K.S. RANGASAMY COLLEGE OF ARTS AND SCIENCE

(AUTONOMOUS)

TIRUCHENGODE – 637 215

BACHELOR OF SCIENCE (COMPUTER SCIENCE)

Scheme and Syllabus (2018 – 2021)

BACHELOR OF SCIENCE (COMPUTER SCIENCE)

VISION

To enrich computer education for rural students, by enhancing knowledge and building confidence for facing global competition.

MISSION

- To provide a learning ambience to enhance innovations, problem solving skills, leadership qualities, team-spirit and ethical responsibilities.

- To inculcate the latest tools and technologies for software development to cope withcurrent industrial needs.

PROGRAMME EDUCATIONAL OBJECTIVES(PEO)

PEO1: To solve wide range of real time problems in computing by effectively applying tools and techniques in order to cater the needs of industry and society.

PEO2: To inculcate the multidisciplinary approach, professional attitude and communication skills, to develop in their professional career through life-long learning and higher education.

PEO3: To create an inventive career path by applying innovative project management techniques to become a successful software professional as well as entrepreneur.

.

PROGRAMME OUTCOMES(PO)

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

PO1: Apply the fundamental knowledge in algorithms, programming languages and technical skills to solve problems.

PO2: Exhibit the acquired skills in different domains such as Project Management, Risk Management and Change Management.

PO3: Identify and formulate the techniques, skills, modern tools to solve real time problems.

PO4: Design and construct the software systems of varying complexity with awareness on innovation and sustainable development.

PO5:Analyze the local and global impact of ecofriendly hardware/software applications for sustainable development with professional and ethical responsibilities.

PROGRAMME SPECIFIC OUTCOMES (PSO)

After completion of the programme, the graduates will beable to

PSO1: Define the essential working principles of hardware and software systems.

PSO2: Apply design and development strategy in the creation of software systems.

PSO3:Develop independent thinking, possess problem solving skills and excel in the capability for self-learning.

PSO4: Use knowledge for the development of real time applications with innovative ideas and emerging technologies.

PSO5: Understand and formulate professional, ethical, legal, security and social issues and responsibilities for the computing profession.

REGULATIONS

ELIGIBILITY

A candidate who has passed in Higher Secondary Examination with Mathematics or Business Mathematics or Computer Science or 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 TamilNaduor an Examination accepted as equivalent thereto by the syndicate, subject to such conditions as may be prescribed thereto are permitted to appear and qualify for the Bachelor of Science in Computer Sciencedegree examinationof this university after a course of study of three academic years.

DURATION OF THE PROGRAMME

The programshall extend over a period of threeyears, comprising of six semesters with two semesters in one academic year. There shall not be less than 90 working days for each semester. The examinationshall be conducted at the end of every semester for the respective courses.

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

Subject Code	Subject	Hrs. of Instruction	Exam Duration (Hrs)	Max Marks			Credits
				CA	CE	Total	
First Semester							
Part I							
18UTALA101/ 18UHILA101/ 18UFRLA101	Tamil-I/ Hindi-I/ French-I	5	3	25	75	100	3
Part II							
18UENLA101	Foundation English-I	5	3	25	75	100	3
Part III							
18UCSM101	Core I: Problem Solving Techniques and C Programming	5	3	25	75	100	4
18UCSM102	Core II: Information Technology	4	3	25	75	100	2
18UMACSA101	Allied I: Algebra and Calculus	5	3	25	75	100	4
18UCSMP101	Core Practical I: Programming in C	2	3	40	60	100	2
18UCSMP102	Core Practical II: Office Package	2	3	40	60	100	2
Part IV							
18UVE101	Value Education I: Yoga	2	3	25	75	100	2
		30				**800**	**22**
Second Semester							
Part I							
18UTALA201/ 18UHILA201/ 18UFRLA201	Tamil-II/ Hindi-II/ French-II	5	3	25	75	100	3
Part II							
18UENLA201	Foundation English-II	5	3	25	75	100	3
Part III							
18UCSM201	Core III: Object Oriented Programming with C++	5	3	25	75	100	4

18UCSM202	Core IV: Computer Architecture	5	3	25	75	100	4
18UMACSA201	Allied II: Numerical Methods	5	3	25	75	100	4
18UCSMP201	Core Practical III: Programming in C++	3	3	40	60	100	2
Part IV							
18UVE201	Value Education II: Environmental Studies	2	3	25	75	100	2
		30				**700**	**22**
Third Semester							
Part I							
18UTALA301/ 18UHILA301/ 18UFRLA301	Tamil-III/ Hindi-III/ French-III	5	3	25	75	100	**3**
Part II							
18UENLA301	Foundation English-III	5	3	25	75	100	**3**
Part III							
18UCSM301	Core V: Programming in Java	4	3	25	75	100	4
18UCSM302	Core VI: Data Structures	4	3	25	75	100	4
18UMACSA301/ 18UECCSA301	Allied III: Statistical Methods/Digital Electronics and Microprocessor	4	3	25	75	100	4
18UCSMP301	Core Practical IV: Programming in Java	2	3	40	60	100	2
Part IV							
18UCSSBP301	SBC Practical I:Web Designing using HTML,CSS (Internal Evaluation)	2	3	100	-	100	2
	NMEC I	2	3	25	75	100	2
Non Credit							
18ULS301	Career Competency Skills I	1	-	-	-	-	-

	Add-On Course I	**1**	3	40	60	100	-
		30				**900**	**24**
Fourth Semester							
Part I							
18UTALA401/ 18UHILA401/ 18UFRLA401	Tamil-IV/ Hindi-IV/ French-IV	5	3	25	75	100	3
Part II							
18UENLA401	Foundation English–IV	5	3	25	75	100	3
Part III							
18UCSM401	Core VII: Programming in .NET(VB.NET & ASP.NET)	4	3	25	75	100	4
18UCSM402	Core VIII: Relational Database Management Systems	4	3	25	75	100	4
18UMACSA401/ 18UECSA401	Allied IV: Operations Research/Internet of Things	4	3	25	75	100	4
18UCSMP401	Core Practical V: Programming in .NET	2	3	40	60	100	2
Part IV							
18UCSSBP401	SBC Practical II: JavaScript(Internal Evaluation)	2	3	100	-	100	2
	NMEC II	2	3	25	75	100	2
Non Credit							
18ULS401	Career Competency Skills II	1	-	-	-	-	-
	Add-On Course II	1	3	40	60	100	-
		30				**900**	**24**

Fifth Semester							
Part III							
18UCSM501	Core IX: Data Mining and Warehousing	6	3	25	75	100	4
18UCSM502	Core X: Software Engineering	5	3	25	75	100	4
18UCSM503	Core XI: Operating Systems	5	3	25	75	100	4
	Elective : I	5	3	25	75	100	3
18UCSMP501	Core Practical VI: R-Programming	3	3	40	60	100	3
18UCSMP502	Core Practical VII: Computer Hardware	3	3	40	60	100	3
Part IV							
18UCSSBP501	SBC Practical III: MySQL(Internal Evaluation)	2	3	40	60	100	2
Part V							
18UCSE501	Extension Activity	-	-	-	-	-	2
Non Credit							
18ULS501	Career Competency Skills III	1	-	-	-	-	-
		30				**700**	**25**
Sixth Semester							
Part III							
18UCSM601	Core XII: Python Programming	6	3	25	75	100	4
18UCSM602	Core XIII: Computer Networks [Fifth Unit as Self- study]	6	3	25	75	100	4
	Elective II	6	3	25	75	100	3
18UCSMP601	Core Practical VIII: Python Programming	3	3	40	60	100	3
18UCSMP602	Core Practical IX: Computer Networking	3	3	40	60	100	3
18UCSPR601	Project Work	3	3	40	60	100	4

Part IV							
18UCSSBP601	SBC Practical IV: PHP(Internal Evaluation)	2	3	40	60	100	2
Non Credit							
18ULS601	Career Competency Skills IV	1	-	-	-	-	-
		30				**700**	**23**
					Grand Total	**4700**	**140**

ADD-ON COURSE

The department offers the following two subjects as ADD-ON Course in third and fourth semester.

S.No.	Semester	Subject Code	Subject
1	III	18UCSAC301	DTP
2	IV	18UCSAC401	Animation

ADVANCED LEARNER COURSE

The department offers the following two subjects as Advanced Learners Course in fourth and fifth semesters.

S.No.	Semester	Subject Code	Subject
1	IV	18UCSAL401	Mobile Commerce
2	IV	18UCSAL402	Cyber Security
3	Online Certification Courses		

S.No.	Semester	Subject Code	Subject
1	V	18UCSAL501	Software Project Management
2	V	18UCSAL502	Artificial Intelligence and Expert Systems
3	Online Certification Courses		

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	18UCSNM301	Internet Technology
2	IV	18UCSNM401	Principles of Web Design

ELECTIVE I

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

S.No	Subject Code	Subject
1.	18UCSEL501	E-Commerce
2.	18UCSEL502	Computer Graphics

ELECTIVE II

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

S.No	Subject Code	Subject
1.	18UCSEL601	Cloud Computing
2.	18UCSEL602	Mobile Computing

FOR COURSE COMPLETION

Student shall complete:

- Language subjects (Tamil/Hindi/French, English) in I, II, III and IV semester.
- All Major papers.
- Value Education: Yoga and Environmental Studies in I and II semester respectively.
- Allied subjects in I, II, III and IV semester.
- Skill Based Course in III and IV semester.
- Non-Major Elective Course in III and IV semester.
- Career Competency Skills in III and IV,V and VI semester.
- Add-on Course in III and IV semester.
- Advanced Learners Course in IV and V semester.
- Extension activity in V semester.
- Elective subjects in the V and VI semesters.
- An In-House project and Viva-voce at the end of VI semester.

TOTAL CREDITS DISTRIBUTION

Components	Subjects	No. of Subjects x Marks	Total	Credits x Papers	Credits
Part - I	Tamil	4 x 100 =	400	3 x 4 papers	12
Part - II	Foundation English	4 x 100 =	400	3 x 4 papers	12
Part - III	Core	13 x 100 =	1300	4 x 12 papers	48
				2 x 1 paper	02
	Project	1 x 100 =	100	4 x 1 paper	04
	Core Practical	7 x 100 =	700	3 x 4 papers	12
				2 x 5 papers	10
	Elective	2 x 100 =	200	3 x 2 papers	06
	Allied	4 x 100 =	400	4 x 4 papers	16
Part - IV	VE (Yoga, EVS)	2 x 100 =	200	2 x 2 papers	04
	SBC	4 x 100 =	400	2 x 4 papers	08
	NMEC	2 x 100 =	200	2 x 2 papers	04
Part - V	Extension Activity	-	-	2 x 1 activity	02
Total		**43 x 100 =**	**4300**		**140**

18UTALA101	**TAMIL – I: கவிதைகளும் கதைகளும்**	**பருவம் - I**

இப்பாடத்திட்டத்தின் நோக்கங்களாவன:

1.தற்காலத்தமிழ் இலக்கியவகைகளைமாணவர்களுக்குக் கற்பித்தல்.

2.காலந்தோறும் தமிழ்க் கவிதைவளர்ச்சிநிலைகளைஅறிமுகப்படுத்துதல்.

3.அடிப்படைத் தமிழ் இலக்கணத்தைக் கற்பித்துஅரசுப்போட்டித் தேர்வுகளுக்கு ஆயத்தப்படுத்துதல்.

Credits: 3 **Total Hours: 50**

UNIT	CONTENTS	Hrs	CO
I	**மரபுக் கவிதைகள்** அ.பாரதியார் - பாரததேசம் ஆ.பாரதிதாசன் - தமிழின் இனிமை இ. நாமக்கல் கவிஞர் - கவிதைஎன்றால் என்ன? ஈ. முடியரசன் - நல்லஉலகமடா!	10	**CO1**
II	**புதுக்கவிதைகள்** அ.வைரமுத்து - ரத்ததானம் - தண்ணீர் பிச்சை ஆ.வெ.இறையன்பு - பூபாளத்திற்கொருபுல்லாங்குழல் - பனித்துளியில் பாற்கடல் இ. தீபா - மழைக்குஒருமடல் - பாரதியார்,வறுமை ஈ. சிற்பி - ஒருகிராமத்துநதி–ஒருகிராமத்துநதி	10	**CO2**
III	**சிறுகதைகள்** அ.அறிஞர் அண்ணா - செவ்வாழை ஆ. கிருத்திகா - உழவுமாடுகள் இ.வள்ளி.வ. - தணல் துண்டாய்...சிலதருணங்கள் ஈ.தி.ஜானகிராமன் - முள்முடி	10	**CO3**

IV	**இலக்கியவரலாறு** அ. மரபுக்கவிதையின் தோற்றமும் வளர்ச்சியும் ஆ. புதுக்கவிதையின் தோற்றமும் வளர்ச்சியும் இ. சிறுகதையின் தோற்றமும் வளர்ச்சியும் ஈ. நாடகத்தின் தோற்றமும் வளர்ச்சியும்	10	**CO4**
V	**அடிப்படை இலக்கணம்** அ.முதலெழுத்துகள் மற்றும் சார்பெழுத்துகள் (நன்னூல் விதிப்படிவிளக்கம்) ஆ.வல்லினம் மிகும் மிகா இடங்கள். இ. மரபுப் பெயர்கள் - இளமைப் பெயர்கள்	10	**CO5**
TEXT BOOK:			
1.	தமிழ்த்துறைவெளியீடு,கே.எஸ்.ரங்கசாமிகலைஅறிவியல் கல்லூரி(தன்னாட்சி), திருச்செங்கோடு.		

COURSE OUTCOMES (CO):

இப்பாடத்தைக் கற்பதன் வாயிலாகமாணவர்கள் பெறும் பயன்களாவன:

CO1	மரபுக்கவிதைகளின் வடிவங்களைஅறிதல்.
CO2	புதுக்கவிதைகளின் வடிவங்கள் மற்றும் பாடுபொருள் தன்மையைஅறிதல்.
CO3	சிறுகதைகளின் உருவம்,உள்ளடக்கங்களைஅறிதல்
CO4	காலந்தோறும் மாறும் இலக்கியவளர்ச்சியைஅறிதல்
CO5	எழுத்துகளின் வகைகளைஅறிதல்.

18UENLA101	FOUNDATION ENGLISH – I	SEMESTER – I

COURSE OBJECTIVES:

The course aims

- To enable the students to develop their comprehensive skill.
- To introduce the students to know about English poetry.
- To introduce the students to know about English short stories.

Credits: 3 **Total Hours: 50**

UNIT	CONTENTS	Hrs	CO
I & II	**POETRY** William Wordsworth - The Solitary Reaper Margaret Atwood - This Is a Photograph of Me **SHORT STORY** A. J. Cronin - Two Gentlemen of Verona **GRAMMAR** Parts Of Speech Articles **COMPOSITION** Letter Writing – Formal **COMMUNICATION SKILLS** Greeting and Introducing Inviting a Person	**20**	**CO1 & CO2**
III & IV	**POETRY** Robert Frost - The Road Not Taken **SHORT STORIES** Pearl S. Buck - The Refugees C. Rajagopalachary – Tree Speaks **GRAMMAR** Kinds of Sentences **COMPOSITION** Dialogue Writing **COMMUNICATION SKILLS** Seeking Permission Offering a Suggestion and Giving an Advice	**20**	**CO3 & CO4**

V	**SHORT STORY** R. K. Narayan - The Axe **GRAMMAR** Question Tag **COMPOSITION** Reading Comprehension **COMMUNICATION SKILLS** Persuading	**10**	**CO5**
TEXT BOOKS:			
1.	*G.Damodar,D.Venkateshwarlu,M.Narendra,M.SaratBabu,G.M.Sundaravalli.* 2009. **English For Empowerment**. Published by Orient BlackswanPrivate Limited. Hyderabad.		
2.	*M.M.Lukose*. 2010. **Images,AhandbookofStories.**MacmillanPublishers Indian Limited. Chennai.		
3.	*Dr.A.Shanmugakani,* M.A., Ph.d, **Prose for Communication**. Manimekala Publishing House, Madurai.		
4.	*SasiKumar V and SyamalaV*. 2006.**Form and Function A CommunicativeGrammar for Colleges.** Emerald Publishers. Chennai.		
5.	*T.M.Farhathullah.*2006.**Communication Skills For Undergraduates**. Publishers-RBA Publications. Chennai.		
REFERENCE BOOK:			
1.	*Thomas, A.J and Martinet, A.V.* 1994.**A Practical English Grammar.** Oxford University Press. Delhi.		

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.

18UCSM101	CORE I: PROBLEM SOLVING TECHNIQUES AND C PROGRAMMING	SEMESTER - I

COURSE OBJECTIVES:

The Course aims

- To explore the problem solving concepts.
- To acquire the basic knowledge in C programming.
- To implement the problem solving techniques using C language.

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**: Exchanging the Values of Two Variables-Reversing the Digits of an Integer. **Factoring Methods**: Finding the Square Root of a Number - Generating Prime Numbers.**Array Techniques:** Finding the Maximum Number in a Set-Finding the k^{th} Smallest Element.	**10**	**CO1**
II	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 -	**10**	**CO2**

	Data Types -Overflow and Underflow Data. **Operators and Expressions**: Arithmetic Operators - Relational Operators - Logical Operators - Assignment Operators- Increment and Decrement Operators - Conditional Operator- Bitwise Operators - Special Operators - Arithmetic Expressions - Evaluation of Expressions - Mathematical Functions. **Managing Input and Output Operations:** Introduction - Reading a Character -Writing a Character - Formatted Input-Formatted Output.		
III	**Decision Making and Branching:** 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. **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.	**10**	**CO3**
IV	**Character Arrays and Strings:** Declaring and Initializing String Variables- Reading Strings from Terminal - Writing Strings to Screen - Arithmetic Operations on Characters –String-handling	**10**	**CO4**

	Functions. **User-defined Functions:** 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 - Recursion – The Scope, Visibility and Lifetime of Variables.		
V	**Pointers:** Introduction- Understanding Pointers- Accessing the Address of a Variable- Declaring Pointer Variables- Initialization of Pointer Variables- Accessing a Variable through its Pointer - Pointers and Arrays- Pointers and Character Strings-Array of Pointers- Pointers as Function Arguments- Functions Returning Pointers-Pointers to Functions. **Structures and Unions:** Defining a Structure - Declaring Structure Variables - Accessing Structure Members - Structure Initialization - Array of Structures - Arrays within Structures - Structures within Structures - Unions - Size of Structures - Bit Fields.	**10**	**CO5**
TEXT BOOKS:			
1.	*R.G.Dromey***.** 2011. **How to solve it by Computer**. PHI,New Delhi. (**Unit I)**		
2.	*Balagurusamy E.* 2011.**Programming in ANSI C.** [Fifth Edition]. Tata McGraw Hill, New Delhi. **(Unit II-V)**		

REFERENCE BOOKS:	
1.	*Suresh Srivastava.*K. 2017.**C in Depth**. [Third Edition]. BPB Publications, NewDelhi.
2.	*YashavantKanetkar*. 2016**. Let Us C**. [Fifteenth Edition]. BPB Publications, NewDelhi.
3.	*ThamaraiSelvi S. and Murugesan R*. 1999.**C for all**. [First Edition]. Anuradha Agencies, Kumbakonam.
4.	*Jeyapoovan T.* 2007. **A First Course in Programming with C**. [Second Edition].Vikas Publishing House Pvt. Ltd., New Delhi.
5.	*Deitel&Deitel*. "**C How to Program**". [Eighth Edition]. Prentice Hall.
6.	*Byron Gottfried.* "**Programming in C**". Tata McGraw Hill.
7.	*Al Kelley & Ira Pohl.* "**A Book on C**". [Fourth Edition]. Pearson Education, Asia.
8.	**Handout: Problem Solving and C Programming**. 2007. Version: PSC/Handout/0307/2.1, Cognizant.
WEB REFERENCES:	
1.	http://www.learn-c.org/
2.	http://www.tutorialspoint.com/cprogramming/
3.	https://www.geeksforgeeks.org/

COURSE OUTCOMES (CO):

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

CO1	Attain problem solving ability.
CO2	Know the basic terminology of C Programming.
CO3	Develop programs using control structures and arrays.
CO4	Understand the String handling andfunctions.
CO5	Develop the program using Pointers and Structure concepts.

MAPPING:

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

H-High; M-Medium; L-Low

18UCSM102	**CORE II: INFORMATION TECHNOLOGY**	**SEMESTER - I**

COURSE OBJECTIVES:

The Course aims

- To understand the major components of Computer System and its working principles.
- To know the role of an Operating System and basic terminologies of networks.
- To study the usage of Information Technology aids for the Current Scenario.

Credits: 2 **Total Hours: 40**

UNIT	CONTENTS	Hrs	CO
I	**Computer Basics: Introduction** - Evolution of Computers- Generations of Computers- Classification of Computers-The Computer System- Applications of Computers. **Data and Information:** Introduction-Types of Data – Simple Model of a Computer – Data Processing Using a Computer - Desktop Computer. **Acquisition of Numbers and Textual Data:** Introduction - Input Units - Internal Representation of Numeric Data – Representation of Characters in Computers –Error Detecting Codes.	**08**	**CO1**
II	**Data Storage:** Introduction -Storage Cell – Physical Devices Used as Storage Cells –Random Access Memory – Read Only Memory - Secondary Storage –Compact Disk Read Only Memory (CDROM) - Archival Store. **Central Processing Unit:** Introduction**–**The Structure of a Central Processing	**08**	**CO2**

	Unit – Specifications of a CPU - Interconnection of CPU with Memory and I/O Units.		
III	**Computer Networks:** Introduction – Local Area Network (LAN) – Applications of LAN – Wide Area Network (WAN) – Future of Internet Technology. **Output Devices:** Introduction – Video Display Devices – Touch Screen Display – E-Ink Display - Printers.	**08**	**CO3**
IV	**Computer Software:** Introduction – Operating System - Programming Languages – Classification of Programming Languages. **Data Organization:** Introduction – Organizing a Database – Structure of a Database – Database Management System - Example of Database Design.	**08**	**CO4**
V	**Some Internet Applications:** Introduction – Email - The World Wide Web - Information Retrieval from the World Wide Web - Other Facilities Provided by Browsers - Audio on the Internet. **Societal Impacts of Information Technology:** Careers in Information Technology.	**08**	**CO5**
TEXTBOOKS:			
1.	*RajaramanV*. 2013.Introduction to Information Technology. [Eleventh Printing]. Prentice Hall of India Pvt. Limited, New Delhi. (UNIT I to V)		
2.	*ITL Education Solutions Limited*, 2013. Introduction to Information Technology. [Second Edition]. Pearson Education, New Delhi. (UNIT I - Computer Basics Chapter)		

REFERENCE BOOKS:	
1.	*Alexis Leon and MathewsLeon. 2009.* Fundamentals of Information Technology. [Second Edition]. Leon TechWorld, New Delhi.
2.	*ITL Educations Solution Limited.* 2011. **Introduction to Computer Science**. Pearson Education, India.
3.	*Nagpal, D.P.* 2010. **Computer Fundamentals**. [First Edition, Revised]. S.Chand& Company Ltd, New Delhi.
WEB REFERENCES:	
1	https://www.geeksforgeeks.org
2	http://best-knowledge-of-computer.blogspot.com
3	https://cs.lmu.edu/~ray/notes/inetapps

COURSE OUTCOMES (CO):

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

CO1	Understand the basic components of a computer system.
CO2	Aware of secondary storage devices and their characteristics.
CO3	Understand the concepts and fundamentals of data communication and computer networks.
CO4	Utilize database management systems to manipulate data for various applications.
CO5	Gain knowledge of Internet technologies and basic web authoring.

MAPPING:

PSO / CO	**PSO 1**	**PSO 2**	**PSO 3**	**PSO 4**	**PSO 5**
CO1	H	H	H	M	M
CO2	H	M	M	H	H
CO3	M	H	M	H	H
CO4	M	H	M	M	H
CO5	H	H	M	H	H

H-High; M-Medium; L-Low

18UMACSA101/ 18UMAECA101	ALLIED I: ALGEBRA AND CALCULUS	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 differentiation and integration.

Credits: 4 **Total Hours: 50**

UNIT	CONTENTS	Hrs.	CO
I	**Matrices:** Matrix operations – Characteristics equation of a matrix – Eigen values and Eigen vectors – Cayley-Hamilton Theorem (Statement only) and its problems – Rank of a matrix – Problems.	10	CO 1
II	**Theory of Equation:** Relation between roots and coefficients (Problems based on A.P., G.P. and H.P.) – Imaginary and Irrational roots.	10	CO 2
III	**Differentiation:** Differential coefficient of a sum or difference – Product rule – Quotient rule – Function of function rule. **Successive Differentiation:** The nth derivative - Leibnitz formula for nth derivative – problems.	10	CO 3
IV	**Partial differentiation:** Partial derivative - Partial derivatives of higher orders – Homogeneous functions (Euler theorem on homogeneous functions) – Problems.	10	CO 4
V	**Methods of integration:** Integral of functions involving $\sqrt{a^2+x^2}$ - Integration by parts – Bernoulli's formula.	10	CO 5

TEXT BOOK:

1.	*Vittal, P.R.* 2002. **Allied Mathematics.** [Third Edition].Margham Publications, Chennai.

REFERENCEBOOKS:

1.	*ManicavachagamPillay, T.K. and Narayanan, S.* 2004. **Algebra –Vol II.** Vijay Nicole

	Imprints Private Limited, Chennai.
2.	*Singaravelu. A.*2002. **Allied Mathematics.** Meenakshi Publishers, Chennai.

COURSE OUTCOMES (CO):

On completion of this course, the students will be able to

CO 1	Calculate Eigen values and Rank of a matrix
CO 2	Solve algebraic equations
CO 3	Understand the variations in variables.
CO 4	Understand the difference between partial and total differentiation
CO 5	Evaluate simple integrations

MAPPING:

PSO / CO	PSO 1	PSO 2	PSO 3	PSO 4	PSO 5
CO 1	M	M	H	M	M
CO 2	M	M	H	M	M
CO 3	M	H	H	M	M
CO 4	M	H	M	H	M
CO 5	M	M	M	H	M

H-High; M-Medium; L-Low

18UCSMP101	CORE PRACTICAL I: PROGRAMMING IN C	SEMESTER - I

COURSE OBJECTIVES:

The course aims

- To acquire the knowledge of C language.
- To develop basic programming skills.

Credits: 2 **Total Hours: 30**

S.No.	PROGRAMS	Hrs	CO
1.	Program to find the Simple interest and Compound interest (Operators).	**3**	**CO1**
2.	Program to find the greatest among the three numbers(Branching).	**3**	**CO2**
3.	Program to find the Fibonacci Series (Looping).	**3**	**CO2**
4.	Program to Sort N numbers in an Array.	**3**	**CO3**
5.	Program to perform Matrix addition and subtraction (Arrays).	**3**	**CO3**
6.	Program to check the given string is a Palindrome(String Handling Functions).	**3**	**CO3**
7.	Program to print Employee details using User defined functions.	**3**	**CO4**
8.	Program to find Factorial using Recursion.	**3**	**CO4**
9.	Program to display the Student Details using Structure	**3**	**CO4**
10.	Program to Swap two numbers using Pointers	**3**	**CO5**

WEB REFERENCES:

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

COURSE OUTCOMES (CO):

On completion of this course, the students will be able to

CO1	Develop simple programs.
CO2	Implement various control structures.
CO3	Develop program using Arrays and String Handling concepts.
CO4	Implement Function and Structure concepts.
CO5	Understand Pointer concepts.

18UCSMP102	CORE PRACTICAL II:OFFICE PACKAGE	SEMESTER – I

COURSE OBJECTIVES:

The Course aims

- To explore the knowledge in office automation tools.
- To standardize theoffice routine.

Credits: 2 **Total Hours: 20**

S.No	PROGRAMS	Hrs	CO
WRITER			
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.	**2**	**CO1**
2.	Create and design Admission/Enquiry forms (shapes, Textboxes, colors, tables).	**2**	**CO2**
3.	Prepare an invitation for the college function using mail merge option.	**2**	**CO1**
CALC			
4.	Prepare a grade sheet of a student using formula, sorting and filtering, Conditional Formatting, Merge & Center.	**2**	**CO3**
5.	Create a pay slip using functions.	**2**	**CO3**
6.	Prepare charts to show a company's sales performance report.	**2**	**CO3**
7.	Prepare Income and Expenses Statement and apply the options in Data Menu wherever necessary.	**2**	**CO3**
IMPRESS			
8.	Creating and formatting slides presentations (template & blank slide)	**2**	**CO4**
9.	Creating a Photo Slideshow with captions.	**2**	**CO5**
10.	Create a PowerPoint presentation using graphics and animation	**2**	**CO5**
WEB REFERENCES:			
1.	http://fccweb.pbworks.com		
2.	http://www.openoffice.org		

COURSE OUTCOMES (CO):

On successful completion of this course, the student 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	Improve the quality of output in terms of presentations.

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, Acupressure, Relaxation exercises - Yogasanas – Surya namaskar - Padmasana - Vajrasana - ArdhakattiChakrasana - Viruchasana - Yogamudra - Patchimothasana - Ustrasana - Vakkarasana – Salabasana	6	CO 1
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	CO 2
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	CO 3
IV	**Human Resources Development:** Eradication of Worries - Analysis and Eradication practice - Benefits of Blessings – Effect of good vibrations - Greatness of Friendship -	6	CO 4

	Guidance for good Friendship – Individual Peace and world peace - Good cultural behavioral patterns		
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**	**CO 5**
TEXT BOOK:			
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 - ThathuvagnaniVethathiri Maharishi		
5.	Sound Health through yoga – Dr. K. Chandrasekaran, November 1999 PremKalyan Publications, Madurai		
6.	Light on yoga - BKS.Iyenger		
7.	ThathuvagnaniVethathiri 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.

18UTALA201	**Tamil – II: சமய இலக்கியங்கள்**	**பருவம் - II**

இப்பாடத்திட்டத்தின் நோக்கங்களாவன:

1. சமய இலக்கியங்களைஅறிமுகம் செய்தல்
2. சமயச் சான்றோர் நிலைப்பாட்டைஉணர்த்துதல்
3. சமயங்கள் வளர்த்ததமிழைஅறியச் செய்தல்

Credits: 3 **Total Hours: 50**

UNIT	CONTENTS	Hrs	CO
I	**சைவ,வைணவ இலக்கியங்கள்** அ. சம்பந்தர் தேவாரம் - திருக்கொடிமாடச்செங்குன்றூர்- (**முதல் ஐந்துபாடல்கள்**) ஆ. மாணிக்கவாசகர் - திருவம்மானை - **(முதல் ஐந்துபாடல்கள்**) இ. பெரியாழ்வார் - திருப்பல்லாண்டு (**முதல் ஐந்துபாடல்கள்)**ஈ. ஆண்டாள் - திருமணக் கனவு **(முதல் ஐந்துபாடல்கள்**)	10	**CO1**
II	**கிறித்துவ, இசுலாமிய இலக்கியங்கள்** அ. இரட்சணியயாத்திரிகம் - சிலுவைப்பாடு**(முதல் பத்துப்பாடல்கள்)** ஆ. நாயகம் ஒருகாவியம்–பாம்பின் நேசமும் தோழரின் பாசமும் **(முதல் பத்துப்பாடல்கள்)**	10	**CO2**
III	**சமயச் சான்றோர் வரலாறு** அ. **சைவசமயச் சான்றோர்கள்** 1. திருஞானசம்பந்தர், 2. திருநாவுக்கரசர், 3. சுந்தரர், 4. மாணிக்கவாசகர் 5. சேக்கிழார் ஆ. **வைணவசமயச் சான்றோர்கள்** 1. முதலாழ்வார்கள் 2. திருமங்கையாழ்வார் 3.ஆண்டாள் 4. நாதமுனிகள்	12	**CO3**
IV	**சமய இலக்கியவரலாறு** அ.பன்னிருதிருமுறைகள்	08	**CO4**

	ஆ. பதினெண்சித்தர்கள் இ. நாலாயிரதிவ்யபிரபந்தம் ஈ. சைவசித்தாந்தசாத்திரங்கள்		
V	**இலக்கணமும் மொழித்திறனும்** அ. ஆகுபெயர் ஆ. தொகைச்சொற்கள் இ. மயங்கொலிச்சொற்கள் (ர,ற வேறுபாடுகள்) ஈ. நேர்காணல்	10	**CO5**
TEXT BOOK:			
1	தமிழ்த்துறை. வெளியீடு : கே.எஸ்.ரங்கசாமிகலைஅறிவியல் கல்லூரி(தன்னாட்சி),திருச்செங்கோடு– 637 215.		

COURSE OUTCOMES (CO):

இப்பாடத்தைக் கற்பதன் வாயிலாகமாணவர்கள் பெறும் பயன்களாவன:

CO1	தேவார,திவ்யபிரபந்தச் சிறப்பினைஉணர்தல்.
CO2	கிறித்துவ, இசுலாமியகாவியங்களின் சிறப்பினைஉணர்தல்.
CO3	சைவசமய,வைணவசமயச் சான்றோர் சிறப்புக்களைஉணர்தல்.
CO4	சமயவளர்ச்சி, இலக்கியவளர்ச்சிஆகியவற்றைஉணர்தல்
CO5	ஆகுபெயர் வகைகளைஉணர்தல்,மொழித்திறன் பெறுதல்.

18UENLA201	**FOUNDATION ENGLISH – II**	**SEMESTER – II**

COURSE OBJECTIVES:

The course aims

- To enable the students to develop their comprehensive skill.
- To introduce the students to know about English poetry and short stories.

Credits: 3 **Total Hours: 50**

UNIT	CONTENTS	Hrs	CO
I & II	**POETRY** Langston Hughes - I, Too **SHORT STORIES** Vsevolod M. Garshin - The Signal W. Somerset Maugham - The Man with the Scar **GRAMMAR** Tenses (Present, Past & Future) **COMPOSITION** E-mail SMS **COMMUNICATION SKILLS** Asking Questions	**20**	**CO1 & CO2**
III & IV	**POETRY** Chinua Achebe - Refugee Mother and Child Nissim Ezekiel - Goodbye Party for Miss Pushpa T. S **SHORT STORY** H. G. Wells - The Stolen Bacillus **GRAMMAR** Voices (Active and Passive) **COMPOSITION** Note Making, Note Taking **COMMUNICATION SKILLS** Praising and Complimenting Complaining and Apologizing	**20**	**CO3 & CO4**

V	**POETRY** TripuraneniSrinivas - I Will Embrace only the Sun **SHORT STORY** O. Henry - One Thousand Dollars **COMPOSITION** Discourse Pattern **COMMUNICATION SKILLS** Expressing Sympathy Phoning	**10**	**CO5**
TEXT BOOKS:			
1.	*G.Damodar, DVenkateshwarlu, M.Narendra, M.SaratBabu, G.M.Sundaravalli.* 2009. **English For Empowerment**. Published by Orient BlackswanPrivate Limited. Hyderabad –500 029.		
2.	*M.M.Lukose*. 2010. **Images, A hand book of Stories.** MacmillanPublishers Indian Limited. Chennai–600 041.		
3.	*SasiKumarVandSyamalaV*. 2006. **Form and Function A Communicative Grammar for Colleges.** Emerald Publishers. Chennai–600 008.		
4.	*T.M.Farhathullah.*2006. **Communication Skills For Undergraduates**. Publishers-RBA Publications. Chennai–600 015.		
REFERENCE BOOKS:			
1.	*Thomas, A.J and Martinet, A.V.*1994. **A Practical English Grammar.** Oxford University Press. Delhi.		
2.	*Martin Hewings.* 1999. **Advanced English Grammar.** Cambridge University Press. New Delhi.		

COURSE OUTCOMES (CO):

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

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

18UCSM201	CORE III: OBJECT ORIENTED PROGRAMMING WITH C++	SEMESTER - II

COURSE OBJECTIVES:

The course aims

- To understand the improvements of C++ over C.
- To know the Object Oriented Features in C++.
- To understand the concept of Files 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 and 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– 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	**10**	**CO2**

	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 – Constmember functions.		
III	**Constructors and Destructors**: Introduction – Constructors - Parameterized Constructor - Multiple constructors in a class – Constructor with Default Arguments - Dynamic initialization of objects – Copy and dynamic constructors – Destructors. **Operator overloading and Type Conversions**: Introduction - Defining operator overloading -Overloading unary and binary operators – Rules for Overloading Operators.	**10**	**CO3**
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 to objects - Virtual Functions - Pure Virtual Functions.	**10**	**CO4**
V	**Managing console I/O operations**: Introduction – C++Streams – C++ Stream classes – Unformatted	**10**	**CO5**

	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.		

TEXTBOOK:	
1.	*Balagurusamy, E.* 2010. **Object OrientedProgrammingwith C++**. [FourthEdition]. Tata McGrawHillEducation Pvt. Limited, New Delhi.
REFERENCE BOOKS:	
1	*ReemaThareja.* 2015. **Object Oriented Programming in C++**. Oxford University Press,India.
2	*BhushanTrivedi.* 2013. **Programming with ANSI C++**. [Second Edition].OUP India.
WEB REFERENCES:	
1.	https://www.tutorialspoint.com/cplusplus
2.	http://www.cplusplus.com/doc/tutorial/
3.	https:// www.javatpoint.com/cpp-tutorial

COURSE OUTCOMES (CO):

After the completion of this 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	PSO 1	PSO 2	PSO 3	PSO 4	PSO 5
CO1	H	H	M	M	H
CO2	M	H	H	H	M
CO3	M	H	H	H	M
CO4	M	M	H	H	H
CO5	M	H	M	M	H

H-High; M-Medium; L-Low

18UCSM202	CORE IV: COMPUTER 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.

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. **Digital Components**: Integrated Circuits – Decoders – Multiplexers – Registers - Shift Registers – Binary Counters.	10	CO1
II	**Data Representation:** Data Types – Complements – Fixed-Point Representation - Conversion of Fractions - Floating-Point Representation – Other Binary Codes – Error Detection Codes. **Register Transfer and Micro operations:** Register Transfer Language – Register Transfer – Bus and Memory Transfers - Arithmetic Microoperations - Logic Microoperations - Shift Microoperations – Arithmetic Logic Shift Unit.	10	CO2
III	**Central Processing Unit:** Introduction – General Register Organization –Stack Organization - Instruction Formats - Addressing Modes – Data	10	CO3

	Transfer and Manipulation – Program Control - Reduced Instruction Set Computer(RISC):CISC Characteristics - RISC Characteristics.		
IV	**Pipeline and Vector Processing:** Parallel Processing – Pipelining – Arithmetic Pipeline – Instruction Pipeline –RISC Pipeline - Vector Processing – Array Processors.	**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 – Main Memory – Auxiliary Memory – Associative Memory – Cache Memory – Virtual Memory.	**10**	**CO5**
TEXT BOOK:			
1.	*Morris Mano M.* 2017. **Computer System Architecture.** [Revised Third Edition]. Pearson India Education Services Pvt. Ltd.		
REFERENCE BOOKS:			
1.	*Navin Kumar*. 2005. **Computer Organization.** [First Edition]. GalgotiaPublications Pvt. Ltd.		
2.	*Badri Ram.* 2012. **Fundamentals of Microprocessors and Microcomputers.**DhanpatRaiPublication Pvt. Ltd.		
3.	*William Stallings*. 2016. **Computer Organization and Architecture.** [Tenth Edition]. Pearson Education Ltd.		
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 the completion of this course, the students will be able to

CO1	Understand the basic concepts of logic circuits.
CO2	Know the data representation and micro operations
CO3	Evaluate the working principles of CPU.
CO4	Understand pipeline and vector processing concepts.
CO5	Identify Input, Output and memory organization.

MAPPING:

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

H-High; M-Medium; L-Low

18UMACSA201/ 18UMAECA201	ALLIED II: NUMERICAL 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: 50

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)**	**10**	**CO 1**
II	**Solution of Simultaneous Linear Algebraic Equations**: Introduction - Gauss Elimination Methods - Gauss Jordan method – Inversion of a matrix using Gauss Elimination method – Iterative method – Gauss-Jacobi - Gauss Seidal method of iteration. **(Chapter – 4 Sections: 4.1 – 4.3, 4.7 - 4.9)**	**10**	**CO 2**
III	**Finite Differences**: Forward Difference – Backward Diffference. **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)**	**10**	**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.	**10**	**CO 4**

	(Chapter – 7 Sections: 7.1 – 7.5)		
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 method – Runge-Kutta method - Second orderRunge-Kutta method (for first order ODE). **(Chapter – 9 Sections: 9.9, 9.13, 9.14, Chapter – 11 Sections: 11.9 – 11.13)**	**10**	**CO 5**
TEXT BOOK:			
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):

On completion of this course, the students will be able to

CO 1	Find solution of algebraic and transcendental equations.
CO 2	Solve system of linear equations.
CO 3	Interpolate unknown values from known values.
CO 4	Know numerical methods of solving differential equations.
CO 5	Find the solution of the integral equations.

MAPPING:

PSO / CO	PSO 1	PSO 2	PSO 3	PSO 4	PSO 5
CO 1	M	M	H	M	M
CO 2	M	M	H	M	M
CO 3	M	M	H	M	M
CO 4	M	M	H	M	M
CO 5	M	M	H	M	M

H-High; M-Medium; L-Low

18UCSMP201	CORE PRACTICAL III: PROGRAMMING IN C++	SEMESTER - II

COURSE OBJECTIVES:

The subject aims

1. To implement the various OOPs concepts and features in C++.

Credits: 2 **Total Hours: 30**

S.No	PROGRAMS	Hrs	CO
1.	Program for Classes and Objects using Scope Resolution Operator.	**3**	**CO1**
2.	Program to find the roots of an algebraic equation using Bisection method.	**3**	**CO2**
3.	Program for Inline and Friend functions.	**3**	**CO3**
4.	Program to find area of circle, rectangle and triangle using Function Overloading.	**3**	**CO3**
5.	Program using Constructor and Destructor.	**3**	**CO3**
6.	Program using Operator Overloading.	**3**	**CO3**
7.	Program using Pure Virtual Function.	**3**	**CO3**
8.	Program to prepare student mark statement using Multiple Inheritance.	**3**	**CO4**
9.	Program to read and write values in a File.	**3**	**CO5**
10.	Program usingFunction Templates.	**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):

On successful completion of this course, the student will be able to

CO1	Implement OOPs concepts.
CO2	Solve numerical method problems.
CO3	Understand the various concepts associated with members functions.
CO4	Explore concepts associated with Inheritance.
CO5	Implement concepts associated with Files and Templates.

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	06	CO5

	and Rehabilitation of people, Role of information technology in environmental health – Environmental awareness.		
TEXT BOOK:			
1.	Department of Biochemistry. Environmental Studies (Study Material) Published by K.S.Rangasamy College of Arts & Science (Autonomous). Tiruchengode.		
REFERENCE BOOK:			
1.	*ErachBharucha*. 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.

18UTALA301	**TAMIL – III: காப்பியம் - சிற்றிலக்கியம்**	**பருவம் - III**

இப்பாடத்திட்டத்தின் நோக்கங்களாவன:

1. தமிழ்க் காப்பியங்கள் தோற்றத்தையும்,காப்பிய இலக்கணத்தையும் காப்பியவகைகளையும் அறிமுகம் செய்தல்.
2. சிற்றிலக்கியங்கள் தோற்றம்,வளர்ச்சிநிலைகளையும்,சிற்றிலக்கியங்களையும் அறிமுகம் செய்தல்.
3. பகுபதஉறுப்புக்களைக் கற்பித்தல்.

Credits: 3 **Total Hours: 50**

UNIT	**CONTENTS**	**Hrs**	**CO**
I	காப்பியங்கள் - சிலப்பதிகாரம் - வழக்குரைகாதை மணிமேகலை - மலர்வனம் புக்ககாதை.	10	**CO1**
II	பிறகாப்பியங்கள் - கம்பராமாயணம் - குகப் படலம் பெரியபுராணம் - இளையான்குடிமாறநாயனார் புராணம்.	10	**CO2**
III	சிற்றிலக்கியங்கள் - குற்றாலக் குறவஞ்சி– வசந்தவல்லியின் காதல் **(1-10 பாடல்)** கலிங்கத்துப் பரணி - பேய்களைப் பாடியது.	10	**CO3**
IV	இலக்கியவரலாறு - காப்பியங்கள் - ஐம்பெருங்காப்பியங்கள் - ஐஞ்சிறுகாப்பியங்கள் -புராணங்கள் - சிற்றிலக்கியங்கள்.	10	**CO4**
V	இலக்கணமும் மொழிப்பயிற்சியும் - பகுபதஉறுப்பிலக்கணம் - சீர் வகைகள் - வழூஉச் சொற்கள் - கடிதம் எழுதுதல்.	10	**CO5**

TEXT BOOK:

1.	தமிழ்த்துறைவெளியீடு,கே.எஸ்.ரங்கசாமிகலைஅறிவியல் கல்லூரி(தன்னாட்சி), திருச்செங்கோடு-637 215.

COURSE OUTCOMES(CO):

இப்பாடத்தைக் கற்பதன் வாயிலாகமாணவர்கள் பெறும் பயன்களாவன:

CO1	இரட்டைக் காப்பியங்களின் மேன்மைநிலையைஉணர்தல்.
CO2	காப்பியக்காலகுடிகளின் நிலையை,உரிமையைஉணர்தல்.
CO3	சிற்றிலக்கியங்களின் சிறப்பைஉணர்தல்.
CO4	காப்பிய,சிற்றிலக்கியங்களின் வரலாறுகுறித்தசெய்திகளைஅறிதல்.
CO5	இலக்கணம் மற்றும் மொழிப்பயிற்சியின் அமைப்பைஉணர்தல்.

18UENLA301	**FOUNDATION ENGLISH – III**	**SEMESTER – III**

COURSE OBJECTIVES:

The course aims

- To enable the students to develop their comprehensive skill.
- To promote language skills through literature.

Credits: 3Total Hours: 50

UNIT	CONTENTS	Hrs	CO
I & II	**ONE ACT PLAY** A. Ball - The Seven Slaves **PROSE** Somerset Maugham - Mr. Know –All **GRAMMAR** Degrees of Comparison **COMPOSITION** Advertisement **COMMUNICATION SKILLS** Speaking About Oneself The Media	**20**	**CO1 & CO2**
III & IV	**ONE ACT PLAY** R.H. Wood - Post Early for Christmas **PROSE** Satyajit Ray - Film Making **GRAMMAR** Determiners **COMPOSITION** Resume Writing **COMMUNICATION SKILLS** Imagining Context specific expression-Master of Ceremonies	**20**	**CO3 & CO4**
V	**PROSE** IsaiTobolsky - Not Just Oranges	**10**	**CO5**

	GRAMMAR Reported Speech **COMPOSITION** Precise Writing **COMMUNICATION SKILLS** Inviting Personalities.		

TEXT BOOKS:	
1.	*G.Damodar, D.Venkateshwarlu, M.Narendra, M.SaratBabu, G.M.Sundaravalli.* 2009. **English For Empowerment**. Published by Orient BlackswanPrivate Limited. Hyderabad –500 029.
2.	*Ramamurthy.K.S. 1984.* **Seven-Act Plays**. Published in India by Oxford University. New Delhi–110 001.
3.	*SasiKumar V and SyamalaV*. 2006. **Form and Function - A Communicative Grammar for Colleges.** Emerald Publishers. Chennai–600 008.
4.	*T.M.Farhathullah.* 2006. **Communication Skills For Undergraduates**. Publishers-RBA Publications. Chennai–600 015.
REFERENCE BOOK:	
1.	*Raymond Murphy*. 1994.**Intermediate English Grammar.**CambridgeUniversity India Pvt. Ltd, Delhi.

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 their grammar knowledge.
CO4	Stimulate their writing skills.
CO5	Deserve appreciation for their communication.

18UCSM301	CORE V: PROGRAMMING IN JAVA	SEMESTER - III

COURSE OBJECTIVES:

The course aims

- To understand the fundamentals of Object Oriented Programming.
- To explore the programming skills using Java.

Credits: 4 **Total Hours:50**

UNIT	CONTENTS	Hrs	CO
I	**Java Evolution**: Java History – Java Features-How Java differs from C and C++- Java and Internet – Java and World Wide Web- Web Browsers. **Overview of Java Language:** Simple Java program- Java program Structure- Java Tokens- Java Statements – Java Virtual Machine. **Constants, Variables and Data Types**: Constants- Variables -Data Types- Declaration of Variables – Giving values to variables- Scope of variables- Symbolic Constants- Type casting- Getting value of variables- Standard and default values.	10	CO1
II	**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 -Mathematical functions. **Decision Making and Branching:** 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. **Decision Making and Looping:** The while Statement- The do	10	CO2

	Statement- The For Statement- Jumps in Loops-Labeled Loops.		
III	**Classes, Objects and Methods:** Introduction-Defining a Class-Fields Declaration-Methods Declaration-Creating Objects-Accessing Class Members – Constructors-Methods Overloading-Static Members-Nesting of Methods-Inheritance: Extending a Class-Overriding Methods-Final Variables and Methods-Final Classes-Finalizer Methods-Abstract Methods and Classes-Methods with Varargs -Visibility Control. **Arrays, Strings and Vectors:** Introduction – One-dimensional Arrays-Creating anArray- Two-dimensional Arrays–Strings – Vectors-Wrapper Classes - Enumerated Types. **Interfaces**: **Multiple Inheritance:** Introduction-Defining Interfaces-Extending Interfaces-Implementing Interfaces-Accessing Interface Variables. **Packages**: **Putting classes Together:** Introduction-Java API Packages-Using System Packages-Naming Conventions-Creating Packages-Accessing a Package-Using a Package-Adding a Class to a Package-Hiding Classes-Static Import.	**10**	**CO3**
IV	**Multithreaded Programming:** Introduction-Creating Threads-Extending the Thread Class- Stopping and Blocking a Thread-Life Cycle of a Thread-Using Thread Methods-Thread Exception-Thread Priority-Synchronization-Implementing the 'Runnable' Interface. **Managing Errors and Exceptions:** Introduction-Types of Errors- Exceptions-Syntax of Exception Handling Code-Multiple Catch Statements-Using Finally Statement-Throwing Our Own Exceptions-Using Exception for Debugging.	**10**	**CO4**
	Applet Programming: Introduction –How Applets Differ from Applications-Preparing to Write Applets-Building Applet Code-Applet Life Cycle- Creating an Executable Applet-Designing a		

V	Web Page-Applet Tag-Adding Applet to HTML File-Running the Applet-More About Applet Tag-Passing Parameters to Applets-Aligning the Display-More about HTML Tags-Displaying Numerical Values-Getting Input from the User.**Managing Input/Output Files in Java**: Introduction- Concepts of Streams-Stream Classes – Byte Stream classes- Character stream classes-Using streams – Other Useful I/O Classes – Using the File Class – Input/Output Exceptions – Creation of Files – Reading / Writing Characters- Reading / Writing Bytes -Handling Primitive Data Types – Random Access Files.	**10**	**CO5**

TEXTBOOK:

1	*Balagurusamy*, *E.* 2008**. Programming with Java – A Primer**. **[**Third Edition].Tata McGraw Hill Education Pvt. Limited, New Delhi.

REFERENCE BOOKS:

1	*Hebert Schildt***.** 2002**. The Complete Reference Java 2.** [Tenth Edition]. Tata McGraw Hill Education Pvt. Limited, New Delhi. Paperback edition 2017
2	S.Horstmann.2019.Core Java,Volume II-Advanced Features[eleventh Edition].Prentice Hall of India Pvt. limited,New Delhi
3	*Debasish Jana***.** 2005. **Java and Object-Oriented Programming Paradigm**. [Second Printing]. Prentice Hall of India, New Delhi.

WEB REFERENCES:

1.	http://www.javapoint.com/java-tutorial
2.	http://www.beginnersbook.com/java-tutorial/
3.	http://tutuorialspoint.com/java

COURSE OUTCOMES (CO):

On successful completion of this course, the students will be

CO1	Understand the basic terminology of Java Programming
CO2	Develop programs using control structures
CO3	Able to understand the interfaces and packages
CO4	Understand the multithreaded programming and exceptions
CO5	Develop program using Applets and files

MAPPING:

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

H-High; M-Medium; L-Low

18UCSM302	CORE VI:DATA STRUCTURES	SEMESTER - III

COURSE OBJECTIVES:

The course aims

1. To know the fundamental concepts of Data Structures.
2. To developapplications using algorithms.

Credits: 4 **Total Hours:50**

UNIT	CONTENTS	HRS	CO
I	**Introduction to Data Structures**: Introduction-Types of Data Structures-Abstract Data Type- Time and Space Complexity-Big-Oh Notation. **Arrays:** Introduction- Declaration of Arrays-Accessing Array Elements- Storing Values in Arrays- Calculating the Length of an Array -Operations on Arrays -Two-dimensional Arrays-Multi- dimensional Arrays.	10	CO1
II	**Linked Lists:** Introduction - Linked List Versus Arrays – Memory Allocation and De-Allocation for a Linked List - Singly Linked List- Polynomial Representation- Circular Linked List-Doubly Linked List.	10	CO2
III	**Stacks and Queues:** Stacks- Array Representation of Stacks-Operations on a Stack- Linked Representation of Stack-Operations on a Linked Stack- Infix, Postfix and Prefix Notation-Evaluation of an Infix Expression- Convert Infix Expression to prefix Expression-Applications of stack.**Queues:** Array Representation of Queues- Circular Queue- Linked Representation of Queue- Operation on a Queue- Deque - Priority Queues – Multiple Queues.	10	CO3
IV	**Trees:** Binary Trees-Expression Trees- Traversing of a Binary Tree.**Efficient Binary Trees:** Binary search Trees- Operations on	10	CO4

	Binary Search Trees. **Graphs:** Introduction- Representation of Graphs-Graph traversal Algorithms.		
V	**Graphs:** Shortest Path Algorithms- Minimum Spanning Tree- Prim's Algorithm- Kruskal's Algorithm- Dijkstra's Algorithm- Applications of Graphs. **Sorting and Searching:** Introduction- Bubble Sort- Insertion Sort- Selection Sort- Merge Sort- Quick Sort– Heap Sort.	**10**	**CO5**
TEXTBOOK:			
1	*ReemaThareja.*2012.**Data Structures Using C.**[First Edition]. Oxford University Press, New Delhi.		
REFERENCE BOOKS:			
1	*A.K.Sharma. 2011.* **Data Structures Using 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	*R.S.Salaria.***Data Structures and Algorithms Using C**. [Fifth Edition]. Khanna Publishing, New Delhi. Paperback - 2018		
4	*G.A.V.Pai.* 2008. **Data Structures and Algorithms: Concepts, Techniques and Applications.** [First Edition]. McGraw Hill, International Editions, New Delhi. Paperback – 1 Jul 2017		
WEB REFERENCES:			
1.	https://www.geeksforgeeks.org/data-structures/		
2.	https://www.edx.org/course/data-structures-fundamentals		
3.	https://www.studytonight.com/data-structures/introduction-to-data-structures		

COURSE OUTCOMES (CO):

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

CO1	Attain the knowledge of linear and non-linear data structures and analyze the efficiency of the algorithms.
CO2	Handle operations like searching, insertion, deletion, traversing mechanism on linked list.
CO3	Understand the stack and queue with its applications.
CO4	Demonstrate different methods for traversing trees.
CO5	Demonstrate knowledge of various sorting and searching techniques.

MAPPING:

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

H-High; M-Medium; L-Low

18UMACSA301	ALLIED III: STATISTICAL METHODS	SEMESTER – III

COURSE OBJECTIVES:

The Course aims

- Providing knowledge about statistical tools which enables them to develop their programming skills.

Credits: 4 **Total Hours: 40**

UNIT	CONTENTS	Hrs.	CO
I	**Measures of Central Tendency (Averages):** Arithmetic Mean - Median - Mode. **Measures of Dispersion:** Range - Quartile deviation – Standard deviation - Coefficient of variation. **(Chapter 9 and Chapter 10)**	08	CO 1
II	**Correlation:** Definition of Correlation – Karl Pearson's Coefficient of Correlation – Rank correlation coefficient. **Regression:** Correlation and Regression - Regression Equations (for ungrouped data). **(Chapter 12 and Chapter 13)**	08	CO 2
III	**Analysis of Time Series:** Meaning – Definition – Uses of Time Series – Time series model - Components of Time Series. Measurement of Secular Trend: Graphic Method – Semi-average method - Moving average method – Method of Least Square. Measurement of Seasonal variations: Method of simple average – Ratio to Trend Method. **(Chapter 15)**	08	CO 3
IV	**Probability:** Basic definitions – Problems – Addition theorem (statement only) Conditional probability – Multiplication Theorem (Statement only) – Baye's theorem (statement only) – Problems.**(Chapter 18)**	08	CO 4
V	**Theoretical standard distributions:** Binomial distribution – Poisson distribution – Normal distribution – Properties and	08	CO 5

	Problems.**(Chapter 19)**		
TEXT BOOK:			
1.	Pillai, R.*S.N and Bagavathi, V.* 2012. **Statistics.** [Seventh Edition]. S.Chand and Company Ltd., New Delhi.		
REFERENCE BOOKS:			
1.	*Gupta, S.P.* 2008. **Statistical Methods.** [Thirty Seventh Edition]. Sultan Chand and Sons, New Delhi.		
2.	*Mariappan, P.* 2008. **Statistics for Scientific Solutions (Business Statistics).** [First Edition]. New Century Book House Private Ltd., Chennai.		

COURSE OUTCOMES(CO):

On completion of this course, the students will be able to

CO 1	Find averages and positional averages.
CO 2	Measure the degree of relationship between variables.
CO 3	Measure the seasonal variations.
CO 4	Gain knowledge on probability theory.
CO 5	Know about discrete and continuous distributions.

MAPPING:

PSO / CO	PSO 1	PSO 2	PSO 3	PSO 4	PSO 5
CO 1	M	M	H	M	M
CO 2	M	M	H	M	M
CO 3	M	M	H	M	M
CO 4	M	M	H	M	M
CO 5	M	M	H	M	M

H-High; M-Medium; L-Low

18UECCSA301	ALLIED – III: DIGITAL ELECTRONICS AND MICROPROCESSOR	SEMESTER-III

COURSE OBJECTIVES:

- To acquire the basic knowledge of digital logic levels and application of knowledge to understand digital electronics circuits.
- To introduce students with the architecture and operation of typical microprocessor.
- To familiarize the students with the programming and interfacing of microprocessor.

Credits: 4Total Hours: 50

UNIT	CONTENTS	Hrs	CO
I	**Number Systems:** The decimal number system- The binary number system-Binary to Decimal conversion –Decimal to binary conversion-Octal number system-Octal to decimal conversion-Decimal to octal conversion-Octal to binary conversion-Binary to octal conversion- Hexa decimal number system- Hexa decimal to binary conversion-Binary to hexa decimal-Hexadecimal to decimal conversion-Decimal to hexadecimal conversion-Hexa decimal to octal conversion-Octal to hexadecimal conversion-Excess-3 code-Gray code.	10	CO1
II	**Arithmetic operations & Logic Gates:** Binary Addition-Binary subtraction-Binary Multiplication- Binary division- 1's complement-2's complement-Logic gates: AND–OR-NOT-NOR-NAND-EX-OR-EX-NOR-RS Flip flop-D-Flip flop-JK Flip flop.	10	CO2
III	**Microprocessor:** Introduction-Microprocessors-Microcomputers-8085 programming model: Registers-Accumulator-Flags-Program counter-Stack pointer-Address bus-Data bus-control bus-memory-The 8085 microprocessor-	10	CO3

	Generating control signals-8085 Architecture.		
IV	**Introduction to 8085 instruction:** Data transfer operations-Arithmetic operations-Logic operations-Branch operations-Machine control instructions-Rotate instructions-Addressing modes-stack-subroutine-Advanced subroutine concepts-Assembly language program for 8-bit Addition, subtraction, multiplication and Division.	**10**	**CO4**
V	**Microprocessor Applications:** Scanned multiplexed displays (LED)-Interfacing a liquid crystal display (LCD)-Interfacing a matrix keyboard-Memory design-EPROM memory.	**10**	**CO5**
TEXT BOOKS:			
1.	*Basavaraj,.B.* 1998. **Digital Fundamentals.** [First Edition].Vikas Publications House Private Limited, New Delhi.		
2.	*Ramesh, S. Gaonkar.* 2006. **Microprocessor Architecture Programming and Application with 8085/8080A.** [Fifth Edition]. Penram Publications, New Delhi.		
REFERENCE BOOKS:			
1.	*Donald,P.Leach, Albert Paul Malvino and GoutamSaha.* 2008. **Digital Principles and Applications.** [Sixth Edition]. Tata McGraw Hill, New Delhi.		
2.	*Tokheim.* 2004. **Digital Electronics Principles and Applications.** [Sixth Edition]. Tata McGraw Hill, New Delhi.		
3.	*Douglas,V.Hall.* 2003. **Microprocessors and interfacing: Programming and Hardware**.[Second Edition]**,** Tata McGraw Hill, New Delhi.		

COURSE OUTCOMES (CO):

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

CO1	Understand the structure of various number systems and its application in digital design.
CO2	Acquire the fundamental concepts and techniques used in digital electronics.
CO3	Examine the units in microcomputer based system.
CO4	Apply knowledge and demonstrate programming proficiency using the various addressing modes and data transfer instructions of the target microprocessor.
CO5	Design real world applications using 8085 microprocessor.

MAPPING:

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

H-High; M-Medium; L-Low

18UCSMP301	**CORE PRACTICAL IV: PROGRAMMING IN JAVA**	**SEMESTER - III**

COURSE OBJECTIVES:

The course aims

- Demonstrate the competency in the use of object oriented programming in Java.
- Utilize Java SDK environment to create, debug and run simple Java programs.

Credits: 2 **Total Hours: 20**

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

WEB REFERENCES:

1.	http://www.guru99.com/java-tutorial.html
2.	http://java.sun.com
3.	http://www.geeksforgeeks.org

COURSE OUTCOMES (CO):

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

CO1	Able to build programs using control statements and arrays.
CO2	Develop programs using inheritance and overloading.
CO3	Able to build programs using interfaces and packages.
CO4	Develop programs to handle exceptions.
CO5	Able to build program using Applets and files.

18UCSSBP301	SBC PRACTICAL I:WEB DESIGNING USING HTML,CSS (INTERNAL EVALUATION)	SEMESTER -III

COURSE OBJECTIVES:

The course aims

- Demonstrate the competency in the use of HTML tags and its attributes.
- Utilize CSS to enhance web pages.

Credits: 2 **Total Hours: 20**

S.No.	PROGRAMS	Hrs	CO
1.	Create a webpage describing your department using paragraph and list tags.	**3**	**CO1**
2.	Create a Table to prepare a class timetable.	**3**	**CO1**
3.	Design a webpage for alumni details using Form tags.	**2**	**CO2**
4.	Create a webpage with frames and Hyperlinks.	**2**	**CO3**
5.	Design a CSS to create menu.	**2**	**CO4**
6.	Design a webpage i.e. Bio data using CSS.	**2**	**CO4**
7.	Create a web page that displays college information using various (font, color etc.)Style sheets.	**3**	**CO5**
8.	Create a web page using following style sheets i. Inline style sheets. ii. Embedded style sheets. iii. External style sheets.	**3**	**CO5**

WEB REFERENCES:

1.	http://www.w3schools.com
2.	http://developer.mozilla.org

COURSE OUTCOMES(CO):

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

CO1	Able to create webpage using paragraph, list and table tags.
CO2	Design a web page using forms.
CO3	Able to design web page using frames and hyperlinks.
CO4	Able to design menus using CSS.
CO5	Create a webpage using various style sheets.

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

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 – 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 BOOKS:

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.

18UTALA401	**TAMIL – IV: சங்க இலக்கியம் - நீதிஇலக்கியம்**	**பருவம் - IV**

இப்பாடத்திட்டத்தின் நோக்கங்களாவன :

1.சங்க இலக்கியம், அற இலக்கியங்களின் சிறப்பைஉணர்த்துதல்.

2.இலக்கண நூல்களைகாலவரிசைப்படிஅறியச் செய்தல்.

3.அணி இலக்கணத்தின் சிறப்பைஉணரச் செய்தல்.

Credits: 3 **Total Hours: 50**

UNIT	CONTENTS	Hrs	CO
I	**எட்டுத்தொகை** அ.நற்றிணை–அன்னாய் வாழிப்பத்து (பாடல் எண். 208, 209, 210) ஆ. குறுந்தொகை–யாயும் ஞாயும் (பாடல் எண்.40) இ. கலித்தொகை– ஆற்றுதல் என்பதொன். (பாடல் எண்.103) ஈ. புறநானூறு –பல்சான்றீரேபல்சான்றீரே (பாடல் எண்.195)	**10**	**CO1**
II	**பத்துப் பாட்டு** அ. குறிஞ்சிப்பாட்டு (1 முதல் 106 அடிகள் வரை) -கபிலர்	**12**	**CO2**
III	**அற இலக்கியங்கள்** அ. நாலடியார் -பாடல் எண் (35,59,94,141,333) ஆ. நான்மணிக்கடிகை - பாடல் எண் (04,09,59,69,80) இ. பழமொழி-பாடல் எண் (05,21,120,149,361) ஈ. சிறுபஞ்சமூலம் - பாடல் எண் (05,17,48,83,99)	**10**	**CO3**
IV	**இலக்கியவரலாறு** அ. சங்க இலக்கிய நூல்கள் அறிமுகம் ஆ. முச்சங்கவரலாறு இ. தமிழ் இலக்கண நூல்கள் அறிமுகம் ஈ. அற இலக்கியங்கள் அறிமுகம்	**10**	**CO4**
V	**இலக்கணம்** அ. அணி இலக்கணம் 1. உவமைஅணி 2. உருவகஅணி 3. வேற்றுமைஅணி 4. வஞ்சப்புகழ்ச்சிஅணி ஆ. அகத்திணைகள்,புறத்திணைகள் - விளக்கம்	**08**	**CO5**

TEXT BOOK:

1.	தமிழ்த்துறைவெளியீடு,கே.எஸ்.ரங்கசாமிகலைஅறிவியல் கல்லூரி(தன்னாட்சி), திருச்செங்கோடு– 637 215.

COURSE OUTCOMES (CO):

இப்பாடத்தைக் கற்பதன் வாயிலாகமாணவர்கள் பெறும் பயன்களாவன:

CO1	எட்டுத்தொகை நூல்களின் சிறப்பைஅறிதல்
CO2	பத்துப்பாட்டு நூல்களின் சுவைஅறிதல்
CO3	அற இலக்கியங்கள் பற்றிஅறிதல்
CO4	இலக்கியங்கள் தோற்றமுறையைஅறிதல்
CO5	அணி இலக்கணத்தின் பயன் பற்றிஅறிதல்.

18UENLA401	**FOUNDATION ENGLISH - IV**	**SEMESTER – IV**

COURSE OBJECTIVES:

The course aims

- To promote communication skills through literature.
- To enhance the language learning through activities.

Credits: 3 **Total Hours: 50**

UNIT	CONTENTS	Hrs	CO
I & II	**ONE ACT PLAY** Monica Thorne-The King Who Limped **PROSE** A.G.Gardiner-On Shaking Hands **GRAMMAR** Punctuation **COMPOSITION** Hints Development **COMMUNICATION SKILLS** Breaking the Law Honoring the Person	**20**	**CO1 & CO2**
III & IV	**ONE ACT PLAY** Ella Adkins–The Unexpected **PROSE** MinooMasani-No Man is an Island **GRAMMAR** Conditional Clause **COMPOSITION** Report Writing **COMMUNICATION SKILLS** Brain Storming	**20**	**CO3 & CO4**
V	**PROSE** Arnold Toynbee-India's Contribution to World Unity **GRAMMAR** Simple, Compound and Complex Sentences **COMPOSITION** Jumbled Sentences **COMMUNICATION SKILLS**	**10**	**CO5**

	Role-Play		
TEXT BOOKS:			
1.	*Ramamurthy*.K.S. 1984. **Seven-Act Plays**. Published in Indiaby OxfordUniversity. New Delhi–110 001.		
2.	*Damodar.G, D.Venkateshwarlu, M.Narendra, M.SaratBabu, G.M.Sundaravalli. 2009*. **English For Empowerment**. Published by Orient BlackswanPrivate Limited. Hyderabad –500 029.		
3.	*SasiKumarVand SyamalaV*. 2006. **Form and Function - A Communicative Grammar for Colleges.** Emerald Publishers. Chennai–600 008.		
4.	*Farhathullah.T.M.* 2006. **Communication Skills for Undergraduates**.RBA Publications. Chennai–600 015.		
REFERENCE BOOK:			
1.	*RaymondMurphy*. 1994. **Intermediate English Grammar.** Cambridge UniversityIndia Pvt. New Delhi.		

COURSE OUTCOMES (CO):

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

CO1	Understand the text on the basis of close reading analytically and critical views.
CO2	Ability to construct a sustained sophisticated and original argument on a specific topic.
CO3	Acquire language skills through composition.
CO4	Acquire both composition and communication skills.
CO5	Apply basic communication skills.

18UCSM401	CORE VII: PROGRAMMING IN .NET (VB.NET & ASP.NET)	SEMESTER - IV

COURSE OBJECTIVES:

The course aims

- To develop the knowledge of creating Web Applications using VB.NET and ASP.NET.
- To improve the skill of developing Database applications using ADO.NET.

Credits: 4 **Total Hours : 50**

UNIT	CONTENTS	Hrs	CO
I	**The .NET Platform and the Web:** The path way to Web Applications-The Web Client/Server Model: Web Clients and Web Servers – Protocols for Web Client/Server Communication – Server-Side Processing with CGI Programs – Disadvantages of Using CGI. Components of ASP.NET and the .NET Framework-Overview of Internet Information Server: ISAPI Extensions – ISAPI Filters. Overview of ASP.NET: Web Forms. The .NET Common Language Runtime and Class Library. Managed Components in .NET- Web Services- Language Independence in the .NET Framework-COM+ Component Services and .NET-Direction and Plans for .NET. **TheVB.NET Crash Course:** What is VB.NET? -Hello World (Yet Again): Your First VB Application. Variables, Constants and Operators: Variable Types – Declaring and Assigning Variables – Scope and Lifetime of Variables – Arrays – Converting Data Types – Using Constants – Arithmetic and Comparison Operators. Modularizing Your Code-Function and Subroutines: Using Functions – Using Subroutines. Controlling Program Flow: Conditional Processing – Flow Control Statements - Loops.	10	CO1

II	**TheVB.NET Crash Course:** Handling Errors and Exceptions: Unstructured Error Handling – Structured Exception Handling. Object Oriented Programming: Class Basics – ClassProperties – Constructors and Destructors – Inheritance-Overridden Functions – Overloading – Polymorphism Overview – Interfaces-Implementing Polymorphism by using Interfaces. Multithreaded Programming: Thread Synchronization – Events and Thread Synchronization.	**10**	**CO2**
III	**Working with ASP.NET**: The Features of ASP.NET- The Anatomy of ASP.NET pages: The code Structure of ASP.NET – Execution Stages and State Management – The Events Model for the Page Class. Introducing Web Forms-VS.NET Web Applications and Other IDE Basics - Separating Content and Code–the Code-Behind Feature-Application Configuration: Structure and Configuration of the Global.asax File. Using HTML Controls: The HTMLForm Control – The HTMLAnchor Control – The HTMLButton Control – The HTMLGenericControl Control – The HTMLImage Control – The HTMLInputButton Control – The HTMLInputCheckBox Control – The HTMLInputFile Control – The HTMLInputHidden Control – The HTMLInputImage Control –The HTMLInputRadioButtonControl – The HTMLInputTextControl – The HTMLSelect Control – The HTMLTable, HTMLTableCell, and HTMLTableRow Controls – The HTMLTextArea Control. Using Web Controls: Shared Web Control Properties.Web Controls for Displaying and Formatting Data: The Label Control – The Panel Control – The Table, TableRow, and TableCell Controls. Web Controls for Creating Buttons: The Button Control – The ImageButton Control – The	**10**	**CO3**

	LinkButton Control – Demonstration of Web Button Controls. Web Control for Inputting Text: The TextBox Control. Web Controls for selecting Choices: The CheckBox Control – The RadioButton Control –The CheckBoxList and RadioButtonList Controls. Web Controls for Creating Lists: The ListBox Control – The DropDownList Control.		
IV	**Working with ASP.NET:** Miscellaneous Basic Controls: The Hyper Link Control-The Image Control. Creating a Simple ASP.NET Application:YourFirst ASP.NET Project.ASP.NET Page Directives: The @ Page and @ Control Directives – The @ Import Directive – The @ Register Directive – The @ Assembly Directive – The @ Output Cache Directive. ASP.NET Rich Controls: The Calendar Control – Ad Rotator Control. Validation Controls: The Base Validator Control–The Required Field Validator Control – The Compare Validator Control – The Range Validator Control – The Regular Expression Validator Control – Custom Validator Control. Data List Controls: The Repeater Control-The Data Grid Control-The Data List Control.	**11**	**CO4**
V	**Accessing Data with ADO.NET:** Overview of Data Access on the Web: Flat Files – Legacy or Mainframe Data – Proprietary Database APIs – Standard APIs – ADO. ADO.NET: The Next Generation of Data Access Technology-ADO.NET Programming Objects and Architecture: The Data Set Class – The .NET Managed Data Provider. Displaying Database Data: The IData Reader Interface (System.Data.IDataReader) – Working with Command Parameters – The Data Grid Control Revisited – Displaying Data in the Data Grid Control – Editing Data in the Data Grid Control. Programming with the Data List and Data Grid Controls: An Online Photo Gallery. Working with the Dataset and	**9**	**CO5**

	DataTableObjects: The DataSet Class Summary – The DataTable Class Summary – Creating DataSet and DataTable Objects – Adding Data to a DataTable Object – Displaying Data in a DataTable Object – Loading and Updating DataSet Objects with the IDataAdapter Interface – Filtering and Sorting Data with the DataView Class.		

TEXT BOOK:

1.	*Matt Crouch. J.* 2006. **Asp.Net and Vb.Net Web Programming.** [First Impression 2006]. Pearson Education, India.

REFERENCE BOOKS:

1.	*Damien Foggon and Daniel Maharry.* 2005. **Beginning Asp.Net 1.1 Databases: From Novice To Professional.** [First Indian Reprint]. Apress, USA.
2.	*William B.Sanders.* 2009. **Asp.Net 3.5[**Second Edition]. Tata McGraw-Hill Publication, New Delhi.
3.	*Jeffrey Shapiro, R.* 2002. **The Complete Reference Visual Basic .Net.** [Tata McGraw Hill Edition]. Tata McGraw Hill, New Delhi.
4.	*Steven Holzner*. 2008. **Visual Basic .Net Programming Black Book**. [New Edition]. Dreamtech Press, New Delhi.

WEB REFERENCES:

1.	https://www.tutorialspoint.com/vb.net/
2.	https://www.vbtutor.net/index.php/visual-basic-net-tutorials/
3.	https://www.guru99.com/asp-net-tutorial.html

COURSE OUTCOMES (CO):

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

CO1	To describe the basic structure of a VB.NET and apply main features of the Integrated Development Environment (IDE).
CO2	To understand exception handling mechanisms and the elements of OOPs concepts.
CO3	To understand the usage of HTML controls in web form.
CO4	To attain knowledge on utilizing the validation controls.
CO5	To translate general requirements into data-related solutions using database concepts for real time applications.

MAPPING:

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

H-High; M-Medium; L-Low

18UCSM402	CORE VIII: RELATIONAL DATABASE MANAGEMENT SYSTEMS	SEMESTER - IV

COURSE OBJECTIVES:

The course aims

- To know the fundamentals of Database Management.
- To apply the techniques of normalization in the database table.
- To understand query optimization.

Credits: 4 **Total Hours: 50**

UNIT	CONTENTS	Hrs	CO
I	**Introduction to Database Management Systems:** Information-Data and Data Management-File Based Data Management – Database Systems –Organization of a Database-Characteristics of Data in a Database-Database Management System-Functions of DBMS. Components of DBMS: Data Dictionary – Database Users. **Database Architecture and Design:** Database Architecture – Data Abstraction – Physical and Logical Data Independence – Database Languages – Database Design-Design Constraints.	10	CO1
II	**Data Models**: Introduction-Relational Model – Object-oriented Model. **Entity-Relationship (E-R) Modeling:** E-R Model – Components of an E-R Model – E-R Diagram Conventions – Relationships-Composite Entities-Entity List-E-R Diagram (ERDS). **Relational Database Management Systems (RDBMS):**Introduction - RDBMS Terminology – Relational Data Structure. **Relational Data Integrity and Database Constraints:** Integrity Constraints. **Data Normalization:** Pitfalls in Relational Database Design -Decomposition – Functional Dependencies – Normalization – Keys-	10	CO2

	Relationships – 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) -Denormilization.		
III	**Relational Algebra:**Introduction - Relational Algebraic Operations – Aggregate Functions – Update Operations.**Structured Query Language (SQL):**Introduction - Characteristics of SQL – Advantages of SQL – Types of SQL Commands – SQL Operators – Arithmetic Operators – Comparison Operators – Logical Operators – Set Operators. **Tables, Views and Indexes:** Tables**–** Views – Indexes.**Queries and Subqueries:** Queries – Subqueries. **Aggregate Functions:** Introduction-General Rules-COUNT()and COUNT(*)-SUM()-AVG()-MAX()and MIN(). **INSERT UPDATE and DELETE Operations:** Insert Statement-Update Statement-Delete Statement.	**10**	**CO3**
IV	**Files, File Organization and File Structures:** Introduction-Operations on Files – File Storage Organization – Physical Storage Media – Storage Access – Buffer Manager - File Organization - File Structure – Record Types. **Indexing and Hashing:** Introduction – Indexing: Ordered Indexes. Hashing.	**10**	**CO4**
V	**Transaction Management and Concurrency Control:** Introduction**-**Transactions – Transaction Properties(ACID Properties) –Transaction States – Concurrency Control – Serializability – Recoverability – Concurrency Control Schemes – Transaction Management in SQL – Transactions and Recovery – User-defined Transactions – The COMMIT command - The ROLLBACK Command – The SAVEPOINT Command.	**10**	**CO5**

TEXT BOOK:	
1.	*Alexis Leon and Mathews Leon.* 2009. **Essentials of Database Management Systems.** Vijay Nicole Imprints Private Limited, Chennai.
REFERENCE BOOKS:	
1.	*P.K Yadav.2013.* **An Introduction to Database Systems.** S.K Kataria& Sons.
2.	*Raghu Ramakrishnan and Johannes Gehrke.* 2014. **Database Management Systems.** [Third Edition]. Tata Mc-GrawHill, New Delhi.
WEB REFERENCES:	
1.	https://www.tutorialspoint.com/dbms
2.	https://www.guru99.com/what-is-dbms.html
3.	https://www.studytonight.com/dbms/overview-of-dbms.php

COURSE OUTCOMES(CO):

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

CO1	Understand the basic concepts of database.
CO2	Aware of logical design and Data Normalization.
CO3	Understand basics of SQL and effective query building concepts.
CO4	Familiar with basic database storage structures and access techniques.
CO5	Gain knowledge on Transaction Management.

MAPPING:

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

H-High; M-Medium; L-Low

18UMACSA401	ALLIED IV: OPERATIONS RESEARCH	SEMESTER – IV

COURSE OBJECTIVES:

The Course aims

- To describe the industrial problems in terms of mathematical modeling and find the solution to the problem.

Credits: 4 **Total Hours: 40**

UNIT	CONTENTS	Hrs.	CO
I	**Linear Programming Formulation and Graphical Method:** Introduction - Requirements for employing LPP technique – Mathematical Formulation of L.P.P. - Basic assumptions - Graphical method of the Solution of a L.P.P. – Some more cases – Advantage of Linear Programming – Limitations of Linear Programming.	08	CO 1
II	**Transportation Model:** Introduction - Mathematical formulation of a transportation problem - Methods for finding initial basic feasible solution – Transportation algorithm or MODI method – Degeneracy in Transportation problems – Unbalanced Transportation Problems – Maximization case in Transportation problems. **(Chapter – 7 Sections: 7.1 – 7.5)**	08	CO 2
III	**Assignment Problem:** Introduction – Mathematical formulation of an Assignment Problem –Difference between the Transportation Problem and Assignment Problem – Assignment Algorithm or Hungarian Method – Unbalanced Assignment Models – Maximization case in Assignment Problems. **(Chapter – 8 Sections: 8.1 – 8.2, 8.4 - 8.7)**	08	CO 3

IV	**Scheduling by PERT and CPM:** Introduction – Basic Terminologies – Rules for constructing a project network – Network computations – Floats – Programme Evaluation Review Technique (PERT) – Basic differences between PERT and CPM. **(Chapter – 15 Sections: 15.1 – 15.7)**	**08**	**CO 4**
V	**Game Theory:** Introduction – Two person zero-sum games – The Maximin-Minimax Principle – Games without Saddle points, Mixed strategies – Dominance property - Graphical method for 2 x n or m x 2 games. **(Chapter - 16 Sections: 16.1 – 16.4, 16.6 – 16.7)**	**08**	**CO 5**
TEXT BOOK:			
1.	*Sundaresan,V., Ganapathy Subramanian, K.S. and Ganesan, K.* 2014. **Resource Management Techniques**. [Eighth Edition]. AR Publication, Chennai.		
REFERENCE BOOKS:			
1.	*KantiSwarup, Gupta, P.K. and Man Mohan.* 2014. **Operations Research.** [Seventeenth Edition]. Sultan Chand & Sons, New Delhi.		
2.	*Gupta, P.K. and Hira. D.S.* 2004. **Operations Research.** [Eighth Edition]. S.Chand and Company, New Delhi.		

COURSE OUTCOMES (CO):

On completion of this course, the students will be able to

CO 1	Formulate and solve real life problems through LPP
CO 2	Calculate the optimum transportation schedule
CO 3	Find the optimum assignment model
CO 4	Use the techniques for planning and scheduling of projects
CO 5	Identify the optimum strategies in business

MAPPING:

PSO / CO	PSO 1	PSO 2	PSO 3	PSO 4	PSO 5
CO 1	M	M	H	M	M
CO 2	M	M	H	M	M
CO 3	M	M	H	M	M
CO 4	M	M	H	M	M
CO 5	M	M	H	M	M

H-High; M-Medium; L-Low

18UECCSA401	ALLIED-IV: INTERNET OF THINGS	SEMESTER – IV

COURSE OBJECTIVES:

The Course aims

- To understand how multiple smart electronic devices can connect themselves together through internetworking.
- To acquire the fundamentals of designing, programming and configuring devices for the smart infrastructure development and maintenance.

Credits:4Total Hours: 50

UNIT	CONTENTS	Hrs	CO
I	**Internet of Things:**IoT Definition – Vision – Smart and Hyper connected devices – IoT Conceptual framework – IoT Architectural view – Technology behind IoT.	10	CO1
II	**Sources for IoT:** Development boards – RFID- WSN- M2M Communication. Examples of IoT: Wearable smart watch- Smart home- Smart cities. Design Principles for Connected devises- IoT/M2M Systems layers – Design Standardization.	10	CO2
III	**Sensors for IoT:** Introduction - Sensor Technology – Participatory Sensing – Industrial IoT – Automotive IoT – Basics of Actuator – Sensor data communication Protocols – Radio Frequency Identification Technology.	10	CO3
IV	**Prototyping the Embedded devices for IoT and M2M :** Introduction - Embedded computing basics – Embedded platforms for prototyping . Prototyping and designing the software for IoT applications: Introduction – Prototyping embedded device software.	10	CO4
V	**IoT case studies (Quantitative study):**IoT application in Premises – IoT application in connected car and services – IoT application in environment monitoring – IoT applications in Agriculture.	10	CO5

TEXT BOOK:	
1.	*Raj Kamal*. 2017. Internet of Things- **Architecture and design principles.** [First Edition]. McGrawhill Education, Chennai.
REFERENCE BOOK:	
1.	*RajkumarBuyya, Amir VahidDastjerdi*. 2016. Internet of Things: Principles and Paradigms. Morgon Kaufmann- Elsevier Publications.

COURSE OUTCOMES (CO):

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

CO1	Understand the basic principles, requirements, functions and system architecture of IoT.
CO2	DesignIoT development boards and devises for RFID, WSN and M2M communication.
CO3	Choose sensors for Industrial and Automotive IoT, configure data communication Protocols.
CO4	Prototype embedded devices for IoT and M2M, embedded platforms and design software for IoT applications.
CO5	Analyze the functioning of IoT applications in smart premises, connected car, environment monitoring and agriculture through quantitative case studies.

MAPPING:

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

H-High; M-Medium; L-Low

18UCSMP401	**CORE PRACTICAL V:PROGRAMMING IN .NET**	**Semester: IV**

COURSE OBJECTIVES:

The course aims

- To understand the usage of tools and techniques.
- To work with SQL.

Credits: 2 **Total Hours: 20**

S.No	PROGRAMS	Hrs	CO
1.	Designing a Simple Calculator using VB.NET	**2**	**CO1**
2.	Developing a Timer Based Quiz using VB.NET	**2**	**CO1**
3.	Writing a VB.NET Program to Handle Exceptions and Implement Overloading.	**2**	**CO1**
4.	Writing a Program Using ADRotator in ASP.NET	**2**	**CO2**
5.	Performing different types of Validation Controls using ASP.NET	**2**	**CO3**
6.	Creating a Database connection and perform Insert, Delete, View and Update records in VB.NET	**2**	**CO3**
7.	Establishing Database connection for binding Student Database through Repeater Control using ASP.NET	**2**	**CO4**
8.	Writing an ASP.NET Program to display data from two tables using SQL - JOIN keyword	**2**	**CO4**
9.	Writing an ASP.NET Program for Storing, Retrieving and Manipulating Students Mark Statement.	**2**	**CO5**
10.	Writing an ASP.NET Program to handle the Integrity and Referential Integrity constraints in Column and Table Level.	**2**	**CO5**

WEB REFERENCES:

1.	https://www.tutorialspoint.com/vb.net/vb.net_web_programming.htm
2.	https://www.w3schools.com/asp/webpages_examples.asp
3.	https://www.guru99.com/what-is-dbms.html

COURSE OUTCOMES (CO):

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

CO1	Understand the tools in .NET.
CO2	Improve the logical ability for developing program.
CO3	Create and manipulate Database.
CO4	Connect the backend with the frontend.
CO5	Maintain the data consistency.

18ULS401	CAREER COMPETENCY SKILLS – II	SEMESTER – IV

COURSE OBJECTIVES:

The course aims

- To impart knowledge on the aptitude skills.
- 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 BOOK:

1.	*R.S. Aggarwal.*2017.**Quantitative Aptitude**, *S Chand and Company Limited, New Delhi.*

REFERENCE BOOK:

1.	*AbhijithGuha.*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.

18UCSSBP401	SBC PRACTICAL II: JAVASCRIPT (INTERNAL EVALUATION)	SEMESTER-IV

COURSE OBJECTIVES:

The course aims

- To Understand the structure of an HTML document, HTML elements and attributes with JavaScript
- To explore the knowledge of fundamental concepts of Java Script such as arrays, function, objects, repetition, constructors, error handling and etc.
- To explore the Program interaction with web pages by JavaScript.

Credits: 2 **Total Hours: 20**

S.No.	PROGRAMS	Hrs	CO
1.	Finding a Factorial Number Using JavaScript.	**3**	**CO1**
2.	Popup Messages Using Event Function in JavaScript	**3**	**CO2**
3.	Frames Using Java Script	**2**	**CO1**
4.	Creating Forms Using JavaScript	**2**	**CO4**
5.	Validating User Input Form using JavaScript	**2**	**CO3**
6.	Looping statement through an array using JavaScript	**2**	**CO2**
7.	Error Handling in JavaScript	**3**	**CO5**
8.	Creating a dynamic Websites using JavaScript	**3**	**CO5**

REFERENCE BOOK:

1.	Programming JavaScript Applications: Robust Web Architecture with Node, HTML5, and Moderns JS Librariesby Eric Elliott

WEB REFERENCES:

1.	https://www.javascript.com
2.	https://www.w3schools.com
3.	https://www.guru99.com/practical-code-examples-using-javascript.com

COURSE OUTCOMES (CO):

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

CO1	Understand the basic concepts of HTML and JavaScript.
CO2	Implement interactive web pages using HTML and JavaScript.
CO3	Perform online validation in forms.
CO4	Apply a structured approach to identify the needs, interests and functionality of a website.
CO5	Build Dynamic Website using JavaScript.

18UCSAC301	ADD-ON COURSE I: DTP Office Automation (Practical)	SEMESTER – III

COURSE OBJECTIVES:

The course aims

- How effectively utilize the office package for automating the documents and manipulating the same with different representations?

Total Hours: 24

S.No	PROGRAMS	Hrs	CO
PAGE MAKER			
1.	a. Working with Text (Entering the Text, Size, Style and Align)	**2**	**CO1**
2.	b. Working with Graphics (Creating, Wrapping Text, Importing)	**2**	**CO2**
3.	a. Managing a Publication (Page Orientation, Numbering, Size, Dimensions and Margins)	**2**	**CO1**
4.	b.Creating Master Page and Applying it to a Publication.	**2**	**CO1**
COREL DRAW			
5.	a. Working With Text (Size, Arranging, Decorating, Type Style, Spell-Checking and Kerning).	**2**	**CO3**
6.	b. Working Graphics (Drawing, Editing, Texturing)	**2**	**CO4**
7.	a. Working with Page Layout (Page Size & Layout Styles).	**2**	**CO4**
8.	b. Working with Background (Bitmap to Background)	**2**	**CO4**
PHOTOSHOP			
9.	a. Working with Images (Scanning, Image size, Resolution, Rotating and Cropping)	**2**	**CO5**

10.	b.Working with Painting Tools (Paintbrush Tool, Brush Palette, Gradient and Paint Bucket)	**2**	**CO5**
11.	a. Working With Editing Tools (Blur, Sharpen, Smudge, Clone, Toning and Eraser)	**2**	**CO5**
12.	b.Working with Layers (Creating, Deleting, Hiding/Showing, Merging and Effects).	**2**	**CO5**

WEB REFERENCES:	
1.	https:// www.coreldraw.com/en/pages/tutorials
2.	https:// www.docnmail.com/learn/pagemakers
3.	https:// www.guru99.com/photoshop-tutorials.html

COURSE OUTCOMES (CO):

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

CO1	Create documents and templates by applying different formatting styles.
CO2	Understand graphics by using various tools.
CO3	Understand CorelDraw workspace, tools, panels and basic techniques.
CO4	Create logos, advertisements and other graphic documents.
CO5	Understand the Layer basics and enhancing digital Photographs.

18UCSAC401	ADD-ON COURSE II:ANIMATION 3D Animation Lab (Practical)	SEMESTER – IV

COURSE OBJECTIVES:

The course aims

- Three Dimensional Modeling, Rendering Process, Lighting and Animation Techniques.

Total Hours: 24

S.No.	PROGRAMS	Hrs	CO
1.	Working With Standard Primitives.	**2**	**CO1**
2.	Drawing Regular and Irregular objects with Primitives.	**2**	**CO1**
3.	Creating a Three Dimensional Logo.	**2**	**CO2**
4.	Creating Text Animation Using Multiple Layers.	**2**	**CO2**
5.	Applying Various Transformations for a Model.	**2**	**CO3**
6.	Cloning the Objects.	**2**	**CO3**
7.	Creating a Model and Applying a Standard Material.	**2**	**CO3**
8.	Applying Lighting Effect for a Model.	**2**	**CO4**
9.	Designing and Animating a Rolling Ball.	**2**	**CO4**
10.	Creating Three Dimensional Characters.	**2**	**CO4**
11.	Creating a New Innovative character and making a Small Action.	**2**	**CO5**
12.	Exporting 3D Max File Format into other File Format.	**2**	**CO5**

WEB REFERENCES:

1.	https://www.autodesk.in/products/3dmax
2.	https://www.wickedliquidfx.com/adwords
3.	https://www.lynda.com/3ds-max-training-tutorials

COURSE OUTCOMES (CO):

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

CO1	Learn the basics of 3D Modeling and Texturing.
CO2	Enhance the 3D Rendering process and Trimmed surfaces.
CO3	Understand the basic concepts of Lighting and Shading Techniques.
CO4	Create and manipulate Animations with proper story boarding.
CO5	Improve the quality of Key frame Interpolations and File Formats.

18UCSAL401	**ADVANCED LEARNERS COURSE: MOBILE COMMERCE**	**SEMESTER - IV**

COURSE OBJECTIVES:

The course aims

- Fundamentals of E-commerce Technology and its applications.
- Learn the basic concepts of m-commerce and its technologies with security issues, fraud prevention.

Credits: 2 **Total Hours: 50**

UNIT	CONTENTS	Hrs	CO
I	**Introduction to E-Commerce:**Introduction -What is E-Commerce? -E-Business –Categories of E-Commerce applications – Global Trading Environment & Adoption of E-Commerce – Comparison between traditional and Electronic commerce - Advantages and disadvantages of e-commerce. **Business Models of E-Commerce:**Introduction –Business	**10**	**CO1**
II	**E-Commerce Technology:** Introduction – IT Infrastructure-Internet-Middleware-Intranet-Extranet-VPN-Firewall-Cryptography-Digital Signature-Digital Envelope-Digital Certificates-Contents: Text and integrating E-Business	**10**	**CO2**
III	**Mobile Commerce and WAP:**Introduction to Mobile Commerce-Application of Mobile Commerce –Advantage of m-commerce –Wireless application Protocol – WAP Browser-Enhanced features of WAP 2.0 –Underlying technologies of m-commerce-Overview of WML- Architectures of Mobile	**10**	**CO3**

IV	**Mobile Commerce Risk Security & Payments Methods:** Introduction –Security and Payment Methods- Mobile Commerce Security- Security Mechanisms- Mobile Security- Network Infrastructure and Security- Wireless Local Area Network and Security- WAP & Security- Mobile commerce payment methods –Mobile Payment Standardization – Reputation and Trust- Application and Risk Scenarios – Reputation Systems- The Trust Model- Future Trends.	**10**	**CO4**
V	**Mobile Money-Infrastructure & Fraud Prevention for M-Payment:** Introduction – Requirements for Authentication Infrastructure for m-commerce – Various Trust Relationships –Different Requirements for mobile commerce – Password-Based Authentication for Mobile Users with support for	**10**	**CO5**

TEXT BOOK:

1.	*Dr.U.S.Pandey, Er.SaurabhShukla*, 2011. **E-Commerce and Mobile Commerce Technologies**,S.Chand& Company LTD, New Delhi.

REFERENCE BOOKS:

1.	*Ravi Kalakota, B.AndrewWhinston*, 2008. Frontiers of Electronic Commerce, Pearson Education.
2.	*US.Pandey,Saurabhshukla.* **E-Commerce and Mobile Commerce Technologies**,S Chand Publication ,New Delhi ,paperback 2007

WEB REFERENCES:

1.	https://www.bigcommerce.com/blog/mobile-commerce
2.	https://searchmobilecomputing-techtarget.com/difinition/m-commerce

COURSE OUTCOMES (CO):

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

CO1	Understand the basic concepts of E-commerce and its applications.
CO2	Perceive the knowledge of E-commerce technology.
CO3	Learn the technology, the applications, and the business model of mobile commerce and WAP.
CO4	Understand the security and payment methods of m-commerce.
CO5	Recognize the money infrastructure and fraud prevention in m-commerce.

MAPPING:

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

H-High; M-Medium; L-Low

18UCSAL402	ADVANCED LEARNERS COURSE: CYBER SECURITY	SEMESTER - IV

COURSE OBJECTIVES:

The course aims

- Build network and system administration fundamentals.
- Learn how to detect threats, protect system and anticipate potential cyber attacks.
- Implement and testing of security monitoring, intrusion detection and analysis of events and trends.

Credits: 4 **Total Hours: 50**

UNIT	CONTENTS	Hrs	CO
I	**Cyber Security Fundamentals:** Network and Security Concepts: Information Assurance Fundamentals – Basic Cryptography - Symmetric Encryption - Public Key Encryption- The Domain Name System(DNS)-Firewalls- Virtualization- Radio Frequency Identification.	**10**	**CO1**
II	**Attacker Techniques And Motivations**: How Hackers Cover Their Tracks - How And Why Attackers Use Proxies - Tunnelling Techniques **- Fraud Techniques:** Phishing, Smishing, Vishing, and Mobile Malicious Code - Rogue Antivirus - Click Fraud - Threads Infrastructure - Fraud Techniques- Threat Infrastructure.	**10**	**CO2**
III	**Exploitation:Techniques to Gain a Foothold**: Shell code – Integer Overflow Vulnerabilities – Stack-Based Buffer Overflows – Format String	**10**	**CO3**

	Vulnerabilities – SQL Injection – Malicious PDF Files – Race Conditions – Web Exploit Tools.		
IV	Ma**licious Code:Self-Replicating Malicious Code:** Worms – Virus - **Evading Detection andElevating Privileges:** Obfuscation - Virtual Machine Obfuscation - Persistent Software Techniques - **Rootkits:** User mode Rootkits - Kernel Mode Rootkits – **Attacks against Privileged User Accounts and Escalation of Privileges:** Many Users Already Have Administrator Permissions - Getting Administrator Permissions - **Virtual Machine Detection:** Fingerprint Everywhere – Understanding the Rules of the Neighborhood – Detecting Communication with the Outside World.	**10**	**CO4**
V	**Stealing Informationand Exploitation**: Form Grabbing - Man-in-the-Middle Attacks - DLL Injection - Browser Helper Objects. **Defenseand Analysis Techniques:** Memory Forensics - Honeypots - Malicious Code Naming - Automated Malicious Code - Intrusion Detection Systems.	**10**	**CO5**
TEXT BOOK:			
1.	*James Graham, Richard Howard and Ryan Olsan***.** 2011. **Cyber Security Essentials**. CRC Press, New York. **(Unit I-V)**		
REFERENCE BOOKS:			
1.	*George K. Kostopoulos*. 2013. **Cyberspace and Cyber Security**. CRC Press, New York.		
2.	*Josiah Dykstra.* 2015**. Essential Cybersecurity**. [First Edition]. Oreilly Publications, USA.		
3.	*Niall Adams and Nicholas Heard*. 2013. **Data Analytics for Network Cyber Security**. [First Edition]. Imperial College Press, USA.		

WEB REFERENCES:	
1.	https://www.javapoint.com/cyber-security-principles
2.	https://www.tutorialpoint.com/computer_security
3.	https://intellipaat.com/tutorial/ethical-hacking_cyber-security
4.	https://simplilearn.com/tutorials/cyber-security

COURSE OUTCOMES (CO):

After the completion of this course, the students should be able to

CO1	Know the fundamentals of Cyber Security.
CO2	Describe the tactics, techniques and procedures used by cyber criminals.
CO3	Discriminate how Cyber Security professionals use technologies, processes and procedures to defend all components of the network.
CO4	Define technologies, products and procedures used to protect confidentiality, ensure integrity and provide high availability.
CO5	Implement continuous network monitoring and provide real-time security solutions.

MAPPING:

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

H-High; M-Medium; L-Low

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: 26**

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.	4	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 WebBrowser:**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	5	CO4

	Message- E-Mail Clients & Servers- Mailing List- E-Mail Security.		
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 Privacy Concepts-Firewall.	**5**	**CO5**

TEXT BOOK:	
1.	*ISRD Group*. 2012. **Internet Technology and Web Design.** [Fourth reprint]. Tata McGraw-Hill Education Private Limited., New Delhi.
REFERENCE BOOKS:	
1.	*Paul Deite , Harvey Deitel , Abbey Deite*2014**Internet & World wide Web-How to Program.** [Fifth Edition]. PearsonEducatin
2.	*McFedries Paul* **Teach yourself computers and the internet visually**. [Fourth Edition]. John Wiley& Sons inc
3.	*DR.R.K.JAIn*2015**Internet Technology and Web Design** .Khanna Book Publishing
WEB REFERENCES:	
1.	https://www.tutorialspoint.com/intarnet_technologies/
2.	www.ironspider.ca
3.	*https://www.guru99.com*

COURSE OUTCOMES (CO):

After the completion of this course, the students should be able to

CO1	Define terms related to intranet.
CO2	Understand how computers are connected to the intranet.
CO3	Demonstrate the ability to users the world wide web.
CO4	Demonstrate an understanding of and the ability to use electronic mail.
CO5	Understand the principles of intranet services such as mailing lists, Usenet News groups, and instant messaging.

MAPPING:

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

H-High; M-Medium; L-Low

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: 26**

UNIT	CONTENTS	Hrs.	CO
I	**Getting Started with HTML:** HTML and XHTML Basics: Understanding HTML and XHTML - 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.	5	CO2
III	**PageLayout and Navigation:** Creating Tables – Formatting Tables.	5	CO3
IV	**Page Layout and Navigation:** Creating Division-Based Layouts – Creating User Forms.	5	CO4
V	**PageLayout and Navigation:** Using Frames for Layout – Incorporating Audio and Video.	5	CO5

TEXT BOOK:	
1.	*FaitheWempen*. 2006. **Microsoft Step by Step HTML and XHTML.** [First Edition]. PHI, New Delhi.
REFERENCE BOOKS:	
1.	*Elizabeth Castro.* 2014. **HTML for The World Wide Web.** [Fourth Edition]. Pearson Education
WEB REFERENCES:	
1.	https://its.temple.edu/creating-tables-html#1714
2.	https://www.w3schools.com
3.	https://www.guru99.com

COURSE OUTCOMES (CO):

After the completion of this course, the students should be able to

CO1	Understand the basic concepts of HTML and create basic web pages.
CO2	Insert and format text and implementing a variety of Hyperlinks to connect pages and communicate with users via email link.
CO3	Understand the basics of table and its properties.
CO4	Create modify and format a basic layout.
CO5	Apply audio and video clips in a web page

MAPPING:

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

H-High; M-Medium; L-Low

GUIDELINES

1. SUBMISSION OF RECORD NOTE BOOKS:

Candidates appearing for Practical Examinations shall submit Bonafide Record Note Books prescribed for Practical Examinations, otherwise the candidates willnot be permitted to appear for the Practical Examinations.

2. PASSING MINIMUM AND INTERNAL MARK DISTRIBUTION

(Theory and Practical)

(i) THEORY

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 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**

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) 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 and Algorithm / Flowchart	: 20 Marks
ii)	Source Code	: 20 Marks
iii)	Test and debug	: 10 Marks
iv)	Output and Result	: 10 Marks
	Total	**: 60 Marks**

4. 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.

18UCSM501	CORE IX: DATA MINING AND WAREHOUSING	SEMESTER - V

COURSE OBJECTIVES:

The Course aims

- To understand fundamental and research aspects of Data Mining.
- To implementation of Mining Algorithms on various Applications.

Credit Points: 4 **Total Hours: 50**

UNIT	CONTENTS	Hrs	CO
I	**Introduction:** Motivation –Data Warehousing and Data Mining Technologies-Data Models-Data Warehousing and OLAP: User's Perspective –Data Mining: User's Perspective-Related Disciplines. **Frequent Pattern Mining**: Basic Problem Definition-Mining Association Rules -Applications – Variations – Interestingness-Frequent Item set Mining (FIM) Algorithms.	10	CO1
II	**Classification:** Basic Problem Definition – Applications-Evaluation of classifiers-Other issues-Classification Techniques-Optimal Classification Algorithms.	10	CO2
III	**Clustering:** Basic Problem Definition- Clustering Applications- Measurement of Similarity-Evaluation of Clustering Algorithms- Classification of Clustering Algorithms-Partitioning Methods-Hierarchical Methods-Density based Methods-Grid-Based methods.	10	CO3
IV	**Pattern Discovery in Real-World Data:** Relational Data- Transactional Data-Multi-Dimensional Data-Distributed Data-Spatial Data-Data Streams-Time-	10	CO4

	Series Data-Text and Web Data.		
V	**Data Warehousing: The Data Model:** Fundamentals-Data Warehouse Data Characteristics-Data Warehouse Components-Approaches to Build Data Marts and Data Warehouse – ETL-Logical Data Modeling-More on Dimensional Modeling-OLAP.	**10**	**CO5**
TEXT BOOK:			
1.	*VikramPudi and Radha Krishna, P.* 2010**. Data Mining.** [Third Impression]. Oxford University Press, New Delhi.		
REFERENCE BOOKS:			
1.	*Jiawei Han and MichelineKamber***.** 2006. **Data Mining Concepts and Techniques.** [Second edition].Morgan Kaufmann Publishers an Imprint of Elsevier, New Delhi.		
2.	*Arun, K.Pujari.* 2007. **Data Mining Techniques.** [Eleventh Impression]. Universities Press Private Limited, Hyderabad.		
3.	*Soman, K. P, ShyamDiwaka, and Ajay, V.*2006. **Insight into Data Mining: Theory and Practice.** [Second Printing].Prentice-Hall of India Private Limited, New Delhi.		

COURSE OUTCOMES (CO):

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

CO1	Understand the basics of Data Warehousing and Pattern Mining.
CO2	Acquire knowledge about problem definition and classification techniques.
CO3	Understand the concepts classification and clustering Algorithms and its method.
CO4	Know the concepts of pattern discovery and data.
CO5	Gain knowledge of data models.

MAPPING

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

H-High; M-Medium; L-Low

18UCSM502	**CORE X:SOFTWARE ENGINEERING**	**SEMESTER - V**	
COURSE OBJECTIVES: The Course aims • To analyze Software Development Life Cycle. • To apply Software Design principles for real time applications.			
Credit Points: 4		**Total Hours: 50**	
UNIT	**CONTENTS**	**Hrs**	**CO**
I	Software Engineering Fundamentals - Software processes: Software life - cycle and process models-Process assessment models - Overview of Project Management activities. Software requirements and specifications – RequirementsElicitation- Requirements analysis modeling techniques- Functional and nonfunctional requirements - User requirements, System requirements, requirements validation and software requirements specification document.	**10**	**CO1**
II	Fundamental design concepts and principles-Design characteristics-System Models-Context, Behavioral, Data and Object models-Architectural design- System structuring, Control models, Structured design - Object-oriented analysis and design- User interface design.	**10**	**CO2**
III	Validation planning- Testing fundamentals-Test plan Creation and test case generation-	**10**	**CO3**

	Black-box and white-box testing techniques, Unit testing, Integration, validation, and system testing- Object-oriented testing.		
IV	Software Evolution- Software maintenance, Characteristics of maintainable software- Reengineering.	**10**	**CO4**
V	Team management, Role identification and assignment, Project tracking, Team problem resolution; Software measurement and estimation techniques. Software quality assurance- Software configuration management: Overview of SEICMM, ISO 9000, CMMI, PCMM, TQM and Six Sigma-Overview of CASE tools. Software tools and environments.	**10**	**CO5**
TEXT BOOK:			
1.	*Ian Sommerville*. 2013. **Software Engineering**. [Ninth Edition]. Pearson.		
REFERENCE BOOK:			
1.	*R. S. Pressman*. 2014. **Software Engineering- A Practitioner's Approach**, [Eighth Edition]. McGraw Hill Higher Education.		
WEB REFERENCES:			
1.	https://www.geeksforgeeks.org/software engineering		
2.	https://www.javatpoint.com/software-engineering-tutorial		
3.	https://www.tutorialspoint.com/software engineering		

COURSE OUTCOMES (CO):

After the completion of this course, the students should be able to:

CO1	Understand the concepts of process, product and project development.
CO2	Acquire the knowledge of requirement analysis.
CO3	Understand the knowledge of software design and testing.
CO4	Know the basics Software maintenance.
CO5	Gain knowledge of project management techniques.

MAPPING:

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

H-High; M-Medium; L-Low

18UCSM503	CORE XI:OPERATING SYSTEMS	SEMESTER–V

COURSE OBJECTIVE:

The course aims

- To learn the fundamentals of Operating Systems.
- To know the components of memory management aspects and security.

Credit Points: 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. **Operating-System Structures:** Operating-System Services-Types of System Calls-System Programs –Operating-System Design and Implementation – Operating-System Structure. **Process Management**: **Processes:** Process Concept - Process Scheduling - Interprocess Communication.	**10**	**CO1**
II	**Threads:** Multithreading Models. **Process Synchronization: C**ritical-Section Problem – Semaphores – Classical Problems of Synchronization. **CPU Scheduling:** Basic Concepts-Scheduling Criteria and Algorithms. **Deadlocks**: Deadlock Characterization- Methods for Handling Deadlocks - Deadlock Prevention, Avoidance and Detection- Recovery from Deadlock.	**10**	**CO2**

III	**Memory Management: Main Memory:** Background – Segmentation – Paging --Structure of the Page Table. **Virtual Memory:** Demand Paging-Page Replacement-Thrashing.	**10**	**CO3**
IV	**Storage Management**: **Mass-Storage Structure:** Disk Structure –Disk Scheduling – RAID Structure. **File-System Interface:** File Concept-Access Methods-Directory and Disk Structure-Protection. **File-System Implementation:** Allocation Methods-Free-Space Management. **I/O Systems**: Kernel I/O	**10**	**CO4**
V	**Protection and Security: Protection:** Domain of Protection-Access Matrix-Implementation of the Access Matrix**. Security:** The Security Problem-Program Threats- System and Network Threats-User Authentication-Firewalling to Protect Systems and Networks. **Case Study**: Windows 7, Android (Open Source): Android Overview.	**10**	**CO5**
TEXTBOOKS:			
1	*Abraham Silberschatz, Peter Baer Galvin and Greg Gagne*. 2013. **Operating System Concepts.** [Ninth Edition]. Wiley Edition.		
2	*Marko Gargenta, Masumi Nakamura. 2014.* **Learning Android**.*[Second Edition].O'Reilly,USA.[**Case study**: Android (open source) – Unit V]*		
REFERENCE BOOKS:			
1	*William Stallings*. 2004. **Operating Systems – Internals & Design Principles.** [Fifth Edition]. Prentice – Hall of India Pvt. Ltd., New Delhi. Prentice – Hall of India P.Ltd., New Delhi.		
2	*Andrew Tannenbaum*, S.2011. **Modern Operating Systems.** [Third Edition].Prentice-Hall of India,New Delhi.		

WEB REFERENCES:	
1	https://www.os-book.com
2	http://www.geeksforgeeks.org
3	http://www.tutorialspoint.com
4	https://www.w3schools.in

COURSE OUTCOMES (CO):

On successful completion of this course, the students will be able to:

CO1	Analyze the structure of OS and process management
CO2	Analyze and design the application to run thread model of operating systems through multi-threading.
CO3	Understand the concepts of paging.
CO4	Attain knowledge on files and storage management.
CO5	DescribeProtection and Security concepts.

MAPPING:

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

H-High; M-Medium; L-Low

18UCSEL501	ELECTIVE I: E-COMMERCE	SEMESTER – V

COURSE OBJECTIVE:

The course aims

- To learn the basics of E-Commerce.
- To know the concept of E-Marketing, E-Payment, Mobile Commerce and Legal Issues.

Credit Points: 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 World Wide Web – The Milestones – Advantages of E-commerce - Disadvantages of E-commerce –Transition to E-commerce in India – The Internet and India – E-Transition Challenges for Indian Corporates-The Information Technology Act,2000. **Business Models for E-Commerce:** E-business model based on the relationship of Transaction parties	**10**	**CO1**
II	**Enabling Technologies of the World Wide Web:** Internet Client- Server Applications - Software Agents – Internet Standards and Specifications – Internet Service Provider (ISP).**E-Marketing:** Traditional Marketing - Identifying Web Presence Goals – The Browsing Behaviour Model – Online Marketing – E-advertising	**10**	**CO2**

III	**E-Security:** Information System Security – Security on the Internet – E-business Risk Management Issues-Information security environment in India. **E-Payment Systems:** Digital Token-based E-Payment Systems - Classification of New Payment Systems– Properties of Electronic Cash (E-cash) –Risk and E-payment System.	**10**	**CO3**
IV	**E-Strategy** : Information and Strategy – The Virtual value Chain – Seven Dimensions of E-commerce Strategy – Value Chain and E-strategy – Planning the E-commerce project - E-commerce Strategy and Knowledge Management - E-Business Strategy and Data Warehousing and Data Mining. **Information Systems for Mobile Commerce:** What is Mobile Commerce – Wireless Applications - Cellular Network – Wireless Spectrum - Technologies for Mobile Commerce - WAP Programming Model – Wireless Technologies.	**10**	**CO4**
V	**Customer – Effective Web Design:** Requirements of Intelligent Websites**-** Setting Websites Goals and Objectives – Strategies for Website Development. **Legal and Ethical Issues**: Ethical Issues in the digital Economy - Computers as Targets for Crime - Computers as Storage Devices - Computers as Communication Tools - Cyber stalking –	**10**	**CO5**

	Privacy is at Risk in the Internet Age – Phishing – Copyright – Internet Gambling – Threats to Children- The Special Nature of Computer Ethics.		

TEXT BOOK:	
1.	*Joseph, P.T. S.J.*2009**.E-Commerce An Indian Perspective.** [Third Edition]. Prentice-Hall of India, New Delhi.
REFERENCE BOOKS:	
1.	*Gray Schneider, P.* 2007. **Electronic Commerce** [Seventh Annual Edition]**.** Thomson Course/technology
2.	*Ravi Kalakota and Andrew Whinston, B.* 2000.**Frontiers of Electronic Commerce**.[Fifth Indian Reprint]. Pearson Education, New Delhi.
3.	*Ravi Kalakot and Andrew Whinston, B.* 2000. **Electronic Commerce –A manager's Guide.** [Second Indian Reprint]. Pearson Education, New Delhi.
WEB REFFERENCES:	
1.	https://www.google.com/amp/s/searchcio.techtarget.com/definition/e-commerce%3famp=1
2.	https://www.businesswsdaily.com/4872-what-is-e-commerce.html

COURSE OUTCOMES (CO):

After the completion of this course, the students should be able to:

CO1	Understand the basics of E-Commerce.
CO2	Know about E-marketing and its applications.
CO3	Understand the concepts of E-security and gain knowledge about the payment systems.
CO4	Understand the E-strategy and mobile commerce.
CO5	Acquire the knowledge of Legal and Ethical issues.

MAPPING:

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

H-High; M-Medium; L-Low

18UCSEL502	ELECTIVE I: COMPUTER GRAPHICS	SEMESTER - V

COURSE OBJECTIVES:

The Course aims

- To know the knowledge about the graphic technique and algorithm.
- To acquire the knowledge of multimedia system design, and various I/O technologies.

Credit Points: 3 **Total Hours: 50**

UNIT	CONTENTS	Hrs	CO
I	**A Survey of Computer Graphics:** Computer–Aided Design- Presentation Graphics- Computer Art– Entertainment-Education and Training – Visualization-Image Processing -Graphical User Interfaces. **Overview of Graphics Systems:** Video Display Devices– Raster Scan Systems-Video Controller–Random Scan Systems- Graphics Monitors and Workstations- Input Devices and Hard Copy Devices.	**10**	**CO1**
II	**Output Primitives:** Points and Lines-Line Drawing Algorithms: DDA Algorithm- Bresenham's Line Algorithm– Circle Generating Algorithms. **Two Dimensional Geometric Transformations:** Basic Transformations- Matrix Representations and Homogeneous Coordinates- Composite Transformations- Other Transformations. **Two Dimensional Viewing:** The Viewing Pipeline-Clipping Operations- Point Clipping-Line Clipping: Cohen-Sutherland line clipping-Polygon Clipping:	**10**	**CO2**

	Sutherland-Hodgeman Polygon Clipping- Curve Clipping- Text Clipping- Exterior Clipping.		
III	**Structures and Hierarchical Modeling:** Structure Concepts- Editing Structures– Basic Modeling Concepts– Hierarchical Modeling with Structures. Graphical **User Interfaces and Interactive Input Methods:** The User Dialogue: Windows and Icons- Input of Graphical Data- Input Functions- Interactive Picture Construction Techniques– Virtual Reality Environments.	**10**	**CO3**
IV	**Three-Dimensional Concepts:** Three-Dimensional Display Methods- Three- Dimensional Graphics Packages. **Three-Dimensional Object Representations:** Polygon Surfaces-Curved Lines and Surfaces- Quadric Surfaces-Blobby Objects. **Three-Dimensional Viewing:** Projections– Clipping– Hardware Implementations- Three-Dimensional Viewing Functions.	**10**	**CO4**
V	**Visible-Surface Detection Methods:** Classification of Visible-Surface Detection Algorithms- Back-Face Detection- Depth-Buffer Method- A-Buffer Method-Scan-Line Method-Depth-Sorting Method-Area-Subdivision Method. **Color Models and Color Applications:** Standard Primaries and the chromaticity Diagram: XYZ Color Model-RGB Color Model-YIQ Color Model-CMY Color Model-HSV Color Model. **Computer Animation:** Design of Animation Sequences-General Computer-	**10**	**CO5**

	Animation Functions-Raster Animations – Computer-Animation Languages-Key-Frame Systems - Motion Specifications.**Understanding Services and Applications:Using Media and Streaming**: Understanding the Streaming Process – Audio Streaming – Working with VoIP Applications – Video Streaming. **Using the Mobile cloud: Working with Mobile Devices**: Using Smart Phones with the Cloud. **Working with Mobile Web Services:** Understanding Service Types.		
TEXT BOOK:			
1.	*Donald Hearnand Pauline Baker.M.*2008.**Computer Graphics C Version**. [Second Edition-Sixth Impression].Pearson Education in South Asia.		
REFERENCE BOOKS:			
1.	*Neuman.W.M.andSproullR.F.* 1997. **Principles of Interactive Computer Graphics.** [Second Edition]. McGraw-Hill.		
2.	*PradeepK.Bhatia.* 2008. **Computer Graphics**. [First Edition]. I.K.International Publishing House Pvt Ltd.		
3.	*ZhigangXiangandRoyA.Plastock.*1986. **Computer Graphics**. [Second Edition].McGraw Hill.		
WEB REFFERENCES:			
1.	http://www.javapoint.com/computer-graphics-tutorial		
2.	http://www.geeksforgeeks.org/computer-graphic-2/		

COURSE OUTCOMES (CO):

After the completion of this course, the students should be able to:

CO1	Understand the basics of computer graphics.
CO2	Acquire knowledge about two dimensional and their transformations.
CO3	Understand the concepts of virtualization and gain knowledge about the user interface between the computer graphics.
CO4	Know the concept of three dimensional viewing methods.
CO5	Gain knowledge of Video, audio streaming and mobile applications.

MAPPING:

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

H-High; M-Medium; L-Low

18UCSMP501	**CORE PRACTICAL VI:R -PROGRAMMING**	**SEMESTER - V**

COURSE OBJECTIVES:

The Course aims

- To provide the knowledge of vector based calculation.
- To develop R programs using looping constructs and R Mathematical functions that can be used for data exploration in R.

Credit Points: 3 **Total Hours:24**

S. No.	CONTENTS	Hrs	CO
1.	Creating and manipulating a vector.	**3**	**CO1**
2.	Generating number series and sequences.	**3**	**CO1**
3.	Creating matrix and manipulating matrix.	**3**	**CO2**
4.	Comparison of matrix and vectors.	**3**	**CO2**
5.	Program on branching statements.	**3**	**CO3**
6.	Program on looping statements.	**3**	**CO3**
7.	Operations on lists.	3	**CO4**
8.	Creating and saving graphs to files.	**3**	**CO5**

WEB REFERENCES:

1.	https://www.coursera.org/learn/r-programming
2.	https://coupontry.wordpress.com/2018/04/r-programming-a-z-r-for-data-science-with-r-real-exercises-learn-r-programming-from-scratch
3.	https://rstudio.com

COURSE OUTCOMES (CO):

After the completion of this course, the students should be able to:

CO1	Understand the concepts of descriptive statistics.
CO2	Gain the knowledge on matrix manipulations.
CO3	Develop programs using control structures.
CO4	Apply computational techniques.
CO5	Learn exploratory data analysis.

18UCSMP502	CORE PRACTICAL VII: COMPUTER HARDWARE	SEMESTER – V

COURSE OBJECTIVES:

The course aims

- To acquire the knowledge of computer hardware components.
- To develop the knowledge of computer peripherals.

Credit Points:3 **Total Hours: 24**

S.NO	PROGRAMS	Hrs	CO
1.	Identification of various Components, External Ports and Interfacing.	**3**	**CO1**
2.	Assembling a PC.	**3**	**CO1**
3.	Disassembling a PC.	**3**	**CO1**
4.	Upgrading the System Components a. Adding New Memory b. Adding new graphics card.	**3**	**CO2**
5.	Installing Windows Operating System in VMWare.	**3**	**CO2**
6.	Installing Application Software's and Utilities a. MS Office b. Anti-Virus.	**3**	**CO3**
7.	Installing LINUX (Red Hat LINUX) in VMWare .	**3**	**CO4**
8.	Creating Users, Groups and Basic File Operations and mounting CD – ROM.	**3**	**CO5**

WEB REFERENCES:

1.	http://courses.lumenlearning.com
2.	http://www.tutorialspoint.com

COURSE OUTCOMES (CO):

On completion of this course, the students will be able to

CO1	Know the concepts of computer hardware components.
CO2	Acquire the knowledge about the functions of hardware.
CO3	Install operating systems.
CO4	Know about the software applications and utilities.
CO5	Create users and groups.

18UCSSBP501	SBC PRACTICAL III:MySQL (INTERNAL EVALUATION)	SEMESTER – V

COURSE OBJECTIVES:

The course aims

- To acquire the knowledge of query building.
- To know about basics of constraints.

Credit Points: 2 **Total Hours: 30**

S.NO	PROGRAMS	Hrs	CO
1.	Perform DDL commands.	**2**	**CO1**
2.	Perform DML commands.	**2**	**CO1**
3.	Creating a table to implement integrity constraints and referential integrity constraints in column and table level.	**2**	**CO2**
4.	Creating queries for Built-in functions.	**2**	**CO3**
5.	Creating queries using limit clause and rand function.	**2**	**CO3**
6.	Implement queries using Group By, Having Clause and Order Clause.	**2**	**CO3**
7.	Implement different types of joins.	**2**	**CO4**
8.	Creating user and assign privileges and roles.	**2**	**CO5**

WEB REFERENCES:

1.	http://dev.mysql.com/doc/refman/8.0/en/programs.html
2.	https://www.geeksforgeeks.org

COURSE OUTCOMES (CO):

On completion of this course, the students will be able to

CO1	Write structured queries.
CO2	Implement record manipulation.
CO3	Write queries using functions.
CO4	Implement various joins.
CO5	Understand about assigning privileges and roles.

<table>
<tr><td>18UCSAL501</td><td>ALC II:
SOFTWARE PROJECT MANAGEMENT</td><td colspan="2">SEMESTER - V</td></tr>
<tr><td colspan="4">COURSE OBJECTIVES:
The Course aims
• To understand the working principles of Project Management.
• To acquire knowledge in Software issue and Techniques.</td></tr>
<tr><td colspan="2">Credit Points: 3</td><td colspan="2">Total Hours: 50</td></tr>
<tr><td>UNIT</td><td>CONTENTS</td><td>Hrs</td><td>CO</td></tr>
<tr><td>I</td><td>Introduction: Software Project Management - Software Project Versus Other Project – Requirement Specification – Information and Control in Organization – Introduction tostep wise Project Planning – Select – Identify Scope and Objectives - Identify Project Infrastructure – Analyse Project Characteristics – Products and Activities – Estimate Effort for each Activity – Identify Activity Risks – Allocate Resources - Review / Publicize Plan – Execute Plan and Lower Levels of Planning</td><td>10</td><td>CO1</td></tr>
<tr><td>II</td><td>Project Evaluation : Introduction – Strategic Assessment – Technical Assessment – Cost Benefit Analysis – Cash Flow Forecasting – Cost Benefit Evaluation Techniques – Risk Evaluation – Selection of an Appropriate Project App roach – Choosing Technologies – Choice of Process Models – Structured Methods – Rap id Application Development – Waterfall Model – V-Process Model – Spiral Model – Software Prototyping – Ways of Categorizing</td><td>10</td><td>CO2</td></tr>
</table>

	Prototypes – Tools – Incremental Delivery – Selection Process Model.		
III	Software Effort Estimation: Introduction – Problems with Over and Under Estimates – Basis for Software Estimating – Software Effort Estimation Technique – Albrecht Function Point Analysis – Function Points – Object Points – Procedural Code Oriented Approach – COCOMO – Activity Planning – Project Schedules - Projects and activities – Sequencing and Scheduling Activities – Network Planning Models – Formulating a Network Planning – Adding Time Dimension – Forward Pass – Backward Pas s – Identifying the Critical Path – Activity Float -Shortening Project Duration – Identifying Critical Activities – Precedence Networks.	**10**	**CO3**
IV	**Risk Management** : Introduction – Nature of Risk Man aging Identification – Analysis – Reducing – Evaluating – Z values – Resource Allocation – Nature of Resources – Requirements – Scheduling – Critical Paths – Counting the Cost – Resource Schedule – Cost Schedule – Scheduling Sequence – Monitoring and Control – Creating the Frame Work - Collecting the Data – Visualizing the Progress – Cost Monitoring – Prioritizing Monitoring – Change Control.	**10**	**CO4**

V	**Managing Contracts:**Introduction – Types of Contract – Stages in Contract Placement – Terms of Contract – Contract Management – Acceptance – Managing People and Organizing Teams – Organizational Behavior Background – Selecting the Right Person for the Job – Instruction in the Best Methods – Motivation – Decision Making – Leadership – Organizational Structures – Software Quality – Importance – Practical Measures – Product.	**10**	**CO5**
TEXT BOOK:			
1.	*Bob Hughes*and Mike Cotterell.**Software Project Management.** [Second Edition].McGraw Hill.		
REFERENCE BOOKS:			
1.	*Walker Royce*. **Software Project Management**. Addition Wesley.		
2.	*DerrelInce, H. Sharp and M. Woodman.* [1995]. **Introduction to Software Project Management and Quality Assurance.** Tata McGraw Hill.		
WEB REFERENCES:			
1.	https://www.springer.com/in/book book		
2.	https://www.tutorialspoint.com/fuzzy_logic/fuzziness_in_neural_networks.htm		
3.	http://www.scholarpedia.org/article/Fuzzy_neural_network		

COURSE OUTCOMES (CO):

After the completion of this course, the students should be able to:

CO1	Understand the basics of project software contexts and appropriate management strategy
CO2	Acquire knowledge about techniques and application of project evaluation
CO3	Understand the concepts of software planning methods
CO4	Acquire the concept of visualizing and monitoring process.
CO5	Gain knowledge of Organizational Structures and its Software quality.

MAPPING:

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

H-High; M-Medium; L-Low

18UCSAL502	ALC II: ARTIFICIAL INTELLIGENCE AND EXPERT SYSTEMS	SEMESTER–V

COURSE OBJECTIVES:

The Course aims

- To demonstrate the knowledge of the building blocks of AI
- To analyze and formalize the problems.

Credit Points: 3 **Total Hours: 50**

UNIT	CONTENTS	Hrs	CO
I	**Introduction to Artificial Intelligence:** Introduction-Brief History-Intelligent Systems: ELIZA-Categorization of Intelligent Systems-Components of AI Program-Foundations of AI-Sub-areas of AI-Applications. Tic-Tac-Toe Game Playing: Approach1-Approach2- Approach3-Development of AI Languages-Current Trends in AI**. Problem Solving: State-space Search and Control Strategies:** Introduction-General Problem Solving: Production System-State-Space Search-Control Strategies.	**10**	**CO1**
II	**Exhaustive Searches:** Breadth-First Search-Depth-First Search- Depth-First Iterative Deepening-Bidirectional Search-Analysis of Search methods. Heuristic Search Techniques: General-Purpose Heuristic-Branch and Bound Search-Hill Climbing-Beam Search-A* Algorithm-Optimal Solution by A* Algorithm-Monotonic Function.	**10**	**CO2**
III	**Expert System and Applications:** Introduction-Phases in Building Expert Systems: Knowledge	**10**	**CO3**

	Engineering-Knowledge Representation. Expert System Architecture: Knowledge Base-Inference Engine-Knowledge Acquisition-Case History-User Interfaces-Explanation Module-Special Interfaces. Expert Systems versus Traditional Systems: Characteristics of Expert Systems-Evaluation of Expert Systems-Advantages and disadvantages of Expert Systems-Languages for ES Development. Rule Based Expert Systems: Expert System Shell in Prolog-Problem-Independent Forward chaining-ES Shells and tools-MYCIN Expert System and various Shells-Applications of Expert Systems.		
IV	**Machine-Learning Paradigms:** Introduction-Machine-Learning Systems: Components of a Learning System-Rote Learning-Learning by Taking Advice-Learning by parameter Adjustment-Learning by Macro-Operators-Learning by Analogy. Supervised and Unsupervised Learnings: Neural-Network-Based Learning-Supervised Concept Learning-Probability Approximating Correct Learning-Unsupervised Learning-Reinforcement Learning.	**10**	**CO4**
V	**Artificial Neural Networks:** Introduction -Artificial Neural Networks: The Neuron Networks-The Neuron Model-Activation Functions-Neural Network Architectures. Single-Layer Feed-Forward Networks: Perceptron: Neuron Model-Learning Algorithm for Perceptron- Perceptron for OR Function: Example-Limitations of Perceptron. Multi-Layer Feed –Forward	**10**	**CO5**

	Networks: Back-Propagation Training Algorithm for FFNN-Weight Update Rule-Delta Rule(Least Mean Square) for Error Minimization.		

TEXTBOOK:	
1	*SarojKaushik.* 2014.**Artificial Intelligence.** [Sixth Edition].Cengage Learning India Pvt. Ltd.
REFERENCE BOOKS:	
1	*Dan W.patterson.*1992. **Introduction toArtificial Intelligence and Expert Systems.** Prentice Hall of India, New Delhi.
2	*SturatJ.Rusell and Peter Norvig.*2010.**Artificial Intelligence.** Prentice.
3	*Elaine Rich,Kevin Knight, B,Nair.*2010.**Artificial Intelligence: A Modern Approach.**[Third Edition]. Prentice Hall of India, New Delhi.
WEB REFERENCES:	
1	https://www.tutorialspoint.com
2	http://www.epub.uni-regensburg.de.pdf
3	http://www.investopedia.com
4	https://www.sas.com

COURSE OUTCOMES (CO):

On successful completion of this course, the students will be able to:

CO1	Acquire the basics of AI.
CO2	Analyze and formalize the problem as a state space, design and heuristics.
CO3	Attain the capability to various expert system methods.
CO4	Characterize machine learning algorithms as supervised, semi-supervised, and unsupervised.
CO5	Understand the concepts of Artificial Neural Networks.

MAPPING:

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

H-High; M-Medium; L-Low

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:

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)

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

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.

18UCSM601	CORE XII: PYTHON PROGRAMMING	SEMESTER - VI

COURSE OBJECTIVES:

The Course aims

- To learn how to design and write programs in Python application.
- To learn how to use lists, tuples and dictionaries in Python programs.
- To understand the object oriented concepts through Python.
- To learn how to identify Python object types.

Credits Points: 4 **Total Hours: 50**

UNIT	CONTENTS	Hrs	CO
I	**BASICS:**PythonVariablesExecutingPythonfromtheCommandLine– EditingPythonFiles– PythonReservedWords– BasicSyntax – Comments– StandardDataTypesRelationalOperators– LogicalOperators– BitwiseOperators–SimpleInputandOutput.	10	CO1
II	**CONTROLSTATEMENTS:**ControlFlowandSyntax– Indenting– ifStatement– statementsandexpressions – stringoperations-BooleanExpressions – whileLoop – breakandcontinue– forLoop.LISTS: List-list slices– listmethods– listloopmutabilityaliasing– cloninglists– listparameters.**TUPLES:** Tupleassignment,tupleasreturnvalue-Sets Dictionaries.	10	CO2
III	**FUNCTIONS:**Definition– PassingparameterstoaFunction– Built – infunctions – VariableNumberofArguments- ScopeTypeconversion – Typecoercion – PassingFunctionstoaFunction– MappingFunctionsinaDictionaryLambda– Modules– StandardModulessysmathtime – dir– helpFunction.	10	CO3

IV	**ERRORHANDLING:**RunTimeErrors – ExceptionModel– ExceptionHierarchy– HandlingMultipleExceptions– DataStreams– AccessModesWriting– DatatoaFileReading– DataFromaFile– AdditionalFileMethods– UsingPipesasDataStreams– HandlingIOExceptions– WorkingwithDirectories.	**10**	**CO4**
V	**OBJECTORIENTEDFEATURES:**ClassesPrinciplesofObject Orientation– CreatingClasses– InstanceMethods– FileOrganization–SpecialMethods- Class Variables – InheritancePolymorphism–TypeIdentification– SimpleCharacterMatches– SpecialCharacters– CharacterClassesQuantifiers – DotCharacter – GreedyMatchesGrouping – MatchingatBeginningorEnd – MatchObjectsSubstituting– Splittinga String-Compiling RegularExpressions.	**10**	**CO5**

TEXT BOOKS:	
1.	*Mark Summerfield.* 2009. **Programming in Python 3; A Complete introduction to the Python Language**, Addison-WesleyProfessional.
2.	*Martin C.Brown*. 2001. **Python: The Complete Reference**,McGraw-Hill.
REFERENCE BOOKS:	
1.	*Allen B.Downey*. 2016. **Think Python: How to Think Like a Computer Scientist**. [Second Edition], Updated for Python 3, Shroff/O'Reilly Publishers.
2.	*Guido van Rossum and Fred L.Drake Jr.*2011. **An Introduction to Python – Revised and updated for Python 3**.[Second Edition]. Network Theory Ltd.
3.	*Welsey J Chun*. 2012.**Core Python Application Programming.** Prentice Hall.
WEB REFERENCES:	
1.	https://www.w3schools.com/Python/default.asp
2.	https://www.tutorialspoint.com/python

3.	http://aactni.edu.in/etutorial/refer/python/

COURSE OUTCOMES (CO):

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

CO1	Know the concepts of basics of Python Programming.
CO2	Understand the knowledge about the control statements.
CO3	Develop the programs using function concepts.
CO4	Implement the Error Handling functions.
CO5	Understand the OOPs features.

MAPPING:

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

H-High; M-Medium; L-Low

18UCSM602	CORE XIII: COMPUTER NETWORKS (Fifth Unit as Self-study)	SEMESTER - VI

COURSE OBJECTIVES:

The Course aims

- To understand the working principles of Network Layers.
- To acquire knowledge in Network Security and its Algorithms.

Credit Points: 4 **Total Hours: 50**

UNIT	CONTENTS	Hrs	CO
I	**Introduction** – Uses of Computer Networks – Network Hardware – Network Software - Reference models: The OSI Reference Model – TCP/IP Reference Model.	10	CO1
II	**The Physical Layer:** Guided Transmission Media – Wireless Transmission – Communication Satellites – Digital Modulation and Multiplexing – The Public Switched Telephone Network: Structure of the Telephone System – Switching.	10	CO2
III	**The Data link Layer:** Data link layer Design Issues – Error Detection and Correction. **The Network Layer:** The Network Layer Design Issues – Routing Algorithms - Congestion Control Algorithms.	10	CO3
IV	**The Transport Layer:** Elements of Transport Protocols – Congestion Control – The Internet Transport Protocols: UDP – The Internet Transport Protocols: TCP / IP.	10	CO4
V	**The Application Layer:** DNS: The Domain Name System – Electronic mail – **Network Security:** Cryptography **-** Symmetric Key Algorithms – Public	10	CO5

	Key Algorithms –Communication Security – E- mail Security – Web Security.		
TEXT BOOK:			
1.	*Andrew S. Tanenbaum.* 2011. **Computer Networks.** [Fifth Edition].Pearson Prentice Hall.		
REFERENCE BOOKS:			
1.	*Behrouz A. Forouzan*. 2003. **Data Communications and Networking.** [Second Edition]. Tata McGraw-Hill.		
2.	*William Stallings*, 2011. **Data and Computer Communication**. [Eighth Edition]. PHI.		
WEB REFERENCES:			
1.	https://www.geeksforgeeks.org/computer networks		
2.	https://www.intronetworks.cs.luc.edu		
3.	https://www.tutorialspoint.com		

COURSE OUTCOMES (CO):

After the completion of this course, the students should be able to:

CO1	Understand the basics of Computer Networks.
CO2	Acquire knowledge about Digital Media Transmission.
CO3	Understand the concepts of Design issues and Networking Algorithms.
CO4	Know the basics of Network protocols.
CO5	Gain knowledge of Network Security.

MAPPING:

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

H-High; M-Medium; L-Low

18UCSEL601	ELECTIVE II:CLOUD COMPUTING	SEMESTER - VI

COURSE OBJECTIVES:

The Course aims

- To know the emerging areas of Cloud Computing.
- To acquire the knowledge of Virtualization, Cloud Security and Services.

Credit Points: 3 **Total Hours: 50**

UNIT	CONTENTS	Hrs	CO
I	**Understanding Cloud Computing: Beyond the Desktop: An Introduction to Cloud Computing:** Cloud Computing: What It Is – and What It Isn't – From Collaboration to the Cloud: A Short History of Cloud Computing – The Network Is the Computer: How Cloud Computing Works – Companies in the Cloud: Cloud Computing Today – Why Cloud Computing Matters. **Are You Ready for Computing in the Cloud? :** The Pros and Cons of Cloud Computing – Who Benefits from Cloud Computing? – Who Shouldn't Be Using Cloud Computing? **Developing Cloud Services:** Why Develop Web-based Applications?– The Pros and Cons of Cloud Service Development– Types of Cloud Service Development – Discovering Cloud Services Development Services and Tools.	10	CO1
II	**Cloud Computing for Everyone: Cloud Computing for the Family:** Centralized E-Mail Communications – Collaborating on Schedules – Collaborating on Grocery List –Collaborating on To-Do List – Collaborating on Household Budgets –	10	CO2

	Collaborating on contact list. **Cloud Computing for the Community:** Communicating across the Community – Collaborating on Group Projects and Events. **Cloud Computing for the Corporation:** Managing Schedules – Managing Contact List – Managing Projects – Collaborating on Reports – Collaborating on Marketing Materials – Collaborating on Expense Reports – Collaborating on Budgets – Collaborating on Financial Statements – Collaborating on Presentations. **Using Cloud Services:Collaborating on Calendars, Schedules, and Task Management:** Exploring Online Calendar Applications – Exploring Online Scheduling Applications – Exploring Online Planning and Task Management.		
III	**Using Platforms: Understanding Abstraction and Virtualization:** Using Virtualization Technologies – Load Balancing and Virtualization – Understanding Hypervisors – Understanding Machine Imaging – Porting Applications. **Using Google Web Services: Exploring** Google Applications – Exploring the Google Toolkit. **Using Amazon Web Services:** Understanding Amazon Web Services – Amazon Web Service Components and Services.**Using Microsoft Cloud Services:** Exploring Microsoft Cloud Services –Using Windows Live.	**10**	**CO3**
IV	**Exploring Cloud Infrastructures: Managing the Cloud:** Administrating the Cloud. **Understanding**	**10**	**CO4**

	Cloud Security: Securing the Cloud – Securing Data – Establishing Identity and Presence. **Understanding Services and Applications:** Moving **Applications to the Cloud:** Applications in the Cloud.		
V	**Understanding Services and Applications:Using Media and Streaming**: Understanding the Streaming Process – Audio Streaming – Working with VoIP Applications – Video Streaming. **Using the Mobile cloud: Working with Mobile Devices**: Using Smart Phones with the Cloud. **Working with Mobile Web Services:** Understanding Service Types.	**10**	**CO5**
TEXT BOOKS:			
1.	*Michael Miller*. 2009. **Cloud Computing: Web – Based Applications That Change the Way You Work and Collaborate Online.** [First Impression]. Pearson Education. New Delhi. (Unit I and Unit II).		
2.	*Barrie Sosinsky*. 2013. **Cloud Computing Bible**. [First Edition - Reprint]. Wiley India Edition. New Delhi. (Unit III to Unit V).		
REFERENCE BOOKS:			
1.	*George Reese. 2009.***Cloud Application Architectures: Building Applications and Infrastructure in the Cloud**. [First Edition]. Oreily's Publications. New York.		
2.	*Thomas Erl, Ricardo Puttini, ZaighamMahmood.* 2013. **Cloud Computing: Concepts, Technology & Architecture**. [Second Edition]. Prentice Hall. New York.		
3.	*Kris Jamsa.* 2014. **Cloud Computing: SaaS, PaaS, IaaS, Virtualization, Business Models, Mobile, Security and More**. [First Edition]. Jones and Bartlett Learning. New Delhi.		

WEB REFERENCES:	
1.	https://searchcloudcomputing.techtarget.com
2.	https://www.webopedia.com/cloudcomputing
3.	https://www.infoworld.com/cloud

COURSE OUTCOMES (CO):

After the completion of this course, the students should be able to:

CO1	Understand the basics of cloud computing
CO2	Acquire knowledge about cloud computing works in family, community and corporation.
CO3	Understand the concepts of virtualization and gain knowledge about Google, Amazon and Microsoft cloud with its services.
CO4	Know the cloud security and its applications.
CO5	Gain knowledge of Video, audio streaming and mobile cloud.

MAPPING:

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

H-High; M-Medium; L-Low

18UCSEL602	ELECTIVE II: MOBILECOMPUTING	SEMESTER–VI

COURSE OBJECTIVES:

The course aims

- To learn basic concept of Mobile Computing.
- To explore the knowledge of Telecommunication among the students.

Credit Points: 3 **Total Hours: 50**

UNIT	CONTENTS	Hrs	CO
I	**Introduction:** Applications - A Simplified Reference Model. Wireless Transmission: Frequencies for radio transmission - Signals - Antennas - Signal Propagation - Multiplexing - Modulation - Spread Spectrum - Cellular System.	10	CO1
II	**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	CO2
III	**Telecommunication Systems:** GSM - Mobile Services - System Architecture - Radio Interface - Protocols - Localization and Calling - Handover - Security. UMTS and IMT 2000: UMTS releases	10	CO3

	and standardization - UMTS System Architecture - UMTS Radio Interface -UTRAN - UMTS Handover.		
IV	**Satellite System:** History - Applications - Basics - Routing- Localization - Handover. Wireless LAN: IEEE 802.11- System Architecture - Protocol Architecture - Physical Layer - Medium Access Control Layer. Bluetooth: User scenarios - Architecture - Radio Layer - Baseband Layer - Link Manager Protocol.	**10**	**CO4**
V	**Mobile Network Layer:** Mobile IP - Goals, Assumption, and Requirements - Entities and Terminology - IP Packet delivery - Agent discovery - Registration. Dynamic Host Configuration Protocol - Mobile Transport Layer: Traditional TCP - Congestion Control - Slow Start - Fast Retransmit.	**10**	**CO5**
TEXTBOOK:			
1	*Jochen Schiller. Pearson Education.***Mobile Communications**.[Second Edition].		
REFERENCE BOOKS:			
1	*Gordon L.Stüber.***Principles of Mobile Communication.** Second Edition.		
2	*William Stallings,***Wireless Communication and Networks**, *2nd Edition, Pearson Education, 2005.*		
3	*Theodore Rappaport,* **Wireless Communications: Principles and Practice**, *Prentice Hall Communications,1996.*		
WEB REFERENCES:			
1	https://www.tutorialspoint.com/mobile computing		
2	https://www.minigranth.com		
3	https://searchmobilecomputing.techtarget.com		

COURSE OUTCOMES (CO):

On successful completion of this course, the students will be able to:

CO1	Describe the basic Wireless Transmission.
CO2	Overview of multiplexing techniques in wireless networks.
CO3	Understand telecommunication Systems concepts.
CO4	Attain the knowledge of satellite system.
CO5	Learn the concept of mobile network layer.

MAPPING:

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

H-High; M-Medium; L-Low

18UCSMP601	CORE PRACTICAL VIII: PYTHON PROGRAMMING	SEMESTER - VI

COURSE OBJECTIVES:

The course aims

- To acquire programming skills in core Python.
- To learn to apply fundamental problem solving techniques.

Credit Points: 3 **Total Hours: 30**

S.NO.	PROGRAMS	Hrs	CO
1.	Program to print all Prime numbers in an interval.	**3**	**CO1**
2.	Program to perform various operations on LIST and TUPLES.	**3**	**CO1**
3.	Program to perform various operations on SET and DICTIONARY.	**3**	**CO2**
4.	Program to handle multiple exceptions.	**3**	**CO3**
5.	Program to multiply two matrices using nested loops and using **NumPy array.**	**3**	**CO3**
6.	Program to count the number of matching characters in a pair of string using "**re module"**.	**3**	**CO4**
7.	Program to solve a linear algebra system which can be given as 1x + 2y =5 and 3x + 4y =6 using **SciPy and NumPy modules.**	**3**	**CO4**
8.	Program to read a csv file consists of students marks statement and write in another csv file with total, average and grade .	**3**	**CO5**

WEB REFERENCES:

1.	https://www.programiz.com
2.	https://www.geeksforgeeks.org

COURSE OUTCOMES (CO):

On completion of this course, the students will be able to

CO1	Develop Simple programs.
CO2	Implement the LIST, TUPLES, SET and DICTIONARY.
CO3	Develop programs using Exceptions and loops.
CO4	Implement various modules like re module, SciPy and NumPy modules**.**
CO5	Develop program using data sets.

18UCSMP602	CORE PRACTICAL IX: COMPUTER NETWORKING	SEMESTER - VI

COURSE OBJECTIVES:

The course aims

- To understand the working principle of various networking devices.
- To know the concept of configuring IP address.

Credit Points: 3 **Total Hours: 30**

S.NO	PROGRAMS	Hrs	CO
1.	Study of different types of network cables and implement the cross wired cable and straight through cable using clamping tool.	3	CO1
2.	Configuring host IP, subnet mask and default gateway in a LAN system (TCP/IP Configuration).	3	CO2
3.	Implementing Peer to Peer Networking Connection using two systems.	3	CO3
4.	Install and configure network devices: Switch and Hub.	3	CO4
5.	Install and Configure Wired and Wireless NIC and transfer files between systems in LAN and Wireless LAN	3	CO5
6.	Transfer files between system in LAN using FTP configuration, install printer server in a LAN and share the printer in a network.	3	CO5

WEB REFERENCES:

1.	http://www.wikihow.com
2.	https://www.geeksforgeeks.org

COURSE OUTCOMES (CO):

On completion of this course, the students will be able to

CO1	Learn the concepts of network cables.
CO2	Understand the configuration process.
CO3	Implement the concept using peer to peer networking
CO4	Install the network devices using switch and hub.
CO5	Know about the LAN technologies.

18UCSSBP601	SBC PRACTICAL IV: PHP (INTERNAL EVALUATION)	SEMESTER - VI

COURSE OBJECTIVES:

The course aims

- To understand how server-side programming works on the web.
- To develop web programming skills.

Credit Points: 2 **Total Hours: 30**

S.NO	PROGRAMS	Hrs	CO
1.	Program for array manipulations.	**2**	**CO1**
2.	Program using decision making and looping statements.	**2**	**CO1**
3.	Program to create a simple calculator using switch case.	**2**	**CO2**
4.	Program to pass value from one form to another form using session and cookies.	**2**	**CO2**
5.	Design an authentication web page to check username and password from database.	**2**	**CO3**
6.	Program for mark statement to find total, average and grade using functions.	**2**	**CO3**
7.	Create a program to calculate electricity bill.	**2**	**CO4**
8.	Design a web page to add, edit and delete the records from database.	**2**	**CO5**

WEB REFERENCES:	
1.	https://www.phpprogramming.com/tutorial/php-tutorial.html
2	https://www.geeksforgeeks.org

COURSE OUTCOMES (CO):

On completion of this course, the students will be able to

CO1	Develop programs to organize data using Array.
CO2	Implement programs using functions, control and looping statements.
CO3	Develop web page authentication
CO4	Implement record manipulation.
CO5	Develop web application.

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 Books

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*

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

COURSE OUTCOMES (CO):

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*

GUIDELINES

1. SUBMISSION OF RECORD NOTE BOOKS:

Candidates appearing for Practical Examinations shall submit Bonafide Record Note Books 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 and Practical)

(i) THEORY

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 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]**

Experiments	: 10 Marks
Attendance	: 5 Marks
Record	: 5 Marks
Internal Examinations	: 20 Marks
Total	**: 40 Marks**

(iii) PROJECT and Viva-Voce

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

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

Research work done	: 10 Marks
Attendance	: 5 Marks
Record	: 5 Marks
Review	: 20 Marks
Total	**: 40 Marks**

(iv) CAREER COMPETENCY SKILLS

1. CCS I – Online Examination (III Semester)

- 100 questions - 100 minutes
- Twenty questions from each UNIT.

2. CCS II - 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 atleast 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) 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 and Algorithm / Flowchart	: 20 Marks
ii)	Source Code	: 20 Marks
iii)	Test and debug	: 10 Marks
iv)	Output and Result	: 10 Marks
	Total	**: 60 Marks**

(iii) PROJECT

<u>External Marks Distribution</u> [CE- Total Marks: 60]

i)	Documentation	: 20 Marks
ii)	Presentation	: 20 Marks
iii)	Viva Voce	: 20 Marks
	Total	: 60 Marks

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