Dr. M.K. Venkataraman,* 2007, **Numerical Methods in Science and Engineering** [Fifth Edition], The National Publishing Company, Chennai.		
2	*Dr. V.N. Vedamurthy, D.N. Ch. and S.N. Iyengar,* 2011, **Numerical Methods,** Vikas Publishing House Private Limited, New Delhi.		

COURSE OUTCOMES (CO):

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

CO1	Find solution of algebraic and transcendental equations
CO2	Solve system of linear equations
CO3	Interpolate unknown values from known values
CO4	Know numerical methods of solving differential equations
CO5	Find the solution of the integral equations

MAPPING:

PSO / CO	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	M	M	H	M	M
CO2	L	M	H	M	M
CO3	M	H	H	M	M
CO4	L	L	H	M	M
CO5	M	M	H	M	H

H-High; M-Medium; L-Low

18UCAMP201	CORE PRACTICAL III: SCIENTIFIC COMPUTING USING C++	SEMESTER – II

COURSE OBJECTIVES:

The Course aims

- To implement various OOPs concepts and features in C++

Credits: 2 **Total Hours: 30**

S.No.	PROGRAMS	Hrs	CO
1	Program to find the Transpose of a Matrix	3	CO1
2	Program to add two matrices	3	CO2
3	Program to calculate Permutation and Combination	3	CO2
4	Program to Print Permutations of given character string	3	CO3
5	Program to find the length of longest common substring.	3	CO3
6	Program to Generate all possible combinations out of the given characters	3	CO3
7	a. Program to find Cubic values using Inline function b. Program to find Mean of two numbers using Friend function	3	CO4
8	Program to find whether a number is Prime using Parameterized Constructor	3	CO4
9	Program to find the Area Circle, Rectangle and Triangle using Function Overloading	3	CO4
10	Program to add two complex numbers using Operator Overloading	3	CO5
11	Program to manage student details(along with sports marks/grade) with Multiple Inheritance	3	CO5
12	Program to read content from a file and write the upper case equivalent in another file	3	CO5

WEB REFERENCES:

1.	https://www.jdoodle.com/online-compiler-c++
2.	https://www.cpp.thiyagaraaj.com/c-programs/c-basic-example-programs
3	https://www.programiz.com/cpp-programming/examples

COURSE OUTCOMES (CO):

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

CO1	The student could implement Matrix, Permutation and Combination concepts in C++
CO2	The student could implement various concepts associated with functions
CO3	The student could implement concepts associated with polymorphism
CO4	The student could implement concepts associated with Inheritance
CO5	The student could implement concepts associated with Files

18UCAMP202	**CORE PRACTICAL IV: DESIGNING TOOLS**	**SEMESTER – II**

COURSE OBJECTIVES:

The Course aims

- To teach the basics of designing and image editing tools

Credits: 2 **Total Hours: 30**

S.No.	PROGRAMS	Hrs	CO
	PHOTOSHOP		
1	Create your visiting card	**3**	**CO1**
2	Design a passport size photo	**3**	**CO2**
3	Convert color photo into black and white photo	**3**	**CO2**
4	Create background changes, enhance and reduce the given image size	**3**	**CO3**
5	Create cover page for any text book	**3**	**CO3**
6	Create titles for any forthcoming film	**3**	**CO3**
	CORELDRAW		
7	Design a logo for an organization	**3**	**CO4**
8	Create brochure for your college	**3**	**CO4**
9	Create a paper advertisement for commercial agency	**3**	**CO4**
10	Create a book wrapper design	**3**	**CO5**
11	Design a two-page invitation	**3**	**CO5**
12	Design a poster for department event	**3**	**CO5**

WEB REFERENCES:

1.	www.tamilpctraining.blogspot.com
2.	www.tutorials.editorvalavan.com
3	www.rgntamil.weebly.com

COURSE OUTCOMES (CO):

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

CO1	Design layouts for web pages, paper adverts, brochure and package designing
CO2	Color corrections for photos
CO3	Event and Exhibition stall designs for an advertisement
CO4	Design a poster for technical paper presentation
CO5	Create a digital scrap book

18UVE201	VALUE EDUCATION II: ENVIRONMENTAL STUDIES	SEMESTER – II

COURSE OBJECTIVES:

The course aims

- To enable the students acquire knowledge, values, attitudes, commitment and skills needed to protect and improve the environment.
- To implicate awareness among young minds for safeguarding environment from manmade disasters.

Credits: 2 **Total Hours: 30**

UNIT	CONTENTS	Hrs	CO
I	Environment– Definition– Scope– Structure and function of ecosystems- producers, consumers and decomposers- Energy flow in the ecosystem- Ecological succession– food chain, food webs and ecological pyramids– Concept of sustainabledevelopment.	**06**	**CO1**
II	Natural resources: Renewable- air, water, soil, land and wildlife resources. Non–renewable – Mineral coal, oil and gas. Environmental problems related to the extraction and use of natural resources.	**06**	**CO2**
III	Biodiversity– Definition– Values– Consumption use, productive social, ethical, aesthetic and option values threats to bio diversity – hotspots of bio diversity– conservation of bio- diversity: in– situ Ex– situ. Bio– wealth - National and Global level.	**06**	**CO3**
IV	Environmental Pollution :Definition– causes, effects and mitigation measures– Air pollution, Water pollution, Soil pollution, Noise pollution, Thermal pollution– Nuclear hazards – Solid wastes acid rain–Climate change and global warming environmental laws and regulations in India– Earth summit	**06**	**CO4**
V	Population and environment – Population explosion – Environment and human health – HIV/AIDS – Women and Child welfare – Disaster Management - Resettlement and Rehabilitation of people, Role of information technology in environmental health – Environmental awareness.	**06**	**CO5**

TEXT BOOK(S):	
1	Department of Biochemistry. Environmental Studies (Study Material). Published by K.S.Rangasamy College of Arts & Science (Autonomous), Tiruchengode.
REFERENCE BOOKS:	
2	*Erach Bharucha*. 2005, Textbook **of Environmental studies**. Universities press. PVT. Ltd.

COURSE OUTCOMES (CO):

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

CO1	Describe the types of ecosystem and concepts in sustainable development
CO2	Explain the importance of natural resources and environmental problems
CO3	Recite about the biodiversity, hot spots of biodiversity and its conservation
CO4	Be conscious on the effects of pollution and population explosion
CO5	Implement the preventive measures for environmental issues

18UCAM301	CORE V: PROGRAMMING IN JAVA	SEMESTER - III

COURSE OBJECTIVES:

The Course aims

- Knowing about a General-purpose and Purely object-oriented programming language including data types, control statements, and classes
- Secured, well-suited for internet programming using applets and GUI-based

Credits : 4 **Total Hours: 50**

UNIT	CONTENTS	Hrs	CO
I	**Declarations and Access Control:** Identifiers and Keywords: Oracle's Java Code Conventions. Define Classes: Import Statements and the Java API - Static Import Statements. Use Interfaces: Declaring an Interface - Declaring Interface Constants. Declare Class Members: Access Modifiers - Nonaccess Member Modifiers - Constructor Declarations - Variable Declarations. Declare and Use enums: Declaring enums. **Object Orientation**: Encapsulation - Inheritance and Polymorphism – Polymorphism - Overriding / Overloading: Overridden Methods - Overloaded Methods.	10	CO1
II	**Object Orientation:** Casting - Implementing an Interface - Legal Return Types: Return Type Declarations - Returning a Value. Constructors and Instantiation: Overloaded Constructors - Initialization Blocks. Statics: Static Variables and Methods. **Assignments**: Stack and Heap - Literals, Assignments, and Variables: Literal Values for All Primitive Types. Scope - Variable Initialization - Passing Variables into Methods: Passing Object Reference Variables - Passing Primitive Variables. Garbage Collection. **Operators:** Java Operators - Assignment Operators - Relational Operators – instanceof Comparison - Arithmetic Operators - Conditional Operator - Logical Operators.	10	CO2
III	**Working with Strings, Arrays, and Array Lists:** Using String and StringBuilder**:** The String Class - The StringBuilder Class - Important Methods in the StringBuilder Class. Using Arrays: Declaring an Array - Constructing an Array - Initializing an Array. Using ArrayList: ArrayList Methods in Action - Important Methods in the ArrayList Class. **Flow Control and Exceptions:** Using if and switch Statements - Creating Loops Constructs - Handling Exceptions - Catching an Exception Using try and catch - Using finally. **String Processing, Data Formatting Resource Bundles:** String, StringBuilder, and StringBuffer - Dates, Numbers, Currencies, and Locales.	10	CO3

IV	**I/O and NIO:** File Navigation and I/O: Creating Files Using the File Class - Using FileWriter and FileReader. File and Directory Attributes – DirectoryStream – Serialization. **Generics and Collections:** toString(), hashCode(), and equals(): The toString() Method - Generic Types - Generic Methods - Generic Declarations. **Inner Classes**: Method - Local Inner Classes - Static Nested Classes - **Threads:** Defining, Instantiating, and Starting Threads - Thread States and Transitions - Synchronizing Code, Thread Problems - Thread Interaction. **Concurrency:** Concurrency with the java.util.concurrent Package - Apply Atomic Variables and Locks - Use java.util.concurrent Collections - Use Executors and ThreadPools.	**10**	**CO4**
V	**Applets:** Applet fundamentals – Applet class – Applet life cycle – Steps for developing an applet program – Passing values through parameters – Graphics in an applet – Event-handling. **GUI Applications – Part 1**: Graphical user interface – Creating windows – Dialog boxes – Layout managers – AWT component classes – Swing component classes. **GUI Applications – Part 2:** Event handling – Other AWT components – AWT graphics classes – Other swing controls.	**10**	**CO5**
TEXT BOOK(S):			
1	Kathy Sierra, Bert Bates " **OCA/OCP Java SE 7 Programmer I & II Study Guide**", Oracle Press.(Unit I,II,III,IV)		
2	*Sagayaraj, Denis, Karthik and Gajalakshmi,* 2018, **Java Programming - For Core and Advanced Learners,** University Press (India) Private Limited, Hyderabad.(Unit V)		
REFERENCE BOOKS:			
1	*Hebert Schild***,** 2002**, The Complete Reference Java2,** [Fifth Edition]. Tata McGraw-Hill, New Delhi.		
2	*John Hubbard, R.*2004. **Programming with Java.** [Second Edition]. Tata McGraw-Hill, New Delhi.		
3	*Debasish Jana***.** 2005. **Java and Object-Oriented Programming Paradigm**, [Second Printing]. Prentice-Hall of India, New Delhi.		

COURSE OUTCOMES (CO):

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

CO1	Understand the OOPs concept and access controls
CO2	Understand the concept and working with of operators and variables
CO3	Have the rich experience of flow controls, arrays and strings
CO4	Realize the method for learning files and threads.
CO5	Have the knowledge about Applet programming, AWT and GUI applications

MAPPING:

PSO / CO	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	H	H	M	H	H
CO2	H	H	L	M	M
CO3	H	M	L	M	H
CO4	H	M	L	M	M
CO5	H	M	M	M	M

H-High; M-Medium; L-Low

18UCAM302	**CORE VI: DATA STRUCTURES**	**SEMESTER – III**

COURSE OBJECTIVES:

The Course aims

- The various design and analysis of algorithms
- The representation of data in memory
- Various sorting and searching algorithm

Credits : 4 **Total Hours: 50**

UNIT	CONTENTS	Hrs	CO
I	**Introduction to Data Structures and Algorithms:** Basic Terminology - Classification of Data Structures – Abstract Data Type - Time and Space Complexity – Big O Notation. **Arrays:** Introduction - Declaration of Arrays – Accessing the Elements of an Array - Storing Values in Arrays - Operations on Arrays - Two-dimensional Arrays - Multi-dimensional Arrays. **Linked Lists:** Introduction: Linked List Versus Arrays – Memory Allocation and De-allocation for a Linked List.	**10**	**CO1**
II	**Linked Lists:** Singly Linked Lists - Circular Linked Lists - Doubly Linked Lists - Polynomial Representation.	**10**	**CO2**
III	**Stacks and Queues:** Introduction to Stacks - Array Representation of Stacks - Operations on a Stack - Linked Representation of Stacks - Operations on a Linked Stack - Applications of Stacks – **Queues:** Array Representation of Queues - Linked Representation of Queues - Circular Queues - Deques - Priority Queues – Multiple Queues.	**10**	**CO3**
IV	**Trees:** Binary Trees – Expression Trees – Traversing a Binary Tree – **Efficient Binary Trees:** Binary Search Trees - Operations on Binary Search Trees. **Graphs:** Introduction –Representation of Graphs – Graph Traversal Algorithms.	**10**	**CO4**
V	**Graphs:** Shortest Path Algorithms: Minimum Spanning Trees - Prim's Algorithm - Kruskal's Algorithm - Dijkstra's Algorithm -Applications of Graphs. **Searching and Sorting:** Linear Search – Binary Search - Bubble Sort - Insertion Sort - Selection Sort - Merge Sort - Quick Sort – Heap Sort.	**10**	**CO5**

TEXT BOOK(S):

1	*Reema Thareja.*2014. **Data Structures Using C** [Second Edition]. Oxford University Press, New Delhi.

REFERENCE BOOKS:

1	*Yashavant P. Kanetkar, 2003,* **Data Structures Through C,** [Second Edition], BPB Publications, NewDelhi.

2	*Seymour Lipschutz,* 2010, **Data Structures with C,** [First Edition], McGraw Hill, International Editions, Schaum's Outline Series, New Delhi.
3	*Brijendra Kumar Hoshi*. 2010, **Data Structures and Algorithms in C**, [First Edition], Tata McGraw Hill Education Private Limited, New Delhi.
4	*G.A.V.Pai.* 2008, **Data Structures and Algorithms: Concepts, Techniques and Applications,** [First Edition], McGraw Hill, International Editions, New Delhi.
WEB REFERENCES:	
1	https://www.tutorialspoint.com/data_structures_algorithms/
2	https://www.javatpoint.com/data-structure-tutoria l
3	https://www.studytonight.com/data-structures/

COURSE OUTCOMES (CO):

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

CO1	Understand the behavior of basic data structures
CO2	Learn the concept of linked list and memory allocation
CO3	Grasp knowledge about stack, queue and its operations
CO4	Have the knowledge about tree and graph concepts
CO5	Understand the basic sorting and searching methods

MAPPING:

PSO / CO	**PSO1**	**PSO2**	**PSO3**	**PSO4**	**PSO5**
CO1	H	H	M	M	M
CO2	H	H	M	L	M
CO3	H	H	L	M	M
CO4	M	H	L	M	M
CO5	H	H	L	M	M

H-High; M-Medium; L-Low

18UCAM303	CORE VII: WEB DESIGNING	SEMESTER – III

COURSE OBJECTIVES:

The Course aims

- The basics for designing web pages using HTML
- Applying Styles for a Webpage using CSS
- Adding Client side scripting (JavaScript)

Credits :4 **Total Hours: 50**

UNIT	CONTENTS	Hrs	CO
I	**Untangling the Web**: Introducing Web Technologies. **The Structure of a Page**: Understanding the Basic Document Structure – Attribute Groups - Basic Text Formatting – Presentational Elements – Lists – Understanding Block and Inline Elements – Grouping Elements with and .	10	CO1
II	**Links and Navigation**: Basic Links – Understanding Directories and Directory Structures – What are you Linking To? – Creating Links with the <a> Element. **Colors, Images, and Objects**: Adding Images to Your Site – Using Images as Links. **Tables**: Introducing Tables – Basic Table Elements and Attributes – Advanced Tables.	10	CO2
III	**Forms**: Introducing Forms – Creating a Form with the <form> Element – Form Controls – Creating Labels for Controls and the <label> Element – Structuring your Forms with <fieldset> and <legend> Elements – Focus – Disabled and Read-Only Controls – Sending Form Data to the Server. **Frames**: Introducing the Frameset – The <frameset> Element – The <frame> Element – The <noframes> Element.	10	CO3
IV	**Cascading Style Sheets**: Introducing CSS – Where You Can Add CSS Rules – CSS Properties – Controlling Fonts – Text Formatting – Text Pseudo-Classes – Selectors – Lengths – Percentages – Coming to Grips with the Box Model. **More Cascading Style Sheets**: Links – Backgrounds.	10	CO4
V	**Learning JavaScript**: What Is Programming About? – How to Add a Script to Your Pages – The Document Object Model – Starting to Program with JavaScript – Variables – Operators – Functions – Conditional Statements – Looping – Events – Built-in Objects – Writing JavaScript. **Creating a JavaScript Library**: Form Validation.	10	CO5

TEXT BOOK(S):	
1	Jon Duckett, "**Beginning Web Programming with HTML, XTHML, CSS & JavaScript**", [Edition: 2005], Wiley – Dreamtech India Pvt Ltd.
REFERENCE BOOKS:	
1	Robert W.Sebesta, 2008, **Programming the World Wide Web**, [Sixth Edition], Pearson, India.
2	Wendy Willard, 2001, **HTML: A Beginner's Guide**, [First Edition], Tata McGraw Hill, Newyork.
WEB REFERENCES:	
1	https://www.w3schools.com/html/
2	https://www.tutorialspoint.com/html/
3	https://www.w3.org/Style/CSS/

COURSE OUTCOMES (CO):

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

CO1	Understand the basic structure and elements in a HTML Page
CO2	Understand Navigation, Color Concepts and creation of Tables
CO3	Understand the creation of Forms and Frames.
CO4	Apply CSS to add style to HTML Page
CO5	Write Client-side scripting code

MAPPING:

PSO / CO	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	H	H	L	H	M
CO2	H	M	L	H	M
CO3	H	L	M	H	M
CO4	H	L	M	H	M
CO5	H	M	M	H	H

H-High; M-Medium; L-Low

18UCCCAA301	ALLIED III: PRINCIPLES OF ACCOUNTANCY	SEMESTER – III

Note: Distribution – Problem 80% and Theory 20%

Course Objectives:

The course aims

- To provide basic knowledge about accounting system and providing an edge over various terminologies of accounting.
- To lay a foundation to understand accounting software without any difficulty.

Credits : 4 **Total Hours: 50**

UNIT	CONTENTS	Hrs	CO
I	Introduction - Advantages and limitations of accounting - Accounting concepts and conventions - Journal - Ledger - Subsidiary books - Cash book, Purchase book, Sales book - Trail balance.	**10**	**CO1**
II	Final Accounts of a Sole Trader (Trading Account, Profit and Loss Account & Balance sheet) with adjustments	**10**	**CO2**
III	Average Due Date – meaning - Advantages of Average due Date - Calculation of Average Due Date - Meaning of and need for Account Current - Red ink interest rate - Problems on Account Current	**10**	**CO3**
IV	Bank Reconciliation Statement – Difference between Pass Book and Cash book - Favourable Bank Balance and Unfavourable bank Balance – Preparation of Bank Reconciliation Statement based on Bank Pass Book and Cash Book	**10**	**CO4**
V	Depreciation on fixed assets – Causes of Depreciation - Methods of Depreciation – Problems on Straight line Method – Calculation of Profit / Loss on Sale of Assets - Problems on Written down value method.	**10**	**CO5**

TEXT BOOK(S):

1	Reddy. T.S and Murthy. A, 2018, Financial Accounting, [Seventh Edition], Margham Publications, Chennai.
2	Gupta, R.L and Gupta, V.K. 2007, Financial Accounting, [Ninth Edition], Sultan Chand & Sons, New Delhi.

REFERENCE BOOKS:	
1	Jain, S.P and Narang, K. 2005, Financial Accounting. [Fifth Edition], Kalyani Publishers, Ludhiana.
2	Shukla, M.C, and Grewal, T.S. 2007, Advanced Accountancy, [Fifth Edition]. S.Chand& Co., New Delhi.

COURSE OUTCOMES (CO):

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

CO1	Understand the basic accounting concepts, conventions and prepare the journal, ledger, subsidiary books and trial balance.
CO2	Prepare the final accounts of sole trader with adjustments.
CO3	Calculate the Average due date and Account Current
CO4	Prepare bank reconciliation statement
CO5	Prepare asset account and depreciation accounts under straight line and written down value methods.

MAPPING

PSO / CO	**PSO1**	**PSO2**	**PSO3**	**PSO4**	**PSO5**
CO1	H	M	L	H	H
CO2	H	M	M	H	M
CO3	L	H	L	H	M
CO4	L	H	L	H	M
CO5	L	M	M	H	M

H-High; M-Medium; L-Low

18UCAMP301	CORE PRACTICAL V: PROGRAMMING IN JAVA	SEMESTER – III

OBJECTIVES:

The Course aims

- To understand the implementation of pure Object Oriented Programming language.
- To create classes and user defined packages.
- To enrich the knowledge in files, applet and graphics based programming.

Credits: 2 **Total Hours: 30**

S.No.	PROGRAMS	Hrs	CO
1	Program using Control statements (IF and Looping Statements).	**3**	**CO1**
2	Program using Array.	**3**	**CO2**
3	Program using Command Line arguments.	**3**	**CO2**
4	Program using Class and Object.	**3**	**CO3**
5	Program using Inheritance and Overriding.	**3**	**CO3**
6	Program for creating User Defined Package.	**3**	**CO3**
7	Program using Interface concept.	**3**	**CO4**
8	Program for Exception Handling.	**3**	**CO4**
9	Program for Multithreading.	**3**	**CO4**
10	Program using Applet.	**3**	**CO5**
11	Program Using Graphics Methods.	**3**	**CO5**
12	Program using Files.	**3**	**CO5**

WEB REFERENCES:

1.	https://www.javatpoint.com
2.	https://www.w3schools.in
3	https://www.ibm.com

COURSE OUTCOMES (CO):

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

CO1	To understand the control, looping statements and array programming
CO2	To implement pure object oriented class creation.
CO3	Able to create package and interface to implement through program.
CO4	Able to handle the errors and create multithreaded programming.
CO5	To create file and applet programming.

18UCCCAAP301	ALLIED PRACTICAL I: ACCOUNTING PACKAGE	SEMESTER - III

OBJECTIVES:

The Course aims

- To understand the implementation of pure Object Oriented Programming language.
- To create classes and user defined packages.
- To enrich the knowledge in files, applet and graphics based programming.

Credits: 2 **Total Hours: 30**

S.No.	PROGRAMS	Hrs	CO
1	Company creation in Tally, Saving the company profile, Alteration / deletion of company.	**3**	**CO1**
2	Creation, Alteration / Deletion of Groups and Ledger accounts.	**3**	**CO2**
3	Feeding of Stock Value and opening balances of Assets and Liabilities.	**3**	**CO2**
4	Preparation of Contra and Journal vouchers	**3**	**CO3**
5	Preparation of Cash Receipt and payment vouchers	**3**	**CO3**
6	Preparation of Purchases and Sales vouchers	**3**	**CO3**
7	Preparation of Debit Note and Credit Note	**3**	**CO4**
8	Voucher Modification, Voucher alteration, deletion and cancellation	**3**	**CO4**
9	Displaying voucher list, Daybook, Ledger and Extracting Daybook Summaries	**3**	**CO4**
10	Extracting detailed Trial Balance	**3**	**CO5**
11	Extracting Profit and Loss Account: Detailed form and Vertical Form	**3**	**CO5**
12	Extracting Balance Sheet: Primary Balance Sheet and Detailed Balance Sheet	**3**	**CO5**

WEB REFERENCES:

1.	https://www.javatpoint.com
2.	https://www.w3schools.in
3	https://www.ibm.com

COURSE OUTCOMES (CO):

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

CO1	Understand the basic accounting concepts, conventions and prepare the journal, ledger, subsidiary books and trial balance.
CO2	Prepare the final accounts of sole trader with adjustments.
CO3	Calculate the Average due date and Account Current
CO4	Prepare bank reconciliation statement
CO5	Prepare asset account and depreciation accounts under straight line and written down value methods.

18UCASBP301	SBC PRACTICAL I: WEB DESIGNING USING HTML, CSS AND JAVA SCRIPT	SEMESTER – III

COURSE OBJECTIVES:

The Course aims

- The creation of Web pages.
- The formatting options available in CSS
- The Client-side Scripting Language (JavaScript)

Credits: 2 **Total Hours: 30**

S.No.	PROGRAMS	Hrs	CO
	HTML & CSS		
1	Creating a page that exercises typography (paragraphs, headings) and page layout tags (div, span).	**3**	**CO1**
2	Creating a page to demonstrate the tags and attributes of a HTML table.	**3**	**CO2**
3	Creating a page to demonstrate Ordered List, Unordered List and Definition List.	**3**	**CO2**
4	Creating Bookmarks in HTML using hyperlinks.	**3**	**CO3**
5	Designing a web of hyperlinked documents using hyperlinks (min 3 pages).	**3**	**CO3**
6	Creating hyperlinks on images using Image maps.	**3**	**CO3**
7	Creating an Internal Stylesheet to adjust the layout options (setting margins, border and padding spaces) of different elements.	**3**	**CO4**
8	Creating an External Stylesheet to format the element colors and backgrounds.	**3**	**CO4**
	JAVASCRIPT		
9	Creating a HTML page with few input controls and validate the data using javascript.	**3**	**CO4**
10	Creating a HTML page to demonstrate event handlers (onclick / onchange / onblur) and html	**3**	**CO5**

	content modification using javascript.		
11	Creating a HTML page to demonstrate Javascript string and math functions.	**3**	**CO5**
12	Creating a HTML page to create and manage Javascript Objects.	**3**	**CO5**
WEB REFERENCES:			
1.	https://www.w3schools.com/html/		
2.	https://www.w3schools.com/css/		
3	https://www.w3schools.com/js/		

COURSE OUTCOMES (CO):

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

CO1	Create Static Web Pages
CO2	Link Webpages to form a Website
CO3	Format pages with CSS
CO4	Adjust the layout of webpage
CO5	Create dynamic pages with Client-side Scripting (Javascript)

18UCSNM301	**NMEC I: INTERNET TECHNOLOGY (Course offered to other than Computer Science students)**	**SEMESTER - III**

COURSE OBJECTIVES:

The Course aims

- Fundamentals of Internet, Connectivity and its Resource Requirements
- Mailing system and applications of Internet

Credits: 2 **Total Hours: 30**

UNIT	CONTENTS	Hrs	CO
I	**Introduction to internet**: What is Internet? - Evolution and History of Internet- Growth of Internet-Owners of Internet- Internet Services- How does the Internet Works? - Anatomy of Internet- Internet Addressing- Internet vs. Intranet- Impact of Internet- Governance of Internet.	6	**CO1**
II	**Internet Technology and Protocol:** ISO-OSI Reference Model**- Internet Connectivity:** Getting Connected- Different Types of Connections- Levels of Internet Connectivity- Internet Service Provider. **Internet Tools and Multimedia:** Current Trends on Internet- Multimedia and Animation.	6	**CO2**
III	**WWW and Web Browser:** WWW- Evolution of Web- Basic Elements of WWW- Web Browsers- Search Engines- Search Criteria. **Web Publishing:** Web Publishing- Web Page Design.	6	**CO3**
IV	**Email:** E-Mail Basics- E-Mail System- E-Mail Protocol- E-Mail Addresses- Structure of an E-Mail Message- E-Mail Clients & Servers- Mailing List- E-Mail Security.	6	**CO4**
V	**Usenet and Internet Relay Chat:** What is Usenet? - Newsgroup Hierarchies- What is a Newsreader? - How do you Read Newsgroups? - Who Administers Usenet?- Common News reading Tasks- How to Read Articles from Network News?- Relationship between Netnews and E-Mail- What is IRC?- Channels- Nicknames- Microsoft Net Meeting. **Internet and Web Security**: Overview of Internet Security- Aspects and Need of Security-E-Mail Threats and Secure E-mail-Web Security and	6	**CO5**

	Privacy Concepts-Firewall.		
TEXT BOOK(S):			
1	*ISRD Group*, 2012, **Internet Technology and Web Design,** [Fourth reprint], Tata McGraw-Hill Education Private Limited, New Delhi.		
REFERENCE BOOKS:			
1	*Deitel, H.M Dietel, P.J. and Goldberg A.B*. 2008, **Internet & World Wide Web- How to Program,** [Third Edition], PHL, New Delhi.		
2	*Comdex*. 2000, **Teach yourself computers and the internet visually,** [First Edition], IDG Book India (p) Ltd.		
3	*Ramachandran, T.M. Nambissan*. 2003, **An Overview of internet and web development**, [First Edition], T M - Dhruv Publications.		

18ULS301	**CAREER COMPETENCY SKILLS - I**	**SEMESTER – III**

COURSE OBJECTIVES:

The Course aims

- To enhance employability skills and to develop career competency

Total Hours: 15

UNIT	**CONTENTS**	**Hrs**	**CO**
I	Basic Grammar – Usage of English – Listening and Speaking (Level-1) Tenses and Voices (Present, Past and Future)	**3**	**CO1**
II	Sentence Correction – Sentence Pattern - Reading Comprehension (Level -1)	**3**	**CO2**
III	Expansion of Proverbs – Closet Test (Level -1)	**3**	**CO3**
IV	Sentence Improvement (Essay Writing, Now- a –Days Vocabulary), Story Writing	**3**	**CO4**
V	E-Mail Building (Sending call letters), Letters (Formal and Informal)	**3**	**CO5**

TEXT BOOK(S):

1	*Anne Seaton, Mew Y. H.* **Basic English Grammar for English-Book 1.** Learners Saddle point Publishers.
2	*Mark Newson.* **Basic English Syntax with Exercises.** (E-Copy)

REFERENCE BOOK:

1	*Chand S, Agarwal R. S.* **Objective General English.** Arihant Publications (India) Limited.

COURSE OUTCOMES (CO):

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

CO1	Recall the basic grammar in English
CO2	Concentrate on Sentence Correction
CO3	Understand Paragraph Writing
CO4	Improve the ability of Sentence Construction and Story Writing
CO5	Format Web Writing and Formal Writing of letters.

18UCAAC301	ADD-ON COURSE I : DIGITAL BUSINESS	SEMESTER – III

COURSE OBJECTIVES:

The Course aims

- To understand latest digital marketing techniques and e-commerce.
- Experiences for mobile and desktop devices.

Total Hours: 30

UNIT	CONTENTS	Hrs	CO
I	**Introduction to digital business and e-commerce:** Introduction - The impact of electronic communications on traditional businesses - What is the difference between digital business and e-commerce?	**6**	**CO1**
II	**Managing digital business infrastructure**: Introduction - Digital business infrastructure components - A short introduction to Internet technology - Management issues in creating a new customer-facing digital service.	**6**	**CO2**
III	**Digital business strategy**: Introduction - What is digital business strategy? - Strategic analysis - Strategic objectives.	**6**	**CO3**
IV	**Digital marketing**: What is digital marketing? - Digital marketing planning - Situation analysis – Strategy - Focus on Online branding.	**6**	**CO4**
V	**Digital business service implementation and optimization:** Introduction - Alternatives for acquiring digital business systems - Testing – Changeover - Content management and maintenance.	**6**	**CO5**

TEXT BOOK(S):

1	*Dave Chaffey*, "**Digital Business and E-Commerce Management Strategy, Implementation and Practice"**, Sixth Edition, Pearson Education Limited, 2015.

REFERENCE BOOKS:

1	*Prasad.R*, "**Digital Marketing: Approaches & Applications"**, ICFAI Press, 2002.
2	*Samantha shurety,* **"e-business with Net. Commerce"**, IBM, 2000.

COURSE OUTCOMES (CO):

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

CO1	Scope of digital business, e-commerce, social media, mobile apps and the use of the Internet in Business.
CO2	To Manage hardware, software and telecommunication to achieve digital business.
CO3	To develop digital business strategy.
CO4	To develop digital marketing plan.
CO5	To manage and monitor digital business systems.

MAPPING:

PSO / CO	**PSO1**	**PSO2**	**PSO3**	**PSO4**	**PSO5**
CO1	L	H	H	M	H
CO2	L	H	H	M	H
CO3	L	M	M	M	H
CO4	L	L	M	M	H
CO5	L	M	M	M	H

H-High; M-Medium; L-Low

18UCAAC302	ADD-ON COURSE I: ETHICS FOR A DIGITIAL ERA	SEMESTER – III

COURSE OBJECTIVES:

The Course aims

- Provides a strong analysis of the ethical issues that have emerged as the digital revolution progresses
- Understand the journalistic practices that impacts on the truth and reliability of communicating information

TOTAL HOURS: 30

UNIT	CONTENTS	Hrs	CO
I	**From Analog to Digital News:** A New Paradigm for News - Legacy News Organizations Move from Analog to Digital.	**6**	**CO1**
II	**From Analog to Digital News:** Intellectual Property and Information Sharing - Citizen Responsibility in the Digital Era	**6**	**CO2**
III	**Thinking Through Ethical Issues in Digital Journalism:** DOIT, A Process for Normative Analysis - Issues in Convergent Journalism.	**6**	**CO3**
IV	**Thinking Through Ethical Issues in Digital Journalism:** Privacy and Disclosure - Deception in Sourcing and Presentation - Media Corruption.	**6**	**CO4**
V	**Using the Virtual World to Create a Better Physical World:** Beyond Ethics: Communicating Wisely - Epilogue: Digital Diversity and Democracy.	**6**	**CO5**

TEXT BOOK(S):

1	*Deni Elliott and Edward H. Spence,* 2017, **"Ethics for a Digital Era"**, Willey Blackwell.

REFERENCE BOOKS:

1	*Charles Ess*, 2014, **"Digital Media Ethics"**, [Second Edition], Polity Press.

COURSE OUTCOMES (CO):

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

CO1	Understand ethical requirement to communicate.
CO2	Know about the aggregation, plagiarism and digital journalism.
CO3	Know the development of journalism and digital communication.
CO4	Analyze Privacy and Disclosure modes of Journalism.
CO5	Differentiate between Information, Communication and Wisdom.

MAPPING:

PSO / CO	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	L	M	H	H	H
CO2	L	L	M	H	H
CO3	L	L	M	M	H
CO4	M	M	H	M	H
CO5	M	M	H	L	H

H-High; M-Medium; L-Low

18UCAM401	CORE VIII: RELATIONAL DATABASE MANAGEMENT SYSTEM	SEMESTER – IV

COURSE OBJECTIVES:

The Course aims

- The fundamental concepts of database management including database languages and database-system implementation.
- Knowledge of data-access techniques with oracle's procedural language.

Credits: 4 **Total Hours: 50**

UNIT	CONTENTS	Hrs	CO
I	**Introduction:** Database-System Applications - Purpose of Database Systems –View of Data – Database Languages - Data Storage and Querying - Database Architecture – Database Users and Administrators. **Relational Databases: Introduction to the Relational Model:** Structure of Relational Databases – Keys.	10	CO1
II	**Introduction to SQL**: SQL Data Definition - Basic Structure of SQL Queries - Set Operations - Aggregate Functions - Nested Subqueries - Modification of the Database. **Intermediate SQL**: Views - Integrity Constraints - Authorization. **Database Design: Database Design and the E-R Model**: The Entity-Relationship Model - Entity-Relationship Diagrams - Extended E-R Features.	10	CO2
III	**Data Normalization**: Introduction- First Normal Form (1NF) – Second Normal Form (2NF), Third Normal Form (3NF) - Boyce-Codd Normal Form (BCNF), Fourth Normal Form (4NF)-Fifth Normal Form (5NF) - Denormalization. **Transaction Management and Concurrency Control**: Introduction- Transactions- Transaction Properties (ACID Properties)- Transaction States- Concurrency Control-The COMMIT Command-The ROLLBACK Command– The SAVEPOINT Command.	10	CO3
IV	**Storage and File Structure**: Overview of Physical Storage Media – RAID -File Organization - Organization of Records in Files. **PL/SQL: A Programming Language:** Fundamentals of PL/SQL - PL/SQL Block Structure – Comments – Data Types – Variable Declaration – Assignment Operation – Bind Variables. **More on PL/SQL: Control Structures and Embedded SQL:** Control Structures – Nested Blocks – SQL in PL/SQL.	10	CO4
V	**PL/SQL Cursors and Exceptions:** Cursors – Implicit Cursors – Explicit Cursors – Explicit Cursor Attributes – Implicit Cursor Attributes – Cursor FOR Loops. **PL/SQL Named Blocks: Procedure, Function, Package and Trigger:** Procedures –	10	CO5

	Functions – Triggers.		
TEXT BOOK(S)			
1	*Abraham Silberschatz, Henry F. Korth, and S.Sudarshan* 2015, **Database System Concepts,** [Sixth Edition]. McGraw-Hill Education (India) Private Limited, New Delhi.(UNIT I, II, IV (Storage and File Structure chapter only))		
2	*Alexis Leon and Mathews Leon* 2006, **Essentials of Database Management Systems,** Vijay Nicole Imprints Private Limited, Chennai. (UNIT III)		
3	*Nilesh Shah* 2009, **Database Systems Using Oracle - A Simplified Guide to SQL and PL/SQL**, [Second Edition], PHI Learning Private Limited, New Delhi. (Unit IV (except Storage and File Structure chapter) and V)		
REFERENCE BOOKS			
1	*Date, C.J.* 1995, An **Introduction to Database Systems,** [Sixth Edition], Addison Wesley, USA.		
2	*Raghu Ramakrishnan and Johannes Gehrke,* 2003, **Database Management Systems,** [Third Edition], Tata Mc-GrawHill, New Delhi.		

COURSE OUTCOMES (CO):

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

CO1	Understand the purpose, common feature, architecture of database systems.
CO2	Knowledge about SQL and overview of the database-design process, with major emphasis on database design using the entity-relationship data model
CO3	Understand Logical Design, Constrains and unnecessary duplication of data, transactions within the system and managing simultaneous operations
CO4	Basics of PL/SQL Programming Language, Control Structure, different decision-making statements, Looping statements, SQL statement to embed with a PL/SQL statements.
CO5	Implicit and Explicit cursor, actions on explicit cursor types, procedure, function, package structure and triggers with different types and functioning.

MAPPING:

PSO / CO	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	M	M	H	L	M
CO2	M	H	H	M	L
CO3	L	H	M	M	L
CO4	H	M	M	M	M
CO5	H	H	M	L	M

H-High; M-Medium; L-Low

18UCAM402	**CORE IX: OPERATING SYSTEM CONCEPTS**	**SEMESTER – IV**

COURSE OBJECTIVES:

The Course aims

- System performance and behavior of operating system
- The major functions of operating system
- To understand the system security and Linux basic commands

Credits : 4 **Total Hours: 50**

UNIT	CONTENTS	Hrs	CO
I	**Overview: Introduction: C**omputer-System Organization - Computer-System Architecture – Operating-System Structure - Operating-System Operations - Process Management - Memory Management - Storage Management - Protection and Security. **System Structures:** Operating-System Services - Types of System Calls -System Programs–Operating-System Design and Implementation – Operating-System Structure. **Process Management**: **Process Concept:** Process Concept- Process Scheduling-Interprocess Communication.	**10**	**CO1**
II	**Multithreaded Programming:** Multithreading Models. **Process Scheduling:** Basic Concepts - Scheduling Criteria - Scheduling Algorithms. **Synchronization:** The Critical-Section Problem – Semaphores – Classic Problems of Synchronization. **Deadlocks**: Deadlock Characterization - Methods for Handling Deadlocks - Deadlock Prevention -Deadlock Avoidance - Deadlock Detection - Recovery from Deadlock.	**10**	**CO2**
III	**Memory Management: Memory-Management Strategies:** Background – Segmentation– Paging - Structure of the Page Table. **Virtual-Memory Management:** Demand Paging - Page Replacement- Thrashing.	**10**	**CO3**
IV	**Storage Management**: **File System:** File Concept - Access Methods - Directory and Disk Structure - Protection. **Implementing File-Systems:** File-System Structure **-** Allocation Methods - Free-Space Management. **Mass-Storage Structure:** Disk Structure – Disk Scheduling - RAID Structure. **I/O Systems**: Kernel I/O Subsystem.	**10**	**CO4**
V	**Protection and Security: System Protection:** Domain of Protection-Access Matrix- Implementation of the Access Matrix. **System Security:** The Security Problem -Program Threats - System and Network Threats - User Authentication - Firewalling to Protect Systems and Networks. **Case Studies**: Windows 7, Android (Open Source): Android Overview. **Linux Commands. Pipes and Filters. VI Editor. Shell Programming.**	**10**	**CO5**

TEXT BOOK(S):

1	*Abraham Silberschatz, Peter B Galvin and Greg Gagne*, 2016, **Operating System Concepts,** [Ninth Edition], Wiley Edition. **(UNIT I-V)**
2	*B.Mohamed Ibrahim,* 2011, **Linux A Practical Approach,** Firewall Media **(UNIT-V)**

REFERENCE BOOKS:	
1	*William Stallings*, 2004, **Operating Systems–Internals &Design Principles,** [Fifth Edition], Prentice–Hall of India Pvt. Ltd., New Delhi.
2	*Andrew Tannenbaum* S, 2011, **Modern Operating Systems,** [Third Edition], Prentice-Hall of India, New Delhi.
WEB REFERENCES:	
1	https://www.tutorialspoint.com/operating_system
2	https://www.studytonight.com/operating-system
3	http://linuxreviews.org/beginner/

COURSE OUTCOMES (CO):

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

CO1	Understand the general architecture of computers
CO2	Understand the process scheduling concepts and deadlocks
CO3	Able to grasp Memory Management concepts
CO4	Understand File Systems and Storage Management
CO5	Understand Protection, Security System and basic Linux concepts

MAPPING:

PSO / CO	**PSO1**	**PSO2**	**PSO3**	**PSO4**	**PSO5**
CO1	L	M	H	M	L
CO2	M	L	H	M	L
CO3	M	H	H	M	M
CO4	H	H	H	M	M
CO5	M	M	H	M	M

H-High; M-Medium; L-Low

18UCAEL401	ELECTIVE I: PRINCIPLES OF INFORMATION SECURITY	SEMESTER – IV

COURSE OBJECTIVES:

The Course aims

- The importance of Information Security
- Legal and ethical issues of Information Security
- Various Security Technologies to protect Information against threats
- Systematic Project Management to ensure Security in an Organization

Credits : 3 **Total Hours: 50**

UNIT	CONTENTS	Hrs	CO
I	**Introduction to Information Security:** Introduction – The History of Information Security – What Is Security? – Components of an Information System – Security in the Systems Life Cycle. **The Need for Security :** Introduction - Threats and Attacks – Technical Hardware Failures or Errors - Technical Software Failures or Errors	10	CO1
II	**Legal, Ethical, and Professional Issues in Information Security:** Introduction – Law and Ethics in Information Security- Relevant U.S. Laws – International Laws and Legal Bodies – Ethics and Information Security – Codes of Ethics at Professional Organizations. **Risk Management:** Introduction – An Overview of Risk Management– Risk Identification – Risk Assessment – Risk Control.	10	CO2
III	**Planning for Security:** Introduction **-** Information Security Planning and Governance - Information Security Policy, Standards, and Practices – The Information Security Blueprint – Security Education, Training, and Awareness Program. **Security Technology: Firewalls and VPNs:** Introduction – Access Control – Firewalls – Protecting Remote Connections.	10	CO3
IV	**Security Technology: Intrusion Detection and Prevention Systems, and Other Security Tools :** Introduction – Intrusion Detection and Prevention Systems – Honeypots, Honeynets, and Padded Cell Systems – Scanning and Analysis Tools. **Cryptography:** Cipher Methods – Cryptographic Algorithms.	10	CO4
V	**Implementing Information Security:** Introduction – Information Security Project Management – Technical Aspects of Implementation – Nontechnical Aspects of Implementation – Information Systems Security Certification and Accreditation. **Information Security Maintenance:** Introduction – Digital Forensics.	10	CO5

TEXT BOOK(S)	
1	*Michael E.Whitman and Herbert J.Mattord* .2015. **Principles of Information Security. [FifthEdition]** Cengage Learning India Private Limited, Delhi.
REFERENCE BOOKS	
1	*Calabrese*. 2006. **Information Security Intelligence: Cryptographic Principles and Applications.** [India Edition]. Thomson Delmar Learning Publications.
2	*Bhaskar, S.M. and Ahson. S.I.* 2008. **Information Security – A Practical Approach**. Narosa Publishing House, New Delhi.

COURSE OUTCOMES (CO):

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

CO1	Understand the history and necessity of information security.
CO2	Familiarity of Relevant laws and ethics, risk management in firm.
CO3	Understand the Plan for security and its technologies.
CO4	Ability to understand intrusion detection and prevention system, Security tools.
CO5	Understand about the Security Project management and implementation, e-Discovery.

MAPPING:

PSO / CO	**PSO1**	**PSO2**	**PSO3**	**PSO4**	**PSO5**
CO1	M	M	M	L	H
CO2	M	M	M	M	H
CO3	M	M	M	M	H
CO4	M	M	H	H	H
CO5	L	L	M	H	H

H-High; M-Medium; L-Low

18UCAEL402	ELECTIVE I: CLIENT/SERVER TECHNOLOGY	SEMESTER – IV

COURSE OBJECTIVES:

The Course aims

- To understand Client/Server Database Server Model and its Capabilities.
- Explores Transaction Processing, Groupware Model, Distributed Object Model, Applications of Client/Server.

Credits : 3 **Total Hours: 50**

UNIT	CONTENTS	Hrs	CO
I	**Your Guide to the New World:** The Survival Plan. **Welcome to Client/Server Computing:** The Client/Server Computing Era – What Is Client/Server? – Will the Real Client/Server Please Stand Up? – Fat Servers or Fat Clients? – 2-Tier versus 3-Tier. **Client/Server Building Blocks**: Client/Server: A One Size Fits All Model – Inside the Building Blocks.	10	CO1
II	**Clients, Servers, and Operating Systems:** The Anatomy of a Server Program – What Does a Server Need From an OS? – Server Scalability – Client Anatomy 101.**The OS Wars: Meet the Players:** Client OS Trends – Server OS Trends. **NOS: Creating the Single System Image:** NOS Middleware: The Transport Illusion. **RPC, Messaging, and Peer-to-Peer:** Peer-to-Peer Communications – Remote Procedure Call (RPC).	10	CO2
III	**SQL Database Servers**: The Fundaments of SQL and Relational Databases – What Does a Database Server Do? – Stored Procedures, Triggers, and Rules. **SQL Middleware and Federated Databases:** SQL Middleware: The Options – Will the Real SQL API Please Stand Up? – Open SQL Gateways. **Data Warehouses: information Where You Want It:** Where Is That OLTP Data Kept? – Information at Your Fingertips – The Data Warehouse.	10	CO3
IV	**Client/Server Groupware:** Why is Groupware Important? – What is Groupware? – The Components of Groupware. **Distributed Objects and Components**: What Distributed Objects Promise – From Distributed Objects To Components – 3-Tier Client/Server, Object-Style. **CORBA: From ORBs To Business Objects:** Distributed Objects, CORBA-Style – OMG's Object Management Architecture.	10	CO4
V	**Web Client/Server: The Hypertext Era:** Client/Server, Web Style – So What Exactly Is a URL? – HTTP. **Web Client/Server: The Interactive Era:** CGI: The Server Side of the Web – Web Security. **Client/Server Distributed System Management:** Dealing With	10	CO5

	Chaos and Learning to Love It – Manager to Agents: What's Going on out There? – The Components of an Open DSM Platform. **Client/Server Tools and Application Development:** Client/Server Application Development Tools – Client/Server Application Design.		

TEXT BOOK(S):	
1	*Robert Orfali, Dan Harkey, Jeri Edwards*, "**The Essential Client/Server Survival Guide"**, Second Edition, 2007, Galgotia Publication.
REFERENCE BOOKS:	
1	*Dawana Travis Dewire*, "**Client/Server Computing**", [3rd Reprint 2005], Tata McGraw-Hill Publishing Company Limited, New Delhi.
2	*Patrick N.Smith*and *Steve L.Guengesich*, "**Client/Server Computing**", [2nd Edition], A Prentice Hall Computer Publishing Reprint, New Delhi, 2002.

COURSE OUTCOMES (CO):

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

CO1	Understand Client/Server Model and its Infrastructure
CO2	Explore Clients, Servers and Operating System
CO3	Database Server Model of Client/Server
CO4	Groupware Model and Distributed Object Model of Client/Server
CO5	Explores Internet from Client/Server Perspective and to Manage Client/Server Applications

MAPPING:

PSO / CO	**PSO1**	**PSO2**	**PSO3**	**PSO4**	**PSO5**
CO1	L	M	M	H	H
CO2	M	M	H	M	H
CO3	M	H	M	M	H
CO4	M	H	M	M	H
CO5	H	H	M	H	H

H-High; M-Medium; L-Low

18UCAEL403	ELECTIVE I: SOFTWARE ENGINEERING	SEMESTER – IV

COURSE OBJECTIVES:

The Course aims

- The System Development Strategies
- Basics of Software Testing
- The Project Management and Quality Management

Credits : 3 **Total Hours: 50**

Unit	Topics Covered	Hrs	CO
I	**Introduction**: FAQs about software engineering – Professional and ethical responsibility. **Software processes**: Software process models – Process iteration – Process activities - The Rational Unified Process. **Project management**: Management activities – Project planning – Project scheduling – Risk management.	10	CO1
II	**Software requirements**: Functional and non-functional requirements – System requirements – The software requirements document. **Requirements engineering processes**: Feasibility studies – Requirements elicitation and analysis **–** Requirements validation**. System models**: Context models – Behavioural models – Data models – Object models – Structured methods.	10	CO2
III	**Architectural design**: Architectural design decisions – System organisation – Modular decomposition styles. **Distributed systems architectures**: Multiprocessor architectures – Client-server architectures – Distributed object architectures. **Object-oriented design**: Objects and object classes – An object-oriented design process – Design evolution.	10	CO3
IV	**Rapid software development**: Agile methods – Extreme programming – Rapid application development – Software prototyping. **Verification and validation**: Planning verification and validation – Software inspections. **Software testing**: System testing – Component testing – Test case design – Test automation.	10	CO4
V	**Managing people**: Selecting staff – Motivating people – Managing groups – The People Capability Maturity Model. **Software cost estimation**: Estimation techniques – Algorithmic cost modelling (the COCOMO model). **Quality management**: Process and product quality – Quality assurance and standards – Quality planning – Quality control.	10	CO5

TEXT BOOK(S):	
1	Ian Sommerville. 2009, **Software Engineering**, [Eighth Edition], Pearson Education Ltd, New Delhi
REFERENCE BOOKS:	
1	*Roger S.Pressman*. 2010, **Software Engineering: A Practitioner's Approach,** [Seventh Edition]. McGrawHill, Newyork.
2	*Deepak Jain*, 2009, **Software Engineering: Principles and Practices**, [First Edition]. Oxford University Press.
3	*Waman S Jawadekar*, 2008, **Software Engineering: a Primer**, [First Edition]. Tata Mc Graw Hill, New Delhi.
WEB REFERENCES:	
1	https://www.tutorialspoint.com/software_engineering/index.htm
2	https://en.wikipedia.org/wiki/Software_engineering
3	https://www.edx.org/course/software-engineering-introduction-ubcx-softeng1x

COURSE OUTCOMES (CO):

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

CO1	Understand basic Project Management Activities
CO2	Prepare Software Requirement Specifications and understand System Models
CO3	Understand the Architectural Design and Object-oriented Design.
CO4	Understand the concepts associated with RAD and Testing.
CO5	Understand the concepts associated with People Management, Cost Estimation and Quality Management

MAPPING:

PSO / CO	**PSO1**	**PSO2**	**PSO3**	**PSO4**	**PSO5**
CO1	M	M	M	M	H
CO2	L	H	M	L	H
CO3	M	L	H	L	H
CO4	H	H	M	H	M
CO5	L	M	M	H	M

H-High; M-Medium; L-Low

18UCCCAA401	ALLIED IV: COST AND MANAGEMENT ACCOUNTING	SEMESTER – IV

COURSE OBJECTIVES:

The course aims

- To provide skills in respect of most sophisticated computerized accounting procedures and practices.
- To help the students to serve better the vast accounting needs of every commercial organization.

Credits : 4 **Total Hours: 50**

UNIT	CONTENTS	Hrs	CO
I	Cost Accounting – Meaning, Scope, Objectives – Advantages and Limitations – Differences between Cost Accounting and Financial Accounting – Elements of cost – Preparation of cost sheet.	**10**	**CO1**
II	Material Management – Purchase Procedure – Various stock levels – Economic Order Quantity – Bin card and Stores ledger – Pricing of Issues – FIFO, LIFO – Simple Average and Weighted Average Methods	**10**	**CO2**
III	Management Accounting – Definition, Nature and scope, distinction between managerial accounting and financial accounting, distinction between managerial accounting and cost accounting	**10**	**CO3**
IV	Budgets and budgetary control – Meaning, objectives, advantages and limitations – preparation of Sales Budget, Production budget, Purchase budget, Cash budget, Flexible budget - Zero base budgeting-advantages and limitations	**10**	**CO4**
V	Application of marginal costing- Definition of marginal cost and costing - Features –Advantages and limitations - Marginal costing and absorption costing – Cost volume profit –Contribution - P/V ratio- Break-even point –Margin of safety.	**10**	**CO5**

TEXT BOOK(S):	
1	*Reddy, T.S and Hariprasad Reddy, Y.* 2017, **Cost Accounting,** [Fifth Edition] Margham Publications, Chennai.
2	*Reddy, T.S and Hariprasad Reddy. Y.* 2017, **Management Accounting,** [Sixth Edition] Margham Publications, Mumbai.
REFERENCE BOOKS:	
1	*Maheshwari,S. N.* 2007, **Cost Accounting**. [Ninth Edition].Sultan Chand & Sons, New Delhi.
2	*Sharma Sasi, K. Gupta.*2008, **Management Accounting.** [Seventh Edition].Kalyani Publications, Mumbai.

COURSE OUTCOMES (CO):

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

CO1	Understand the basic concepts of cost accounting and prepare cost sheet
CO2	Determine the different types of material management and pricing of issues methods.
CO3	Understand the basic concepts of Management accounting
CO4	Prepare various budget for business enterprises
CO5	Utilize the marginal costing techniques for corporate organization

MAPPING:

PSO / CO	**PSO1**	**PSO2**	**PSO3**	**PSO4**	**PSO5**
CO1	L	M	L	H	M
CO2	M	H	L	H	M
CO3	L	M	M	H	M
CO4	M	H	L	H	M
CO5	L	H	M	H	M

H-High; M-Medium; L-Low

18UCAMP401	**CORE PRACTICAL VI: RDBMS PACKAGE**	**SEMESTER – IV**

OBJECTIVES:

The course aims

- Enhance the knowledge of SQL and PL/SQL.
- Understand the Relational model design.
- Solve Database problems using Procedures, Functions, Packages, and Triggers.

Credits: 2 **Total Hours: 30**

S.No.	PROGRAMS	Hrs	CO
1	SQL Queries for DDL Commands.	**3**	**CO1**
2	SQL Queries for DML Commands.	**3**	**CO2**
3	Creating a Table to implement Integrity Constraints and Referential Integrity Constraints in Column and Table Level.	**3**	**CO2**
4	SQL Queries for Built-in functions.	**3**	**CO3**
5	SQL Queries for creating an Index, Synonym, and Sequence.	**3**	**CO3**
6	SQL Queries for creating a User and assigning privileges and roles.	**3**	**CO3**
7	Program using PL/SQL for preparing Students Mark Statement.	**3**	**CO4**
8	Program for Looping Statements using PL/SQL	**3**	**CO4**
9	Program using PL/SQL to prepare Employee Pay slip using Cursor.	**3**	**CO4**
10	Program using PL/SQL to implement Functions.	**3**	**CO5**
11	Program using PL/SQL to implement Procedures.	**3**	**CO5**
12	Program using PL/SQL to implement Triggers	**3**	**CO5**

WEB REFERENCES:	
1.	https://www.w3schools.com
2.	https://www.tutorialspoint.com
3	http://plsql-tutorial.com

COURSE OUTCOMES (CO):

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

CO1	Understand the Data Definition and Manipulation commands in SQL.
CO2	Able to implement constraints in tables and to use built-in functions.
CO3	Be familiar with handling index, synonym and sequence in real world scenario.
CO4	Understand to use the control and looping statements with cursor.
CO5	Able to use Functions, Procedures and Triggers using PL/SQL.

18UCAMP402	**CORE PRACTICAL VII: LINUX PROGRAMMING**	**SEMESTER – IV**

OBJECTIVES:

The course aims

- The basic commands and Shell Script in Linux

Credits: 2 **Total Hours: 30**

S.No.	PROGRAMS	Hrs	CO
1	Execute the File and Directory Commands.	**3**	**CO1**
2	Execute the Process and Communication Oriented Commands.	**3**	**CO2**
3	Execute Pipes and Filter Commands.	**3**	**CO2**
4	Write shell script to add two numbers using command line arguments.	**3**	**CO3**
5	Write a script to find the biggest number from given three number using command line arguments.	**3**	**CO3**
6	Write a script to get current date, time, username, and current directory.	**3**	**CO3**
7	Write a script to print given number in reverse order.	**3**	**CO4**
8	Write a shell script to print the multiplication table of the given argument using for- loop.	**3**	**CO4**
9	Write a script to determine whether given file exist or not, using command line arguments.	**3**	**CO4**
10	Write an AWK script that uses all of its features.	**3**	**CO5**
11	Write a shell script to display list of current logged in users.	**3**	**CO5**
12	Write a shell script to remove the files which has file size as zero bytes.	**3**	**CO5**

WEB REFERENCES:

1.	https://www.javatpoint.com/linux-tutorial

2.	https://www.tecmint.com/
3	http://linuxreviews.org/beginner/

COURSE OUTCOMES (CO):

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

CO1	Get exposure of LINUX basic commands
CO2	Implement Pipes and Filter commands
CO3	Understand command line argument concepts
CO4	Execute the Shell script concepts
CO5	Implement File concepts using Shell Program

18ULS401	**CAREER COMPETENCY SKILLS - II**	**SEMESTER – IV**

COURSE OBJECTIVES:
The course aims

- To enhance employability skills and to develop career competency

Total Hours: 15

UNIT	**CONTENTS**	**Hrs**	**CO**

I	Aptitude: Speed Maths - Multiplication of Numbers - Simplification - Squaring of numbers - Square roots and cube roots – HCF & LCM –Decimals - Averages, Powers and Roots.	**3**	**CO1**
II	Aptitude: Problems on Numbers – Problems on Ages – Surds & Indices – Percentage – Profit & Loss – Ratio & Proportion – Partnership – Chain Rule.	**3**	**CO2**
III	Aptitude: Simple & Compound Interest – Alligation or Mixture - Permutation and Combination.	**3**	**CO3**
IV	Aptitude: Probability – Missing Number series – Wrong Number Series – Races & Games of Skill.	**3**	**CO4**
V	Aptitude: Time & Work – Pipes & Cistern – Time & Distance – Problems on Trains – Boats and Streams.	**3**	**CO5**
TEXT BOOKS:			
1	*R.S. Aggarwal.* 2017. **Quantitative Aptitude**, *S Chand and Company Limited, New Delhi.*		
REFERENCE BOOK:			
2	*Abhijith Guha.* 2015. **Quantitative Aptitude for Competitive Examinations**, *5th Edition, Tata McGraw Hill, New Delhi.*		

COURSE OUTCOMES (CO):

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

CO1	Carry out mathematical calculations using shortcuts.
CO2	Calculate problems on age, surds and indices with shortcuts
CO3	Understand the core concepts of SI and CI, Permutation and Combination.
CO4	Obtain knowledge on shortcuts to calculate number series.
CO5	Perform new methods for aptitude calculations.

18UCASBP401	SBC PRACTICAL II: DATA STRUCTURE USING C	SEMESTER – IV

OBJECTIVES:

The course aims

- To implement various Data Structure concepts using C Programming Language

Credits: 2 **Total Hours: 30**

S.No.	PROGRAMS	Hrs	CO
1	Program to implement Matrix Addition.	3	CO1
2	Program to implement Stack using array.	3	CO2
3	Program to implement Queue using array.	3	CO2
4	Program to implement Insert and Delete operation in Singly Linked List.	3	CO3
5	Program to find the length of a Linked List.	3	CO3
6	Program to Reverse a Linked List.	3	CO3
7	Program to implement In-order Traversal.	3	CO4
8	Program to implement Post-order Traversal.	3	CO4
9	Program to implement Linear/Sequential Search.	3	CO4
10	Program to implement Binary Search.	3	CO5
11	Program to implement Insertion Sort.	3	CO5
12	Program to implement Quick Sort.	3	CO5

WEB REFERENCES:

1.	https://www.tutorialspoint.com/data_structures_algorithms/index.htm
2.	https://scanftree.com/programs/operation/data-structure/
3	https://www.sanfoundry.com/c-programming-examples-data-structures/

COURSE OUTCOMES (CO):

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

CO1	The student could implement 2-Dimensional Array concepts
CO2	The student could implement various operations associated with Stack, Queue and Linked List
CO3	The student could implement the concepts associated with Tree Traversals
CO4	The student could implement various Searching Techniques
CO5	The student could implement various Sorting Techniques

18UCSNM401	NMEC II: PRINCIPLES OF WEB DESIGN (Course offered to other than Computer Science students)	SEMESTER – IV

COURSE OBJECTIVES:

The course aims

- Fundamentals of basic programming language for World Wide Web
- How HTML is used to build basic web pages?

Credits: 2 **Total Hours: 30**

UNIT	CONTENTS	Hrs	CO
I	**Getting Started with HTML:** HTML and XHTML Basics: Understanding HTML-Setting Up the Document Structure–Formatting Text by Using Tags.	6	**CO1**
II	**Getting Started with HTML:** Using Lists and Backgrounds–Creating Hyperlinks and Anchors. **Style Sheets and Graphics:** Displaying Graphics	6	**CO2**
III	**Page Layout and Navigation:** Creating Tables –Formatting Tables.	6	**CO3**
IV	**Page Layout and Navigation:** Creating Division-Based Layouts – Creating User Forms.	6	**CO4**
V	**Page Layout and Navigation:** Using Frames for Layout–Incorporating Audio and Video.	6	**CO5**

TEXT BOOK(S):

1	*Faithe Wempen*, 2006, **Microsoft Step by Step HTML an XHTML,** [First Edition], PHI, New Delhi.

REFERENCE BOOKS:

1	*Xavier*, C. 2007.**WorldWideWebDesignwithHTML**.[First Edition]. TMH, New Delhi.

18UCAAC401	ADD-ON COURSE II: DIGITAL HYGIENE	SEMESTER – IV

COURSE OBJECTIVES:

The course aims

- the issues in the software and data in PC and Internet
- the privacy of users and their data
- measures to protect ourselves from the cyber threats

Total Hours: 30

UNIT	CONTENTS	Hrs	CO
I	**A scary story for grown ups – The inhabitants of cyberspace's hostile side – Good digital hygiene: the essentials**: Malicious software – Anti-virus and Firewalls – Use a vault – Bad ideas – Disposing of your devices – Backups – Passwords, Personal Identification Numbers (PIN) – Choosing software for your devices – Downloads – Sharing your devices – Locking your devices when not in use – Securing online transactions and "https".	**6**	**CO1**
II	**Your footprints in cyberspace:** Who is watching your online activities? – Your browser disclosures – Your cookies – Your disclosures – What others may be saying about you – Your IDs and privacy in cyberspace – Being selective about who is in your network – Social media and Internet memory.	**6**	**CO2**
III	**Hygiene and the cyber-minefield:** Spam and scams – Phishing and spear-phishing – Attachments – Click here to follow the link – Unencrypted "free" WiFi (or WLAN) – Encrypting your domestic WiFi – Bluetooth – Log out of everything you do online.	**6**	**CO3**
IV	**Beyond the essentials:** Inventory of your devices – Crapware, craplets and Scareware – Inventory of all your accounts – Lost your smartphone or your computer? – Tracking software for electronic devices – Remotely wipe the contents of your lost device - Encryption and digital signatures	**6**	**CO4**
V	**Beyond the essentials:** Geo-tagging – Legislation you should know about – Jailbreaking or rooting your devices. **Good hygiene in the future: Coming your way:** the Internet Of Things – Digital hygiene in 2003.	**6**	**CO5**

TEXT BOOK(S):

1	*Dr.Eduardo Gelbstein*. 2015. **Good Digital Hygiene**. [First Edition].

	Bookboon.com Release (EBook-ISBN:978-87-403-0577-7)
REFERENCE BOOKS:	
1	*Peter Gottschalk.* 2014, **Policing Cyber Crime.** [First Edition]. Bookboon.com Release (EBook-ISBN:978-87-7681-679-7)
2	*Geoffrey Sampson.* 2018, **Law for Computing Students.** [Second Edition]. Bookboon.com Release (EBook-ISBN:978-87-403-1972-9)
3	*Jonathan Weir, WeiQi Yan.* 2018, **Fundamentals of Media Security.** [First Edition]. Bookboon.com Release (EBook-ISBN: 978-87-7681-706-0)
WEB REFERENCES	
1	https://www.staysmartonline.gov.au/sites/g/files/net301
2	https://digitalguardian.com/blog/what-cyber-security
3	https://www.cisco.com/c/en/us/products/security/what-is-cybersecurity.html

COURSE OUTCOMES (CO):

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

CO1	The student could understand the essentials of Good Digital Hygiene
CO2	Understand the Problems related to User's Privacy in Device / Website
CO3	Understand the problems faced in Web / Online
CO4	Understand the protective measures
CO5	Understand the issues associated with Geo-tagging and Future Technologies

MAPPING:

PSO / CO	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	L	M	H	L	H
CO2	M	H	H	M	H
CO3	M	H	H	L	H
CO4	M	H	H	L	H
CO5	M	M	H	L	H

H-High; M-Medium; L-Low

18UCAAC402	ADD-ON COURSE II : FUNDAMENTALS OF MULTIMEDIA	SEMESTER – IV

COURSE OBJECTIVES:

The course aims

- Basics of multimedia
- Working with Text, Image, Audio and Video
- Making and Delivering Multimedia content

Total Hours: 30

UNIT	CONTENTS	Hrs	CO
I	**What is Multimedia?** Where to Use Multimedia - Delivering Multimedia. **Text:** About Fonts and Faces - Using Text in Multimedia.	6	CO1
II	**Text:** Computers and Text - Font Editing and Design Tools - Hypermedia and Hypertext. **Images:** Making Still Images - Color- Image File Formats.	6	CO2
III	**Sound:** Digital Audio - MIDI Audio - MIDI vs. Digital Audio- Multimedia System Sounds - Audio File Formats- Adding Sound to Your Multimedia project. **Animation:** The Power of Motion **-** Principles of Animation - Animation by Computer - Making Animations That Work.	6	CO3
IV	**Video:** Using Video - How Video Works and Is Displayed - Digital Video Containers - Obtaining Video Clips - Shooting and Editing Video. **Making Multimedia:** The Stages of a Multimedia Project - What You Need: The Intangibles - What You Need: Hardware - What You Need: Software	6	CO4
V	**Making Multimedia:** What You Need: Authoring Systems. **Multimedia Skills**. **The Internet and Multimedia:** Internetworking - Multimedia on the Web. **Delivering:** Testing -	6	CO5

	Preparing for Delivery – Delivering on CD-ROM- Delivering on DVD- Wrapping It Up – Delivering on the World Wide Web.		

TEXT BOOK(S):

1 Tay Vaughan 2011 **Multimedia: Making it work** Eighth Edition. McGraw Hill.

REFERENCE BOOKS:

1	Ramesh Yerraballi. **Multimedia Systems Concepts Standards and Practice**.
2	Zie- Nian Li and Mark S.Drew. **Fundamentals of Multimedia**, Pearson Education.
3	**Daid A.Lauer & Stephen Pentak. Design Basics, Multimedia Edition (with ArtExperience CD-ROM),** [Sixth Edition]. Cengage Learning.

WEB REFERENCES:

1	https://www.vskills.in/certification/tutorial/html/multimedia-basics/
2	https://en.wikibooks.org/wiki/Introduction_to_Computer_Information_Systems/Multimedia
3	https://www.teufelaudio.com/multimedia-basics.html

COURSE OUTCOMES (CO)

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

CO1	Understand the basics of Multimedia
CO2	Understand the concepts associated with Text and Images
CO3	Understand the concepts associated with Sound and Animation
CO4	Understand the concepts associated with Video and requirements for creating Multimedia Applications
CO5	Create and Deliver Multimedia Applications through various sources

MAPPING:

PSO / CO	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	L	M	M	L	M
CO2	L	M	M	L	M
CO3	H	M	H	M	M
CO4	H	M	H	H	H
CO5	H	M	H	H	H

H-High; M-Medium; L-Low

18UCAAL401	ADVANCED LEARNERS COURSE: SOFTWARE TESTING	SEMESTER – IV

COURSE OBJECTIVES:

The course aims

- The basics of Testing
- The installation and usage of Testing tools
- Various Testing methods

UNIT	CONTENTS	CO
I	**Assessing Capabilities, Staff Competency, and User Satisfaction:** The Three-Step Process to Becoming a World-Class Testing Organization. **Creating an Environment Supportive of Software Testing:** Minimizing Risks: Risks Associated with Implementing Specifications - Writing a Policy for Software Testing - Testing-An Organizational Issue.	**CO1**
II	**Building the Software Testing Process:** Software Testing Guidelines - Workbench Concept - Customizing the Software-Testing Process. **Selecting and Installing Software Testing Tools:** Integrating Tools into the Tester's Work Processes - Tools Available for Testing Software - Selecting and Using Test Tools - Training Testers in Tool Usage - Appointing Tool Managers.	**CO2**
III	**Verification Testing:** Objective – Workbench – Input - Do Procedures: Task 1: Test During the Requirements Phase - Task 2: Test During the Design Phase - Task 3: Test During the Programming Phase. **Validation Testing:** Objective – Workbench – Input - Do Procedures: Task 1: Build the Test Data - Task 2: Execute Tests - Task 3: Record Test Results. **Post-Implementation Analysis:** Workbench – Do Procedures - Task 1: Establish Assessment Objectives.	**CO3**
IV	**Software Development Methodologies:** How Much Testing is Enough? - Software Development Methodologies - Defining Requirements - Methodology Maturity - Competencies Required - Configuration-Management Controls. **Testing Client/Server Systems:** Overview - Workbench - Input - Do Procedures: Task 1: Assess Readiness - Task 2: Assess Key Components - Task 3: Assess Client Needs.	**CO4**
V	**Rapid Application Development Testing:** Overview – Objective - Concerns - Workbench - Input - Do Procedures: Testing Within Iterative RAD - Spiral Testing - Check Procedures - Output - Guidelines. **Testing Internal Controls**: Overview – Internal Controls: Control Objectives - Preventive Controls - Detective	**CO5**

	Controls - Corrective Controls - Cost/Benefit Analysis. **Testing Web-Based Systems:** Overview - Workbench - Input - Do procedures: Task 1: Select Web-Based Risks to Include in the Test Plan - Task 2: Select Web-Based Tests - Task 3: Select Web - Based Test Tools - Task 4: Test Web-Based Systems.	

TEXT BOOK(S)

1	*William E Perry.* 2012, **Effective Methods for Software Testing**. [Third Edition].Wiley Publishing, Inc.

REFERENCE BOOKS:

1	*Srinivasan Desikan. Gopalaswamy Ramesh.* 2005, **Software Testing Principles and Practices**, [First Edition], Pearson Education.
2	*Boris Beizer.* 2002, **Software Testing Techniques**, [Second Edition], Dreamtech Press.
3	*Ron Patten.* 2005, **Software Testing**, [Second Edition], Pearson Education, India.

WEB REFERENCES:

1	https://www.tutorialspoint.com/software_testing/
2	https://www.guru99.com/software-testing.html
3	https://www.softwaretestingmaterial.com/manual-testing-tutorial/

COURSE OUTCOMES (CO):

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

CO1	Understand the testing basics
CO2	Select the required test tools
CO3	Perform the Verification and Validation test
CO4	Understand the limitation of testing and can also test the Client/Server Systems
CO5	Can test the RAD and Web-based Systems

MAPPING:

PSO / CO	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	L	L	M	L	L
CO2	M	L	H	M	M
CO3	H	H	H	M	H
CO4	H	H	H	M	H
CO5	H	H	H	H	H

H-High; M-Medium; L-Low

EVALUATION GUIDELINES

1. SUBMISSION OF RECORD NOTE BOOKS DISSERTATION:

Candidates appearing for Practical Examinations shall submit Bonafide Record Note Books/ Dissertation prescribed for Practical Examinations, otherwise the candidates will not be permitted to appear for the Practical Examinations.

2. PASSING MINIMUM AND INTERNAL MARK DISTRIBUTION (Theory, Practical)

(i) THEORY

The candidate shall be declared to have passed the Examination, if the candidate secure not less than 40 marks put together out of 100 in the Comprehensive Examination in each Theory paper with a passing minimum of 30 marks in External out of 75.

***Internal Marks Distribution** [CA- Total Marks: 25]*

Attendance	: 5 Marks
Assignment	: 5 Marks
Internal Examinations	: 15 Marks
Total	**: 25 Marks**

(ii) PRACTICAL

The candidate shall be declared to have passed the Examination, if the candidate secures not less than 40 marks put together out of 100 in the Comprehensive Examination in each Practical paper with a passing minimum of 24 marks in External out of 60.

***Internal Marks Distribution** [CA- Total Marks: 40]*

Experiment	: 10 Marks (10-12 Experiments)
Attendance	: 5 Marks
Record	: 5 Marks
Internal Examinations	: 20 Marks
Total	**: 40 Marks**

The candidate shall be declared to have passed the Examination, if the candidate secure not less than 40 marks put together out of 100 in the Comprehensive Examination in each Project with a passing minimum of 24 marks in External out of 60.

(iii) PRACTICAL
Question Paper Pattern and Mark Distribution [Maximum Marks 60]

Question Paper Pattern

- Practical Examinations shall be conducted at the end of concern Semester.
- Student shall write two questions as examiners choice from the practical list.

External Marks Distribution [CE- Total Marks: 60]
For each practical question the marks shall be awarded as follows:

i) Aim	: 5 Marks
ii) Algorithm / Flowchart	: 10 Marks
iii) Writing the Source Code	: 15Marks
iv) Test and debug the Source Code	: 15 Marks
v) Displaying the Output	: 10 Marks
vi) Result Declaration	: 5 Marks
Total	**: 60 Marks**

(iv) CAREER COMPETENCY SKILLS

- **Viva voce– Semester III**
  - The student has to come in proper dress code for the Viva Voce
  - Questions will be asked to evaluate the reading, speaking and listening skills of the students.
  - E-mail and Letter drafting exercises will be given.
- **On Line Objective Examination (Multiple Choice questions) – Semester IV**
  - 100 questions-100 minutes
  - Twenty questions from each UNIT.
  - Online examination will be conducted at the end of the IV Semester.

3. QUESTION PAPER PATTERN AND MARK DISTRIBUTION

(i) THEORY **(For 75 marks)**

Question Paper Pattern and Mark Distribution

1. **PART – A (10 x 2 = 20 Marks)**
   Answer ALL questions
   Two questions from each UNIT

2. **PART – B (5 x 5 = 25 Marks)**
   Answer ALL questions
   One question from each UNIT with Internal Choice

3. **PART – C (3 x 10 = 30 Marks)**
   Answer ANY THREE questions
   Open Choice – 3 out of 5 questions
   One question from each UNIT

(ii) ***THEORY (*****100% External Evaluation - Add-on Course, Advanced Learner Course)**

Question Paper Pattern and Mark Distribution

1. **PART – A (10 x 2 = 20 Marks)**
   Answer ALL questions
   Two questions from each UNIT

2. **PART – B (5 x 7 = 35 Marks)**
   Answer ALL questions
   One question from each UNIT with Internal Choice

3. **PART – C (3 x 15 = 45 Marks)**
   Answer ANY THREE questions
   Open Choice – 3 out of 5 questions
   One question from each UNIT

18UCAM501	CORE X: WEB APPLICATION DEVELOPMENT	SEMESTER-V

COURSE OBJECTIVES:

The Course aims

- The development of Web Applications using C#.NET and ASP.NET
- The enhancement of developing Database applications using ADO.NET

Credits: 4 **Total Hours: 50**

UNIT	CONTENTS	Hrs	CO
I	**Introduction to ASP.NET 3.5**: HTML Forms to Nowhere – Try This: HTML Data Entry with No Exit – ASP.NET 3.5 as an Alternative to CGI – From Client Side to Server Side – .NET Organization. **ASP.NET 3.5 Tools and Development Environment:** Creating a Simple ASP.NET Application – ASPX and C# Files. **C# and ASP.NET 3.5:** C# 3.0 and ASP.NET 3.5 – Basic C# Structures – Operators and Punctuators – Conditional Statements.	**10**	**CO1**
II	**Doing More with C# and ASP.NET**: Events and Handling Them – Creating and using Classes – Using Interfaces. **Standard Web Controls**: Data Entry – Data Display – Triggers, Links and Images. **Control Events and Event Handlers**: Automatic Events – Event and Event Handling – Button Command Events.	**10**	**CO2**
III	**Validation Controls**: Where to Validate – Required Field Validator – Range Validator – Regular Expression Validator – Compare Validator – Custom Validator – Summarizing Validation Errors. **Rich Data Controls**: Calendar Web Control – AdRotator Web Server Control – Try This Basic	**10**	**CO3**

	AdRotator.		
IV	**ADO.NET: Hello Database**: Creating a Database – Creating Web Sites for Database Use – Entering Data from a Web Site – Using Good Practices. **Data Binding**: What Is Data Binding? – Basic Binding – Repeater – DataList – DataGrid Made Easy - ListView.	**10**	**CO4**
V	**Files**: Writing Files – Reading Text Files – Viewing Directories and Files. **ASP.NET Ajax**: ASP.NET Ajax – Ajax Timer Control – Using Events with Ajax.	**10**	**CO5**
TEXT BOOK(S)			
1	*William B.Sanders,* "**ASP.NET 3.5**: **A Beginner's Guide**", 2011, [Tata McGraw-Hill Edition], Tata McGraw Hill Education Pvt. Ltd, New Delhi.		
REFERENCE BOOKS			
1	*Thomas A.Powell,* "**AJAX: The Complete Reference**",2008, [Tata McGraw-Hill Edition], Tata McGraw-Hill Publishing Company Ltd.		
2	*Robert Lair, Jason Lefebvre,* "**Pure ASP.NET**", 2002, [First Edition], Techmedia, Sams Publishing		
3	*Andrew Troelsen,* "**Pro C# 2008 and the .NET Platform**", 2007, [Fourth Edition], Apress, Berkeley, CA, USA		
4	*Douglas J.Reilly,* "**Designing Microsoft ASP.NET Applications**", 2002, [Low-Cost Edition], Microsoft Press		
5	*Vijay Mukhi, SonalMukhi, NehaKatecha,* "**ASP.NET with C#: The Basics**", 2001, [First Edition], BPB Publications, New Delhi		
WEB REFERENCES			
1	https://www.javatpoint.com/asp-net-tutorial		

2	https://www.microsoft.com/net/learn/in-browser-tutorial/
3	https://www.tutorialspoint.com/asp.net
4	https://www.w3schools.com/asp/default.asp
5	https://www.tutorialspoint.com/csharp/

COURSE OUTCOMES (CO):

On Successful completion of this course, the student can	
CO1	Understand the basics of C# and ASP.NET
CO2	Implement Event Handlers in C#
CO3	Use various validation and other controls
CO4	Implement Database related application
CO5	Handle Files &Directories and AJAX code

MAPPING:

PSO / CO	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	H	M	M	L	L
CO2	H	H	L	M	M
CO3	H	H	L	H	M
CO4	H	H	L	H	M
CO5	H	H	M	H	H

H-High; M-Medium; L-Low

18UCAM502	CORE XI: COMPUTER NETWORKS	SEMESTER-V

COURSE OBJECTIVES:

The Course aims

- To educate concepts and techniques currently used in the area of computer networks.
- To master the terminology and basics of OSI model and TCP/IP model.
- To be familiar with contemporary issues in networking technologies.

Credits: 4 **Total Hours: 50**

UNIT	CONTENTS	Hrs	CO
I	**Introduction** – Uses of Computer Networks – Network Hardware – Network Software-Reference models: The OSI Reference Model – The TCP/IP Reference Model.	**10**	**CO1**
II	**The Physical Layer:** Guided Transmission Media – Wireless Transmission– The Public Switched Telephone Network: Structure of the Telephone System– Switching.**The Data Link Layer:** Data Link Layer Design Issues–Error Detection and Correction.	**10**	**CO2**
III	**The Network Layer:** Network Layer Design Issues – **Routing Algorithms:** The Optimality Principle - Shortest Path Algorithm - Distance Vector Routing-Hierarchical Routing-Broadcast Routing-Congestion Control Algorithms. **Network Layer:** Logical Addressing- IPv4 Addresses -IPv6 Addresses.	**10**	**CO3**
IV	**The Transport Layer:** Elements of Transport Protocols – The Internet Transport Protocols: UDP– Introduction to UDP-Remote Procedure Call-The Internet Transport	**10**	**CO4**

	Protocols: TCP-Introduction to TCP-The TCP Service Model-The TCP Segment Header-TCP Connection Establishment-TCP Connection Release-TCP Sliding Window.		
V	**The Application Layer:** DNS - The Domain Name System – Electronic Mail. **Network Security:** Cryptography **–** Symmetric-Key Algorithms: DES—The Data Encryption Standard - AES—The Advanced Encryption Standard – Public –Key Algorithms: RSA–Communication Security– E-Mail Security.	**10**	**CO5**
TEXT BOOK(S):			
1	*Andrew S. Tanenbaum, David J.Wetherall* 2011.**Computer Networks**.[FifthEdition].Pearson Prentice Hall.(UNIT I to V)		
2	*BehrouzA. Forouzan*. 2003. **Data Communications and Networking**. [FourthEdition]. Tata McGraw-Hill.(UNIT II-Logical Addressing)		
REFERENCE BOOKS:			
1	*WilliamStallings,*2011. **Data and Computer Communication**.[EighthEdition].PHI.		
WEB REFERENCES:			
1	https://www.studytonight.com		
2	https://www.cse.iitk.ac.in		
3	https://www.smartzworld.com		

COURSE OUTCOMES (CO):

On Successful completion of this course, the student can	
CO1	Understand the organization of computer networks and analyze about the hardware, software and the components of a network.
CO2	Understand the transmission techniques and communication media used to connect different types of networks.
CO3	Learn the network routing algorithms and congestion control algorithms.
CO4	Learn the connections of UDP and TCP protocols.
CO5	Analyze the security algorithms used to secure a network communication.

MAPPING

PSO / CO	**PSO1**	**PSO2**	**PSO3**	**PSO4**	**PSO5**
CO1	L	M	H	L	L
CO2	L	H	H	L	L
CO3	M	H	H	H	M
CO4	M	H	H	H	M
CO5	M	H	H	H	H

H-High; M-Medium; L-Low

18UCAM503	CORE XII: CLOUD COMPUTING	SEMESTER-V

COURSE OBJECTIVES:

The Course aims

- To explain the basic concepts and core services provided by cloud technology
- To describe the virtualization technology and security issues
- To learn about service oriented architecture.

Credits: 4 **Total Hours: 50**

UNIT	CONTENTS	Hrs	CO
I	**Introducing Cloud Computing**: Web 2.0 and the Cloud-Distinguishing Cloud Types-Exploring Uses of the Cloud – Introducing Scalability – Introducing Virtualization – Collecting Processing Power Through Grid Computing. **Software as a Service (SaaS):** Getting Started with SaaS – Understanding the Multitenant Nature of SaaS Solutions – Understanding Open SaaS Solutions – Understanding Service-Oriented Architecture (SOA).**Platform as a Service (PaaS):** IT Evolution Leading to the Cloud – Benefits of PaaS Solutions – Disadvantages of PaaS Solutions	10	CO1
II	**Infrastructure as a Service (IaaS)**: Understanding IaaS – Improving Performance Through Load Balancing – System and Storage Redundancy –Utilizing Cloud-Based NAS Devices – Advantages of IaaS Solutions – Server Types Within an IaaS Solution. **Data Storage in the Cloud:** Examining the Evolution of Network Storage – Understanding Cloud-Based Data Storage – Advantages	10	CO2

	and Disadvantages of Cloud-Based Data Storage – Getting Past the Fear of Cloud-Based Data – Cloud-Based Backup Systems – Understanding File Systems – Industry-Specific Cloud-Based Data Storage – Cloud-Based Database Solutions – Cloud-Based Block Storage.		
III	**Collaboration in the Cloud:** Collaborating in the Clouds – Web-Based Collaboration Began with Web Mail - Cloud-Based Phone and Fax Systems – Collaborating via Web Logs (Blogs) – Collaborative Meetings in the Cloud – Virtual Presentations and Lectures – Using Social Media for Collaboration – Using Cloud-Based Calendar Management – Using Streaming Video Content to Collaborate. **Virtualization:** Understanding Virtualization – The History of Virtualization – Leveraging Blade Servers – Server Virtualization – Desktop Virtualization – Desktop Solutions on Demand – Virtual Networks – Data Storage Virtualization - Not All Applications Are Well Suited for Virtualization – Why Virtualize?.	**10**	**CO3**
IV	**Securing the Cloud:** General Security Advantages of Cloud-Based Solutions – Introducing Business Continuity and Disaster Recovery. **Disaster Recovery and Business Continuity and the Cloud:** Understanding the Threats – Understanding Service- Level Agreements – Measuring Business Impact: The Essence of Risk Mitigation – Disaster Recovery Plan Template.	**10**	**CO4**

V	**Service-Oriented Architecture:** Understanding Service-Oriented Architecture – Web Services Are Not Web Pages - Understanding Web Service Performance – Web Service and Reuse – Scaling Web Services – Web Services and Loose Coupling**-** Treating a Web Service as a Black Box**-** Web Service Interoperability – Governing Web Services. **Managing the Cloud**: Know Your Service-Level Agreement –Ensure and Audit System Backups - Know your System's Data Flow – Beware of Vendor Lock-In - Determine Technical Support and Help Desk Procedures – Determine Training Procedures	**10**	**CO5**

TEXT BOOK(S):	
1	*Kris Jamsa. 2014.* **Cloud Computing: SaaS, PaaS, IaaS, Virtualization, Business Models, Mobile, Security, and More**. [First Edition].Jones and Bartlett Student Edition .New Delhi.
REFERENCE BOOKS:	
1	*BarrieSosinsky.2013.***CloudComputingBible**. [FirstEdition-Reprint]. Wiley India Edition. New Delhi.
2	*RajkumarBuyya , James Broberg , AndrzejGoscinski. 2015*. **Cloud Computing Principles and Paradigms.** Wiley India Pvt, Ltd. New Delhi.
WEB REFERENCES:	
1	https://www.tutorialspoint.com
2	https://www.guru99.com

COURSE OUTCOMES (CO):

On Successful completion of this course, the student can	
CO1	Acquire the core concepts of cloud computing paradigm.
CO2	Grasp the fundamental concepts of cloud storage.
CO3	Understand the collaboration and virtualization technologies.
CO4	Explore the security and disaster recovery mechanisms.
CO5	Know about service oriented architecture.

MAPPING

PSO / CO	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	H	L	M	L	M
CO2	L	H	H	L	L
CO3	M	L	H	L	M
CO4	L	L	H	L	M
CO5	M	M	L	M	H

H-High; M-Medium; L-Low

18UCAEL501	ELECTIVE II: SOCIAL AND BUSINESS ETIQUETTE	SEMESTER-V

COURSE OBJECTIVES:

The Course aims:

- To establish social and business ethical behavior in society.
- To explain and demonstrate appropriate dressing and communication in both society and business.
- To develop an action plan to improve personal professionalism.

Credits: 3 **Total Hours: 40**

UNIT	CONTENTS	Hrs	CO
I	**Conquering Business From the Break Room to the Boardroom:** Networking- Executive Wardrobe Suggestions for Him- Executive Wardrobe Suggestions for Her- In the Workplace- Receiving Line Etiquette- Stand and Deliver.	8	CO1
II	**Conquering Business From the Break Room to the Boardroom:** Office Technology and Social Media Savvy- Leaving the Company- **The Delicate Art of a Powerful Business Meal:** Dining Etiquette from A to Z- Navigating a Buffet Line- 10 Foods to Avoid at a Lunch Job Interview.	8	CO2
III	**The Delicate Art of a Powerful Business Meal:** The Importance of Lunch at the Office- How to Propose an Eloquent Toast- Negotiating After- Work Camaraderie (a.k.a., Happy Hour Fun)- **Social Skills That Dazzle and Shine:** Travel.	8	CO3

IV	**Social Skills That Dazzle and Shine:** Host and Guest Duties- How to Host a Dazzling Dinner Party- Dinner Party Guest Faux Pas- RSVP Etiquette- How to Write a Notable "Thank-You"- Party Dress Code Defined.	**8**	**CO4**
V	**Social Skills That Dazzle and Shine:** Hosting a Housewarming – Party- Talking Polite Politics- Weddings- Other Social Events Smart Tips for Daily Savings- Don't Settle for the Scraps.	**8**	**CO5**

TEXT BOOK(S):	
1	*Diane Gottsman, 2017.* **Modern Etiquette for a Better Life: Master All Social and Business Exchanges Paperback ,** Page Street Publishing Co.
REFERENCE BOOKS:	
1	*Barbara Pachter,2013.* **The Essentials of Business Etiquette: How to Greet, Eat, and Tweet Your Way to Success Paperback,**McGraw Hill Education.
2	*Lillian H. Chaney, Jeanette S. Martin 2010.* **The Essential Guide to Business Etiquette,** Harper Collins Publisher.
3	*ShitalkakkarMehra,2012.* **Business Etiquette**, Harper Business(Herper Collins Publisher.
4	*SarveshGulati, 2012.* **Corporate Grooming and Etiquette**, Rupa Publications India Pvt. Ltd.
WEB REFERENCES:	
1	http://www.db-business-ethics.org
2	http://www.business-ethics.com
3	http://www.investopedia.com -Business -Business Essentials.com

COURSE OUTCOMES (CO):

On Successful completion of this course, the student can	
CO1	Know the basic ethics to behave in the society.
CO2	Understand etiquette morals of everyday activity.
CO3	Enhance communication, helps to groom in business.
CO4	Improvise civility at workplace and network in business.
CO5	Understand entertaining and social skills in business.

MAPPING

PSO / CO	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	H	L	M	L	L
CO2	M	H	L	L	L
CO3	M	M	H	L	L
CO4	L	M	L	M	L
CO5	L	L	M	M	M

H-High; M-Medium; L-Low

18UCAEL502	**ELECTIVE II: ARTIFICIAL INTELLIGENCE**	**SEMESTER-V**

COURSE OBJECTIVES:

The Course aims:

- To learn how computers can be made to perform intellectual tasks like decision making, problem solving and perception
- To learn how system is made to understand human communication

Credits: 3 **Total Hours: 40**

UNIT	CONTENTS	Hrs	CO
I	**Introduction:** Early History of AI – The Middle Ages of AI Development - The Dark Ages of AI Research - The AI Renaissance - To the Present - The Advent of Wireless - HAL 9000 - To The Future – CYBORGS. **What is Intelligence?**: Defining Intelligence: An Impossible Task? - Animal Intelligence - Brain Size and Performance - Sensing and Movement - Alien View - Subjective Intelligence.	8	CO1
II	**What is Intelligence?**: IQ Tests- Nature Versus Nurture - Twins - Comparative Intelligence. **Classical AI:** Introduction - Expert Systems - Conflict Resolution - Multiple Rules - Forward Chaining - Backward Chaining - Good Points - Problems With Expert Systems - Fuzzy Logic – Fuzzification - Fuzzy Rules – Defuzzification - Fuzzy Expert System.	8	CO2
III	**Classical AI:** Problem Solving - Breadth-First Search - Depth-First Search – Depth - Limited Search - Bidirectional Search - Searching Problems - Practical Search Examples - Heuristic Searching - Knowledge Representation – Frames - Methods And Demons - Machine Learning - Data Mining –	8	CO3

	Correlations - Decision Trees - Fuzzy Trees – Applications.		
IV	**The Philosophy of AI:** Introduction - Starting Point - Penrose's Pitfall - Weak AI – Strong AI - Brain-In-A-Vat Experiment - Rational AI - Brain Prosthesis Experiment - The Chinese Room Problem - The Emergence of Consciousness - Technological Singularity - The Turing Test - What Does The Turing Test Actually Test? - Loebner Competition - Can a Machine Tell a Joke? - Argument From Disability.	**8**	**CO4**
V	**MODERN AI:** Introduction - Biological Brain - Basic Neuron Model - Perceptrons And Learning – Self - Organising Neural Network - N-Tuple Network - Evolutionary Computing - Genetic Algorithms - Genetic Algorithm: Simple Example - Genetic Algorithms: Some Comments - Agent Methods - Agents For Problem Solving - Software Agents – Multiagents - Hardware Agents - Subsumption Architecture.	**8**	**CO5**
TEXT BOOK(S):			
1	*Kevin Warwick,* "**Artificial Intelligence: the basics**", 2012, Routledge Publishing, New York		
REFERENCE BOOKS:			
1	*Elaine Rich, Kevin Knight*, "**Artificial Intelligence**", 2007, [Second Edition], Tata McGraw-Hill Publishing Company Ltd, New Delhi.		
2	*Stuart Russel,* "**Artificial Intelligence: A Modern Approach**", 2007, [Second Edition], Pearson Education Inc.		

3	*Dan W Patterson,* "**Introduction to Artificial Intelligence and Expert System**", 1999, [Sixth Indian Reprint], Prentice Hall of India Pvt. Ltd, New Delhi
4	*Eugene Charnaik, Drew McDermott,* "**Introduction to Artificial Intelligence**",1999, [Second ISE Reprint], Eastern Press Pvt. Ltd.
5	*RajendraAkerkar,* "**Introduction to Artificial Intelligence**", 2008, [Third Printing], Prentice Hall of India Pvt. Ltd, New Delhi
WEB REFERENCES:	
1	https://data-flair.training/blogs/ai-tutorials-home/
2	https://www.tutorialspoint.com/artificial_intelligence/
3	https://intellipaat.com/blog/tutorial/artificial-intelligence-tutorial/
4	https://www.javatpoint.com/artificial-intelligence-tutorial
5	https://www.edureka.co/blog/artificial-intelligence-tutorial/

COURSE OUTCOMES (CO):

On Successful completion of this course, the student can	
CO1	Understand the basics of AI and different types of Intelligence
CO2	Understand the Classical AI Concepts
CO3	Learn the Algorithms/methods used in Classical AI concepts
CO4	Understand the Philosophy of AI
CO5	Learn the Modern AI concepts with the Methods/ Algorithms

MAPPING:

PSO / CO	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	L	M	H	M	L
CO2	L	H	M	H	M
CO3	L	H	M	H	H
CO4	L	H	M	H	H
CO5	L	H	M	H	H

H-High; M-Medium; L-Low

18UCAEL503	ELECTIVE II: SOCIAL MEDIA ANALYTICS	SEMESTER-V

COURSE OBJECTIVES:

The Course aims

- To understand the fundamentals of Data Analytics.
- To learn various Social Media Data Analytics tools.

Credits: 3 **Total Hours: 40**

UNIT	CONTENTS	Hrs	CO
I	**A Social Media Analytics: An overview:** Purpose of Social Media Analytics – Social Media Vs Traditional Business Analytics –Seven Layers of Social Media Analytics – Types of Social Media Analytics - Social Media Analytics Cycle – Challenges to Social Media Analytics - Social Media Analytics Tools.	**8**	**CO1**
II	**Introduction to Social Media:** World Wide Web – Web 1.0 - Web 2.0 - Web 3.0 – Social Media**-** Core Characteristics of Social Media – Types of Social Media. **Social Media Text Analytics:** Types of Social Media Text– Purpose of Text Analytics – Steps in Text Analytics - Social Media Text Analysis Tools.	**8**	**CO2**
III	**Social Media Actions Analytics:** What Is Action Analytics? -Common Social Media Actions – Action Analytics Tools. **Mobile Analytics:** What is Mobile Analytics? – Types of Apps – Characteristics of Mobile Apps –Developing your own App – Mobile Analytics Tools.	**8**	**CO3**

IV	**Social Media Hyperlink Analytics:** Types of Hyperlinks-Hyperlink Analytics –Hyperlink Analytics Tools. **Location Analytics:** Sources of Location Data – Categories of Location Analytics – Location Analytics and Privacy Concerns - Location Analytics Tools.	**8**	**CO4**
V	**Search Engine Analytics:** Types of Search Engines – Search Engine Analytics - Search Engine Analytics Tools. **Analytics – Business Alignment:** Understanding Social Media and Business Alignment – Formulating a Social Media Strategy –Managing Social Media Risks.	**8**	**CO5**

TEXT BOOK(S):	
1	*GoharF.Khan*. 2015. **Seven Layers of Social Media Analytics – Mining Business Insights from Social Media.**Kindle Edition.
REFERENCE BOOKS:	
1	*GoharF.Khan*. 2018. **Creating Value with Social Media Analytics.**Create Space, Seattle, USA.
2	*Matthew Ganis, AvinashKohirkar*, 2016. **Social Media Analytics – Techniques and Insights for Extracting Business Value Out of Social Media.** IBM Press Pearson pic.
3	*Marshall Sponder,* 2012. **Social Media Analytics – Effective Tools for Building and Interpreting Metrics.**McGraw Hill.
4	*Krish Krishnan, Shawn Rogers,* 2014. **Social Data Analytics.** Elsevier.
WEB REFERENCES:	
1	https://7layersanalytics.com/
2	https://www.analytics-book.com
3	https://www.klipfolio.com/resources/dashboard-examples/social-media

COURSE OUTCOMES (CO):

On Successful Completion of this Course, the Student can	
CO1	Understand the foundations of Social Media Analytics
CO2	Learn Social Media Text Analytics and Tools
CO3	Enhance the knowledge of Action Analytics and Mobile Data Analytics Tools
CO4	Realize the potential of Location Data Analytics and Hyperlinks Analytics Tools.
CO5	Understand and Use Search engine Analytics tools

MAPPING

PSO / CO	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	L	M	L	L	L
CO2	L	H	L	M	M
CO3	L	H	L	M	H
CO4	L	H	L	M	H
CO5	L	H	L	M	H

H-High; M-Medium; L-Low

18UCAMP501	CORE PRACTICAL VIII: WEB APPLICATION DEVELOPMENT	SEMESTER-V

COURSE OBJECTIVES:

The course aims

- The creation of Windows and Console Application using C#.NET
- The development of Web Applications using C#.NET and ASP.NET
- The development of Database applications using ADO.NET

Credits: 2 **Total Hours: 36**

S No	PROGRAMS	Hrs	CO
	C#.NET		
1	Creating a Windows/Console Application for handling at least two exceptions	**3**	**CO1**
2	Creating a Windows Application to read / write Text and Binary Files.	**3**	**CO1**
3	Creating a Windows Application to implement the Auto-Completion feature (for text box).	**3**	**CO1**
	ASP.NET		
4	Performing the following validationsina Web Page usingASP. NET (Compare Validator , Custom Validator, Range Validator)	**3**	**CO2**
5	Performing the following validationsina Web Page usingASP. NET (RegularExpression Validator, Required Field Validator, Validation summary)	**3**	**CO2**
6	Creating an application to demonstrate the use of Cookies in ASP.NET.	**3**	**CO3**
7	Creating an application to demonstrate the use of Sessions	**3**	**CO3**

	in ASP.NET (Login process).		
8	Creating an application to demonstrate ADRotatorinASP.NET.	**3**	**CO3**
9	Creating an ASP.NET application to display the content of SQLServer database table in Datagrid.	**3**	**CO4**
10	Creating an ASP.NET application to Insert, Delete and Update records of SQLServer Database table.	**3**	**CO4**
11	Creating an ASP.NET application to demonstrate the search process.	**3**	**CO4**
12	Creating an ASP.NET application to create Reports from the available database with (multiple) tables.	**3**	**CO5**

COURSE OUTCOMES (CO):

On Successful Completion of this Course, the Student can	
CO1	Develop Windows/Console Applications
CO2	Understand the use of Validators
CO3	Understand the use of Cookies, Sessions and AdRotators
CO4	Create Database Applications using ADO.NET
CO5	Prepare reports from the data in Database

18UCAMP502	CORE PRACTICAL IX: COMPUTER NETWORKS LAB	SEMESTER – V

COURSE OBJECTIVES:

The Course aims

- To learn the hardware and software based network configuration using different network protocols

Credits: 2 **Total Hours: 24**

S.No.	PROGRAMS	Hrs	CO
1	Do the following Cabling works in a network a)Cable Crimping b) Standard Cabling and c) Cross Cabling	**2**	**CO1**
2	Establish a LAN connection using three systems using bus topology.	**2**	**CO1**
3	Establish Peer to Peer network connection using two systems in a LAN.	**2**	**CO2**
4	Interface PCs using connectivity devices – Hub, router and switch.	**2**	**CO2**
5	Configure IP Address in a system in LAN (TCP/IP Configuration)	**2**	**CO3**
6	Transfer files between systems in LAN using FTP Configuration	**2**	**CO3**
7	Login a system remotely using telnet protocol.	**2**	**CO4**
8	Share a file and printer (remotely) between two systems in a LAN	**2**	**CO4**
9	Establish security in a system using firewall configuration	**2**	**CO4**

10	Create and share the user rights by accessing server for a specific user groups	**2**	**CO4**
11	Install and configure the following a) A DHCP server in windows with IP Address ranging from 192.168.5.1 to 192.168.5.100 - b) Configure a DHCP Client	**2**	**CO5**
12	Transfer Files between wirelesses Communication.	**2**	**CO5**

COURSE OUTCOMES (CO):

On Successful Completion of this Course, the Student can	
CO1	Learn different types of network cabling and cable crimping
CO2	Learn to interconnect the personal computers using different topologies and network devices
CO3	Establish the different protocol configurations between the network systems
CO4	Configure the firewall for security, create and share user rights in server system
CO5	Configure the DHCP server and client using IP address

18UCASBCP501	**SBC PRACTICAL III: WEB SERVICES USING PYTHON**	**SEMESTER – V**

COURSE OBJECTIVES:

The Course aims

- Describe the core syntax and semantics of Python programming language.
- Infer the Object-oriented Programming concepts in Python.
- To get practical knowledge of a popular programming language Python

Credits: 2 **Total Hours: 30**

S.No.	**PROGRAMS**	**Hrs**	**CO**
1	Develop programs to understand the control structures of python	**3**	**CO1**
2	Develop programs to learn different types of structures (list, dictionary, tuples) in python	**3**	**CO2**
3	Develop programs to learn concept of functions scoping, recursion and list mutability.	**3**	**CO2**
4	Develop programs to understand working of exception handling and assertions.	**3**	**CO3**
5	Develop programs for data structure algorithms using python –searching, sorting and hash tables.	**3**	**CO3**
6	Develop programs to learn regular expressions using python.	**3**	**CO3**
7	Develop chat room application using multithreading.	**3**	**CO4**
8	Learn to plot different types of graphs using PyPlot.	**3**	**CO4**
9	Implement classical ciphers using python.	**3**	**CO4**
10	Draw graphics using Turtle.	**3**	**CO5**

11	Develop programs to learn GUI programming using Tkinter.	**3**	**CO5**
12	Develop CRUD Application Using Web service.	**3**	**CO5**

COURSE OUTCOMES (CO):

On Successful Completion of this Course, the Student can	
CO1	Able to apply the principles python programming
CO2	Implement object oriented concepts,
CO3	Implement database and GUI applications.
CO4	Develop web applications using python programming.
CO5	Develop and use Web Services using python.

18ULS501	CAREER COMPETENCY SKILLS - III	SEMESTER – V

COURSE OBJECTIVES:

The course aims

- To impart knowledge on the logical reasoning.
- To enhance employability skills and to develop career competency.

Total Hours: 15

UNIT	CONTENTS	Hrs	CO
I	Verbal Reasoning: Number Series Completion-Alpha Series Completion-Blood Relation-Distance and Direction-Analogy-Inequality-Classification.	**3**	**CO1**
II	Non-Verbal Reasoning: Series Completion - Analogy and Classification - Completion of Incompletion Pattern.	**3**	**CO2**
III	Non-Verbal Reasoning: Mirror Image and Water Image – Statement and Arguments - Cubes and Dices.	**3**	**CO3**
IV	Reasoning:Puzzle Arrangement - Syllogism - Input and Output.	**3**	**CO4**
V	Verbal Reasoning:Linear Arrangement - Circular Arrangement – Matrix Arrangement.	**3**	**CO5**

TEXT BOOK(S):

1	**Test of Reasoning** – *RS Aggarwal, S* Chand and Company Limited, 2017Edition,New Delhi.

REFERENCE BOOK :

1	**Verbal & Non-Verbal Reasoning For Competitive Exams** - *Gajendra Kumar, AbhishekBanerjee,* Disha publication, New Delhi.

COURSE OUTCOMES (CO)

On Successful Completion of this Course, the Student can	
CO1	Understand the core concepts of Verbal Reasoning
CO2	Formulate Non Verbal Reasoning with shortcuts
CO3	Find Mirror Image, Cubes and Dices
CO4	Obtain the knowledge on shortcuts to solve Puzzles.
CO5	Solve Linear Arrangement and Matrices with shortcuts.

18UCAM601	**CORE XIII : BIG DATA ANALYTICS**	**SEMESTER-VI**

COURSE OBJECTIVES:

The Course aims

- To focus the Fundamentals of Big Data Analytics..
- To transform the big data into real-world business processes using Hadoop tool.

Credits: 4 **Total Hours: 50**

UNIT	**CONTENTS**	**Hrs**	**CO**
I	**Examining Big Data Types:** Defining Structured Data, Defining Unstructured Data, Putting Big Data Together. **Old Meets New: Distributed Computing**- A Brief History of Distributed Computing – Understanding the Basics of Distributed Computing.	**10**	**CO1**
II	**Digging into Big Data Technology Components:** Exploring the Big Data Stack – Layer 0 to Layer 4. **Virtualization and How it Supports Distributed Computing:** Understanding the Basics of Virtualization – Managing Virtualization with the Hypervisor. **Big Data Management**: **MapReduce Fundamentals**.	**10**	**CO2**
III	**Big Data Management:** Exploring the World of Hadoop -The Hadoop Foundation and Ecosystem – Appliances and Big Data Warehouses. **Analytics and Big Data:** Defining Big Data Analytics – Understanding Text Analytics and Big Data – Customized Approaches for Analysis of Big Data.	**10**	**CO3**
IV	**Big Data Implementation:** Integrating Data Sources –	**10**	**CO4**

	Dealing with Real-Time Data Streams and Complex Event Processing – Operationalizing Big Data – Applying Big Data within Your Organization - Security and Governance for Big Data Environments.		
V	**Big Data Solutions in Real World**: The Importance of Big Data to Business. Analyzing Data in Motion: A Real-World View -Improving Business Processes with Big Data Analytics: A Real-World View. **The Part of Tens:** Ten Big Data Best Practices – Ten Great Big Data Resources.	**10**	**CO5**
TEXT BOOK(S):			
1	*Judith Hurwitz, Alan Nugent, Dr. Fern Halper and Marcia Kaufman*. 2013. **Big Data for Dummies.** John Wiley& Sons, New Jersey.		
REFERENCE BOOKS:			
1	*Paul C. Zikopoulos, Chris Eaton, Dirk deRoos, Thomas Deutsch, George Lapis*.2012.**Understanding Big Data: Analytics for Enterprise Class Hadoop and Streaming Data.** McGraw-Hill.		
2	*Lin and Chris Dyer,* 2010. **Data-Intensive Text Processing with MapReduce Jimmy.** Morgan & Claypool Synthesis.		
3	*ÖzgürErgül*, 2013. **Guide to Programming and Algorithms Using R**. Springer-VerlagLondon.		
4	Robert I. Kabacoff, 2011. **R in Action - Data analysis and graphics with R.** ManningShelter Island.		
WEB REFERENCES:			
1	https://www.tutorialspoint.com		
2	https://www.tutorialspoint.com		

3	https://intellipaat.com

COURSE OUTCOMES (CO):

On Successful Completion of this Course, the Student can	
CO1	To know about various types of Data, Big Data environment and Distributed computing Networks.
CO2	Understanding Big Data Stack Architecture and Map Reduce fundamentals.
CO3	To understand Hadoop environment and Different types of Analytics.
CO4	To Understand Data integration in Big Data Warehouses.
CO5	To study about Big Data Applications in different Areas.

MAPPING

PSO / CO	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	L	H	L	L	L
CO2	M	H	M	H	H
CO3	H	H	M	H	H
CO4	H	H	M	M	H
CO5	H	H	M	H	H

H-High; M-Medium; L-Low

18UCAM602	CORE XIV: MOBILE TECHNOLOGY	SEMESTER – VI

COURSE OBJECTIVES:

The Course aims

- The generations of mobile communications.
- The specifications and functionalities of various protocols/standards of mobile networks.
- The students with a detailed knowledge on Mobile application and Development.

Credits: 4 **Total Hours: 50**

UNIT	CONTENTS	Hrs	CO
I	**Introduction:** Applications- A Simplified Reference Model. Wireless Transmission: Cellular Systems. **Medium Access Control:** Motivation for a Specialized MAC. Hidden and exposed terminals-Near and far terminals- SDMA-FDMA– **TDMA**: Fixed TDM-Classical Aloha – Slotted Aloha- Carrier Sense Multiple Access–Demand assigned Multiple Access - PRMA Packet Reservation Multiple Access-Reservation TDMA- Multiple Access with Collision Avoidance - Polling-Inhibit Sense Multiple Access. **CDMA:** Spread Aloha multiple access-Comparison of S/T/F/CDMA.	**10**	**CO1**
II	**Telecommunications Systems: GSM:** Radio Interface-Protocols-Localization and Calling-Handover-Security-New Data Services **DECT:** System Architecture- Protocol Architecture–**TETRA. Satellite Systems:** History–Applications– Basics.	**10**	**CO2**

III	**Introduction:** All about Android - The Consumer Perspective – The Developer Perspective - The Business Perspective. **Installing the Software Tools**: Installing the Java Development Kit- Installing the Android SDK Starter Package - Installing the Eclipse Development - Configuring Eclipse - Fattening Up the Android SDK. **Creating an Android App**: Creating Your First App - Testing Apps on a Real Device - Examining a Basic Android App. **Conjuring and Embellishing an Android App**: Improving Your App. **Object-Oriented Programming in Java**: Static Fields and Methods - Interfaces and Callbacks - Inner Classes. **A brief Look at XML**: XML Isn't Ordinary Text - What's in a Namespace?	**10**	**CO3**
IV	**Android Activities**: All about Activities - The Activity Lifecycle – Getting Results Back from an Activity. **Intents and Intent Filters: How to Make a Match** – The parts of an intent - The parts of an intent filter. **Activities and Stacks**: The activity stack.	**8**	**CO4**
V	**Services:** A Very Simple Service -Talking about the Weather: Binding to the service – Querying the service - Getting Real Weather Data. **Broadcast Receivers**: Receivers 101: Creating a receiver on the fly – Beyond the Fundamentals: Managing receivers - Using receiver intents – ordered broadcasts. **Content Providers:** Working with a Database - Creating and Using a Content Provider. **Lay Out Your Stuff:** Android Layouts - Linear Layout - Attributes (A Detour). **Menus, Lists, and Notifications:** Creating an options Menu -	**12**	**CO5**

	Creating a Context Menu - More Stuff about Lists. **(Note : Fifth Unit For Self Study)**		

TEXT BOOK(S):	
1	*Jochen H.Schiller*," **Mobile Communications**", [Fifth Impression 2007].Pearson Education, India.(Unit I,II)
2	*Barry Burd,* "**Android Application Development** – All-in-one for Dummies", 2nd Edition,Wiley India, 2012.(Unit III,IV,V)
REFERENCE BOOKS:	
1	*Jochen Schiller,* **Mobile Communications**, Pearson Education, Second Edition, 2011
2	Paul Deitel, Harvey Deitel, Alexander Wald, " **Android 6 for Programmers** – An App-driven Approach", 3rd edition, Pearson education, 2016.
3	Jerome (J. F) DiMarzio, "**Android – A Programmer"s Guide**", McGraw Hill Education, 8th reprint, 2015.

COURSE OUTCOMES (CO):

On Successful Completion of this Course, the Student can	
CO1	Be familiar with various generations of mobile communications.
CO2	Understand the concepts of cellular communications.
CO3	Understand the basics of wireless communication.
CO4	Gain the knowledge about mobile system specifications.
CO5	Understand multiple access techniques in mobile applications.

MAPPING

PSO / CO	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	L	H	L	L	L
CO2	M	H	M	H	H
CO3	H	H	M	H	H
CO4	H	H	M	M	H
CO5	H	H	M	H	H

H-High; M-Medium; L-Low

18UCAM603	CORE XV: E-COMMERCE	SEMESTER-VI

COURSE OBJECTIVES:

The Course aims

- To understand the history of E-commerce and its Business Models along with Marketing strategy in worldwide.
- To ascertain the importance of customer relationship towards security services in Communication domain.

Credits: 3 **Total Hours: 50**

UNIT	CONTENTS	Hrs	CO
I	**History of E-commerce and Indian Business Context:** Early Business Information Interchange Efforts- Emergence of the Internet- Emergence of the World Wide Web- The Milestones-Advantages of E-commerce-Disadvantages of E-commerce-Transition to E-commerce in India. **Business Models for E-commerce:** E-business Models Based on the Relationship of Transaction Parties-E-business Models Based on the Relationship of Transaction Types.	10	CO1
II	**e-Marketing:** Traditional Marketing-Identifying Web Presence Goals: Achieving Web Presence Goals-The Uniqueness of the Web- E-marketing Value Chain-Maintaining a Website-The Browsing Behaviour Model-Online Marketing- E-advertising – Internet Marketing Trends – Marketing Strategies.	10	CO2
III	**e-Security:** Information System Security- Security on the Internet- E-business Risk Management Issues. **E-**	10	CO3

	payment Systems: Classification of New Payment Systems- Properties of Electronic Cash(E-cash)- Cheque Payment Systems on the Internet – Risk and E-payment Systems.		
IV	**e-Customer Relationship Management:** Customer Relationship Management - Typical Business Touch-points. **E-strategy:** Information and Strategy – The Virtual Value Chain – Seven Dimensions of E-commerce Strategy- E-commerce Strategy and Knowledge Management – Enterprise Resource Planning (ERP).	**10**	**CO4**
V	**Information Systems for Mobile Commerce:** What is Mobile Commerce?- Cellular Networks- Technologies for Mobile Commerce – WAP Programming Model- Different Generations in Wireless Communication- Security Issues Pertaining to Cellular Technology.	**10**	**CO5**
TEXT BOOK(S):			
1	*P.T. Joseph, S.J.* 2019. **E-COMMERCE: An Indian Perspective.** [Sixth Edition]. PHI Learning Private Limited, Delhi.[**UNIT-I TO UNIT-IV, UNIT-V: What is Mobile Commerce? , Cellular Networks**]		
2	*P.T. Joseph, S.J.* 2009. **E-Commerce: An Indian Perspective**. [Third Edition]. PHI Learning Private Limited, Delhi.[**UNIT-III: E-payment Systems, UNIT-IV:E-strategy & UNIT-V**]		
REFERENCE BOOK(S):			
1	*JANICE REYNOLDS,* 2017. **The Complete E-Commerce Book: Design, Build & Maintain a Successful Web-based Business.** (2nd Edition).CRC Press, Taylor & Francis Group.		

2	*P.T. Joseph, S.J.* 2015**. E-COMMERCE: An Indian Perspective** [Fifth Edition], PHI Learning Private Limited, Delhi.
WEB REFERENCES:	
1	https://en.wikipedia.org/wiki/E-commerce
2	https://www.tutorialspoint.com/e_commerce/index.htm
3	https://www.toppr.com/guides/business-environment/emerging-trends-in-business/electronic-commerce/

COURSE OUTCOMES (CO):

On Successful Completion of this Course, the Student can	
CO1	Think the importance of E - commerce in Worldwide
CO2	Know the different methodologies in doing e-Marketing
CO3	Manage the Circumstances occur in securing the system and e-payment
CO4	Enrich the different strategies in customer relationships
CO5	Enhance the knowledge in Mobile Commerce

MAPPING

PSO / CO	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	L	M	L	H	H
CO2	L	H	H	H	H
CO3	M	L	H	M	H
CO4	L	H	L	L	H
CO5	M	M	H	M	H

H-High; M-Medium; L-Low

18UCAM604	CORE XVI: INTERNET OF THINGS	SEMESTER-VI

COURSE OBJECTIVES:

The Course aims

- To explain the emerging industrial structure and architecture design of IoT.
- To describe Interconnection of Security, Trust, Identity and Privacy in Cyberspace.
- To understand Aids in IoT revolution.

Credits: 3 **Total Hours: 50**

UNIT	CONTENTS	Hrs	CO
I	**The Evolving Iot Landscape:** Why the Internet of Things?– **Origins and Iot Landscape :** Evolving to an Internet of Things -IoT in a Global Context: General technology and scientific trends - Trends in information and communications technologies. **Iot – A Business Perspective:** Introduction-Definitions-Value Chains Overview- Business Model Innovation in IoT. **An Architecture Perspective:** Building an Architecture-Requirements and Main Design Principles -An IoT Architecture Outline.	10	CO1
II	**Iot Technologies And Architectures: Technology Fundamentals:** Devices and Gateways-Local and Wide Area Networking-Machine Intelligence-Distributed Cloud and Edge Computing- Data Management.	10	CO2
III	**Security:** Introduction - Basic Principles- Threats to IoT	10	CO3

	Systems -Mitigating Threats to IoT Applications-Security in Architectures and Standards-Security for a Safe IoT -Privacy in IoT -Future Developments in Security. **Architecture And State-of-The-Art:** ITU-T -OMA -IoT-A and IIRA -RAMI 4.0 -W3C-OGC.		
IV	**Architecture And State-Of-The-Art:** GS1 Architecture and Technologies- Other Relevant State-of-the-Art. **Architecture Reference Model:** Introduction-Reference Model and Architecture-IoT Reference Model - IoT Reference Architecture- Functional View - Information View- Deployment and Operational View -Other Relevant Architectural Views- Other Reference Models and Architectures- Best Practices.	**10**	**CO4**
V	**Industrial Automation:** SOA-Based Device Integration-SOCRADES: Realizing the Enterprise Integrated Web of Things- IMC-AESOP: From the Web of Things to the Cloud of Things. **Smart Grid:** Introduction- Smart Metering- Smart House -Smart Grid City - **Commercial Building Automation:** Introduction-Case Study: Phase One – Commercial Building Automation Today - Case Study: Phase Two – Commercial Building Automation in the Future- **Smart Cities:** Introduction – What Is a Smart City?-Smart Cities – A Technical Perspective-IoT Data Supply Chains-IoT Data and Context Management in Smart Cities-ETSI ISC Context Information Management-Smart Cities – A Reference Architecture-Smart Cities – Smart Parking. **Logistics:** Introduction-	**10**	**CO5**

	Roles and Actors-Technology Overview-Example Scenario – Food Transport.		
TEXT BOOK(S):			
1	*Vlasios Tsiatsis , Stamatis Karnouskos , Jan Höller , David Boyle, Catherine Mulligan*,"**Internet of Things Technologies and Applications for a New Age of Intelligence**", Second Edition, Academic Press,2019.		
REFERENCE BOOKS:			
1	*Olivier Hersent, Omar Elloumi and David Boswarthick,* "**The Internet of Things: Applications to the Smart Grid and Building Automation**", Wiley, 2012.		
2	Olivier Hersent, David Boswarthick and Omar Elloumi, "**The Internet of Things – Key applications and Protocols**", Wiley, 2012.		
WEB REFERENCES:			
1	http://www.internet-of-things-book.com		
2	https://cloud.google.com/solutions/iot-overview.com		
3	https://www.internetsociety.org/resources/doc/2015/iot-overview.com		

COURSE OUTCOMES (CO):

On Successful Completion of this Course, the Student can	
CO1	Know the architecture design of IoT.
CO2	Understand domains of IoT and M2M Communication techniques.
CO3	Know about the System Management and Design Methodology of IOT.
CO4	Identify Systems Logical Design and Raspberry Pi with Python.
CO5	Explore IoT Technology in Real time Applications.

MAPPING

PSO / CO	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	M	H	M	M	M
CO2	L	H	H	M	H
CO3	M	H	H	M	L
CO4	L	M	L	M	L
CO5	L	M	M	H	H

H-High; M-Medium; L-Low

18UCAMP601	**CORE PRACTICAL X: R PROGRAMMING**	**SEMESTER-VI**

COURSE OBJECTIVES:

The Course aims

- To acquire the knowledge in R Programming Language

Credits: 2 **Total Hours: 48**

S.No.	PROGRAMS	Hrs	CO
1	Basic Commands in R / Functions in R.	**4**	**CO1**
2	Program to perform numerical operations (MAX, MIN, AVG, SUM, SQRT, ROUND).	**4**	**CO2**
3	Program to perform Statistical Operations (Mean, Median, Mode, Variance and Standard Deviation.	**4**	**CO2**
4	Program for Control flow Statements.	**4**	**CO3**
5	Program for Looping Statements.	**4**	**CO3**
6	Program using Vectors(1D), Matrices(2D), Arrays.	**4**	**CO4**
7	Program to perform Matrix addition, subtraction, multiplication using vector concept.	**4**	**CO4**
8	Program using Factors function.	**4**	**CO4**
9	Program for Data Input (Keyboard) / Import (Text File, Excel)	**4**	**CO5**
10	Program for Working with Basic Graphs (Simple Bar, Mean Bar, Tweaking Bar, and Pie Chart).	**4**	**CO5**
11	Program for Creating, Recording, Renaming, Missing Values.	**4**	**CO5**

12	Working with Mathematical, Character and Other functions	**4**	**CO5**

COURSE OUTCOMES (CO):

On Successful Completion of this Course, the Student can	
CO1	To know the mandatory commands and functions of console application development in R Environment.
CO2	To understand the notations used for statistical operations.
CO3	To know about Control Structures syntax in detail.
CO4	To know about role of memory management operators in Matrix and Array operations.
CO5	To make understanding in data Import and Export in various data types, Record Manipulation, Graphs and specialized functions.

18UCASBCP602	SBC PRACTICAL IV: MOBILE APPLICATION DEVELOPMENT	SEMESTER-VI

COURSE OBJECTIVES:

The course aims

- To develop and implement basic mobile applications in Androidx`

Credits: 2 **Total Hours: 36**

S.No	PROGRAMS	Hrs	CO
1	Create an application to display Hello World.	**3**	**CO1**
2	Create an Application to compute different Arithmetic Operations using Buttons.	**3**	**CO2**
3	Create an Application to Open Multiple Activities using Buttons.	**3**	**CO2**
4	Create an Application to Pickup order of different items using Checkbox.	**3**	**CO3**
5	Develop a simple Calculator application.	**3**	**CO3**
6	Create simple Home Screen Widget.	**3**	**CO3**
7	Create Chat Application.	**3**	**CO4**
8	Create simple Camera application.	**3**	**CO4**
9	Create Basic List View Demo.	**3**	**CO4**
10	Create a simple Web Browser.	**3**	**CO5**
11	Create a simple location finder application	**3**	**CO5**
12	Create a simple alarm clock.	**3**	**CO5**

COURSE OUTCOMES (CO):

On Successful completion of this course, the student can	
CO1	Apply general programming knowledge to develop mobile applications
CO2	Design and develop user Interfaces for the Android platform
CO3	Write simple GUI based mobile applications
CO4	Learn to develop mobile applications using database concepts
CO5	Model new applications for hand held devices

18ULS601	**CAREER COMPETENCY SKILLS-IV**	**SEMESTER – VI**

COURSE OBJECTIVES:

The course aims

- To understand the basic needs of Communication
- To utilize the communication skills for achieving at the time of Interview

Total Hours: 15

UNIT	**CONTENTS**	**Hrs**	**CO**
I	Basic Grammar- English usage- Reading and Writing (Level-2) Direct and Indirect Speech	3	CO1
II	Spotting Errors – Parts of speech and Punctutation	3	CO2
III	Role Play – Just a Minute (JAM) -Group Discussion	3	CO3
IV	Interview Presentation (Self-Introduction)-Critical thinking,problem solving.	3	CO4
V	Dress Code and Body Language-Leadership	3	CO5

TEXT BOOK(S):

1	**Basic English Grammar for English-**Book 1, Learners,Anne Seaton, *Y.H.Mew*, Saddlepoint Publishers(E-Copy)
2	**Basic English Syntax with Exercises**, *Mark Newson*(E-Copy)

REFERENCE BOOK

1	**Objective General English**, *S.Chand, Dr.R.S.Agarwal*

COURSE OUTCOMES (CO):

On Successful completion of this course, the student can	
CO1	Recall the basic grammar in language
CO2	Concentrate on sentence correction
CO3	Recognize the differences among facts, opinions and judgment.
CO4	Develop their personal skills through interview
CO5	Appropriately apply their learning and leadership style and strength

18UCAAL401	ADVANCED LEARNERS COURSE: SOFTWARE TESTING	SEMESTER – IV

COURSE OBJECTIVES:

The course aims

- The basics of Testing
- The installation and usage of Testing tools
- Various Testing methods

UNIT	CONTENTS	CO
I	**Assessing Capabilities, Staff Competency, and User Satisfaction:** The Three-Step Process to Becoming a World-Class Testing Organization. **Creating an Environment Supportive of Software Testing:** Minimizing Risks: Risks Associated with Implementing Specifications - Writing a Policy for Software Testing - Testing-An Organizational Issue.	CO1
II	**Building the Software Testing Process:** Software Testing Guidelines - Workbench Concept - Customizing the Software-Testing Process. **Selecting and Installing Software Testing Tools:** Integrating Tools into the Tester's Work Processes - Tools Available for Testing Software - Selecting and Using Test Tools - Training Testers in Tool Usage - Appointing Tool Managers.	CO2
III	**Verification Testing:** Objective – Workbench – Input - Do Procedures: Task 1: Test During the Requirements Phase - Task 2: Test During the Design Phase - Task 3: Test During the Programming Phase. **Validation Testing:** Objective – Workbench – Input - Do Procedures: Task 1: Build the Test Data - Task 2: Execute Tests - Task 3: Record Test Results. **Post-Implementation Analysis:** Workbench – Do Procedures - Task 1: Establish Assessment Objectives.	CO3
IV	**Software Development Methodologies:** How Much Testing is	CO4

	Enough? - Software Development Methodologies - Defining Requirements - Methodology Maturity - Competencies Required - Configuration-Management Controls. **Testing Client/Server Systems:** Overview - Workbench - Input - Do Procedures: Task 1: Assess Readiness - Task 2: Assess Key Components - Task 3: Assess Client Needs.	
V	**Rapid Application Development Testing:** Overview – Objective - Concerns - Workbench - Input - Do Procedures: Testing Within Iterative RAD - Spiral Testing - Check Procedures - Output - Guidelines. **Testing Internal Controls**: Overview – Internal Controls: Control Objectives - Preventive Controls - Detective Controls - Corrective Controls - Cost/Benefit Analysis. **Testing Web-Based Systems:** Overview - Workbench - Input - Do procedures: Task 1: Select Web-Based Risks to Include in the Test Plan - Task 2: Select Web-Based Tests - Task 3: Select Web - Based Test Tools - Task 4: Test Web-Based Systems.	**CO5**

TEXT BOOK(S)

1	*William E Perry.* 2012, **Effective Methods for Software Testing**. [Third Edition].Wiley Publishing, Inc.

REFERENCE BOOKS:

1	*Srinivasan Desikan. Gopalaswamy Ramesh.* 2005, **Software Testing Principles and Practices**, [First Edition], Pearson Education.
2	*Boris Beizer.* 2002, **Software Testing Techniques**, [Second Edition], Dreamtech Press.
3	*Ron Patten.* 2005, **Software Testing**, [Second Edition], Pearson Education, India.

WEB REFERENCES:

1	https://www.tutorialspoint.com/software_testing/

2	https://www.guru99.com/software-testing.html
3	https://www.softwaretestingmaterial.com/manual-testing-tutorial/

COURSE OUTCOMES (CO):

On Successful completion of this course, the student can	
CO1	Understand the testing basics
CO2	Select the required test tools
CO3	Perform the Verification and Validation test
CO4	Understand the limitation of testing and can also test the Client/Server Systems
CO5	Can test the RAD and Web-based Systems

MAPPING:

PSO / CO	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	L	L	M	L	L
CO2	M	L	H	M	M
CO3	H	H	H	M	H
CO4	H	H	H	M	H
CO5	H	H	H	H	H

H-High; M-Medium; L-Low

EVALUATION GUIDELINES

1. SUBMISSION OF RECORD NOTE BOOKS AND PROJECT DISSERTATION:
Candidates appearing for Practical Examinations and Project Viva-Voce shall submit Bonafide Record Note Books/ Dissertation prescribed for Practical/ Project Viva-Voce Examinations, otherwise the candidates will not be permitted to appear for the Practical/ Project Viva-voce Examinations.

2. PASSING MINIMUM AND INTERNAL MARK DISTRIBUTION (Theory, Practical and Project)

(i) A. THEORY
The candidate shall be declared to have passed the Examination, if the candidate secure not less than 40 marks put together out of 100 in the Comprehensive Examination in each Theory paper with a passing minimum of 30 marks in External out of 75.

Internal Marks Distribution ***[CA- Total Marks: 25]***

Attendance	: 5 Marks
Assignment	: 5 Marks
Internal Examinations	: 15 Marks
Total	**: 25 Marks**

B. (i) THEORY (If Internal Evaluation is for 100 Marks)
The candidate shall be declared to have passed the Examination, if the candidate secures not less than 40 marks out of 100 in the Comprehensive Examination (Internal Evaluation only).

Internal Marks Distribution

Attendance	: 10 Marks
Assignment	: 30 Marks (3 Assignments Compulsory)
Internal Examinations	: 60 Marks
Total	**: 100 Marks**

For SBC III & IV (Technical Skills I & II) Mode of examination is Online and questions are objective type.

(ii) PRACTICAL
The candidate shall be declared to have passed the Examination, if the candidate secures not less than 40 marks put together out of 100 in the Comprehensive Examination in each Practical paper with a passing minimum of 24 marks in

External out of 60.

***Internal Marks Distribution** [CA- Total Marks: 40]*

Experiment	: 10 Marks (10-12 Experiments)
Attendance	: 5 Marks
Record	: 5 Marks
Internal Examinations	: 20 Marks
Total	**: 40 Marks**

(iii) PROJECT WORK

The candidate shall be declared to have passed the Examination, if the candidate secure not less than 40 marks put together out of 100 in the Comprehensive Examination in each Project with a passing minimum of 24 marks in External out of 60.

Internal Mark Distribution **[CA - Total Marks: 40 Marks]**

1.	Research work done	:	10 Marks
2.	Attendance	:	5 Marks
3.	Record	:	5 Marks
4.	Review	:	20 Marks (Three reviews)
	Total	**:**	**40 Marks**

(iv) CAREER COMPETENCY SKILLS

1. CCS III

- 100 questions-100 minutes
- Twenty questions from each UNIT.
- On line examination will be conducted at the end of the III Semester.

2. CCS IV -Viva Voce (IV Semester)

- A Student has to come in proper dress code and he/she should bring 2 copies of Resume for the Viva Voce.
- A student may be asked to
    - Give Self Introduction
    - Submit the resume to the examiner(s) and answer the questions based on it.

- Speak on any given topic for at least two minutes.
- Give a presentation for 10 minutes on a topic of their choice.
- Sit with other students in a Group for a Discussion.

3. QUESTION PAPER PATTERN AND MARK DISTRIBUTION

***(i) THEORY* (For 75 marks)**
Question Paper Pattern and Mark Distribution

1. **PART – A (10 x 2 = 20 Marks)**
   Answer ALL questions
   Two questions from each UNIT

2. **PART – B (5 x 5 = 25 Marks)**
   Answer ALL questions
   One question from each UNIT with Internal Choice

3. **PART – C (3 x 10 = 30 Marks)**
   Answer ANY THREE questions
   Open Choice – 3 out of 5 questions
   One question from each UNIT

(ii) *THEORY* (100% Internal & External Evaluation)
Question Paper Pattern and Mark Distribution

1. **PART – A (10 x 2 = 20 Marks)**
   Answer ALL questions
   Two questions from each UNIT

2. **PART – B (5 x 7 = 35 Marks)**
   Answer ALL questions
   One question from each UNIT with Internal Choice

3. **PART – C (3 x 15 = 45 Marks)**
   Answer ANY THREE questions
   Open Choice – 3 out of 5 questions
   One question from each UNIT

(iii) PRACTICAL
Question Paper Pattern and Mark Distribution [Maximum Marks 60]

Question Paper Pattern

- Practical Examinations shall be conducted at the end of concern Semester.
- Student shall write two questions as examiners choice from the practical list.

External Marks Distribution [CE- Total Marks: 60]
For each practical question the marks shall be awarded as follows:

i) Aim	: 5 Marks
ii) Algorithm / Flowchart	: 10 Marks
iii) Writing the Source Code	: 15Marks
iv) Test and debug the Source Code	: 15 Marks
v) Displaying the Output	: 10 Marks
vi) Result Declaration	: 5 Marks
Total	**: 60 Marks**

(iv) PROJECT WORK /DISSERTATION:

External Mark Distribution **[EA – Total Marks: 60 Marks]**

1. Documentation	: 20 Marks
2. Presentation	: 20 Marks
3. Viva Voce	: 20 Marks
Total	**: 60 Marks**

Marks may be proportionately reduced for the errors committed in each of the above.