PONNAIYAH RAMAJAYAM INSTITUTE OF SCIENCE & TECHNOLOGY (PRIST)

Declared as DEEMED-TO-BE-UNIVERSITY
U/s 3 of UGC Act, 1956

SCHOOL OF ARTS AND SCIENCE

DEPARTMENT OF COMPUTER SCIENCE

B.C.A COMPUTER APPLICATION CURRICULUM

FULL TIME

[Regulation 2023]

[Candidates admitted from the academic year 2023-2024 onwards]

THE REGULATIONS ON LEARNING OUTCOMES BASED CURRICULUM

FRAME WORK FOR UNDERGRADUATE EDUCATION
BCA (Bachelor of Computer Application)

1. Preamble

Education is the key to development of any society. Role of higher education is crucial for securing right kind of employment and also to pursue further studies in best available world class institutes elsewhere within and outside India. Quality education in general and higher education in particular deserves high priority to enable the young and future generation of students to acquire skill, training and knowledge in order to enhance their thinking, creativity, comprehension and application abilities and prepare them to compete, succeed and excel globally. Learning Outcomes-based Curriculum Framework (LOCF) which makes it student-centric, interactive and outcome-oriented with well-defined aims, objectives and goals to achieve. LOCF also aims at ensuring uniform education standard and content delivery across the state which will help the students to ensure similar quality of education irrespective of the institute and location.

Computer Application is the study of quantity, structure, space and change, focusing on problem solving, application development with wider scope of application in science, engineering, technology, social sciences etc. throughout the world in last couple of decades and it has carved out a space for itself like any other disciplines of basic science and engineering. Computer Application is a discipline that spans theory and practice and it requires thinking both in abstract terms and in concrete terms. Nowadays, practically everyone is a computer user, and many people are even computer programmers. Computer Application can be seen on a higher level, as a science of problem solving and problem solving requires precision, creativity, and careful reasoning. The ever-evolving discipline of computer Application also has strong connections to other disciplines. Many problems in science, engineering, health care, business, and other areas can be solved effectively with computers, but finding a solution requires both computer science expertise and knowledge of the particular application domain. Computer Application has a wide range of specialties. These include Computer Architecture, Software Systems, Graphics, Artificial Intelligence,

Computational Science, and Software Engineering. Drawing from a common core of computer science knowledge, each specialty area focuses on specific challenges. Computer Application is practiced by mathematicians, scientists and engineers. Mathematics, the origins of Computer Science, provides reason and logic. Science provides the methodology for learning and refinement. Engineering provides the techniques for building hardware and software.

Programme Outcome, Programme Specific Outcome and Course Outcome

Computer Application is the study of quantity, structure, space and change, focusing on problem solving, application development with wider scope of application in science, engineering, technology, social sciences etc. The key core areas of study in Mathematics include Algebra, Analysis (Real & Complex), Differential Equations, Geometry, and Mechanics.

The Students completing this programme will be able to present Software application clearly and precisely, make abstract ideas precise by formulating them in the Computer languages. Completion of this programme will also enable the learners to join teaching profession, enhance their employability for government jobs, jobs in software industry, banking, insurance and investment sectors, data analyst jobs and jobs in various other public and private enterprises.

PONNAIYAH RAMAJAYAM INSTITUTE OF SCIENCE & TECHNOLOGY (PRIST) LEARNING OUTCOMES-BASED CURRICULUM FRAMEWORK GUIDELINES BASED REGULATIONS FOR UNDER GRADUATE PROGRAMME	
Programme:	B.C.A.,
Programme Code:	23UGCOAGE
Duration:	3 years [UG].
Programme Outcomes:	PO1: Disciplinary knowledge: Capable of demonstrating comprehensive knowledge and understanding of one or more disciplines that form a part of an undergraduate Programme of study PO2: Communication Skills: Ability to express thoughts and ideas effectively in writing and orally; Communicate with others using appropriate media; confidently share one's views and express herself/himself; demonstrate the ability to listen carefully, read and write analytically, and present complex information in a clear and concise manner to different groups. PO3: Critical thinking: Capability to apply analytic thought to a body of knowledge; analyze and evaluate evidence, arguments, claims, beliefs on the basis of empirical evidence; identify relevant assumptions or implications; formulate coherent arguments; critically evaluate practices, policies and theories by following scientific approach to knowledge development. PO4: Problem solving: Capacity to extrapolate from what one has learned and applies their competencies to solve different kinds of non-familiar problems, rather than replicate curriculum content knowledge; and apply one's learning to real life situations. PO5: Analytical reasoning: Ability to evaluate the reliability and relevance of evidence; identify logical flaws and holes in the arguments of others; analyze and synthesize data from a variety of sources; draw valid conclusions and support them with evidence and examples, and addressing opposing viewpoints. PO6: Research-related skills: A sense of inquiry and capability for asking relevant/appropriate questions, problem arising, synthesizing and articulating; Ability to recognize cause-and-effect relationships, define problems, formulate

	hypotheses, test hypotheses, analyze, interpret and draw conclusions from data, establish hypotheses, predict cause-and-effect relationships; ability to plan, execute and report the results of an experiment or investigation PO7: Cooperation/Team work: Ability to work effectively and respectfully with diverse teams; facilitate cooperative or coordinated effort on the part of a group, and act together as a group or a team in the interests of a common cause and work efficiently as a member of a team PO8: Scientific reasoning: Ability to analyze interprets and draws conclusions from quantitative/qualitative data; and critically evaluates ideas, evidence and experiences from an open-minded and reasoned perspective. PO9: Reflective thinking: Critical sensibility to lived experiences, with self-awareness and reflexivity of both self and society. PO10 Information/digital literacy: Capability to use ICT in a variety of learning situations, demonstrate ability to access, evaluate, and use a variety of relevant information sources; and use appropriate software for analysis of data. PO 11 Self-directed learning: Ability to work independently, identify appropriate resources required for a project, and manage a project through to completion. PO 12 Multicultural competence: Possess knowledge of the values and beliefs of multiple cultures and a global perspective; and capability to effectively engage in a multicultural society and interact respectfully with diverse groups. PO 13: Moral and ethical awareness/reasoning: Ability to embrace moral/ethical values in conducting one's life, formulate a position/argument about an ethical issue from multiple perspectives, and use ethical practices in all work. Capable of demon starting the ability to identify ethical issues related to one's work, avoid unethical behavior such as fabrication, falsification or misrepresentation of data or committing plagiarism, not adhering to intellectual property rights; appreciating environmental and sustainability issues; and adopting objective, unbiased and truthful actions in all aspects of work. PO 14: Leadership readiness/qualities: Capability for mapping out the tasks of a team or an organization, and setting direction, formulating an inspiring vision, building a team who can help achieve the vision, motivating and inspiring team members to engage with that vision, and using management skills to guide

	people to the right destination, in a smooth and efficient way. PO 15: Lifelong learning: Ability to acquire knowledge and skills, including learning how to learn‟, that are necessary for participating in learning activities throughout life, through self-paced and self-directed learning aimed at personal development, meeting economic, social and cultural objectives, and adapting to changing trades and demands of work place through knowledge/skill development/re-skilling.
Programme Specific Outcomes:	PSO1:Think in a critical and logical based manner PSO2:Familiarizethestudents with suitable software tools of computer science and industrial applications to handle issues and solve problems in mathematics or statistics and real time application related sciences. PSO3: Know when there is a need for information, to be able to identify, locate, evaluate, and effectively use that information for the issue or problem at hand. PSO4: Understand, formulate, develop programming model with logical approaches to an Address issues arising in social science, business and other contexts. PSO5: Acquire good knowledge and understanding to solve specific theoretical and applied problems in advanced areas of Computer science and industrial statistics. PO6:Providestudents/learners sufficient knowledge and skills enabling them to undertake further studies in Computer Science or Applications or Information Technology and its allied a reason multiple disciplines linked with Computer Science. PO7: Equip with Computer science technical ability, problem solving skills creative talentandpowerofcommunicationnecessaryforvariousformsofemployment. PO8: Develop a range of generic skills helpful in employment, internships& societal activities. PO9: Get adequate exposure to global and local concerns that provides platform for further exploration into multi-dimensional aspects of computing sciences.

Programme Educational Objectives-PEO

PEO1-To gain and apply knowledge of Programming concept to solve the problems.

PEO2-Problem Analysis.

PEO3-Design/Development of Solutions.

PEO4-Conduct investigations of complex problems

PEO5-Modern tool usage.

PEO6-Applying to society

PO/PSO	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6
PO1	□					
PO2		□				
PO3			□			
PO4				□		
PO5					□	
PO6						□

Highlights of the Revamped Curriculum:

Student-centric, meeting the demands of industry & society, incorporating industrial components, hands-on training, skill enhancement modules, industrial project, project with viva-voce, exposure to entrepreneurial skills, training for competitive examinations, sustaining the quality of the core components and incorporating application oriented content wherever required.

The Core subjects include latest developments in the education and scientific front, advanced programming packages allied with the discipline topics, practical training, devising mathematical models and algorithms for providing solutions to industry / real life situations. The curriculum also facilitates peer learning with advanced mathematical topics in the final semester, catering to the needs of stakeholders with research aptitude.

The General Studies and Mathematics based problem solving skills are included as mandatory components in the 'Training for Competitive Examinations' course at the final semester, a first of its kind.

The curriculum is designed so as to strengthen the Industry-Academia interface and provide more job opportunities for the students.

The Industrial Statistics course is newly introduced in the fourth semester, to expose the students to real life problems and train the students on designing a mathematical model to provide solutions to the industrial problems.

The Internship during the second year vacation will help the students gain valuable work experience that connects classroom knowledge to real world experience and to narrow down and focus on the career path.

Project with viva-voce component in the fifth semester enables the student, application of conceptual knowledge to practical situations. The state of art technologies in conducting a Explain in a scientific and systematic way and arriving at a precise solution is ensured. Such innovative provisions of the industrial training, project and internships will give students an edge over the counterparts in the job market.

State-of Art techniques from the streams of multi-disciplinary, cross disciplinary and inter disciplinary nature are incorporated as Elective courses, covering conventional topics to the latest - Artificial Intelligence.

Value additions in the Revamped Curriculum:

Semester	Newly introduced Components	Outcome/ Benefits
I	**Foundation Course** To ease the transition of learning from higher secondary to higher education, providing an overview of the pedagogy of learning Literature and analyzing the world through the literary lens Gives rise to a new perspective.	Instill confidence among students. Create interest for the subject.
I,II,III,IV	Skill Enhancement papers (Discipline centric /Generic/Entrepreneurial)	Industry ready graduates Skilled human resource. Students are equipped with essential skills to Make them employable.
		Training on language and communication skills enable the students gain knowledge and Exposure in the competitive world.
		Discipline centric skill will improve the Technical know-how of solving real life Problems.
III,IV,V& VI	Elective papers	Strengthening the domain knowledge. Introducing the stake holders to the State-of Art techniques from the streams of multi-disciplinary, cross disciplinary and interdisciplinary nature.

		Emerging topics in higher education/industry/communicationnetwork/healthsectoretc.areintroducedwith Hands-on-training.
IV	Elective Papers	Exposure to industry molds students into solution providers Generates Industry ready graduates employment opportunities enhanced
V	Elective papers	Self-learning is enhanced ApplicationoftheconcepttorealsituationisconceivedresultingIntangibleoutcome
VI	Elective papers	Enriches the study beyond the course. Developing a research framework and presenting their independent and Intellectual ideas effectively.
Extra Credits: For Advanced Learners/Honors degree		To cater to the need s of peer learners/research aspirants
Skills acquired from the Courses		Knowledge, Problem Solving, Analytical ability, Professional Competency, Professional Communication and Transferrable Skill.

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DEPARTMENT OF COMPUTER SCIENCE

BCA (BACHLOR OF COMPUTER APPLICATION)

REGULATION 2023 – 2024

COURSE STRUCTURE

SEMESTER-I

Course Code	Course Title - BCA	L	T	P	C
THEORY					
23110AEC11/ 23111AEC11/ 23132AEC11/ 23135AEC11	Tamil – I/Advanced English-I/Hindi-I/ French - I	3	1	0	3
23111AEC12	English-I	3	1	0	3
23122AEC13	Python Programming	4	1	0	3
23122GEC14	Numerical Methods	3	1	0	3
23122GEC15	Statistics	3	1	0	3
PRACTICAL					
23122SEC16L	Python Programming Lab	0	0	3	3
SKILL ENHANCEMENT COURSE					
23122SEC17	Fundamentals of Information Technology	2	0	0	2
23122SEC18	Foundation Course	2	0	0	2
ABILITY ENHANCEMENT COMPULSORY COURSE(AECC1)					
231AECCINC	Indian Constitution	2	0	0	2
AUDIT COURSE					
231LSCUV	Universal Human Values	-	-	-	1
	Total	22	5	3	25

SEMESTER – II

Course Code	Course Title - BCA	L	T	P	C
THEORY					
23110AEC21/ 23111AEC21/ 23132AEC21/ 23135AEC21	Tamil – II/Advanced English-II/Hindi-II/ French - II	3	1	0	3
23111AEC22	English-II	3	1	0	3
23122AEC23	Object oriented programming concepts using C++	4	1	0	3
23122GEC24	Operations Research	4	1	0	3
23122GEC25	Discrete Mathematics	2	1	0	3
PRACTICAL					
23122SEC26L	C++ Programming Lab	0	0	3	3
SKILL ENHANCEMENT COURSE					
23122SEC27	Quantitative Aptitude	2	0	0	2
23122SEC28	Advanced Excel	2	0	0	2
ABILITY ENHANCEMENT COMPULSORY COURSE(AECC1)					
231AECCCMS	Communication Skills	2	0	0	2
AUDIT COURSE					
231SSCBE	Basic Behavioural Etiquette	-	-	-	1
	Total	22	5	3	25

SEMESTER – III

Course Code	Course Title - BCA	L	T	P	C
THEORY					
23110AEC31/ 23111AEC31/ 23132AEC31/ 23135AEC31	Tamil – III/Advanced English-III/Hindi-III/ French – III	3	1	0	3
23111AEC32	English-III	3	1	0	3
23122AEC33	Data Structure & Algorithm	5	1	0	4
23122DSC34_	Discipline Specific Elective-I	5	1	0	3
PRACTICAL					
23122SEC35L	Data Structure & Algorithm Lab using C++	0	0	3	3
SKILL ENHANCEMENT COURSE					
23122SEC36	Introduction to HTML	3	0	0	2
23122SEC37	Financial Accounting I	2	0	0	2
ABILITY ENHANCEMENT COMPULSORY COURSE(AECC1)					
23122RMC38	Research Methodology	2	0	0	2
AUDIT COURSE					
231ACLSOAN	Office Automation	-	-	-	1
	Total	23	4	3	23

SEMESTER – IV

Course Code	Course Title - BCA	L	T	P	C
THEORY					
23110AEC41/ 23111AEC41/ 23132AEC41/ 23135AEC41	Tami – IV/Advanced English-IV/Hindi-IV/ French – IV	3	0	0	3
23111AEC42	English-IV	3	0	0	3
23122AEC43	Programming in Java	5	1	0	3
23122DSC44_	Discipline Specific Elective-II	5	1	0	3
PRACTICAL					
23122SEC45L	Programming in Java Lab	0	0	3	3
SKILL ENHANCEMENT COURSE					
23122SEC46	Enterprise Resource Planning	3	0	0	2
23122SEC47	Multimedia Systems	2	0	0	2
ABILITY ENHANCEMENT COMPULSORY COURSE(AECC1)					
23122BRC48	Participation in Bounded Research	2	0	0	2
231AECCEVS	Environmental Studies	2	-	-	2
AUDIT COURSE					
231LCSCLS	Leadership and Management Skills	-	-	-	1
	Total	25	2	3	24

SEMESTER – V

Course Code	Course Title - BCA	L	T	P	C
THEORY					
23122AEC51	Operating System	5	1	0	4
23122AEC52	ASP.NET Programming	5	1	0	3
23122AEC53	Information Security	5	0	0	4
23122DSC54_	Discipline Specific Elective-III	4	0	0	4
23122DSC55_	Discipline Specific Elective-IV	4	0	0	4
PRACTICAL					
23122SEC56L	ASP.NET Programming Lab	0	0	3	3
23122SEC57	Internship / Industrial Training				2
AUDIT COURSE					
231ACLSPSL	Professional Skills	-	-	-	1
231AECCVED	Value Education	2	-	-	2
	Total	25	2	3	27

SEMESTER – VI

Course Code	Course Title - BCA	L	T	P	C
THEORY					
23122AEC61	Computer Network	5	1	0	4
23122AEC62	Data Analytics using R Programming	5	0	0	4
23122DSC63_	Discipline Specific Elective-V	5	0	0	3
PRACTICAL					
23122SEC64L	Data analytics using R Lab	0	0	3	3
23122PRW65	Project	8	0	0	4
23122SEC66	Professional Competency Skill General awareness for competitive examination	2	0	0	2
23122EXACT	Extension Activity	-	-	-	1
AUDIT COURSE					
231ACSIKWS	Indian Knowledge System	-	-	-	2
	Total	25	2	3	23
Total Credits-Programme					140
Total Credits-Audit Courses					07
Total Credits					147

Discipline Specific Electives

Semester	Discipline Specific Elective Courses-I
III	a)23122DSC34A-Grid Computing b)23122DSC34B- Big Data Analytics c)23122DSC34C-Natural Language Processing
	Discipline Specific Elective Courses-II
IV	a)23122DSC44A-Image Processing b)23122DSC44B- Analytics for Service Industry c)23122DSC44C-Computational Intelligence
V	Discipline Specific Elective Courses-III
	a)23122DSC54A-Database Management System b)23122DSC54B- Agile Project Management c)23122DSC54C- Cloud Computing
	Discipline Specific Elective Courses-IV
	a)23122DSC55A-Disaster Management b)23122DSC55B- Artificial Neural Network c)23122DSC55C- Mobile Adhoc Network
	Discipline Specific Elective Courses-V
VI	a)23122DSC63A-Human Computer Interaction b)23122DSC63B- Data Science c)23122DSC63C- IOT and its Applications

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Credit Distribution for UG Programme

Consolidated Semester wise Credit distribution

SEM	AEC	SEC	GEC	DSC	AECC	Research	others	Total
I	9	7	6	-	2	-	1	25
II	9	7	6	-	2	-	1	25
III	10	7	-	3	-	2	1	23
IV	9	7	-	3	2	2	1	24
V	11	5	-	8	-	-	3	27
VI	8	5	-	3	-	4	3	23
Total	56	38	12	17	6	8	10	147

AUDIT COURSE CREDIT DISTRUBUTION

Sem	Audit
I	1
II	1
III	1
IV	1
V	1
VI	2
Total	7

HOD **DEAN**

Eligibility for admission

To be eligible to enroll in for the BCA Computer Application degree courses you need to clear the following eligibility criteria.

Students need to have graduated their 12th standard in the science stream with physics, chemistry and mathematics (PCM),

Students who have science with physics, chemistry and biology (PCB).

இக்கால இலக்கியம்

23110AEC11

முதல்பருவம்

பாடநோக்கங்கள்

இக்காலதமிழ் இலக்கியவகைகளின்மாதிரிகளைகற்பித்தல்.

தமிழின்இனிமையையுணரச்செய்தல்

தமிழின்ஈடுபாட்டையும்சுவைக்கும்திறனையும்ஏற்படுத்துதல்.

கவிதை எழுதும் திறனை உருவாக்குதல்

படைப்பாளர்களாக உருவாக்கும் திறனை ஏற்படுத்துதல்

படைப்பாளர்களாக உருவாக்கும் திறனை ஏற்படுத்துதல்.

பயன்கள்

மொழி ஆளுமைத்திறன் பெறுதல்.

சமூக சிந்தனையை வளர்த்துக் கொள்ளுதல்.

படைப்பாளர்களாக உருவாகும் திறனைப் பெறுதல்.

இலக்கியங்களின் அறிவை மேம்படுத்துதல்.

கவிதைஎழுதும் முறையை புரிந்துக்கொள்ளுதல்

அலகு -1 மரபுக்கவிதை

1. பாரதியார்--விடுதலை, வந்தே மாதரம் ,காற்று

2.பாரதிதாசன் - அழகின்சிரிப்பு , தமிழனுக்கு வீழ்ச்சி இல்லை

3.கவிமணிதேசியவிநாயகம்பிள்ளை—தொழிலாளியின் முறையீடு

4.நாமக்கல்கவிஞர்—தருணம் இதுவே ,

5.கண்ணதாசன்-- அனுபவம்

அலகு -2புதுக்கவிதைகள்

1.அப்துல்ரகுமான் -வெற்றி

2.அறிவுமதி-நட்புக்காலம்

3.வைரமுத்து- ருசி, சிற்பி- ஓடுஓடுசங்கிலி

4.மு.மேத்தா- வெளிச்சம் வெளியே இல்லை

அலகு -3நாட்டுப்புறவியல்

1.பழமொழிகள்

2. விடுகதைகள்

3. தொழில்பாடல்

அலகு- 4 சிறுகதை

1. தடயம்- மா. ஜெயபிரகாசம்

2. எதார்த்தம் - சு. தமிழ்ச்செல்வி

3.நீதி-- பூமணி

அலகு- 5இலக்கியவரலாறு

கவிதை

சிறுகதை

நாட்டுப்புறவியல்

பொதுக்கட்டுரை –மனிதநேயம், வாழ்வியல்அறங்கள்

மனப்பாடப்பகுதி : பாரதியார் கவிதை- வேண்டும்,பாரதிதாசன் கவிதை- செந்தாமரை

பார்வை நூல்கள் :

1. பாரதியார் கவிதைகள் - மணிவாசகர் பதிப்பகம் சென்னை

2.பாரதிதாசன்கவிதைகள் - பாரிநிலையம், சென்னை

3. தமிழ் இலக்கிய வரலாறு - முவரதராஜன் சாகித்திய அகாதெமி,சென்னை.

4. நாட்டுப்புறவியல் - முனைவர். ஆறு. ராமநாதன் ,மணிவாசகர்பதிப்பகம், சென்னை.

5.தமிழ்சிறுகதையும்தோற்றம்வளர்ச்சி – தமிழ் புத்தக நிலையம், சென்னை.

இணையதளம் -www.tamilvu.org

www.noolulagam.com

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PSO1	PSO2
CLO1	3	2	3	3	3	2	2	2	3	2	3	2
CLO2	3	3	2	2	2	3	2	3	3	2	2	2
CLO3	3	2	3	3	2	2	2	3	2	3	3	2
CLO4	3	3	3	2	2	2	3	2	3	2	3	3
CLO5	3	3	2	2	2	2	3	2	2	2	3	3

Course Code	Course Title	L	T	P	C
23111AEC11	Advanced English-I	4	0	0	2

Objective:

To enhance vocabulary

To understand the impact of the speeches of famous people

Outcome:

Development of vocabulary

UNIT–I:

The Origin of Language - Development of Gesture, Animals and Human Language, Language and Disadvantage

UNIT–II:

Vowels, Diphthongs and Consonants Language Varieties: Dialects, Idiolect,

UNIT–III:

Linguistic Form Morphology, Grammar, Syntax, Semantics, Pragmatics

UNIT–IV:

Branches of Linguistics- Structural Linguistics, Sociolinguistics, Psycholinguistics, Neu linguistics, Applied Linguistics

UNIT–V:

Stylistics and Discourse Analysis: Relationship between Language and Literature, Style and Function, Discourse, Narrative Discourse and Dramatic Discourse

Course Code	Course Title	L	T	P	C
23111AEC12	English-I GENERAL ENGLISH	3	1	0	3

Course Objectives

CO1: To enable learners to acquire the linguistic competence necessarily required in various life situations.

CO2: To help them understand the written text and able to use skimming, scanning skills

CO3: To assist them in creative thinking abilities

CO4: To enable them become better readers and writers

CO5: To assist those in developing correct reading habits, silently, extensively and intensively

Course Content:

UNIT I:

Poetry

1.1 A Patch of Land –Subramania Bharati

1.3 A Nation's Strength – Ralph Waldo Emerson

1.4 Love Cycle - Chinua Achebe

UNIT II:

Prose

2.1 JRD - Harish Bhat

2.2 Us and Them - David Sedaris from Dress Your Family in Corduroy and Denim

UNIT III:

Short Stories

3.1 The Faltering Pendulum- Bhabani Bhattacharya

3.2 How I Taught my Grandmother to Read- Sudha Murthy

3.3 The Gold Frame- R.K. Laxman

UNIT IV:

Language Competency

4.1 Vocabulary: Synonyms, Antonyms, Word Formation

4.2 Appropriate use of Articles and Parts of Speech

4.3 Error correction

UNIT V:

English for Workplace

5.1 Self - introduction, Greetings

5.2 Introducing others

5.3 Listening for General and Specific Information

5.4 Listening to and Giving Instructions / Directions

Course Outcomes

Course Outcomes	On completion of this course, students will;	
CO1	Develop and integrate the use of the four language skills i.e. Reading, Listening, Speaking and Writing	PO1
CO2	Understand the total content and underlying meaning in the context.	PO1, PO2
CO3	Form the habit of reading for pleasure and for information	PO4,PO6
CO4	Comprehend material other than the prescribed text	PO4, PO5, PO6
CO5	Develop the linguistic competence that enables them, in the future, to present the culture and civilization of their nation.	PO3, PO8

Text books (Latest Editions)	
1.	Steel Hawk and other stories by Bhattacharya, Bhabani, New Delhi: Sahitya Akademi, 1967
2.	How I taught my Grandmother to Read and other Stories, Murthy, Sudha,Penguin Books, India, 2004

Reference Books (Latest Editions, and the style given must be strictly adhered to)	
1.	English in use - A textbook for College Students (English ,Paper back, - T.Vijay Kumar, K DurgaBhavani, YL Srinivas
2.	Practical English Usage - 4th Edition By Michael Swan
3.	The Art of Civilized Conversation: A Guide to Expressing Yourself with Style and Grace -Margaret Shepherd,Penny Carter, (Illustrator), Sharon Hogan, 2005.

Web Resources	
1.	A patch of land by Subramania Bharati translated by Usha Rajagoplan : https://books.google.co.in/books?id=iSHvOmXuvLMC&printsec=frontcover&dq=subramania+bharati+poems&hl=en&newbks=1&newbks_redir=0&source=gb_mobile_search&sa=X&redir_esc=y#v=onepage&q=subramania%20bharati%20poems&f=false
2.	The Sparrow by Paul Laurence Dunbar https://poets.org/poem/sparrow-0
3.	A Nation's Strength by Emerson https://poets.org/poem/nations-strength
4.	Love cycle by Chinua Achebe : https://www.best-poems.net/chinua-achebe/love-cycle.html
5.	JRD by Harish Bhat https://www.tata.com/newsroom/heritage/coffee-tea-jrd-tata-stories
.	Us and Them by David Sedaris From Dress Your Family in Corduroy and Denim https://legacy.npr.org/programs/morning/features/2004/jun/sedaris/usandthem.html
7.	Uncle Podger Hangs a Picture: http://rosyhunt.blogspot.com/2013/01/uncle-podger-hangs-picture.html
8.	The Gold Frame: https://fybaenglish.blogspot.com/2018/12/the-gold-frame-r-k-laxman.html

Mapping with Programme Outcomes:

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1	3	3	3	3	3	3	3	2	3	2
CO2	2	3	3	3	2	3	3	2	2	2
CO3	3	3	3	2	3	3	3	2	3	2
CO4	3	3	3	3	3	3	3	2	2	2
CO5	3	2	3	3	3	3	3	2	2	3

Mapping with Programme Specific Outcomes:

CO /PO	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	3	3	3	3	3
CO2	3	3	3	3	3
CO3	3	3	3	3	3
CO4	3	3	3	3	3
CO5	3	3	3	3	3
Weightage	15	15	15	15	15
Weighted percentage of Course Contribution to Pos	3.0	3.0	3.0	3.0	3.0

FIRST YEAR SEMESTER-I

Subject Code	Subject Name	Category	L	T	P	C
23122AEC13	PYTHON PROGRAMMING	Core	4	1	0	3

Learning Objectives		
LO1	To make students understand the concepts of Python programming.	
LO2	To apply the OOPs concept in PYTHON programming.	
LO3	To impart knowledge on demand and supply concepts	
LO4	To make the students learn best practices in PYTHON programming	
LO5	To know the costs and profit maximization	
UNIT	Contents	No. of Hours
I	Basics of Python Programming: History of Python-Features of Python-Literal-Constants-Variables - Identifiers–Keywords-Built-in Data Types-Output Statements –Input Statements-Comments –Indentation- Operators-Expressions-Type conversions. Python Arrays: Defining and Processing Arrays–Array methods.	15
II	Control Statements: Selection/Conditional Branching statements: if, if-else, nested if and if-elif-else statements. Iterative Statements: while loop, for loop, else suite in loop and nested loops .Jump Statements: break, continue and pass statements.	15
III	Functions: Function Definition – Function Call – Variable Scope and its Lifetime-Return Statement. Function Arguments: Required Arguments, Keyword Arguments, Default Arguments and Variable Length Arguments-Recursion. Python Strings: String operations- Immutable Strings - Built-in String Methods and Functions - String Comparison. Modules: import statement- The Python module – dir() function – Modules and Namespace–Defining our own modules.	15

IV	Lists: Creating a list-Access values in List-Updating values in Lists-Nested lists-Basic list operations-List Methods. Tuples: Creating, Accessing, Updating and Deleting Elements in a tuple–Nested tuples Difference between lists and tuples .Dictionaries: Creating, Accessing, Updating and Deleting Elements in a Dictionary–Dictionary Functions and Methods-Difference between Lists and Dictionaries.	15
V	Python File Handling: Types of files in Python -Opening and Closing files-Reading and Writing files: write() and write lines()methods-append()method–read() and readlines() methods–with keyword–Splitting words –File methods- File Positions-Renaming and deleting files.	15
TOTALHOURS		75

Course Outcomes		Programme Outcomes
CO	On completion of this course, students will	
CO1	Learn the basics of python, Do simple programs on python, Learn how to use an array.	PO1,PO2,PO3,PO4,PO5,PO6
CO2	Develop program using selection statement, Work with Looping and jump statements, Do programs on Loops and jump statements.	PO1,PO2,PO3,PO4,PO5,PO6
CO3	Concept of function, function arguments, Implementing the concept strings in various application, Significance of Modules, Work with functions, Strings and modules.	PO1,PO2,PO3,PO4,PO5,PO6
CO4	Work with List, tuples and dictionary; Write program using list, Tuples and dictionary.	PO1,PO2,PO3,PO4,PO5,PO6
CO5	Usage of File handlings in python, Concept of reading and writing files, Do programs using files.	PO1,PO2,PO3, PO4,PO5,PO6

Textbooks

1	Reema Thareja, ―Python Programming using problem solving approach‖, First Edition, 2017, Oxford University Press.
2	Dr.R.NageswaraRao, ―Core Python Programming‖,First Edition, 2017, Dreamtech Publishers.

Reference Books	
1.	Vamsi Kurama, ―Python Programming:A Modern Approach‖,Pearson Education.
2.	Mar klutz, Learning Python‖,Orielly.
3.	Adam Stewarts, ―Python Programming ‖, Online.
4.	Fabio Nelli,―Python Data Analytics‖, A Press
5.	Kenneth A. Lambert,―Fundamentals of Python–First Programs ‖,CENGAGE Publication.
Web Resources	
1.	https://www.programiz.com/python-programming
2.	https://www.guru99.com/python-tutorials.html
3.	https://www.w3schools.com/python/python_intro.asp
4.	https://www.geeksforgeeks.org/python-programming-language/
5.	https://en.wikipedia.org/wiki/Python_(programming_language)

Mapping with Programme Outcomes:

CO/PSO	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6
CO1	3	2	2	3	3	3
CO2	3	2	2	3	2	3
CO3	3	2	2	3	2	2
CO4	3	2	2	3	2	3
CO5	3	2	2	3	3	3
Weightage of course contributed to each PSO	15	10	10	15	13	14

S-Strong-3 M-Medium-2L-Low-1

ALLIED MATHEMATICS

PAPER-1 NUMERICAL METHODS

Subject Code	Category	L	T	P	C
23122GEC14	Allied	3	1	0	3

Learning Objectives	
LO1	To introduce the various topics in Numerical methods.
LO2	To make understand the fundamentals of algebraic equations.
LO3	To apply interpolation and approximation on examples.
LO4	To solve problems using numerical differentiation and integration.
LO5	To solve linear systems, numerical solution of ordinary differential equations
UNIT	DETAILS
I	FUNDAMENTALS OF ALGEBRAIC EQUATION: Solution of algebraic and transcendental equations-Bisection method – Fixed point iteration method – Newton Raphson method –linear system of equations – Gauss elimination method – Gauss Jordan method .
II	ITERATIVE, INTERPOLATION AND APPROXIMATION: Iterative methods - Gauss Jacobi and Gauss Seidel – Eigen values of a matrix by Power method and Jacobi's method for symmetric matrices. Interpolation with unequal intervals – Lagrange's interpolation – Newton's divided difference interpolation
III	INTERPOLATION WITH EQUAL INTERVAL: Difference operators and relations. - Interpolation with equal intervals – Newton's forward and backward difference formulae.
IV	NUMERICAL DIFFERENTIATION AND INTEGRATION: Approximation of derivatives using interpolation polynomials – Numerical integration using Trapezoidal, Simpson's 1/3 rule
V	INITIAL VALUE PROBLEMS FOR ORDINARY DIFFERENTIAL EQUATIONS: Single step methods – Taylor's series method – Euler's method – Modified Euler's method - RungeKutta method for solving(first, second , Third and 4th) order equations – Multi step methods

Course Outcomes		
CO1	Know how to solve various problems on numerical methods	PO1
CO2	Use approximation to solve problems	PO1,PO2
CO3	Differentiation and integration concept are applied	PO4,PO6
CO4	Apply , direct methods for solving linear systems	PO4,PO5, PO6
CO5	Numerical solution of ordinary differential equations	PO3,PO8

Text Books (Latest Editions)	
1	Charles Dierbach, “Introduction to Computer Science using Python - A computational Problem solving Focus”, Wiley India Edition, 2015.
2	Wesley J. Chun, “Core Python Applications Programming”, 3rd Edition , Pearson Education, 2016
References Books (Latest editions, and the style as given below must be strictly adhered to)	
1	Mark Lutz, “Learning Python Powerful Object Oriented Programming”, O’reilly Media 2018, 5th Edition.
2	Timothy A. Budd, “Exploring Python”, Tata MCGraw Hill Education Private Limited 2011, 1 st Edition.
Web Resources	
1	https://onlinecourses.swayam2.ac.in/cec22_cs20/preview

Mapping with Programme Outcomes

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1	3	1	3	2	3	3	3	2	1	3
CO2	2	1	3	1	3	3	3	2	1	2
CO3	3	2	3	1	3	3	3	2	1	3
CO4	1	2	3	2	3	3	3	2	1	1
CO5	3	1	2	3	3	3	3	2	1	3

3 – Strong, 2 – Medium, 1 - Low

Mapping with Programme Specific Outcomes

CO /PSO	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	3	3	3	3	3
CO2	3	3	3	3	3
CO3	3	3	3	3	3
CO4	3	3	3	3	3
CO5	3	3	3	3	3
Weightage	15	15	15	15	15
Weighted percentage of Course Contribution to POs	3.0	3.0	3.0	3.0	3.0

ALLIED MATHEMATICS

PAPER-2 STATISTICS

Subject Code	Category	L	T	P	C	Credits
23122GEC15	Allied	3	1	0	3	

Learning Objectives	
LO1	Distinguish among different scales of measurement and their implications for solving problems
LO2	Create tables and graphs to format, organize, and interpret data; summarize and present data
LO3	Calculate and analyze numerical descriptive measures for a given data set
LO4	Apply concepts of sample space and probability to solving problems
LO5	Calculate measures of central tendency and variation; use statistical software to analyze
UNIT	DETAILS
I	Data: quantitative and qualitative, attributes, variables, Scales of measurement: nominal, ordinal, interval and ratio, Measures of Central Value: Meaning, Need for measuring central value. Characteristics of an ideal measure of central value. Types of averages - mean, median, mode, harmonic mean and geometric mean. Merits, Limitations and Suitability of averages.
II	Correlation Analysis: Meaning and significance. Correlation and Causation, Types of correlation, Methods of studying simple correlation - Scatter diagram, Karl Pearson's coefficient of correlation, Spearman's Rank correlation coefficient.
III	Regression Analysis: Meaning and significance, Regression vs. Correlation, Simple Regression model: Linear Regression, Conditions for simple linear regression
IV	Time Series :Analysis of Time Series, Methods of measuring trend and seasonal variations
V	Index Numbers: Consumers price index and cost of living indices

Course Outcomes		
CO1	The learners will apprehend the basics of data science and data analysis like Averages and forecasting techniques.	PO1
CO2	The learners will comprehend the basics of data science and data analysis like Averages and forecasting techniques.	PO1,PO2
CO3	The learners will understand use of Time series and Index numbers in management decisions.	PO4,PO6
CO4	The learners will be able to understand the business implications and	PO4,PO5, PO6

	probabilities of every decision being made.	
CO5	Gain entrance into careers as well as in graduate or professional school.	PO3,PO8

Text Books (Latest Editions)	
1	P A Navanitham (2006): Business Mathematics and Statistics
2	Gupta S.P. (2017) : Statistical Methods, Sultan Chand & Sons, 45h Revised Edition
	Levin, R. and Rubin, D. (2017). Statistics for Management. 8thed. New Delhi: Pearson
References Books (Latest editions, and the style as given below must be strictly adhered to)	
1	HaraldCramér Mathematical Methods of Statistics, Princeton Mathematical Series, vol. 9. Princeton University Press, Princeton, N. J., 1946. xvi+575 pp
2	S.C.Gupta, Business Statistics
Web Resources	
1	https://www.ascdegreecollege.ac.in/wp-content/uploads/2020/12/Business-Statistics-by-Gupta.pdf

Mapping with Programme Outcomes

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1	3	1	3	2	3	3	3	2	1	3
CO2	2	1	3	1	3	3	3	2	1	2
CO3	3	2	3	1	3	3	3	2	1	3
CO4	1	2	3	2	3	3	3	2	1	1
CO5	3	1	2	3	3	3	3	2	1	3

3 – Strong, 2 – Medium, 1 - Low

Mapping with Programme Specific Outcomes

CO /PSO	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	3	3	3	3	3
CO2	3	3	3	3	3
CO3	3	3	3	3	3
CO4	3	3	3	3	3
CO5	3	3	3	3	3
Weightage	15	15	15	15	15
Weighted percentage of Course Contribution to POs	3.0	3.0	3.0	3.0	3.0

M-Medium-2 L-Low-1

Subject Code	Subject Name	Category	L	T	P	C
23122SEC16L	PYTHON LAB	Core	0	0	3	3

Learning Objectives	
LO1	Be able to design and program Python applications.
LO2	Be able to create loops and decision statements in Python.
LO3	Be able to work with functions and pass arguments in Python.
LO4	Be able to build and package Python modules for reusability.
LO5	Be able to read and write files in Python.

LAB EXERCISES	Required Hours
Program using variables, constants, I/O statements in Python. Program using Operators in Python. Program using Conditional Statements. Program using Loops. Program using Jump Statements. Program using Functions. Program using Recursion. Program using Arrays. Program using Strings. Program using Modules. Program using Lists. Program using Tuples. Program using Dictionaries. Program for File Handling.	60

Course Outcomes	
On completion of this course, students will	
CO1	Demonstrate the understanding of syntax and semantics of PYTHON language
CO2	Identify the problem and solve using PYTHON programming techniques.

CO3	Identify suitable programming constructs for problem solving.
CO4	Analyze various concepts of PYTHON language to solve the problem in an efficient way.
CO5	Develop a PYTHON program for a given problem and test for its correctness.

Mapping with Programme Outcomes:

CO/PSO	PSO 1	PSO 2	PSO 3	PSO 4	PSO 5	PSO 6
CO 1	3	3	3	3	3	3
CO 2	3	3	1	3	2	3
CO 3	3	3	3	3	2	2
CO 4	3	3	3	3	2	3
CO 5	3	2	3	3	3	3
Weightage of course contributed to each PSO	15	15	13	15	13	14

S-Strong-3 M-Medium-2 L-Low-1

Subject Code	Subject Name	Category	L	T	P	C
23122SEC17	FUNDAMENTALS OF INFORMATION TECHNOLOGY	Skill enhancement course	2	2	0	2

Learning Objectives		
LO1	Understand basic concepts and terminology of information technology.	
LO2	Have a basic understanding of personal computers and their operation	
LO3	Be able to identify data storage and its usage	
LO4	Get great knowledge of software and its functionalities	
LO5	Understand about operating system and their uses	
UNIT	Contents	No. Of. Hours
I	Introduction to Computers-Generations of Computer–Data and Information – Components of Computer – Software – Hardware – Input Devices-Output Devices– –Types of Operating System.	6
II	MSWord: Introduction–Elements of Window–Files, Folders and Directories – Text Manipulating: Cut, Copy, Paste, Drag and Drop – Text Formatting: Font – Style, Size, Face and Colors (Both foreground and background)–Alignment-Bullets and Numbering-Header and footer-Watermark– inserting objects (images, other application document)–Table creation – Mail merge.	6
III	MsExcel: Introduction–Inserting rows and columns–Sizing rows and columns– Implementing formulas–Generating series-Functions in excel–CreationofChart– Insertingobjects–Filter–Sorting–Insertingworksheet.	6
IV	MS Power Point: Introduction–Slides Manipulation (Inserting new, Copy, paste, delete and duplicate slides) –Slide show– Types of Views – Types of Animations– Inserting Objects–Implementing multimedia (Video and Audio)–Templates (Built-in and User-Defined).	6
V	Internet: Introduction to Internet and Intranet–Services of Internet-Domain Name – URL – Browser – Types of Browsers – Search Engine -E-Mail – Basic Components	

	of E-Mail –.How to send group mail E-Commerce: Digital Signature– Digital Currency–Online shopping and Transaction.	
TOTAL HOURS		30

Course Outcomes		Programme Outcomes
CO	On completion of this course, students will	
CO1	Learn the basics of computer, Construct the structure of the required things in computer, learn how to use it.	PO1, PO2, PO3,PO4,PO5,PO6
CO2	Developorganizationalstructureusingforthedevicespresentcurrentlyunderinputor output unit.	PO1, PO2, PO3,PO4,PO5,PO6
CO3	ConceptofstoringdataincomputerusingtwoheadersnamelyRAMandROMwithdifferenttypesofROMwithadvancementinstoragebasis.	PO1, PO2, PO3,PO4,PO5,PO6
CO4	Work with different software, Write program in the software and Applications of software.	PO1, PO2, PO3,PO4,PO5,PO6
CO5	Usage of Operating system in information technology which really acts as an interpreter between software and hardware.	PO1,PO2,PO3, PO4,PO5,PO6

Text books

1	Anoop Mathew, S.Kavitha Murugeshan(2009),—Fundamental of Information Technology‖, Majestic Books.
2	Alexis Leon, Mathews Leon, ‖Fundamental of Information Technology‖, 2ndEdition.
3	S.KBansal, —Fundamental of Information Technology ‖.

Reference Books

1.	Bhardwaj Sushil Puneet Kumar,—Fundamental of Information Technology‖
2.	GGWILKINSON,—FundamentalsofInformationTechnology‖,Wiley-Blackwell
3.	ARavichandran,—FundamentalsofInformationTechnology‖,KhannaBookPublishing

Web Resources

1.	https://testbook.com/learn/computer-fundamentals
2.	https://www.tutorialsmate.com/2020/04/computer-fundamentals-tutorial.html

3.	https://www.javatpoint.com/computer-fundamentals-tutorial
4.	https://www.tutorialspoint.com/computer_fundamentals/index.htm
5.	https://www.nios.ac.in/media/documents/sec229new/Lesson1.pdf

Mapping with Programme Outcomes:

CO/PSO	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6
CO1	2	3	2	2	1	1
CO2	3	2	3	2	3	3
CO3	3	2	2	2	2	3
CO4	2	3	3	3	3	1
CO5	3	3	3	3	3	2
Weightage of course Contributed to each PSO	13	13	13	12	12	10

S-Strong-3 M-Medium-2L-Low-1

Course Objective			
LO1	To familiarize the students with the Programming basics and the fundamentals of C, Data types in C, Mathematical and logical operations.		
LO2	To understand the concept using if statements and loops		
LO3	This unit covers the concept of Arrays		
LO4	This unit covers the concept of Functions		
LO5	To understand the concept of implementing pointers.		
UNIT	Details	No. of Hours	Course Objectives
I	Overview of C: Importance of C, sample C program, C program structure, executing C program. Constants, Variables, and Data Types: Character set, C tokens, keywords and identifiers, constants, variables, data types, declaration of variables, Assigning values to variables---Assignment statement, declaring a variable as constant, as Volatile. Operators and Expression.	6	CO1
II	Decision Making and Branching: Decision making with If, simple IF, IF ELSE, nested IF ELSE, ELSE IF ladder, switch, GOTO statement. Decision Making and Looping: While, Do-While, For, Jumps in loops.	6	CO2
III	Arrays: Declaration and accessing of one & two-dimensional arrays, initializing two-dimensional arrays, multi-dimensional arrays.	6	CO3
IV	Functions: The form of C functions, Return values and types, calling a function, categories of functions, Nested functions, Recursion, functions with arrays, call by value, call by reference, storage classes-character arrays and string functions	6	CO4
V	Pointers: definition, declaring and initializing pointers, accessing a variable through address and through pointer, pointer expressions, pointer increments and scale factor, pointers and arrays, pointers and functions, pointers and Structures.	6	CO5
	Total		30

Course Outcomes		Programme Outcomes
CO	On completion of this course, students will	
1	Remember the program structure of C with its syntax and semantics	PO1,PO3,PO5

2	Understand the programming principles in C(data types, operators, branching and looping, arrays, functions, structures, pointers and files)	PO2,PO3,PO6,PO7
3	Apply the programming principles learnt in real-time problems	PO3,PO4,PO7
4	Analyze the various methods of solving a problem and choose the best method	PO4,PO5,PO6
5	Code, debug and test the programs with appropriate Test cases	PO7,PO8
Text Book		
1	E.Balagurusamy, Programming in ANSI Fifth Edition, Tata McGraw-Hill, 2010.	
Reference Books		
1.	Byron Gottfried, Schaum‘s Outline Programming with C, Fourth Edition, Tata McGraw-Hill, 2018.	
2.	Kernighan and Ritchie, The C Programming Language, Second Edition, Prentice Hall, 1998	
3.	Yashavant Kanetkar, Let Us C, Eighteenth Edition, BPB Publications,2021	
Web Resources		
1.	https://codeforwin.org/	
2.	https://www.geeksforgeeks.org/c-programming-language/	
3.	http://en.cppreference.com/w/c	
4.	http://learn-c.org/	
5.	https://www.cprogramming.com/	

Mapping with Programme Outcomes:

CO/PSO	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6
CO1	1	2	2	2	2	-
CO2	2	2	2	2	-	2
CO3	3	2	2	1	1	-
CO4	3	2	2	1	-	1
CO5	1	2	2	2	2	3
Weightage of course contributed to each PSO	7	10	10	18	15	6

S-Strong-3 M-Medium-2L-Low-1

INDIAN CONSTITUTION

Subject Code	Category	L	T	P	C	
231AECCINC	AECC	2	-	-	2	

Learning Objectives	
LO1	To make the students understand about the democratic rule and parliamentarian administration
LO2	To appreciate the salient features of the Indian constitution
LO3	To know the fundamental rights and constitutional remedies
LO4	To make familiar with powers and positions of the union executive, union parliament and the Supreme Court
LO5	To exercise the adult franchise of voting and appreciate the electoral system of Indian democracy
UNIT	DETAILS
I	The making of Indian constitution: The constitution assembly organization - character - work salient features of the constitution-written and detailed constitution - socialism -secularism-democracy and republic.
II	Fundamental rights and fundamental duties of the citizens: Right of equality - right of freedom- right against exploitation -right to freedom of religion-cultural and educational rights -right to constitutional remedies -fundamental duties.
III	Directive principles of state policy: Socialistic principles - Gandhi an principles-liberal and general principles -differences between fundamental rights and directive principles
IV	The union executive, union parliament and Supreme Court : Powers and positions of the president - qualification - method of election of president and vice president -prime minister - Rajya Sabah - Lok Sabah .the supreme court - high court -functions and position of supreme court and high court
V	State council -election system and parliamentary democracy in India: State council of ministers -chief minister -election system in India-main features election commission-features of Indian democracy.

Course Outcomes		
CO1	Students can know about constitution our fundamental rights and duties	PO1
CO2	Students can get knowledge of the Indian administrative systems.	PO1,PO2
CO3	Students will be able to understand the Nature of Indian Politics	PO4,PO6
CO4	Students will be able to understand the Indian constitution and Fundamental rights and Duties.	PO4,PO5, PO6
CO5	Integrate knowledge of the diversity of cultures and peoples.	PO3,PO8

Text Books (Latest Editions)	
1	India's Constitution by M.V.Pylee., 16thedt.,S.Chand& Company Ltd, Ram Nagar, New Delhi-110055.
2	Introduction to the Constitution of India by Durga Das Basu · 2015,.LexisNexis publication,SBN:9789351434467, 935143446X.
References Books (Latest editions, and the style as given below must be strictly adhered to)	
1	Palekar.s.a. Indian constitution government and politics, ABD publications, India
2	Aiyer, alladikrishnaswami, Constitution and fundamental rights 1955.
3	Markandan. K.c.directive Principles in the Indian constitution 1966.
Web Resources	
1	https://www.google.co.in/books/edition/India_s_Constitution_16th_Edition/yjJlDwAAQBAJ?hl=en&gbpv=1&dq=indian+constitution+pdf&printsec=frontcover
2.	

Mapping with Programme Outcomes

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1	3	3	3	3	3	3	3	2	3	2
CO2	2	3	3	3	2	3	3	2	2	2
CO3	3	3	3	2	3	3	3	2	3	2
CO4	3	3	3	3	3	3	3	2	2	2
CO5	3	2	3	3	3	3	3	2	2	3

3 – Strong, 2 – Medium, 1 - Low

Mapping with Programme Specific Outcomes

CO /PSO	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	3	3	3	3	3
CO2	3	3	3	3	3
CO3	3	3	3	3	3
CO4	3	3	3	3	3
CO5	3	3	3	3	3
Weightage	15	15	15	15	15
Weighted percentage of Course Contribution to POs	3.0	3.0	3.0	3.0	3.0

UNIVERSAL HUMAN VALUES

Subject Code	Category	L	T	P	C	
231LSCUV	AC	-	-	-	1	

Learning Objectives	
LO1	The present course deals with meaning, purpose, and relevance of universal human values and how to inculcate and practice them consciously to be a good human being and realize one's potentials
UNIT	DETAILS
I	Introduction: What is love? Forms of love for self, parents, family, friend, spouse, community, nation, humanity and other beings, both for living and non-living Love and compassion and inter-relatedness Love, compassion, empathy, sympathy and non-violence Individuals who are remembered in history for practicing compassion and love. Narratives and anecdotes from history, literature including local folklore Practicing love and compassion: What will learners learn gain if they practice love and compassion? What will learners lose if they don't practice love and compassion? Sharing learner's individual and/or group experience(s) Simulated Situations Case studies
II	Introduction: What is truth? Universal truth, truth as value, truth as fact(veracity, Sincerity, honesty among others) Individuals who are remembered in history for practicing this value Narratives and anecdotes from history, literature including local folklore Practicing Truth: What will learners learn/gain if they practice truth? What will learners lose if they don't practice it? Learners' individual and/or group experience(s) Simulated situations Case studies

III	Introduction: What is nonviolence? Its need. Love, compassion, empathy sympathy for others as pre-requisites for non-violence Ahimsa as non-violence and non-killing Individuals and organizations that are known for their commitment to non-violence Narrativesandanecdotesaboutnon-violencefromhistory,andliteratureincluding local folklore Practicing on-violence: What will learners learn/gain if they practice non- violence? What will learners lose if they don't practice it? Sharing learner's individual and/or group experience(s) about non-violence Simulated situations Case studies
IV	Introduction: What is righteousness? Righteousness and dharma, Righteousness and Propriety Individuals who are remembered in history for practicing righteousness Narratives and anecdotes from history, literature including local folklore Practicing righteousness: What will earners learn/gain if they practice righteousness? What will learners lose if they don't practice it? Sharing learners' individual and/or group experience(s) Simulated situations Case studies
V	Introduction: What is peace? Its need, relation with harmony and balance Individuals and organizations that are known for their commitment to peace Narratives and Anecdotes about peace from history, and literature including local folklore Practicing peace: What will learners learn/gain if they practice peace? What will learners lose if they don't practice it? Sharing learner's individual and/or group experience(s) about peace Simulated situations Case studies
VI	Introduction: What is service? Forms of service, for self, parents, family, friend, spouse, community, nation, humanity and other beings—living and non-living, persons in distress or disaster. Individuals who are remembered in history for practicing this value. Narratives and anecdotes dealing with instances of service from history, literature including local folklore

	Practicing service: What will earners learn/gain gain if they practice service? What will learners lose if they don't practice it? Sharing learners' individual and/or group experience(s) regarding service Simulated situations Case studies
VII	Introduction: What is renunciation? Renunciation and sacrifice. Self-restrain and Ways of overcoming greed. Renunciation with action as true renunciation Individuals who are remembered in history for practicing this value. Narratives and anecdotes from history and literature, including local folklore about individuals who are remembered for their sacrifice and renunciation. Practicing renunciation and sacrifice: What will learners learn/gain if they practice Renunciation and sacrifice? What will learners lose if they don't practice it? Sharing learners' individual and/or group experience(s) Simulated situations Casestudies

Mapping with Programme Outcomes

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1	3	3	3	3	3	3	3	2	2	2
CO2	3	3	3	2	3	3	3	2	3	2
CO3	2	3	3	3	2	3	3	2	2	2
CO4	3	3	3	3	3	3	3	2	3	2
CO5	3	2	3	3	3	3	3	2	2	3

3 – Strong, 2 – Medium, 1 - Low

Mapping with Programme Specific Outcomes

CO /PSO	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	3	3	3	3	3
CO2	3	3	3	3	3
CO3	3	3	3	3	3
CO4	3	3	3	3	3
CO5	3	3	3	3	3
Weightage	15	15	15	15	15
Weighted percentage of Course Contribution to POs	3.0	3.0	3.0	3.0	3.0

II -SEMESTER

Course Code	Course Title	L	T	P	C
23110AEC21	Tamil-II	3	1	0	3

பக்தி இலக்கியம் 23110AEC21

இரண்டாம்பருவம்

பாட நோக்கங்கள்

காலந்தோறும் பக்தி இலக்கியம் வளர்ந்துள்ள தன்மையைக் கற்பித்தல்.

நாயன்மார்கள், ஆழ்வார்களின் பக்திச்சிறப்பைஅறியசெய்தல்.

ஆழ்வார்களின் பக்தி உணர்வை ஊட்டுதல்

பாடல்களில் இசை இன்பம், ஓசை நயம் ஆகியவற்றை உணரச்செய்தல்

குழந்தைப் பருவத்தின் தன்மையை உணர்த்துதல்

பயன்கள்

நாயன்மார்கள் பக்திச்சிறப்பை அறிதல்.

ஆழ்வார்களின் பக்திநெறியை உணர்தல்.

பக்தி இலக்கியம்காலம் தோறும் வளர்ந்ததை அறிதல்.

பாடல்களில் இசை இன்பம், ஓசை நயம் அறிதல்.

குழந்தைப் பருவத்தின் தன்மையை உணர்தல்.

அலகு- 1 பன்னிருதிருமுறைகள்

திருஞானசம்பந்தர்– திருத்தில்லைப்பதிகம்

திருநாவுக்கரசர் - திருநீற்றுப்பதிகம்

சுந்தரர் - திருவெண்ணைநல்லூர்

திருமூலர்- திருமந்திரம்(இளமைநிலையாமை)

அலகு- 2 பன்னிருஆழ்வார்கள்

ஆண்டாள் - திருப்பாவை

பெரியாழ்வார்- மூன்றாம்திருமுறை(பத்துபாடல்கள்)

மதுரகவியாழ்வார் - கண்ணின்நுண்சிறுதாம்பு

அலகு- 3சிற்றிலக்கியங்கள்

மீனாட்சியம்மைப்பிள்ளைத்தமிழ்– செங்கீரைபருவம், அம்புலிபருவம்

நந்திக்கலம்பகம்

குற்றாலகுறவஞ்சி- குறத்திநகர்வளம்கூறுதல்

காளமேகப் புலவர் பாடல்கள்

அலகு- 4 புதினம

நா .பார்த்தசாரதியின்- குறிஞ்சிமலர்

அலகு-5 தமிழ் இலக்கிய வரலாறு

பக்திஇலக்கியங்கள்

சைவமும்தமிழும்

வைணவசமயம்போற்றிவளர்த்ததமிழ்

சிற்றிலக்கியங்கள்

நாவல்இலக்கியம்

பார்வைநூல்கள் :

1. தேவாரம் - மணிவாசகர்பதிப்பகம்சென்னை

2. நாலாயிரதிவ்ய பிரபந்தம் - வர்த்தமான பதிப்பகம் சென்னை.

3. தமிழ்இலக்கியவரலாறு - முனைவர்சுபாஷ்சந்திரபோஸ், இயல்வெளியீடு ,தஞ்சாவூர

4. தமிழ் நாவல் இலக்கியம் -காகைலாசபதி- தமிழ் புத்தக,நிலையம், சென்னை

இணையதளம் -www.tamilvu.org , www.noolulagam.com

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PSO1	PSO2
CLO1	3	2	3	3	3	2	2	2	3	2	3	2
CLO2	3	3	2	2	2	3	2	3	3	2	2	2
CLO3	3	2	3	3	2	2	2	3	2	3	3	2
CLO4	3	3	3	2	2	2	3	2	3	2	3	3
CLO5	3	3	2	2	2	2	3	2	2	2	3	3

FIRST YEAR - SEMESTER II

PAPER II –GENERAL ENGLISH

Subject Code	Category	L	T	P	C
23111AEC22	Language	3	1	-	3

Learning Objectives		
LO1	To introduce learners to the essential skills of communication in English	
LO2	To enable them use these skills effectively in academic and non-academic contexts	
LO3	To help them identify and eliminate common mistakes in writing and speaking	
LO4	To enable them use various business communication strategies and to use advanced vocabulary	
LO5	To familiarize them in writing descriptive essays and respond to arguments orally and in writing	
Unit No.	Unit Title & Text	No. of Periods for the Unit
I	Poetry 1.1Very Indian Poem in Indian English - Nissim Ezekiel 1.2 Still I Rise - Maya Angelou 1.3 On Killing a Tree -Gieve Patel	20
II	Prose 2.1 If You Are Wrong Admit it- Dale Carnegie 2.2 Kindly Adjust Please –ShashiTharoor 2.3 The Spoon-fed Age- W.R.Inge	20
III	Fiction Alchemist - Paulo Coelho	20

IV	Language Competency 4.1 Homonyms, Homophones, Homographs Portmanteau words 4.2 Subject Verb Agreement	15
V	English in the Workplace 5.1 Reading for General and Specific information [charts, tables, schedules, graphs etc] 5.2 Reading news and weather reports 5.3 Writing paragraphs 5.4 Taking and making notes	15

Course Outcomes		
Course Outcomes	On completion of this course, students will;	
CO1	Learn to introduce themselves and talk about everyday activities confidently	PO1
CO2	Be able to write short paragraphs on people, places and events	PO1, PO2
CO3	Identify the purpose of using various tenses and effectively employ them in speaking and writing	PO4, PO6
CO4	Gain knowledge to write subjective and objective descriptions	PO4, PO5,PO6
CO5	Identify and use their skills effectively in formal contexts.	PO3,PO8

Text Books(Latest Editions)	
1	The Alchemist - Paulo Coelho Harper – 2005
References Books (Latest editions, and the style as given below must be strictly adhered to)	
1	Advanced English Grammar. Martin Hewings. Cambridge University Press, 2000
2	Descriptive English. SP Bakshi, Richa Sharma · 2019, Arihant Publications (India) Ltd.
3	The Reading Book: A Complete Guide to Teaching Reading. Sheena Cameron, Louise Dempsey, S & L. Publishing, 2019.

4	Skimming and Scanning Techniques, Barbara Sherman, Liberty University Press, 2014
5	Brilliant Speed Reading: Whatever you need to read, however ...Phil Chambers, Pearson, 2013.
6	The Archer, Paulo Coelho. Penguin Viking, 2020.
Web Resources	
1	Very Indian poem by Nissim Ezekiel http://econtent.in/pacc.in/admin/contents/40_%20_2020103001102714.pdf
2	Still I Rise by Maya Angelou https://www.poetryfoundation.org/poems/46446/still-i-rise
3	The Flower by Tennyson: https://www.poemhunter.com/poem/the-flower-2/
4	On Killing a tree by Gieve Patel: https://www.poemhunter.com/poem/on-killing-a-tree/
5	If you are wrong, admit it: https://www.tbr.fun/if-youre-wrong-admit-it/
6	Kindly Adjust please –ShashiTharoor https://www.theweek.in/columns/shashi-tharoor/2018/05/25/kindly-adjust-to-our-english.html?fbclid=IwAR3IhtdXqvuV4ySECn9S7SA6HmCEYISyd1QHd3BlwKgiNKKwdkeSg3qWp-U/
7	The Spoon Fed Age: https://www.nrkacademy.com/2016/04/spoon-feeding-by-wringe .html
8	The Alchemist: https://www.youtube.com/watch?v=lxBYpmxjeDU

Mapping with Programme Outcomes:

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1	3	3	3	3	3	3	3	2	3	2
CO2	2	3	3	3	2	3	3	2	2	2
CO3	3	3	3	2	3	3	3	2	3	2
CO4	3	3	3	3	3	3	3	2	2	2
CO5	3	2	3	3	3	3	3	2	2	3

3 – Strong, 2 – Medium, 1 – Low

Mapping with Programme Specific Outcomes:

CO /PO	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	3	3	3	3	3
CO2	3	3	3	3	3
CO3	3	3	3	3	3
CO4	3	3	3	3	3
CO5	3	3	3	3	3
Weightage	15	15	15	15	15
Weighted percentage of Course Contribution to Pos	3.0	3.0	3.0	3.0	3.0

SEMESTER II

Title of the Course/Paper	Subject Name	Category	L	T	P	C
23122AEC23	OBJECT ORIENTED PROGRAMMING CONCEPTS USING C++	Core	4	1	0	3

Course Objective		
LO1	Describe the procedural and object oriented paradigm with concepts of streams, class, functions, data and objects	
LO2	Understand dynamic memory management techniques using pointers, constructors, destructors, etc	
LO3	Describe the concept of function overloading, operator overloading, virtual functions and polymorphism	
LO4	Classify inheritance with the understanding of early and late binding, usage of exception handling, generic programming	
LO5	Demonstrate the use of various OOPs concepts with the help of programs	
UNIT	Details	No. of Hours
I	Introduction to C++ - key concepts of Object-Oriented Programming – Advantages–Object Oriented Languages–I/O in C++ - C++ Declarations. Control Structures:- Decision Making and Statements: If. else, jump, go to, break, continue, Switch case statements - Loops in C++ :for, while, do - functions in C++ - in line functions – Function Overloading.	15
II	Classes and Objects: Declaring Objects – Defining Member Functions – Static Member variables and functions–array of objects–friend functions – Overloading member functions – Bit fields and classes –Constructor and destructor with static members.	15
III	Operator Overloading: Overloading unary, binary operators–Overloading Friend functions –type conversion – Inheritance: Types of Inheritance – Single, Multilevel, Multiple, Hierarchal, Hybrid, Multi path inheritance– Virtual base Classes–Abstract Classes.	15
IV	Pointers–Declaration–Pointer to Class, Object–this pointer–Pointers	15

	to derived classes and Base classes – Arrays – Characteristics – array of classes – Memory models – new and delete operators – dynamic object – Binding, Polymorphism and Virtual Functions.	
V	Files –File stream classes –file modes–Sequential Read /Write operations– Binary and ASCII Files–Random Access Operation–Templates –Exception Handling- String –Declaring and Initializing string objects–String Attributes–Miscellaneous functions.	15
	Total	75

Course Outcomes		Programme Outcome
CO	Up on completion of the course the students would be Able to:	
1	Remember the program structure of C with its syntax and semantics	PO1,PO6
2	Understand the programming principles in C (data types, operators, branching and looping, arrays, functions, structures, pointers and files)	PO2
3	Apply the programming principles learnt in real-Time problems	PO4,PO7
4	Analyze the various methods of solving a problem And choose the best method	PO6
5	Code, debug and test the programs with appropriate test cases	PO7,PO8

Text Book	
1	E.Balagurusamy, ―Object-Oriented Programming with C++‖, TMH2013, 7thEdition.
Reference Books	
1.	Ashok N Kamthane,―Object-Oriented Programming with ANSI and Turbo C++ ‖, Pearson Education 2003.
2.	Maria Litvin& Gray Litvin, ― C++ for you ‖,Vikas publication 2002.
Web Resources	
1.	https://alison.com/course/introduction-to-c-plus-plus-programming

Mapping with Programme Outcomes:

CO/PSO	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6
CO1	3	2	1	-	-	1
CO2	2	2	2	1	-	-
CO3	3	1	1	-	1	-
CO4	1	2	1	2	2	1
CO5	3	2	1	2	3	2
Weightage of course contributed to each PSO	12	9	6	5	6	4

S-Strong-3 M-Medium-2L-Low-1

SEMESTER II

ALLIED MATHEMATICS

PAPER-III OPERATIONS RESEARCH

Subject Code	Category	L	T	P	C
23122GEC24	Allied	4	1	0	3

Learning Objectives	
LO1	To understand the methodology of OR problem solving and formulate linear programming problem..
LO2	To develop formulation skills in transportation models and finding solutions
LO3	To understand the basics in the field of game theory and assignment problems
LO4	To know how project management techniques help in planning and scheduling a project
LO5	To know the basics of dynamic programming and simulation
UNIT	DETAILS
I	Definition of operations research, models of operations research, scientific methodology of operations research, scope of operations research, importance of operations research in decision making, role of operations management, limitations of OR
II	Linear Programming: Introduction – Mathematical formulation of a problem – Graphical solutions, standard forms the simplex method for maximization and minimization problems. Method application to management decisions.
III	Transportation problem – Introduction – Initial basic feasible solution - NWC method – Least cost method – Vogel's method – MODI – moving towards optimality – solution procedure without degeneracy
IV	Assignment problem – Algorithm – Hungarian method – simple problems.
V	Network models and simulation. Network models for project analysis CPM; Network construction and time analysis; cost time trade off, PERT – problems

Course Outcomes		
CO1	To recognize the importance and value of Operations Research and linear programming in solving practical problems in industry	PO1
CO2	Interpret the transportation models' solutions and infer solutions to the real-world problems.	PO1,PO2
CO3	To know, how to transport a thing in minimum cost.	PO4,PO6
CO4	Gain knowledge about the assigning process	PO4,PO5, PO6
CO5	Gain knowledge of drawing project networks for quantitative analysis of projects	PO3,PO8

Text Books (Latest Editions)	
1	Kalavathy, Operations Research
References Books (Latest editions, and the style as given below must be strictly adhered to)	
1	KantiSwarup, Gupta.P.K. & Man Mohan, operations Research, S.Chand& Sons
2	Taha.H.A, operation Research: An Introduction, McMilan publishing Co., 1982. 7 th ed.
Web Resources	
1	https://rccmindore.com/wp-content/uploads/2015/06/Operations-Research.pdf

Mapping with Programme Outcomes

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1	3	1	3	2	3	3	3	2	1	3
CO2	2	1	3	1	3	3	3	2	1	2
CO3	3	2	3	1	3	3	3	2	1	3
CO4	1	2	3	2	3	3	3	2	1	1
CO5	3	1	2	3	3	3	3	2	1	3

3 – Strong, 2 – Medium, 1 - Low

Mapping with Programme Specific Outcomes

CO /PSO	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	3	3	3	3	3
CO2	3	3	3	3	3
CO3	3	3	3	3	3
CO4	3	3	3	3	3
CO5	3	3	3	3	3
Weightage	15	15	15	15	15
Weighted percentage of Course Contribution to POs	3.0	3.0	3.0	3.0	3.0

ALLIED MATHEMATICS

PAPRER-IV DISCRETE MATHEMATICS

Learning Objectives	
LO1	Use mathematically correct terminology and notation.
LO2	Apply logical reasoning to solve a variety of problems.
LO3	Construct correct direct and indirect proofs
LO4	Use division into cases in a proof.
LO5	Use counterexamples.
UNIT	DETAILS
I	SET THEORY: Introduction- set and Its Element – Set Description (Roster, Set Builder and cardinal number method) Types of Sets- Set Operations and Laws of set Theory. Partition of sets. Countable and uncountable set. Algebra of sets and Duality
II	MATHEMATICAL LOGIC: Basic Logic and Proof, logical operations – Logic Propositional equivalence, Predicates and Quantities, Tautology-Contradiction-Methods of proofs (Direct and Indirect) - Function- Definition-Notation- Types of Function- Composition of Functions
III	NUMBER THEORY: The Integers and Division, Integers and Algorithms, (Multiplication, Addition and Division -Sequences and Summations, Recursive algorithms, Program correctness
IV	RELATIONS: Relations – Relations and their properties, Representing Relations, Closures of relations, Equivalence relations, Partial orderings-Recurrence Relations Binary Relations
V	MATRIX, DETERMINANT OF MATRIX AND ITS APPLICATION: Introduction, definitions, Types of Matrix, Properties of matrix, operations on matrix, Inverse of matrix, Cayley Hamilton of matrix-applications

Course Outcomes		
CO1	To gain knowledge on set theory	PO1
CO2	Able to understand different mathematical logics and functions	PO1,PO2
CO3	To get an idea on Permutations and Combinations	PO4,PO6
CO4	Understanding the different form of number theory	PO4,PO5, PO6
CO5	Able to understand Relations and its applications	PO3,PO8

Text Books (Latest Editions)	
1	Rosen K.H. Discrete Mathematics and its Applications, 5th edition, Tata McGraw –

	Hills,2003
2	J.K Sharma "DISCRETE MATHEMATICS" 3 rd Edition Macmillan Reprint2011
References Books (Latest editions, and the style as given below must be strictly adhered to)	
1	Johnson Baugh R, and Carman R, Discrete mathematics, 5th edition, Person Education, 2003.
2	Kolman B, Busoy R.C, and Ross S.C, Discrete Mathematical Structures, 5th edition, Pretitice – Hall, 2004.
Web Resources	
1	Web resources from NDL Library, E-content from open-source libraries

Mapping with Programme Outcomes

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1	3	1	3	2	3	3	3	2	1	3
CO2	2	1	3	1	3	3	3	2	1	2
CO3	3	2	3	1	3	3	3	2	1	3
CO4	1	2	3	2	3	3	3	2	1	1
CO5	3	1	2	3	3	3	3	2	1	3

3 – Strong, 2 – Medium, 1 - Low

Mapping with Programme Specific Outcomes

CO /PSO	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	3	3	3	3	3
CO2	3	3	3	3	3
CO3	3	3	3	3	3
CO4	3	3	3	3	3
CO5	3	3	3	3	3
Weightage	15	15	15	15	15
Weighted percentage of Course Contribution to POs	3.0	3.0	3.0	3.0	3.0

Title of the Course/Paper	Subject Name	Category	L	T	P	C					
23122SEC26L	C++ PROGRAMMING LAB	Core	0	0	3	3					
Course Objective											
LO1	Describe the procedural and object oriented paradigm with concepts of streams, classes, functions, data and objects										
LO2	Understand dynamic memory management techniques using pointers, constructors, destructors ,etc										
LO3	Describe the concept to function overloading, operator overloading, virtual functions and polymorphism										
LO4	Classify inheritance with the understanding of early and late binding, usage of exception handling, generic programming										
LO5	Demonstrate the use of various OOPs concepts with the help of programs										
S. No	Details										No. of Hours
1	Write a C++ program to demonstrate function overloading, Default Arguments and Inline function.										
2	Write a C++ program to demonstrate Class and Objects										
3	Write a C++ program to demonstrate the concept of Passing Objects to Functions										
4	Write a C++ program to demonstrate the Friend Functions.										
5	Write a C++ program to demonstrate the concept of Passing Objects to Functions										
6	Write a C++ program to demonstrate Constructor and Destructor										
7	Write a C++ program to demonstrate Unary Operator Overloading										
8	Write a C++ program to demonstrate Binary Operator Overloading										

9	Write a C++ program to demonstrate Single Inheritance Multilevel Inheritance Multiple Inheritance Hierarchical Inheritance Hybrid Inheritance	
10	Write a C++ program to demonstrate Virtual Functions.	
11	Write a C++ program to manipulate a Text File.	
12	Write a C++program to perform Sequential I/O Operations on a file.	
13	Write a C++ program to find the Biggest Number using Command Line Arguments	
14	Write a C++ program to demonstrate Class Template	
15	Write a C++ program to demonstrate Function Template.	
16	Write a C++ program to demonstrate Exception Handling.	
Course Outcomes		Programme Outcomes
CO	Up on completion of the course the students would be able to:	
1	Remember the program structure of C with its syntax and semantics	PO1,PO6
2	Understand the programming principles in C (data types, operators, branching and looping, arrays, functions, structures, pointers and files)	PO2
3	Apply the programming principles learnt in real-time problems	PO4,PO7
4	Analyze the various methods of solving a problem and choose the best method	PO6
5	Code, debug and test the programs with appropriate test cases	PO7,PO8
Text Book		
1	E.Balagurusamy, ―Object-Oriented Programming with C++‖, TMH2013, 7th Edition.	
Reference Books		

1.	Ashok N Kamthane,―Object-Oriented Programming with ANSI and Turbo C++‖, PearsonEducation2003.
2.	Maria Litvin & Gray Litvin, ―C++ for you‖,Vikas publication 2002.
Web Resources	
1.	https://alison.com/course/introduction-to-c-plus-plus-programming

Mapping with Programme Outcomes:

CO/PSO	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6
CO1	3	3	3	3	1	2
CO2	2	3	3	3	1	2
CO3	2	3	3	3	1	2
CO4	2	3	3	3	1	2
CO5	2	3	3	3	1	2
Weightage of course contributed to each PSO	11	15	15	15	5	10

S-Strong-3 M-Medium-2L-Low

Subject Code	Subject Name	Category	L	T	P	C
23122SEC27	QUANTITATIVE APTITUDE	Skill Enhancement. Course	2	0	0	2

Course Objective		
LO1	To understand the basic concepts of numbers	
LO2	Understand and apply the concept of percentage, profit & loss	
LO3	To study the basic concepts of time and work, interests	
LO4	To learn the concepts of permutation, probability, discounts	
LO5	To study about the concepts of data representation, graphs	
UNIT	Details	No. of Hours
I	Numbers-HCF and LCM of numbers-Decimal fractions-Simplification-Square root and cube roots-Average-problems on Numbers.	6
II	Problems on Ages-Surds and Indices- percentage -profits and loss - ratio and proportion-partnership-Chain-rule.	6
III	Time and work-pipes and cisterns-Time and Distance -problems on trains-Boats and streams-simple interest -compound interest-Logarithms-Area-Volume and surface area-races and Games of skill.	6
IV	Permutation and combination-probability-True Discount-Bankers Discount– Height and Distances-Odd man out &	6

	Series.	
V	Calendar-Clocks-stocks and shares- Data representation-Tabulation – Bar Graphs-Pie charts-Line graphs.	6
	Total	30

Course Outcomes		Programme Outcomes
CO	On completion of this course, students will	
1	Understand the concepts, application and the problems of numbers	PO1
2	To have basic knowledge and understanding about percentage, profit & loss related processing's	PO2,PO3
3	To understand the concepts of time and work	PO4,PO6
4	Speaks about the concepts of probability, discount	PO4,PO5,PO6
5	Understanding the concept of problem solving involved in stocks & shares, graphs	PO3,PO8

Text Book	
1	—Quantitative Aptitude‖ ,R.S.AGARWAL., S.Chand & Company Ltd.,
Reference Books	
1.	
Web Resources	
1.	https://www.javatpoint.com/aptitude/quantitative
2.	https://www.toppr.com/guides/quantitative-aptitude/

Mapping with Programme Outcomes:

CO/PSO	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6
CO1	2	3	1	2	-	2
CO2	2	2	2	3	3	1
CO3	3	2	2	2	3	3
CO4	3	2	3	2	3	3
CO5	2	3	1	2	3	3
Weightage of course Contributed to each PSO	12	12	9	11	12	12

S-Strong-3 M-Medium-2L-Low-1

Subject Code	SUBJECT NAME	Category	L	T	P	C					
23122SEC28	ADVANCED EXCEL	Skill Enhancement Course	2	0	0	2					

Course Objective		
LO1	Handle large amounts of data	
LO2	Aggregate numeric data and summarize in to categories and sub-categories	
LO3	Filtering, sorting, and grouping data or subsets of data	
LO4	Create pivot tables to consolidate data from multiple files	
LO5	Presenting data in the form of charts and graphs	
UNIT	Details	No. of Hours
I	Basics of Excel-Customizing common options-Absolute and relative cells-Protecting and un-protecting worksheets and cells-Working with Functions-Writing conditional expressions- logical functions-lookup and reference functions-VlookUP with Exact Match, Approximate Match-Nested VlookUP with Exact Match-VlookUP with Tables, Dynamic Ranges-Nested VlookUP with Exact Match-Using VLookUP to consolidate Data from Multiple Sheets	6
II	Data Validations-Specifying a valid range of values-Specifying a list of valid values-Specifying custom validations based on formula-Working with Templates Designing the structure of a template-templates for standardization of worksheets - Sorting and Filtering Data –Sorting tables –multiple –level sorting-custom sorting-Filtering data for selected view -advanced filter options-Working with Reports Creating sub totals-Multiple-level sub-total.	6

III	Creating Pivot tables Formatting and customizing Pivot tables-advanced options of Pivot tables-Pivot charts-	6
	Consolidating data from multiple sheets and files using Pivot tables- external data sources-data consolidation feature to consolidate data-Show Value As % of Row,% of Column, Running Total, Compare with Specific Field-Viewing Sub-total under Pivot-Creating Slicers.	
IV	More Functions Date and time functions-Text functions-Database functions-Power Functions – Formatting Using auto formatting option for worksheets-Using conditional formatting option for rows, columns and cells-What If Analysis- Goal Seek-Data Tables-Scenario Manager.	6
V	Charts -Formatting Charts-3D Graphs-Bar and Line Chart together-Secondary Axis in Graphs-Sharing Charts with PowerPoint/ MS Word, Dynamically- New Features Of Excel Spark lines, Inline Charts, data Charts-Overview of all the new features.	6
	Total	30

Course Outcomes		Programme Outcomes
CO	On completion of this course, student swill	
1	Work with big data tools and its analysis techniques.	PO1
2	Analyze data by utilizing clustering and classification algorithms.	PO1,PO2
3	Learn and apply different mining algorithm and recommendation systems for large volumes of data.	PO4,PO6
4	Perform analytics on data streams.	PO4,PO5,PO6
5	Learn No –SQL databases and management.	PO3,PO8

Text Book	
1	Excel2019All
2	MicrosoftExcel2019PivotTable Data Crunching

Web Resources	
1.	https://www.simplilearn.com

2	https://www.javatpoint.com

Mapping with Programme Outcomes:

CO/PSO	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6
CO1	2	2	2	1	3	-
CO2	3	2	2	1	1	3
CO3	3	2	1	2	1	3
CO4	3	3	2	2	2	1
CO5	3	2	1	3	1	3
Weightage of course Contributed to each PSO	14	11	8	9	8	10

S-Strong-3 M-Medium-2L-Low-1

SOFT SKILL -2-COMMUNICATION SKILL

Subject Code	Category	L	T	P	C		Inst. Hours			
231AECCCMS	AECC	2	0	0	2		2			
Learning Objectives										
LO1	Identify common communication problems that may be holding learners back									
LO2	Identify what their non-verbal messages are communicating to others									
LO3	Understand role of communication in teaching-learning process									
LO4	Learning to communicate through the digital media									
LO5	Understand the importance of empathetic listening									
LO6	Explore communication beyond language.									
UNIT	DETAILS									
I	Listening Techniques of effective listening Listening and comprehension Probing questions Barriers to listening									
II	Speaking Pronunciation Enunciation Vocabulary Fluency Common Errors									
III	Reading Techniques of effective reading Gathering ideas and information from a given text									

	Identify the main claim of the text Identify the purpose of the text Identify the context of the text Identify the concepts mentioned Evaluating these ideas and information Identify the arguments employed in the text Identify the theories employed or assumed in the text Interpret the text To understand what a text says To understand what a text does To understand what a text means
IV	Writing and different modes of writing Clearly state the claims Avoid ambiguity, vagueness, unwanted generalizations and oversimplification of issues Provide background information Effectively argue the claim Provide evidence for the claims Use examples to explain concepts Follow convention Be properly sequenced Use proper signposting techniques Be well structured Well-knit logical sequence Narrative sequence Category groupings Different modes of Writing - E-mails Proposal writing for Higher Studies Recording the proceedings of meetings Any other mode of writing relevant for learners
V	Digital Literacy Role of Digital literacy in professional life Trends and opportunities in using digital technology in workplace

	Internet Basics Introduction to MS Office tools Paint Office Excel PowerPoint
VI	Effective use of Social Media Introduction to social media websites Advantages of social media Ethics and etiquettes of social media How to use Google search better Effective ways of using Social Media Introduction to Digital Marketing
VII	Non-verbal communication Meaning of non-verbal communication Introduction to modes of non-verbal communication Breaking the misbelieves Open and Closed Body language Eye Contact and Facial Expression Hand Gestures Do's and Don’ts Learning from experts Activities-Based Learning

Course Outcomes		
CO1	By the end of this program participants should have a clear understanding of what good communication skills are and what they can do to improve their abilities.	PO1

References Books (Latest editions, and the style as given below must be strictly adhered to)	
1	S. Madhu c chanda (2010), An Introduction to Critical Thinking, Pearson, Delhi
2	Silvia P. J. (2007), How to Read a Lot, American Psychological Association, Washington DC

Mapping with Programme Outcomes

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1	3	3	3	3	3	3	3	2	3	2
CO2	3	3	3	3	3	3	3	2	2	2
CO3	2	3	3	3	2	3	3	2	2	2
CO4	3	3	3	2	3	3	3	2	3	2
CO5	3	2	3	3	3	3	3	2	2	3

3 – Strong, 2 – Medium, 1 - Low

Mapping with Programme Specific Outcomes

CO /PSO	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	3	3	3	3	3
CO2	3	3	3	3	3
CO3	3	3	3	3	3
CO4	3	3	3	3	3
CO5	3	3	3	3	3
Weightage	15	15	15	15	15
Weighted percentage of Course Contribution to POs	3.0	3.0	3.0	3.0	3.0

Course Code	Course Title - BCA	L	T	P	C
THEORY					
23110AEC31/	Tamil – III	3	1	0	3

காப்பிய இலக்கியம் - 23110AEC31

மூன்றாம் பருவம்

பாடநோக்கங்கள்

தமிழ்க்காப்பியங்களை அறிமுகப்படுத்துதல்.

காப்பியங்கள் கூறும் வாழ்வியல் அறங்களை உணர்த்துதல்.

காப்பிய இலக்கியங்களில் இலக்கியச் சுவையை பயிற்றுவித்தல்.

நாடக இலக்கியத்தின் தனித்துவத்தைக்கற்பித்தல்.

புராணச் செய்திகளை மேம்படுத்திக்கொள்ளச்செய்தல்.

பயன்கள்

இலக்கியங்களின் சிறப்புகளை அறிவர்.

காப்பியக்கதைகள்வழிஅறச்சிந்தனைபெறுவர்

பல்வேறு காப்பியவடிவங்களை பற்றிய அறிவுபெறுவர்.

நாடக படைப்பாக்கத்திற்கான தூண்டுதலைப் பெறுவர்

புராணச் செய்திகள் வழி தமிழ்கலாச்சாரத்தை அறிவர்.

அலகு-1 காப்பியங்கள்

1.சிலப்பதிகாரம் - மதுரைகாண்டம் (வழக்குரைகாதை)]

2.மணிமேகலை - விழாவறைகாதை

3.சீவகசிந்தாமணி - குணமாலையார்இலம்பகம்

அலகு-2 காவியங்கள்

1.கம்பராமாயணம்- மந்தரைசூழ்ச்சிபடலம்

2.மகாபாரதம் - ஆரண்யபருவம்

அலகு-3புராணங்கள்

1. பெரியபுராணம்- இளையான்குடிமாறநாயனார்புராணம்.

2. சீறாப்புராணம் – ஈத்தங்குழைவரவழைத்தப்படலம்.

3.தேம்பாவணி- பிரிந்தமகனைகாண்படலம்.

அலகு-4 நாடகம் - சாபம்? விமோசனம்

அலகு-5 இலக்கியவரலாறு

காப்பியங்கள்

இரட்டைக்காப்பியங்கள்

நாடகஇலக்கியம்

பார்வை நூல்கள் :

1. காப்பியத்திறன்- மணிவாசகர்நூலகம், சிதம்பரம்.

2 . தமிழ்காப்பியங்கள் - கி. வா .ஜெகன்ஜெகநாதன் , அமுதநிலையம், சென்னை.

3 .நவீனநாடகஉருவாக்கம் - கோபழனி , தமிழ்பல்கலைக்கழகம், தஞ்சாவூர்.

4.இணையதளம் -www.tamilvu.org, www.noolulagam.com

5. சாபம்? விமோசனம்

மு.இராமசுவாமி,

செண்பகம்இராமசுவாமி,

பாவைபதிப்பகம்,ஜானிஜான்சாலை,சென்னை – 14

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PSO1	PSO2
CLO1	3	2	3	3	3	2	2	2	3	2	3	2
CLO2	3	3	2	2	2	3	2	3	3	2	2	2
CLO3	3	2	3	3	2	2	2	3	2	3	3	2
CLO4	3	3	3	2	2	2	3	2	3	2	3	3
CLO5	3	3	2	2	2	2	3	2	2	2	3	3

SECOND YEAR - SEMESTER III

Part-II - ENGLISH - II

Subject Code	Category	L	T	P	C		Inst. Hours			
23111AEC32	LANGUAGE	3	1	0	3		4			

Learning Objectives	
LO1	To enhance the level of literary and aesthetic experience of students and to help them respond creatively.
LO2	To sensitize them to the major issues in the society and the world.
LO3	To provide them with an ability to build and enrich their communication skills
LO4	To equip them to utilize the digital knowledge resources effectively for their chosen fields of study
LO5	To help them think and write imaginatively and critically.
UNIT	DETAILS
I	Poetry: 1.1 The Voice of the Mountains -Mamang Dai 1.2 A Song of Hope –Oodgeroo Noonuccal 1.3In an Artist's Studio - Christina Rossetti
II	Scenes From Shakespeare: 2.1 Romeo & Juliet -The Balcony Scene 2.2 Macbeth-Banquet Scene 2.3 Julius Caesar - Murder Scene
III	Speeches of Famous personalities 3.1Yes, We Can-Barack Obama 3.2You've Got to Find What You Love-Steve Jobs
IV	Language Competency 4.1 Writing letters and emails. 4.2 Writing and messaging in social media platforms. [blogs, twitter, instagram, face book]. 4.3 Learning netiquette, email etiquette.
V	English for Workplace 5.1 Data Interpretation and Reporting 5.2 Data Presentation and analysis 5.3 Meeting Etiquettes - language, dress code, voice modulation. Online Meetings - Terms and expressions used 5.4 Conducting and participating in a meeting

Course Outcomes		
CO1	Broaden their outlook and sensibility and be acquainted with cultural diversity and divergence in perspectives.	PO1
CO2	Be updated with basic informatics skills and attitudes relevant to the emerging knowledge society	PO1,PO2
CO3	Produce grammatically and idiomatically correct language.	PO4,PO6
CO4	Gain knowledge in writing techniques to meet academic and professional needs.	PO4,PO5, PO6
CO5	Be equipped with sufficient practice in Vocabulary, Grammar, Comprehension and Remedial English from the perspective of career oriented tests.	PO3,PO8

Text Books (Latest Editions)	
1	Arden Shakespeare Complete works by Shakespeare (Author), William (Author), Bloomsbury, 2011)
References Books (Latest editions, and the style as given below must be strictly adhered to)	
1	The Shakespeare Book: Big Ideas Simply Explained, Stanley Wells et al. DK Publishing, 2015
2	Famous Speeches by Mahatma Gandhi, Create space Independent Publishing Platform, 2016
3	How to Build a Professional Digital Profile Kindle Edition by Jeanne Kelly Bernish,Bernish Communications Associates, LLC; 1st edition (May 29, 2012)
4	Keys to Teaching Grammar to English Language Learners, Second Ed.: A Practical Handbook by Keith S Folse, Michigan Teacher Training, 2016.
5	Role Play-Theory and Practice.Krysia M Yardley-Matwiejczuk, SAGE publications ltd, 1997
Web Resources	
1	The Voice of the Mountains by Mamang Dai: https://www.scribd.com/document/558838656/The-Voice-of-the-Mountain-By-Mamang-Dai-Adivasi-Resurgence
2	A song of Hope by Kath Walker: http://www.wordslikethis.com.au/a-song-of-hope/

3	In an artist's studio by Christina Rossetti: https://www.poetryfoundation.org/poems/146804/in-an-artist39s-studio
4	Sita by Toru Dutt: https://www.poetrynook.com/poem/s%E2%94%9C%C2%ABta
5	Tryst with Destiny: https://www.cam.ac.uk/files/a-tryst-with-destiny/index.html#:~:text=Jawaharlal%20Nehru%2C%20delivering%20his%20Tryst%20with%20Destiny%20speech.&text=%22Long%20years%20ago%20we%20made,awake%20to%20life%20and%20freedom.
6	Yes, We Can: https://www.englishspeecheschannel.com/english-speeches/barack-obama-speech/
7	You've got to find what you love: https://www.businessbusinessbusiness.com.au/steve-jobs-youve-got-to-find-what-you-love/#:~:text=Steve%20Jobs%2C%20in%20his%20commencement,emphasizes%20on%20believing%20in%20oneself.

Mapping with Programme Outcomes

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1	3	3	3	3	3	3	3	2	3	2
CO2	2	3	3	3	2	3	3	2	2	2
CO3	3	3	3	2	3	3	3	2	3	2
CO4	3	3	3	3	3	3	3	2	2	2
CO5	3	2	3	3	3	3	3	2	2	3

3 – Strong, 2 – Medium, 1 - Low

Mapping with Programme Specific Outcomes

CO /PSO	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	3	3	3	3	3
CO2	3	3	3	3	3
CO3	3	3	3	3	3
CO4	3	3	3	3	3
CO5	3	3	3	3	3
Weightage	15	15	15	15	15
Weighted percentage of Course Contribution to POs	3.0	3.0	3.0	3.0	3.0

Semester III

Title of the Course /Paper	Subject Name	Category	L	T	P	C					
23122AEC33	DATA STRUCTURES AND ALGORITHMS	Core	5	1	0	4					
Course Objective											
LO1	To understand the concepts of ADTs										
LO2	To learn linear data structures-lists, stacks, queues										
LO3	To learn Tree structures and application of trees										
LO4	To learn graph structures and application of graphs										
LO5	To understand various sorting and searching										
UNIT	Details										No. of Hours
I	Abstract Data Types (ADTs)- List ADT-array-based implementation-linked list implementation singly linked lists-circular linked lists-doubly-linked lists-applications of lists-Polynomial Manipulation-All operations-Insertion-Deletion-Merge-Traversal										15
II	Stack ADT-Operations-Applications-Evaluating arithmetic expressions –Conversion of infix to postfix expression-Queue ADT-Operations-Circular Queue-Priority Queue-deQueue applications of queues.										15
III	Tree ADT-tree traversals-Binary Tree ADT-expression trees-applications of trees-binary search tree ADT- Threaded Binary Trees-AVL Trees-B-Tree- B+ Tree –Heap-Applications of heap.										15
IV	Definition-Representation of Graph-Types of graph-Breadth first traversal – Depth first traversal-Topological sort- Bi-connectivity – Cut vertex- Euler circuits- Applications of graphs.										15
V	Searching- Linear search-Binary search-Sorting-Bubble sort-Selection sort-Insertion sort-Shell sort-Radix sort- Hashing-Hash functions-Separate chaining-Open Addressing-Rehashing Extendible Hashing										15
	Total										75

Course Outcomes		Programme Outcome
CO	On completion of this course, students will	
1	Understand the concept of Dynamic memory management, data types, algorithms, Big O notation	PO1,PO6
2	Understand basic data structures such as arrays, linked lists, stacks and queues	PO2
3	Describe the hash function and concepts of collision and Its are solution methods	PO2,PO4
4	Solve problem involving graphs, trees and heaps	PO6,PO8
5	Apply Algorithm for solving problems like sorting, searching, insertion and deletion of data	PO7
Text Book		
1	1.MarkAllenWeiss,—DataStructuresandAlgorithmAnalysisinC++‖,Pearson Education2014, 4thEdition.	
2	Reema Thareja,—Data Structures Using C‖, Oxford Universities Press2014,2nd Edition	
Reference Books		
1.	Thomas H.Cormen, Chales E.Leiserson, Ronald L.Rivest, Clifford Stein, — Introduction to Algorithms ‖,McGraw Hill 2009,3rd Edition.	
2.	Aho,HopcroftandUllman,—Data Structures and Algorithms ‖,Pearson Education 2003	
Web Resources		
1.	NPTEL & MOOC course titled Data Structures	
2.	https://nptel.ac.in/courses/106106127/	

Mapping with Programme Outcomes:

CO/PSO	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6
CO1	3	3	3	-	1	-
CO2	1	2	1	-	-	-
CO3	3	1	2	1	-	-
CO4	2	2	1	-	-	1
CO5	3	1	1	-	-	-
Weightage of course Contributed to each PSO	12	9	8	1	1	1

S-Strong-3 M-Medium-2L-Low-1

Code	Subject Name	Category	L	T	P	C					
23122DSC34A	Grid Computing	Elective	5	1	-	3					
Course Objective											
LO1	To learn the basic construction and application of Grid computing.										
LO2	To learn grid computing organization and their Role.										
LO3	To learn Grid Computing Anotomy.										
LO4	To learn Grid Computing road map.										
LO5	To learn various type of Grid Architecture.										
UNIT	Details										No.of Hours
I	Introduction: Early Grid Activity, Current Grid Activity, Overview of Grid Business areas, Grid Applications, Grid Infrastructures.										12
II	Grid Computing organization and their Roles: Organizations Developing Grid Standards, and Best Practice Guidelines, Global Grid Forum (GCF), #Organization Developing Grid Computing Toolkits and Framework#, Organization and building and using grid based solutions to solve computing, commercial organization building and Grid Based Solutions.										12
III	Grid Computing Anatomy: The Grid Problem, The conceptual of virtual organizations, # Grid Architecture # and relationship to other distributed technology.										12
IV	The Grid Computing Road Map: Autonomic computing, Business on demand and infrastructure virtualization, Service-Oriented Architecture and Grid, #Semantic Grids#.										12
V	Merging the Grid services Architecture with the Web Services Architecture: Service-Oriented Architecture, Web Service Architecture, #XML messages and Enveloping #, Service message d encryption Mechanisms, Relationship between Web Services and Grid Services, Web services Interoperability and the role of the WS-I organization.										12
	Total										60

Course Outcomes		Programme Outcomes
CO	On completion of this course, students will	
1	To understand the basic elements and concepts of Grid computing.	PO1
2	To understand the Grid computing toolkit sand Framework.	PO1,PO2
3	To understand the concepts of Anatomy of Grid Computing.	PO4,PO6
4	To understand the concept of service oriented Architecture.	PO4,PO5,PO6
5	To Gain knowledge on grid and web service Architecture.	PO3,PO8
Text Book		
1	Joshy Joseph and Craig Fellenstein, Grid computing, Pearson/IBMPress, PTR, 2004.	
Reference Books		
1.	1 .Ahmer Abbas and Graig computing, A Practical Guide to technology and applications, Charles River Media, 2003.	
Web Resources		
1.	https://en.wikipedia.org/wiki/Grid_computing	
2.	https://link.springer.com/chapter/10.1007/978-1-84882-409-6_4	
3.	https://www.redb ooks.ibm.com/redbooks/pdfs/sg246778.pdf	

Mapping with Programme Outcomes:

CO/PSO	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6
CO1	2	3	1	2	1	2
CO2	2	1	2	1	3	1
CO3	3	2	1	1	-	1
CO4	3	-	3	2	1	3
CO5	2	3	1	2	3	2
Weightage of course Contributed to each PSO	12	9	8	8	8	9

S-Strong-3 M-Medium-2L-Low-1

Subject Code	Subject Name	Category	L	T	P	C	Credits		
23122DSC34B	Big Data Analytics	EC	4	-	-	-	3		
Course Objective									
LO1	Understand the Big Data Platform and its Use cases, Map Reduce Jobs								
LO2	To identify and understand the basics of cluster and decision tree								
LO3	To study about the Association Rules, Recommendation System								
LO4	To learn about the concept of stream								
LO5	Understand the concepts of No SQL Databases								
UNIT	Details							No. of Hours	
I	Evolution of Big data — Best Practices for Big data Analytics — Big data characteristics — Validating —The Promotion of the Value of Big Data — Big Data Use Cases- Characteristics of Big Data Applications — Perception and Quantification of Value –Understanding Big Data Storage —A General Overview of High-Performance Architecture—HDFS—Map Reduce And YARN—Map Reduce Programming Model							12	
II	Advanced Analytical Theory and Methods: Overview of Clustering — K-means — Use Cases — Overview of the Method—Determining the Number of Clusters—Diagnostics — Reasons to Choose and Cautions .-Classification: Decision Trees—Overview of a Decision Tree — The General Algorithm — Decision Tree Algorithms—Evaluating a Decision Tree—Decision Trees in R — Naïve Bayes — Bayes Theorem—Naïve Bayes Classifier.							12	
III	Advanced Analytical Theory and Methods: Association							12	

	Rules—Overview—Apriori Algorithm—Evaluation of Candidate Rules—Applications of Association Rules—Finding Association & finding similarity —Recommendation System: Collaborative Recommendation- Content Based Recommendation —Knowledge Based Recommendation- Hybrid Recommendation Approaches.	
IV	Introduction to Streams Concepts—Stream Data Model and Architecture—Stream Computing, Sampling Data in a Stream — Filtering Streams —Counting Distinct Elements in a Stream — Estimating moments—Counting on enessina Window—Decaying Window—Real-time Analytics Platform (RTAP) applications — Case Studies — Real Time Sentiment Analysis, Stock Market Predictions. Using Graph Analytics for Big Data: Graph Analytics	12
V	No SQL Databases : Schema-less Models: Increasing Flexibility for Data Manipulation-Key Value Stores-Document Stores — Tabular Stores — Object Data Stores—Graph Databases Hive—Shading—H base — Analyzing big data with twitter — Big data for E-Commerce Big data for blogs — Review of Basic Data Analytic Methods using R.	12
	Total	60

Course Outcomes		Programme Outcomes
CO	On completion of this course, students will	
1	Work with big data tools and its analysis techniques.	PO1
2	Analyze data by utilizing clustering and classification algorithms.	PO1,PO2

3	Learn and apply different mining algorithms and recommendation systems for large volumes of data.	PO4,PO6
4	Perform analytics on data streams.	PO4,PO5,PO6
5	Learn No SQL databases and management.	PO3,PO8
Text Book		
1	Anand Rajaraman and Jeffrey David Ullman, ―Mining of Massive Datasets‖, CambridgeUniversityPress, 2012.	
Reference Books		
1.	David Loshin,―Big Data Analytics: From Strategic Planning to Enterprise IntegrationwithTools,Techniques,NoSQL,andGraph‖,MorganKaufmann/ElsevierPublishers,2013	
2.	EMC Education Services, ―Data Science and Big Data Analytics: Discovering, Analyzing, Visualizing and Presenting Data‖, Wiley publishers, 2015.	
Web Resources		
1.	https://www.simplilearn.com	
2.	https://www.sas.com/en_us/insights/analytics/big-data-analytics.html	

Mapping with Programme Outcomes:

CO/PSO	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6
CO1	1	3	2	2	3	1
CO2	3	2	3	2	3	3
CO3	1	3	2	2	2	1
CO4	3	3	3	1	3	3
CO5	3	2	3	3	3	3
Weightage of course contributed to each PSO	11	13	13	10	14	11

S-Strong-3 M-Medium-2L-Low-1

Subject Code	Subject Name	Category	L	T	P	C	Credits	
23122DSC34C	NATURAL LANGUAGE PROCESSING	Elect	4	-	-	-	3	

Learning Objectives		
LO1	To understand approaches to syntax and semantics in NLP.	
LO2	To learn natural language processing and to learn how to apply basic algorithms in This field.	
LO3	To understand approaches to discourse, generation, dialogue and summarization with n NLP.	
LO4	To get acquainted with the algorithmic description of the main language levels: morphology, syntax, semantics, pragmatics etc.	
LO5	To understand current methods for statistical approaches to machine translation.	
UNIT	Contents	No. of. Hours
I	Introduction : Natural Language Processing tasks in syntax, semantics, and pragmatics – Issue- Applications – The role of machine learning – Probability Basics –Information theory – Collocations -N-gram Language Models – Estimating parameters and smoothing – Evaluating language models.	12
II	Word level and Syntactic Analysis: Word Level Analysis: Regular Expressions-Finite-State Automata-Morphological Parsing-Spelling Error Detection and correction- Words and Word classes-Part-of Speech Tagging. Syntactic Analysis: Context-free Grammar-Constituency-Parsing-Probabilistic Parsing.	12
III	Semantic analysis and Discourse Processing: Semantic Analysis: Meaning Representation-Lexical Semantics-Ambiguity-Word Sense Disambiguation. Discourse Processing: cohesion-Reference Resolution-Discourse Coherence and Structure.	12

IV	Natural Language Generation: Architecture of NLGS systems-Generation Tasks and Representations- Application of NLG. Machine Translation: Problems in Machine Translation. Characteristics of Indian Languages-Machine Translation Approaches-Translation involving Indian Languages.	12
V	Information retrieval and lexical resources: Information Retrieval:	
	Design features of Information Retrieval Systems-Classical, Non-classical, Alternative Models of Information Retrieval – valuation Lexical Resources: World Net-Frame Net Stemmers- POS Tagger-Research Corpora SSAS.	12
TOTAL		60
Course Outcomes		Programme Outcomes
CO	On completion of this course, students will	
CO1	Describe the fundamental concepts and techniques of natural language processing.	PO1, PO2,PO3, PO4,PO5,PO6
CO2	Use NLP technologies to explore and gain abroad understanding of text data.	PO1, PO2,PO3, PO4,PO5,PO6
CO3	Use appropriate descriptions, visualizations, and statistics to communicate the problems and their solutions.	PO1, PO2,PO3, PO4,PO5,PO6
CO4	Analyze large volume text data generated from a range of real-world applications.	PO1, PO2,PO3, PO4,PO5,PO6
CO5	Determine the framework in which artificial intelligence and the Internet of things may function, including interactions with people, enterprise functions, and environments.	PO1, PO2,PO3, PO4,PO5,PO6
Text books		
1	DanielJurafsky, JamesH.Martin,―Speech&languageprocessing‖,Pearson publications.	
2	Allen, James. Natural language understanding. Pearson, 1995.	
Reference Books		

1.	PierreM.Nugues,―An Introduction to Language Processing with Perland Prolog‖,Springer
Web Resources	
1.	https://en.wikipedia.org/wiki/Natural_language_processing
2.	https://www.techtarget.com/searchenterpriseai/definition/natural-language-processing-NLP

Mapping with Programme Outcomes:

CO/PSO	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6
CO1	3	3	3	3	3	1
CO2	2	3	3	3	2	3
CO3	1	3	3	3	1	3
CO4	3	2	1	3	2	3
CO5	3	3	3	3	3	3
Weightage of course contributed to each PSO	12	14	13	15	11	13

S-Strong-3 M-Medium-2L-Low-1

Title of the Course/ Paper	Subject Name	Category	L	T	P	C	Credits	Inst. Hours			
23122SEC35L	DATA STRUCTURES AND ALGORITHMS LAB using C++	Core	0	0	3	3	4	4			
Course Objective											
LO1	To understand the concepts of ADTs										
LO2	To learn linear data structures- lists, stacks, queues										
LO3	To learn Tree structures and application of trees										
LO4	To learn graph structures and application of graphs										
LO5	To understand various sorting and searching										
S .No	Details									No .of Hours	
1.	Write a program to implement the List ADT using arrays andl inked lists.										
2.	Write a programs to implement the following using a singly linked list. Stack ADT Queue ADT										
3.	Write a program that reads an infix expression, converts the expression to postfix form and then evaluates the postfix expression (use stack ADT).										
4.	Write a program to implement priority queue ADT.										
5.	Write a program to perform the following operations: Insert an element in to a binary search tree. Delete an element from a binary search tree. Search for a key element in a binary search tree.										
6.	Write a program to perform the following operations Insertion in to an AVL-tree Deletion from an AVL-tree										

7.	Write a programs for the implementation of BFS and DFS for a given graph.	
8	Write a programs for implementing the following searching methods: Linear search Binary search.	
9.	Write a programs for implementing the following sorting methods: Bubble sort Selection sort Insertion sort Radix sort.	
	Total	

Course Outcomes		Programme Outcome
CO	On completion of this course, students will	
1	Understand the concept of Dynamic memory management, data types, algorithms, Big O notation	PO1,PO4,PO5
2	Understand basic data structures such as arrays, linked lists, stacks and queues	PO1,PO4,PO8
3	Describe the hash function and concepts of collision and Its resolution methods	PO1,PO3,PO6
4	Solve problem involving graphs ,trees and heaps	PO3,PO4
5	Apply Algorithm for solving problems like sorting, searching, insertion an deletion of data	PO1,PO5,PO6

Text Book	
1	Mark Allen Weiss, Data Structures and Algorithm Analysis in C++‖, Pearson Education 2014, 4th Edition.
2	ReemaThareja,―DataStructuresUsingC‖,OxfordUniversitiesPress2014,2nd Edition
Reference Books	
1	ThomasH.Cormen,ChalesE.Leiserson,RonaldL.Rivest,CliffordStein,―Introduction to Algorithms‖,McGrawHill2009,3rdEdition
2.	Aho, Hop croft and Ullman,―Data Structures and Algorithms‖, Pearson Education2003

Web Resources	
1.	NPTEL & MOOC courses titled Data Structures
2.	https://nptel.ac.in/courses/106106127/

Mapping with Programme Outcomes:

CO/PSO	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6
CO1	3	3	3	2	1	-
CO2	1	2	1	-	-	2
CO3	3	1	2	1	-	-
CO4	2	2	1	2	3	1
CO5	3	2	1	-	-	-
Weightage of course contributed to each PSO	12	10	8	5	4	4

S-Strong-3 M-Medium-2L-Low-1

Subject-Code	Subject Name	Category	L	T	P	C	Credits			
23122SEC36	INTRODUCTION TO HTML	Specific Elective	3	0	0	2	2			

Learning Objectives	
LO1	Insert a graphic with in a web page.
LO2	Create a link with in a web page.
LO3	Create a table with in a web page.
LO4	Insert heading levels within a web page.
LO5	Insert ordered and unordered lists with in a webpage. Create a webpage.

UNIT	Contents	No. Of. Hours
I	Introduction: Web Basics: What are Internet– Web browsers–What is Webpage–HTML Basics: Understanding tags?	6
II	Tags for Document structure(HTML, Head ,Body Tag).Block level text elements: Headings paragraph(<p>tag)–Font style elements:(bold, italic, font, small, strong, strike, big tags)	6
III	Lists: Types of lists: Ordered, Unordered– Nesting Lists –Other tags: Marquee, HR, BR-Using Images–Creating Hyperlinks.	6
IV	Tables: Creating basic Table, Table elements, Caption–Table and cell alignment–Rowspan, Colspan –Cell padding.	6
V	Frames: Frameset– Targeted Links– No frame–Forms: Input, Text area, Select, Option.	6
TOTALHOURS		30

Course Outcomes		ProgrammeOutcomes
CO	On completion of this course, students will	
CO1	Knows the basic concept in HTML Concept of resources in HTML	PO1, PO2, PO3,PO4,PO5,PO6
CO2	Knows Design concept .Concept of Meta Data Understand the concept of save the files.	PO1, PO2, PO3,PO4,PO5,PO6
CO3	Understand the page formatting. Concept to flist.	PO1, PO2, PO3,PO4,PO5,PO6
	Creating Links.	PO1, PO2,PO3,

CO4	Know the concept of creating link to email address	PO4,PO5,PO6
CO5	Concept of adding images Understand the table creation.	PO1, PO2,PO3, PO4,PO5,PO6

Text books	
1	—Mastering HTML5 and CSS3 Made Easy‖,Teach U CompInc., 2014.
2	Thomas Michaud, “Foundations of Web Design: Introduction to HTML & CSS”

Web Resources	
1.	https://www.teachucomp.com/samples/html/5/manuals/Mastering-HTML5-CSS3.pdf
2.	https://www.w3schools.com/html/default.asp

Mapping with Programme Outcomes:

CO/PSO	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6
CO1	3	3	3	3	3	3
CO2	3	3	2	3	3	3
CO3	2	3	3	3	3	3
CO4	3	3	3	3	3	3
CO5	3	3	3	2	3	3
Weightage of course Contributed to each PSO	14	15	14	14	15	15

S-Strong-3 M-Medium-2 L-Low-1

COURSECODE	COURSE TITLE	L	T	P	C
23122SEC37	FINANCIAL ACCOUNTING I	2	0	0	2

OBJECTIVES

To understand the basic accounting concepts and standards.

To know the basis for calculating business profits.

To familiarize with the accounting treatment of depreciation.

To learn the methods of calculating profit for single entry system.

To gain knowledge on the accounting treatment of insurance claims.

UNIT–I

Fundamentals of Financial Accounting

Financial Accounting – Meaning, Definition, Objectives, Basic Accounting Concepts and Conventions -Journal, Ledger Accounts– Subsidiary Books — Trial Balance - Classification of Errors – Rectification of Errors– Preparation of Suspense Account– Need and Preparation-Bank Reconciliation Statement

UNIT–II

Final Accounts

Final Accounts of Sole Trading Concern- Capital and Revenue Expenditure and Receipts–Preparation of Trading, Profit and Loss Account and Balance Sheet with Adjustments.

UNIT– III

Depreciation and Bills of Exchange

Depreciation-Meaning–Objectives–Accounting Treatments-Types-Straight Line Method Diminishing Balance method–Conversion method. Annuity Method–Depreciation Fund Method–Insurance Policy Method– Revaluation Method–Depletion Method – Sum of Digits Method – Machine Hour Rate Method .Bills of Exchange – Definition – Specimens – Discounting of Bills – Endorsement of Bill – Collection –Noting–Renewal–Retirement of Bill under rebate–Insolvency of Acceptor–Accommodation.

UNIT–IV

Accounting from Incomplete Records

Incomplete Records -Meaning and Features -Limitations -Difference between Incomplete Records and Double Entry System - Methods of Calculation of Profit - Statement of Affairs Method – Preparation of final statements by Conversion method. Average Due Date and Account Current

UNIT–V

Royalty and Insurance of Claims

Meaning–Minimum Rent–Short Working–Recoupment of Short Working–Lessor and Lessee–Sub lease-Accounting Treatment.

Course Outcomes

CO1 Remember the concept of rectification of errors and Bank reconciliation statements

CO2 Apply the knowledge in preparing detailed accounts of sole trading concerns

CO3 Analyze the various methods of providing depreciation

CO4 Evaluate the methods of calculation of profit

CO5 Determine the royalty accounting treatment and claims from insurance companies in case of loss of stock.

Text books	
1.	S.P. JainandK. L. Narang Financial Accounting- I, Kalyani Publishers, New Delhi.
2.	S.N.Maheshwari, Financial Accounting,Vikas Publications,Noida.
3.	ShuklaGrewalandGupta,"AdvancedAccounts",volume1, S.Chandand Sons,NewDelhi.
4.	Radhaswamy and R.L.Gupta: Advanced Accounting, Sultan Chand, NewDelhi.
5.	R.L.Guptaand V.K. Gupta, "Financial Accounting", Sultan Chand, New Delhi.
Reference Books	
1.	Dr.Arulanandanand Raman:AdvancedAccountancy,Himalaya Publications, Mumbai.
2.	Tulsian, Advanced Accounting, Tata McGraw-Hill's, Noida.
3.	Charumathiand Vinayagam, Financial Accounting, S.Chandand Sons, New Delhi.
4.	Goyaland Tiwari, Financial Accounting,Taxmann Publications, New Delhi.
5.	Robert NAnthony,DavidHawkins,KennethA.Merchant,Accounting: Text and Cases.McGraw-HillEducation, Noida.
NOTE: Latest Edition of Textbooks May be Used.	
Web Resources	
1.	https://www.slideshare.net/mcsharma1/accounting-for-depreciation-1
2.	https://www.slideshare.net/ramusakha/basics-of-financial-accounting
3.	https://www.accountingtools.com/articles/what-is-a-single-entry-system.html

MAPPINGWITHPROGRAMMEOUTCOMESANDPROGRAMMESPECIFICOUTCOMES

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PSO1	PSO2	PSO3
CO1	3	2	3	3	2	3	2	2	3	2	2
CO2	3	2	3	3	3	2	2	2	3	2	2
CO3	3	2	3	3	3	2	2	2	3	2	2
CO4	3	2	3	3	2	2	2	2	3	2	2
CO5	3	2	3	3	3	2	2	2	3	2	2
TOTAL	15	10	15	15	13	11	10	10	15	10	10
AVERAGE	3	2	3	3	2.6	2.2	2	2	3	2	2

3– Strong,2-Medium,1-Low

COURSECODE	COURSETITLE	L	T	P	C
23122RMC38	Research Methodology	2	0	0	2

AIM:

To create a basic appreciation towards research process and awareness of various research publication.

OBJECTIVES:

To understand the steps in research process and the suitable methods.

To identify various research communications and their salient features

To carry out basic literature survey using the common data-based

To give exposure to MATLAB platform for effective computational and graphic works required for quality research

PREREQUISITIES:

Basic computer skill for working in window environment & conceptual knowledge on basic matrices.

UNIT-I Introduction to Research Methodology

Meaning of research – Objectives of research – Type of research – Significance of research – Research approaches.

UNIT-II Research Methods

Research methods versus Methodology – Research and scientific method – criteria of good research – Problems encountered by researchers in India.

UNIT-III Literature Survey

Articles – Thesis – Journals – Patents – Primary sources of journals and patents – Secondary sources – Listing of titles – Abstracts – Review – General treatises – Monographs.

UNIT-IV Database Survey

Database search – NIST –MSDS –PubMed – Scopus – Science citation index – Information about a specific search.

UNIT-V Introduction to MATLAB:

What is MATLAB? Matrix and its application in different areas: MATLAB approach to environmental modeling; Arithmetic Matrix – Operators; Arithmetic Array – Operators and its applications in MATLAB; Expressions, Opening M-Files; Structure of MATLAB Programming; Programming; Concatenation of strings; Vectorization ; Basic Graphics.

OUTCOME:

Ability to carry out independent literature survey corresponding to the specific publication type and assess basic computation frame works used in mathematical researches.

REFERENCES BOOK:

1. C.R. Kothari, Research Methodology, New Age International publishers. New Delhi, 2004.

2. R.A Day and A.L. Underwood, Quantitative analysis, Prentice Hall, 1999.

3. R. Gopalan, Thesis writing, Vijay Nicole Imprints Private Ltd., 2005.

4. A Guide to MATLAB: For Beginners and experienced Users by Brian R. Hunt (Editor), Ronald L. Lipsman, J. Rosenberg.

5. Introduction to MATLAB for Engineers by William J. Palm III.

Subject Code	Subject Name	Category	L	T	P	C					
231ACLSOAN	OFFICE AUTOMATION	AC	-	-	-	1					
Learning Objectives											
LO1	Understand the basics of computer systems and its components.										
LO2	Understand and apply the basic concepts of a word processing package.										
LO3	Understand and apply the basic concepts of electronic spreadsheet software.										
LO4	Understand and apply the basic concepts of database management system.										
LO5	Understand and create a presentation using PowerPoint tool.										
UNIT	Contents										No. of Hours
I	Introductory concepts: Memory unit– CPU-Input Devices: Key board, Mouse and Scanner. Output devices: Monitor, Printer. Introduction to Operating systems & its features: DOS–UNIX–Windows. Introduction to Programming Languages.										6
II	Word Processing: Open, Save and close word document; Editing text – tools, formatting, bullets; Spell Checker - Document formatting – Paragraph alignment, indentation, headers and footers, numbering; printing– Preview, options ,merge.										6
III	Spreadsheets :Excel–opening ,entering text and data, formatting, navigating; Formulas– entering, handling and copying; Charts–creating, formatting and printing, analysis tables, preparation of financial statements, introduction to data analytics.										6

IV	Database Concepts: The concept of data base management system; Data field, records, and files, Sorting and indexing data; Searching records. Designing queries, and reports; Linking of data files; Understanding Programming environment in DBMS; Developing menu drive applications in query language(MS–Access).	6
V	Power point: Introduction to Power point - Features – Understanding slide typecasting & viewing slides – creating slide shows. Applying special object – including objects & pictures – Slide transition–Animation effects, audio inclusion, timers.	6
	Total	30

Course Outcomes		Programme Outcomes
CO	On completion of this course, students will	
CO1	Possess the knowledge on the basics of computers and its components	PO1,PO2,PO3,PO6,PO8
CO2	Gain knowledge on Creating Documents, spreadsheet and presentation.	PO1,PO2,PO3,PO6
CO3	Learn the concepts of Database and implement the Query in Database.	PO3,PO5,PO7
CO4	Demonstrate the understanding of different automation tools.	PO3,PO4,PO5,PO7
CO5	Utilize the automation tools for documentation, calculation and presentation purpose.	PO4,PO6,PO7,PO8

Text Book	
1	PeterNorton, “Introduction to Computers”–Tata McGraw-Hill.
Reference Books	
1.	Jennifer Ackerman Kettle, Guy Hat-Davis, Curt Simmons, “Microsoft 2003”, Tata McGraw Hill.
Web Resources	
1.	https://www.udemy.com/course/office-automation-certificate-course/
2.	https://www.javatpoint.com/automation-tools

Mapping with Programme Outcomes:

MAPPING TABLE						
CO/ PSO	PSO 1	PSO 2	PSO 3	PSO 4	PSO 5	PSO 6
CO1	3	2	2	3	3	3
CO2	3	3	3	3	3	3
CO3	3	3	3	3	3	3
CO4	3	3	3	3	3	3
CO5	3	3	3	3	3	3
Weightage of course contributed to each PSO	15	14	14	15	15	15

S-Strong-3 M-Medium-2 L-Low-1

சங்க இலக்கியம் - 23110AEC41

நான்காம் பருவம்

பாடநோக்கங்கள்

இலக்கியங்கள் வாயிலரக சமுதாயக்கருத்தக்களை.

பழந்தமிழ்இலக்கியவளத்தைஉணர்த்துதல்.

சங்கஅக. புறபாடல்மரபுகளைப்பயிற்றுவித்தல்.

வாழ்வியல்அறங்கள்மற்றும்வரலாற்றுச்செய்திகளை .பயிற்றுவித்தல்.

புறஇலக்கியங்கள்காட்டும்வாழ்வியல்அறங்களைஎடுத்துக்கூறுதல்.

பயன்கள்

பழந்தமிழ்இலக்கியமரபைஅறிவர்.

சங்கஇலக்கியங்களில்உள்ளஅழகியல்கூறுகளைஉணர்வர்.

வாழ்வியல்அறங்கள்மற்றும்வரலாற்றுச்செய்திகளைஅறிவர்.

சங்கஅக, புறபாடல்மரபுகளைபுரிந்துக்கொள்வர்.

புறஇலக்கியங்கள்காட்டும்வாழ்வியல்அறங்களைஉணர்வர்.

அலகு-1

1. குறுந்தொகை– பாடல்எண்: 28, 38.
2. நற்றிணை– பாடல்எண்: 1,27,28,167,168.
3. ஐங்குறுநூறு– பாடல்எண்: இளவேனில்பத்து.

அலகு-2

1. கலித்தொகை– பாடல்எண்: 3, 7
2. அகநானூறு– பாடல்எண்:5, 42,100
3. புறநானூறு– பாடல்எண்: 182, 204, 41,121

அலகு-3

1 சிறுபாணாற்றுப்படைமுழுவதும்

அலகு-4

திருக்குறள்–செய்நன்றிஅறிதல், கூடாநட்பு, நலம்புனைந்துரைத்தல்.

2. நாலடியார் – பாடல்எண்: 1,172,215,253

அலகு-5

இலக்கியவரலாறு

1.சங்கஇலக்கியம்.

2.எட்டுத்தொகை, பத்துப்பாட்டு.

3.பதினெண்கீழ்க்கணக்குநூல்கள்.

பார்வைநூல்கள்:

1.குறுந்தொகை - கழகவெளியீடு, சென்னை.

2.நற்றிணை - கழகவெளியீடு,சென்னை.

3.ஐங்குறுநூறு - கழகவெளியீடு,சென்னை.

4.கலித்தொகை - கழகவெளியீடு,சென்னை.

5.அகநானூறு - கழகவெளியீடு, சென்னை.

6.புறநானூறு - கழகவெளியீடு,சென்னை.

7.திருக்குறள் -பரிமேலழகர்உரை ,கழகவெளியீடு,சென்னை

8.இணையதளம் -www.tamilvu.org, www.noolulagam.com

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PSO1	PSO2
CLO1	3	2	3	3	3	2	2	2	3	2	3	2
CLO2	3	3	2	2	2	3	2	3	3	2	2	2
CLO3	3	2	3	3	2	2	2	3	2	3	3	2
CLO4	3	3	3	2	2	2	3	2	3	2	3	3
CLO5	3	3	2	2	2	2	3	2	2	2	3	3

SECOND YEAR - SEMESTER IV

PAPER II –GENERAL ENGLISH [23111AEC42]

Subject Code	Category	L	T	P	C					
23111AEC42	Language	3	0	0	3					

Learning Objectives	
LO1	To help learners imbibe the rules of language unconsciously and tune to deduce language structure and usage.
LO2	To enable them use receptive skills through reading and listening to acquire good exposure to language and literature.
LO3	To help them develop style in speech and writing and manipulate the tools of language for effective communication.
LO4	To provide exposure to plays, autobiographies and expose them to value based ideas.
LO5	To enhance their language skills especially in the areas of grammar and pronunciation.

Unit No.	Unit Title & Text	No. of Periods for the Unit
I	Life Writing 1.1 I am Malala-MalalaYousafzai - Chapter 1 1.2 My Inventions - Nikola Tesla - Chapter 2	20
II	One Act Plays 2.1The Zoo Story- Edward Albee 2.2 The Proposal- Anton Chekhov	20
III	Interviews 3.1 Nelson Mandela's Interview with Larry King. 3.2 Rakesh Sharma's Interview with Indira Gandhi from Space 3.3 Lionel Messi with Sid Lowe (Print)	20
IV	Language Competency 4.1 Refuting, Arguing & Debating 4.2 Making Suggestions & Responding to Suggestions, Asking for and Giving Advice or Help4.3 Interviews (face to face, telephone and video conferencing)	15

V	English for Workplace 5.1 Job Applications: Covering letters, CV and Resume 5.2 Creating a digital profile - LinkedIn 5.3 Filling Forms (Online & Manual): creation of account, railway reservation, ATM,Credit/debit card 5.4 Body Language -Practical Skills for Interviews	15

Course Outcomes		
Course Outcomes	On completion of this course, students will;	
CO1	Learn to communicate effectively and appropriately in real life situation.	PO1
CO2	Use English effectively for study purpose across the curriculum	PO1,PO2
CO3	Develop interest in and appreciation of Literature	PO4,PO6
CO4	Develop and integrate the use of the four language skills	PO4,PO5,PO6
CO5	Enhance their language skills especially in the areas of grammar and pronunciation.	PO3,PO8

Text Books (Latest Editions)	
1	I Am Malala The Girl Who Stood Up for Education and Was Shot by the Taliban by MalalaYousafzai, Christina Lamb , Little Brown, 2013.
2	My Inventions by Nikola Tesla Ingram Short title, 2011 Edition
References Books (Latest editions, and the style as given below must be strictly adhered to)	
1	Autobiographies, Mary, Taylor & Francis, 2021

2	One-act Plays for Acting Students: An Anthology of Short Norman A. Bert · 1987 ·
3	The One-Act Play Companion: A Guide to plays, playwrights ... Colin Dolley, Rex Walford · 2015
4	How to Build a Professional Digital Profile Kindle Edition by Jeanne Kelly Bernish, Bernish Communications Associates, LLC; 1st edition (May 29, 2012)
5	Role Play-Theory and Practice.Krysia M Yardley-Matwiejczuk, SAGE publications ltd, 1997

Web Resources	
1	For Readers' Theatre: https://www.youtube.com/watch?v=JaLQJt8orSw&t=469s(the link to the performance; refer scripts by Aaron Sheperd)
2	http://BBC learn English.com
3	http://onestopenglish.com
4	http://hearn-english-today.com
5	http://talkenglish.com
6	TheZooStory: http://www.lem.seed.pr.gov.br/arquivos/File/livrosliteraturaingles/zoostory.pdf
7	The Proposal: https://www.one-act-plays.com/comedies/proposal.html
8	Nelson Mandela with Larry King Interviews: http://edition.cnn.com/TRANSCRIPTS/0005/16/lkl.00.html
9	Rakesh Sharma with Indira Gandhi Interview : https://www.ndtv.com/offbeat/what-first-indian-astronaut-rakesh-sharma-told-indira-gandhi-about-india-from-space-2204839
10	Lionel Messi with Sid Lowe Interview:https://www.worldsoccer.com/world-soccer-latest/lionel-messi-interview-part-one-338553

Mapping with Programme Outcomes:

CO/ PSO	PSO 1	PSO 2	PSO 3	PSO 4	PSO 5	PSO 6
CO1	3	2	2	3	3	2
CO2	3	3	2	3	3	2
CO3	3	3	3	3	3	2
CO4	3	3	2	3	3	2
CO5	3	3	2	3	3	2
Weightage of course contributed to each PSO	15	14	11	15	15	10

S-Strong-3 M-Medium-2 L-Low-1

SEMESTER IV

Subject Code	Subject Name	Category	L	T	P	C					
23122AEC43	PROGRAMMING IN JAVA	Core	5	1	0	3					
Learning Objectives											
LO1	To provide fundamental knowledge of object-oriented programming										
LO2	To equip the student with programming knowledge in Core Java from the basics up.										
LO3	To enable the students to use AWT controls, Event Handling and Swing for GUI.										
LO4	To provide fundamental knowledge of object-oriented programming.										
LO5	To equip the student with programming knowledge in Core Java from the basics up.										
UNIT	Contents									No. of Hours	
I	Introduction: Review of Object Oriented concepts – History of Java – Java buzz words – JVM architecture – Data types - Variables - Scope and life time of variables - arrays - operators – control statements - type conversion and casting - simple java program - constructors - methods - Static block - Static Data – Static Method String and String Buffer Classes.									15	
II	Inheritance: Basic concepts - Types of inheritance - Member access rules - Usage of this and Super key word - Method Overloading - Method overriding - Abstract classes - Dynamic method dispatch - Usage of final keyword. Packages: Definition- Access Protection –Importing Packages. Interfaces:Definition–Implementation–Extending Interfaces. Exception Handling: try – catch- throw - throws – finally – Built-in exceptions - Creating own Exception classes.									15	
III	Multithreaded Programming: Thread Class - Runnable interface –Synchronization–Using synchronized methods–									15	

	Using synchronized statement- Inter thread Communication –Deadlock. I/O Streams: Concepts of streams - Stream classes- Byte and Character stream - Reading console Input and Writing Console output - File Handling.	
IV	AWT Controls: The AWT class hierarchy - user interface components- Labels - Button - Text Components - Check Box - Check Box Group - Choice - List Box - Panels – Scroll Pane - Menu - Scroll Bar. Working with Frame class - Colour - Fonts and layout managers. Event Handling: Events - Event sources - Event Listeners - Event Delegation Model (EDM) - Handling Mouse and Keyboard Events - Adapter classes - Inner classes	15
V	Swing: Introduction to Swing - Hierarchy of swing components. Containers - Top level containers – JFrame – JWindow – JDialog – JPanel – JButton – JToggleButton – JCheckBox – JRadioButton – JLabel,JTextField – JtextArea – JList – JComboBox – JScrollPane.	15
	Total	75

Course Outcomes		
Course Outcomes	On completion of this course, students will;	
CO1	Understand the basic Object-oriented concepts. Implement the basic constructs of Core Java.	PO1, PO2, PO6
CO2	Implement inheritance, packages, interfaces and exception handling of Core Java.	PO2, PO3, PO8
CO3	Implement multi-threading and I/O Streams of Core Java	PO1, PO3, PO5
CO4	Implement AWT and Event handling.	PO2, PO6
CO5	Use Swing to create GUI.	PO1, PO3, PO6

Text Books:	
1.	Herbert Schildt, The Complete Reference, Tata McGraw Hill, New Delhi, 7th Edition, 2010
2.	Gary Cornell, Core Java 2 Volume I – Fundamentals, Addison Wesley, 1999
References :	
1.	Head First Java, O'Rielly Publications,
2.	Y. Daniel Liang, Introduction to Java Programming, 7th Edition, Pearson Education India, 2010
Web Resources	
1.	https://javabeginnerstutorial.com/core-java-tutorial
2.	http://docs.oracle.com/javase/tutorial/
3.	https://www.coursera.org/

Mapping with Programme Outcomes:

S-Strong-3 M-Medium-2 L-Low-1

CO/ PSO	PSO 1	PSO 2	PSO 3	PSO 4	PSO 5	PSO 6
CO1	3	3	3	3	3	2
CO2	3	3	3	2	2	3
CO3	2	2	1	3	3	3
CO4	3	3	3	3	3	2
CO5	3	3	3	3	3	1
Weightage of course contributed to each PSO	14	14	13	14	14	11

Subject Code	Subject Name	Category	L	T	P	C	Credits				
23122DSC44A	Image Processing	Elective	5	1	0	3	3				
Course Objective											
LO1	To learn fundamentals of digital image processing.										
LO2	To learn about various2D Image transformations										
LO3	To learn about various image enhancement processing methods and filters										
LO4	To learn about various classification of Image segmentation techniques										
LO5	To learn about various image compression techniques										
UNIT	Details									No. of Hours	
I	Digital Image Fundamentals: Image representation - Basic relationship between pixels, Elements of DIP system -Applications of Digital Image Processing - 2D Systems - Classification of 2D Systems – Mathematical Morphology- Structuring Elements- Morphological Image Processing- 2D Convolution-2D Convolution Through Graphical Method-2D Convolution Through Matrix Analysis									12	
II	2D Image transforms: Properties of 2D-DFT-Walsh transform-Hadamard transform-Haar transform-Discrete Cosine Transform- Karhunen -Loeve Transform- Singular Value Decomposition									12	
III	Image Enhancement: Spatial domain methods-Point processing-Intensity transformations-Histogram processing-Spatial m filtering-smoothing filter-Sharpening filters - Frequency domain methods: low pass filtering, high pass Filtering-Homomorphic filter.									12	
IV	Image segmentation: Classification of Image segmentation techniques – Region approach–Clustering techniques-Segmentation based on thresholding-Edge based segmentation-Classification of edges-Edge Detection- Hough transform-Active contour.									12	
V	Image Compression: Need for compression-Redundancy-Classification Of image-Compression schemes-Huffman coding-Arithmetic coding-Dictionary based compression-Transform based compression,									12	
	Total									60	
Course Outcomes										Programme	

		Outcome
CO	On completion of this course, students will	
1	Understand the fundamental concepts of digital image processing.	PO1
2	Understandvarious2DImagetransformations	PO1,PO2
3	Understand image enhancement processing Techniques and filters	PO4,PO6
4	Understand the classification of Image segmentation techniques	PO4,PO5,PO6
5	Understand various image compression techniques	PO3,PO8
Text Book		
1	SJayaraman, SEsakkirajan, TVeerakumar, Digital image processing, Tata McGrawHill,2015	
2	Gonzalez RafelC, Digital Image Processing, Pearson Education,2009	
Reference Books		
1.	1.JainAnilK,Fundamentals of digital image processing:,PHI,1988	
2.	Kenneth RCastleman, Digital image processing:, Pearson Education,2/e,2003	
3.	PrattWilliamK,DigitalImageProcessing:,JohnWiley,4/e,2007	
Web Resources		
1.	https://kanchiuniv.ac.in/coursematerials/Digital%20image%20processing%20-Vijaya%20Raghavan.pdf	
2.	http://sdeuoc.ac.in/sites/default/files/sde_videos/Digital%20Image%20Processing%203rd%20ed.%20-%20R.%20Gonzalez%2C%20R.%20Woods-ilovepdf-compressed.pdf	
3.	https://dl.acm.org/doi/10.5555/559707	
4.	https://www.ijert.org/image-processing-using-web-2-0-2	

Mapping with Programme Outcomes:

CO/PSO	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6
CO1	1	3	2	2	3	1
CO2	3	2	3	2	3	3
CO3	3	3	2	2	2	1
CO4	3	3	3	1	3	3
CO5	3	2	3	3	3	3
Weightage of course contributed to each PSO	13	13	13	10	14	11

S-Strong-3 M-Medium-2L-Low-1

Subject Code	Subject Name	Category	L	T	P	C				
23122DSC44B	ANALYTICS FOR SERVICE INDUSTRY	Elective	5	1	0	3				

Learning Objectives	
LO1	Recognize challenges in dealing with data sets in service industry.
LO2	Identify and apply appropriate algorithms for analyzing the healthcare, Human Resource, hospitality and tourism data.
LO3	Make choices for a model for new machine learning tasks.
LO4	To identify employees with high at triton risk.
LO5	To Prioritizing various talent management initiatives for your organization.

UNIT	Contents	No. Of. Hours
I	Healthcare Analytics: Introduction to Healthcare Data Analytics-Electronic Health Records– Components of EHR- Coding Systems-Benefits of EHR- Barrier to Adopting HER Challenges- Phenotyping Algorithms. Biomedical Image Analysis and Signal Analysis- Genomic Data Analysis for Personalized Medicine. Review of Clinical Prediction Models.	12
II	Healthcare Analytics Applications: Applications and Practical Systems for Healthcare– Data Analytics for Pervasive Health- Fraud Detection in Healthcare – Data Analytics for Pharmaceutical Discoveries-Clinical Decision Support Systems-Computer-Assisted Medical Image Analysis Systems- Mobile Imaging and Analytics for Biomedical Data.	12
III	HR Analytics: Evolution of HR Analytics, HR information systems and data sources, HR Metric and HR Analytics, Evolution of HR Analytics; HR Metrics and HR Analytics; Intuition versus analytical thinking; HRMS/HRIS and data sources; Analytics frameworks like LAMP, HCM: 21(r) Model.	12
IV	Performance Analysis: Predicting employee performance, Training requirements, evaluating training and development, Optimizing selection and promotion decisions.	12
V	Tourism and Hospitality Analytics: GuestAnalytics – Loyalty Analytics– Customer Satisfaction–Dynamic Pricing–optimized Disruption management–Fraud detection in payments.	12
	TOTAL HOURS	60

Course Outcomes		Programme Outcomes
CO	On completion of this course, students will	
CO1	Understand and critically apply the concepts and methods of business analytics	PO1, PO2,PO3, PO4,PO5,PO6
CO2	Identify, model and solve decision problems in different settings.	PO1,PO2, PO3,PO4,PO5,PO6
CO3	Interpret results/solutions and identify appropriate courses of action for a given managerial situation whether a problem or an opportunity.	PO1,PO2,PO3,PO4, PO5,PO6
CO4	Create solutions to decision making problems.	PO1,PO2, PO3,PO4,PO5,PO6
CO5	Instill a sense of ethical decision-making and a commitment to the long-run welfare of both organizations and the communities they serve.	PO1, PO2,PO3, PO4,PO5,PO6
Text books		
1	Chandan K. Reddy and Charu C Aggarwal, ―Health care data analytics‖, Taylor & Francis, 2015.	
2	Edwards MartinR, Edwards Kirsten(2016),―Predictive HR Analytics: Mastering the HRMetric‖, Kogan Page Publishers, ISBN-0749473924	
3	Fitz-enzJac(2010),―The new HR analytics :predicting the economic value of your company‘s human capital investments ‖,AMACOM,ISBN-13:978-0-8144-1643-3	
4	Rajendra Sahu, Manoj Dashand Anil Kumar. Applying Predictive Analytics Within the Service Sector.	
Reference Books		
1.	HuiYangandEvaK.Lee,―Healthcare Analytics: From Datato Knowledge to HealthcareImprovement,Wiley,2016	
2.	Fitz-enzJac,MattoxIIJohn(2014),―PredictiveAnalyticsforHumanResources‖, Wiley,ISBN-1118940709.	
Web Resources		
1.	https://www.ukessays.com/essays/marketing/contemporary-issues-in-marketing-marketing-essay php	
2.	https://yourbusiness.azcentral.com/examples-contemporary-issues-marketing-field-26524.html	

Mapping with Programme Outcomes:

CO/PSO	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6
CO1	3	3	3	3	3	3
CO2	2	3	3	3	3	3
CO3	3	3	2	3	3	2
CO4	3	3	3	3	3	3
CO5	3	3	3	3	3	3
Weightage of course Contributed to each PSO	14	15	14	15	15	14

S-Strong-3 M-Medium-2L-Low-1

Subject Code	Subject Name	Category	L	T	P	C					
23122DSC44C	Computational Intelligence	Elective	5	1	0	3					
Course Objective											
LO1	To identify and understand the basics of AI and its search.										
LO2	To study about the Fuzzy logic systems.										
LO3	Understand and apply the concepts of Neural Network and its functions.										
LO4	Understand the concepts of Artificial Neural Network										
LO5	To study about the Genetic Algorithm.										
UNIT	Details								No. of Hours		
I	Introduction to AI: Problem formulation – AI Applications – Problems – State Space and Search –Production Systems–Breadth First and Depth First–Travelling Salesman Problem – Heuristic search techniques: Generate and Test – Types of Hill Climbing.								12		
II	Fuzzy Logic Systems: Notion of fuzziness – Operations on fuzzy sets – T-norms and other aggregation operators – Basics of Approximate Reasoning – Compositional Rule of Inference – Fuzzy Rule Based Systems – Schemes of Fuzzification – Inference – De fuzzification –Fuzzy Clustering–fuzzy rule-based classifier.								12		
III	Neural Networks What is Neural Network, Learning rules and various activation functions, Single layer Perceptions, Back Propagation networks, Architecture of Back propagation (BP) Networks, Back propagation Learning, Variation of Standard Back propagation Neural Network, Introduction to Associative Memory, Adaptive Resonance theory and Self Organizing Map, Recent Applications								12		
IV	Artificial Neural Networks: Fundamental Concepts – Basic Models of Artificial Neural Networks – Important Terminologies of ANNs–McCulloch-Pitts Neuron– Linear Separability– Hebb Network.								12		

V	Genetic Algorithm: Introduction–Biological Background – Genetic Algorithm Vs Traditional Algorithm–Basic Terminologies in Genetic Algorithm–Simple GA–General Genetic Algorithm–Operators in Genetic Algorithm	12
	Total	60

2.	ChinTengL in, C.S.GeorgeLee,‖ Neuro-Fuzzy Systems‖, PHI.
Web Resources	
1.	https://www.javatpoint.com/artificial-intelligence-tutorial
2.	https://www.w3schools.com/ai/

Subject Code	Subject Name	Category	L	T	P	S	Credits			
23122SEC45L	JAVA PROGRAMMING LAB	Core	0	0	3	3	4			
Learning Objectives										
LO1	To provide fundamental knowledge of object-oriented programming.									
LO2	To equip the student with programming knowledge in Core Java from the basics up.									
LO3	To enable the students to know about Event Handling.									
LO4	To enable the students to use String Concepts.									
LO5	To equip the student with programming knowledge in to create GUI using AWT controls.									
EXERCISE	Details									
1	Write a Java program that prompts the user for an integer and then prints out all the prime numbers up to that Integer									
2	Write a Java program to multiply two given matrices.									
3	Write a Java program that displays the number of characters, lines and words in a text									
4	Generate random numbers between two given limits using Random class and print messages according to the range of the value generated.									
5	Write a program to do String Manipulation using CharacterArray and perform the following string operations: String length Finding a character at a particular position Concatenating two strings									
6	Write a program to perform the following string operations using String class: String Concatenation Search a substring To extract substring from given string									
7	Write a program to perform string operations using String Buffer class:									

	Length of a string Reverse a string Delete a substring from the given string	
8	Write a java program that implements a multi-thread application that has three threads. First thread generates random integer every 1 second and if the value is even, second thread computes the square of the number and prints. If the value is odd, the third thread will print the value of cube of the number.	
9	Write a threading program which uses the same method asynchronously to print the numbers 1to10 using Thread1 and to print 90 to100 using Thread2.	
10	Write a program to demonstrate the use of following exceptions. Arithmetic Exception Number Format Exception ArrayIndexOutofBoundException NegativeArraySizeException	
11	Write a Java program that reads on file name from the user, then displays information about whether the file exists, whether the file is readable, whether the file is writable, the type of file and the length of the file in bytes	
12	Write a program to accept a text and change its size and font. Include bold italic options. Use frames and controls.	
13	Write a Java program that handles all mouse events and shows the event name at the center of the window when a mouse event is fired. (Use adapter classes).	
14	Write a Java program that works as a simple calculator. Use a grid layout to arrange buttons for the digits and for the +, -,*, % operations. Add a text field to display the result. Handle any possible exceptions like divide by zero.	
15	Write a Java program that simulates a traffic light. The program lets the user select one of three lights: red, yellow, or green with radio buttons. On selecting a button, an appropriate message with “stop” or “ready” or “go” should appear above the buttons in a selected color. Initially there is no message shown.	
	Total	60

Course Outcomes		Programme Outcome
CO	On completion of this course, students will	
1	Understand the basic Object-oriented concepts. Implement the basic constructs of Core Java.	PO1
2	Implement inheritance, packages, interfaces and exception handling of Core Java.	PO1, PO2
3	Implement multi-threading and I/O Streams of Core Java	PO4, PO6
4	Implement AWT and Event handling.	PO4, PO5, PO6
5	Use Swing to create GUI.	PO3, PO6
Text Book		
1	Herbert Schildt, The Complete Reference, Tata McGraw Hill, New Delhi, 7th Edition, 2010.	
2.	Gary Cornell, Core Java 2 Volume I – Fundamentals, Addison Wesley, 1999.	
Reference Books		
1.	Head First Java, O'Rielly Publications,	
2.	Y. Daniel Liang, Introduction to Java Programming, 7th Edition, Pearson Education India, 2010.	
Web Resources		
1.	https://www.w3schools.com/java/	
2.	http://java.sun.com	
3.	http://www.afu.com/javafaq.html	

Mapping with Programme Outcomes:

S-Strong M-Medium L-Low

CO/ PSO	PSO 1	PSO 2	PSO 3	PSO 4	PSO 5	PSO 6
CO1	3	3	3	3	3	2
CO2	3	3	3	2	2	3
CO3	2	2	1	3	3	3
CO4	3	3	3	3	3	2
CO5	3	3	3	3	3	2
Weightage of course contributed to each PSO	14	14	13	14	14	12

Subject Code	Subject Name	Category	L	T	P	C				
23122SEC46	Enterprise Resource Planning	Skill Enhancement Course	3	-	-	2				

Course Objectives		
LO1	To understand the basic concepts, Evolution and Benefits of ERP.	
LO2	To know the need and Role of ERP in logical and Physical Integration.	
LO3	Identify the important business functions provided by typical business software such A sender price are source planning and customer relationship management	
LO4	To train the students to develop the basic understanding of how ERP enriches the Business organizations in achieving a multidimensional growth	
LO5	To aim at preparing the students technological competitive and make them ready to self-upgrade with the higher technical skills	
UNIT	Details	No. of Hours
I	ERP Introduction, Benefits, Origin, Evolution and Structure: Conceptual Model of ERP, the Evolution of ERP, the Structure of ERP, Components and needs of ERP,ERP Vendors; Benefits & Limitations of ERP Packages.	6
II	Need to focus on Enterprise Integration/ERP; Information mapping; Role of common shared Enterprise database; System Integration, Logical vs. Physical System Integration, Benefits & limitations of System Integration, ERP‘s Role in Logical and Physical Integration. Business Process Reengineering, Data ware Housing, Data Mining, Online Analytic Processing (OLAP), Product Life Cycle Management (PLM),LAP, Supply chain Management.	6
III	ERP Market place and Market place Dynamics: Market Overview, Market place Dynamics, and the Changing ERP Market. ERP-Functional Modules: Introduction, Functional Modules of ERP Software, Integration of ERP, Supply chain and Customer Relationship Applications. Cloud and Open Source, Quality Management, Material Management, Financial Module, CRM and Case Study.	6

IV	ERP Implementation Basics, ERP implementation Strategy, ERP Implementation Life Cycle, Pre-Implementation task, Role of SDLC/SSAD, Object Oriented Architecture, Consultants, Vendors and Employees.	6
V	ERP & E-Commerce, Future Directives-in ERP, ERP and Internet, Critical success and failure factors, Integrating ERP In to organizational culture. Using ERP tool: either SAP or ORACLE format to case study.	6
	Total	30

Course Outcomes		
Course Outcomes	On completion of this course, students will;	
CO1	Understand the basic concepts of ERP.	PO1,PO2,PO6
CO2	Identify different technologies used in ERP	PO2,PO3,PO8
CO3	Understand and apply the concepts of ERP Manufacturing Perspective and ERP Modules	PO1,PO3,PO7
CO4	Discuss the benefits of ERP	PO2,PO6
CO5	Apply different tools used in ERP	PO1,PO3,PO8

Reference Text:	
1.	Enterprise Resource Planning–Alexis Leon, Tata McGraw Hill.
References:	
1.	Enterprise Resource Planning–Diversified by Alexis Leon, TMH.
2.	Enterprise Resource Planning–Ravi Shankar & S. Jaiswal, Galgotia
Web Resources	
1.	1.https://www.tutorialspoint.com/management_concepts/enterprise_resource_planning.htm
2.	1.https://www.saponlinetutorials.com/what-is-erp-systems-enterprise-resource-planning/
3.	1.https://www.guru99.com/erp-full-form.html
4.	2.https://www.oracle.com/in/erp/what-is-erp/

Mapping with Programme Outcomes:

CO/PSO	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6
CO1	1	3	2	1	3	2
CO2	3	2	-	1	2	-
CO3	2	3	2	2	3	2
CO4	1	-	2	1	-	2
CO5	3	3	-	1	3	-
Weightage of course contributed to each PSO	10	11	6	7	11	6

S-Strong-3 M-Medium-2 L-Low-1

Subject Code	Subject Name	Category	L	T	P	C				
23122SEC47	Multimedia Systems	Skill Enhancement Course	2	-	-	2				

Course Objective		
LO1	Understand the definition of Multimedia	
LO2	To study about the Image File Formats, Sounds Audio File Formats	
LO3	Understand the concepts of Animation and Digital Video Containers	
LO4	To study about the Stage of Multimedia Project	
LO5	Understand the concept of Ownership of Content Created for Project Acquiring Talent	
UNIT	Details	No. of Hours
I	Multimedia Definition-Use Of Multimedia-Delivering Multimedia- Text: About Fonts and Faces-Using Text in Multimedia-Computers and Text Font Editing and Design Tools-Hypermedia and Hypertext.	6
II	Images: Plan Approach-Organize Tools-Configure Computer Workspace-Making Still Images-Color –Image File Formats. Sound: The Power of Sound-Digital Audio-Midi Audio- Midi vs. Digital Audio-Multimedia System Sounds Audio File Formats-Vaughan's Law of Multimedia Minimums-Adding Sound to Multimedia Project	6
III	Animation: The Power of Motion-Principles of Animation- Animation by Computer-Making Animations that Work. Video: Using Video –Working with Video and Displays-Digital Video Containers- Obtaining Video Clips-Shooting and Editing Video	6
IV	Making Multimedia: The Stage of Multimedia Project-The Intangible Needs -The Hardware Needs - The Software Needs-An Authoring System’s Needs-Multimedia Production Team.	6
V	Planning and Costing: The Process of Making Multimedia-Scheduling-Estimating-RFPs and Bid Proposals. Designing and Producing- Content and Talent: Acquiring Content-Ownership of Content Created for Project-Acquiring Talent	6
	Total	30

Course Outcomes		Programme Outcomes
CO	On completion of this course, students will	
1	understand the concepts, importance, application and the process of developing multimedia	PO1
2	To have basic knowledge and understanding about image related processing	PO1,PO2
3	To understand the framework of frames and bit images to animations	PO4,PO6
4	Speaks about the multimedia projects and stages of requirement in phases of project.	PO4,PO5,PO6
5	Understanding the concept of cost involved in multimedia planning designing, and producing	PO3,PO8
Text Book		
1	TayVaughan,"Multimedia:MakingItWork",8thEdition,Osborne/McGraw-Hill, 2001.	
Reference Books		
1.	Ralf Steinmetz & Klara Nahrstedt "Multimedia Computing, Communication & Applications", Pearson Education, 2012.	
Web Resources		
1.	https://www.geeksforgeeks.org/multimedia-systems-with-features-or-characteristics/	

Mapping with Programme Outcomes:

CO/PSO	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6
CO1	3	2	3	3	2	1
CO2	3	2	3	3	2	1
CO3	3	2	3	3	2	1
CO4	3	2	3	3	1	1
CO5	3	3	3	3	1	1
Weightage of course contributed to each PSO	15	11	15	15	8	5

S-Strong-3 M-Medium-2 L-Low-1

ABILITY ENHANCEMENT COMPULSORY COURSE(AECC1)					
23122BRC48	Participation in Bounded Research	2	0	0	2

Course Code	Course Title	L	T	P	C
231AECCEVS	Environmental Studies	2	0	0	2

AIM:

To create the awareness about environmental problems among the students.

OBJECTIVE:

It deals with the study of flow of energy and materials in the environment

It deals with the study of natural and its function.

UNIT–I

The Multidisciplinary Nature of Environmental Studies – Definition, Scope and Importance - Need for public awareness - Natural Resources: Renewable and Non-Renewable Resources - Forest resources - Water resources - Mineral resources - Food resources - Energy resources - Land resource.

UNIT-II

Ecosystems - Concept of an ecosystem - Structure and function of an ecosystem - Producers, consumers an decomposers - Energy flow in the ecosystem - Ecological succession - Food chains, food webs and ecological pyramids - Types of ecosystem - Forest ecosystem - Grassland ecosystem - Desert ecosystem - Aquatic ecosystems.

NIT-III

Biodiversity and its Conservation – Definition - Genetic, species and ecosystem diversity - Bio geographical classification of India - Values of biodiversity - Biodiversity at global, National and local levels - India as a mega - diversity nation - Hot-spots of biodiversity - Threats to biodiversity - Endangered and endemic species of India - Conversation of biodiversity.

UNIT-IV

Environmental Pollution – Definition - Air pollution - Water pollution - Soil pollution - Marine pollution - Noise pollution - Thermal pollution - Nuclear hazards - Solid waste Management - Role of an individual in prevention of pollution - Disaster management.

UNIT-V

Social Issues and the Environment - From Unsustainable to Sustainable development - Urban problems related to energy - Water conservation, rain water harvesting, watershed management - Environmental ethics - Climate change greenhouse effect and global warming - Ozone depletion - Waste land reclamation - Consumerism and waste products - Environmental Legislation - Issues involved in enforcement of environmental legislation - Public awareness - Human Population and the Environment.

REFERENCE BOOK:

1. “ENVIRONMENTAL STUDIES”, K.Kumarasamy, A.Alagappa Moses, M.Vasanthy.

SEMESTER IV

Course Code	Course Title	L	T	P	C
231LCSCLS	Leadership and Management Skills	-	-	-	1

Aim:

The aim of the course cultivating and nurturing the innate leadership skills of the youth so that they may transform these challenges into opportunities and become torch bearers of the future by developing creative solutions.

Course Objective:

The Module is designed to:

- Help students to develop essential skills to influence and motivate others
- Inculcate emotional and social intelligence and integrative thinking for effective leadership
- Create and maintain an effective and motivated team to work for the society
- Nurture a creative and entrepreneurial mindset
- Make students understand the personal values and apply ethical principles in professional and social contexts.

Course Outcomes:

- Upon completion of the course students will be able to:
- Examine various leadership models and understand/assess their skills, strengths and abilities that affect their own leadership style and can create their leadership vision
- Learn and demonstrate a set of practical skills such as time management, self-management, handling conflicts, team leadership, etc.
- Understand the basics of entrepreneurship and develop business plans
- Apply the design thinking approach for leadership
- Appreciate the importance of ethics and moral values for making of a balanced personality.

UNIT I- Leadership Skills

Understanding Leadership and its Importance

What is leadership?

Why Leadership required?

Whom do you consider as an ideal leader?

Traits and Models of Leadership

Are leaders born or made?

Key characteristics of an effective leader

- Leadership styles
- Perspectives of different leaders
- Basic Leadership Skills
- Motivation
- Team work
- Negotiation
- Networking

UNIT II - Managerial Skills

- Basic Managerial Skills
- Planning for effective management
- How to organize teams?
- Recruiting and retaining talent
- Delegation of tasks
- Learn to coordinate
- Conflict management
- Self-Management Skills
- Understanding self-concept
- Developing self-awareness
- Self-examination
- Self-regulation

UNIT III - Entrepreneurial Skills

- Basics of Entrepreneurship
- Meaning of entrepreneurship
- Classification and types of entrepreneurship
- Traits and competencies of entrepreneur
- Creating Business Plan
- Problem identification and idea generation
- Idea validation
- Pitch making

UNIT IV - Innovative Leadership and Design Thinking

Innovative Leadership

Concept of emotional and social intelligence

Synthesis of human and artificial intelligence

Why does culture matter for today's global leaders

Design Thinking

What is design thinking?

Key elements of design thinking:

Discovery

Interpretation

Ideation

Experimentation

Evolution.

How to transform challenges into opportunities?

How to develop human-centric solutions for creating social good

UNIT V- Ethics and Integrity

Learning through Biographies

What makes an individual great?

Understanding the persona of a leader for deriving holistic inspiration

Drawing insights for leadership

How leaders sail through difficult situations?

Ethics and Conduct

Importance of ethics

Ethical decision making

Personal and professional moral codes of conduct

Creating a harmonious life

Bibliography and Suggested Readings:

Books

Ashokan, M. S. (2215). Karmayogi: A Bibliography of E. Sreedharan. Penguin, UK.

Brown, T. (2212). Change by Design. Harper Business

Elkington, J., & Hartigan, P. (2208). The Power of Unreasonable People: How Social Entrepreneurs Create Markets that Change the World. Harvard Business Press.

Goleman D. (1995). Emotional Intelligence. Bloomsbury Publishing India Private Limited.

Kalam A. A. (2203). Ignited Minds: Unleashing the Power within India. Penguin Books India

Kelly T., Kelly D. (2214). Creative Confidence: Unleashing the Creative Potential Within Us All. William Collins.

Kurien V., & Salve G. (2212). I Too Had a Dream. Roli Books Private Limited

Livermore D. A. (2210). Leading with cultural intelligence: The New Secret to Success. New York: American Management Association

McCormack M. H. (1986). What They Don't Teach You at Harvard Business School: Notes From A Street-Smart Executive. RHUS

O'Toole J. (2219) The Enlightened Capitalists: Cautionary Tales of Business Pioneers Who Tried to Do Well by Doing Good. HarperCollins

Sinek S. (2209). Start with Why: How Great Leaders Inspire Everyone to Take Action. Penguin

Sternberg R. J., Sternberg R. J., & Baltes P. B. (Eds.). (2204). International Handbook of Intelligence. Cambridge University Press.

E-Resources

Fries, K. (2219). 8 Essential Qualities That Define Great Leadership. Forbes. Retrieved 2219- 02-15 from https://www.forbes.com/sites/kimberlyfries/2218/02/08/8-essential- qualities-that-define-great-leadership/#452ecc963b63.

How to Build Your Creative Confidence, Ted Talk by David Kelly - https://www.ted. com/talks/david_kelley_how_to_build_your_creative_confidence.

India's Hidden Hot Beds of Invention Ted Talk by Anil Gupta - https://www.ted.com/ talks/anil_gupta_india_s_hidden_hotbeds_of_invention.

Knowledge@Wharton Interviews Former Indian President APJ Abdul Kalam - . "A Leader Should Know How to Manage Failure" https://www.youtube.com/ watch?=laGZaS4sdeU

Martin, R. (2207). How Successful Leaders Think. Harvard Business Review, 85(6): 60.

NPTEL Course on Leadership - https://nptel.ac.in/courses/122105021/9.

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Subject Code	Subject Name	Category	L	T	P	C				
23122AEC51	Operating Systems	Core	5	1	-	4				
Course Objective										
LO1	Understanding the design of the Operating System									
LO2	Imparting knowledge on CPU scheduling, Process and Memory Management.									
LO3	To code specialized programs form an aging over all resources and operations of the computer.									
LO4	To study about the concept of Job and processor scheduling									
LO5	To learn about the concept to memory organization and multiprogramming									
UNIT	Details						No. of Hours			
	Introduction: operating system, history (1990sto2000 and beyond), distributed computing, parallel computation. Process concepts: definition of process, process states-Lifecycle of a process, process management-process state transitions, process control block(PCB), process operations , suspend and resume, context switching, Interrupts-Interrupt processing, interrupt classes, Inter process communication-signals, message passing.						15			
II	Asynchronous concurrent processes: mutual exclusion-critical section, mutual exclusion primitives, implementing mutual exclusion primitives, Petersons algorithm, software solutions to the mutual Exclusion Problem-,n-thread mutual exclusion-Lamports Bakery. Algorithm. Semaphores– Mutual exclusion with Semaphores, thread synchronization with semaphores, Counting semaphores, implementing semaphores. Concurrent programming: monitors, message passing						15			

III	Dead lock and in definite postponement: Resource concepts, four necessary conditions for deadlock, deadlock prevention, deadlock avoidance and Dijkstra‘s Banker‘s algorithm, deadlock detection, deadlock recovery.	15
IV	Job and processor scheduling: scheduling levels, scheduling objectives, scheduling criteria, Preemptive non-preemptive scheduling, interval time orient interrupting clock, priorities, scheduling algorithms-FIFO scheduling, RR scheduling, quantum size, SJF scheduling, SRT scheduling, HRN scheduling, multilevel feedback queues, Fair share scheduling.	15
V	Real Memory organization and Management: Memory organization, Memory management, Memory hierarchy, Memory management strategies, contiguous vs non-contiguous memory allocation, single user contiguous memory allocation, fixed partition multiprogramming, variable partition multiprogramming, Memory swapping. Virtual Memory organization: virtual memory basic concepts, multilevel storage organization, Block mapping, paging basic concepts, segmentation, paging/segmentation systems. Virtual Memory Management: Demand Paging, Page replacement strategies	15
	Total	75
Course outcomes		Programme Outcomes
CO	On completion of this course, students will	

1	Define the fundamentals of OS and identify the concepts relevant to process, process life cycle, Scheduling Algorithms, Deadlock and Memory management	PO1
2	Know the critical analysis of process involving various algorithms, an exposure to threads and semaphores	PO1,PO2
3	Have a complete study about Deadlock and its impact over OS. Knowledge of handling Deadlock with respective algorithms and measures to retrieve from deadlock..	PO4,PO6
4	Have complete knowledge of Scheduling Algorithms and its types.	PO4,PO5,PO6
5	Understand memory organization and management	PO3,PO8
Text Book		
1	H.M.Deitel, Operating Systems,Third Edition,Pearson Education Asia,2011	
Reference Books		
1.	William Stallings, Operating System: Internals and Design Principles, Seventh Edition, Prentice-Hall of India, 2012.	
2.	A.Silberschatz, and P.B. Galvin., Operating Systems Concepts, Nineth Edition, JohnWiley&Sons(ASIA)PteLtd.,2012	

Mapping with Programme Outcomes:

CO/PSO	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6
CO1	3	-	1	2	-	1
CO2	2	3	1	2	-	1
CO3	3	2	-	3	-	1
CO4	1	3	1	1	3	2
CO5	3	-	1	3	2	1
Weightage of course contributed to each PSO	12	8	4	11	5	6

S-Strong-3M-Medium-2L-Low-1

Subject Code	Subject Name	Category	L	T	P	C					
23122AEC52	ASP.Net Programming	Core	5	1	-	3					

Course Objective		
LO1	To identify and understand the goals and objectives of the .NET framework and ASP.NET with C# language.	
LO2	To develop ASP.NET Web application using standard controls.	
LO3	To implement file handling operations.	
LO4	TohandlesSQLServerDatabaseusingADO.NET.	
LO5	Understand the Grid view control and XML classes.	
UNIT	Details	No. of Hours
I	Overview of .NET framework: Common Language Runtime (CLR), Framework Class Library-C# Fundamentals: Primitive types and Variables – Operators –Conditional statements-Looping statements –Creating and Using Objects–Arrays–String operations.	15
II	Introduction to ASP.NET-IDE-Language supported Components-Working with Web Forms– Web form standard controls: Properties and its events–HTML Controls-List Controls: Properties and its events.	15
III	Rich Controls: Properties and its events–validation controls: Properties and its events– File Stream classes -File Modes – File Share – Reading and Writing to files –Creating, Moving, Copying and Deleting files –File uploading.	15
IV	ADONET Overview–Database Connections–Commands –Data Reader- Data Adapter- Data Sets- Data Controls and Its Properties–Data Binding	15

V	Grid View control: Deleting, editing, Sorting and Paging.XML classes–Web form to manipulate XML files-Website Security-Authentication-Authorization– Creating a Web application.	15
	Total	75
Course Outcomes		Programme Outcome
CO	On completion of this course, students will	
1	Develop working knowledge of C# programming constructs and the .NET Framework	PO1,PO2,PO6
2	To develop a software to solve real-world problems using ASP.NET	PO2,PO3,PO8
3	To Work On Various Controls Files	PO1,PO3,PO7
4	To create a web application using Microsoft ADO.NET.	PO2,PO6
5	To develop web applications using XML	PO1,PO3,PO8
Text Book		
1	SvetlinNakov, VeselinKolev &Co, Fundamentals of Computer Programming with C#, Faber publication, 2019.	
2	Mathew, MacDonald, The completeReferenceASP.NET, TataMcGraw-Hill, 2015.	
Reference Books		
1.	Herbert Schildt, The Complete Reference C#. NET, Tata McGraw-Hill, 2017.	
2.	Kogent Learning Solutions, C# 2012 Programming Covers .NET4.5 Black Book, Dream tech press, 2013.	
3.	Anne Boehm, Joe lMurach, Murach‘sC#2015, Mike Murach & AssociatesInc.2016.	
4.	Denielle Otey, Michael Otey, ADO.NET: The Complete reference, McGraw Hill, 2008.	
5.	Matthew Mac Donald, Beginning ASP.NET 4 in C# 2010, A PRESS, 2010.	
Web Resources		
1.	https://www.geeksforgeeks.org/introduction-to-net-framework/	
2.	https://www.javatpoint.com/net-framework	

Mapping with Programme Outcomes:

CO/PSO	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6
CO1	3	1	2	2	1	3
CO2	3	2	2	2	2	3
CO3	3	3	2	2	3	3
CO4	3	1	2	2	1	3
CO5	3	1	2	2	1	2
Weightage of course contributed to each PSO	15	8	10	10	8	14

S-Strong-3 M-Medium-2L-Low-1

Subject Code	Subject Name	Category	L	T	P	C					
23122AEC53	Information Security	Elective	5	-	-	4					

Course Objectives	
LO1	To know the objectives of information security
LO2	Understand the importance and application of each of confidentiality, integrity, authentication and availability
LO3	Understand various cryptographic algorithms
LO4	Understand the basic categories of threats to computers and networks
LO5	To study about the concepts of security in networks, web security

UNIT	Details	No. of Hours
I	Introduction to Information Security: Security mindset, Computer Security Concepts(CIA), Attacks, Vulnerabilities and protections, Security Goals, Security Services, Threats, Attacks, Assets, malware, program analysis and mechanisms	12
II	The Security Problem in Computing: The meaning of computer Security, Computer Criminals, Methods of Defense. Cryptography: Concepts and Techniques: Introduction, plain text and cipher text, substitution techniques, transposition techniques, encryption and decryption	12
III	Symmetric and Asymmetric Cryptographic Techniques: DES, AES, RSA algorithms Authentication and Digital Signatures: Use of Cryptography for authentication, Secure Hash function, Key management–Kerberos	12

IV	Program Security : Non-malicious Program errors – Buffer overflow, Incomplete mediation, Time-of-check to Time-of- use Errors, Viruses, Trapdoors, Salami attack, Man-in-the- middle attacks, Covert channels. File protection Mechanisms, User Authentication Designing Trusted O.S: Security polices, models of security, trusted O.S design, Assurance in trusted O.S. Implementation examples	12
V	Security in Networks: Threats in networks, Network Security Controls–Architecture, Encryption, Content Integrity, Strong Authentication, Access Controls, Wireless Security, Honey pots, Traffic flow security. Web Security: Web security considerations, Secure Socket Layer and Transport Layer Security, Secure electronic transaction	12
	Total	60

Course Outcomes

Course Outcomes	On completion of this course, students will;	Programme Outcomes
CO1	Understand network security threats, security services, and counter measures	PO1
CO2	Understand vulnerability analysis of network security	PO1,PO2
CO3	Acquire background on hash functions; authentication; firewalls; intrusion detection techniques	PO4,PO6
CO4	Gain hands-on experience with programming and simulation techniques for security protocols.	PO4,PO5,PO6
CO5	Apply methods for authentication, access control, Intrusion detection and prevention	PO3,PO8

Text Books

1.	Security in Computing, Fourth Edition, by Charles. Pfleeger, Pearson Education

2.	Cryptography And Network Security Principles And Practice, Fourth or Fifth Edition, William Stallings, Pearson
References Books (Latest editions, and the style as given below must be strictly adhered to)	
1.	Cryptography and Network Security: CKShyamala, NHarini, Dr TR Padmanabhan, Wiley India,lst Edition
2.	Cryptography and Network Security: Forouzan Mukho padhyay, McGraw Hill,2"dEdition
3.	Information Security, Principles and Practice: Mark Stamp, Wiley India
4.	Principles of Computer Security: WM.Arthur Conklin, Greg White, TMH
Web Resources	
1.	https://www.geeksforgeeks.org/what-is-information-security/
2.	https://www.tutorialspoint.com/what-is-information-security#:~:text=Information%20security%20is%20designed%20and,destruction%2C%20alteration%2C%20and%20disruption.

Mapping with Programme Outcomes:

CO/PSO	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6
CO1	2	3	1	2	3	2
CO2	2	-	1	-	3	2
CO3	-	3	1	3	-	-
CO4	2	3	1	3	3	-
CO5	2	3	1	3	3	2
Weightage of course contributed to each PSO	8	12	5	11	12	6

S-Strong-3 M-Medium-2 L-Low-1

Subject Code	Subject Name	Category	L	T	P	C					
23122DSC54A	Database Management System	Core	4	-	-	4					
Course Objective											
LO1	To enable the students to learn the designing of database systems, foundation on the Relational model of data and normal forms.										
LO2	To understood the concepts of database management system, designs implement Database Models										
LO3	To learn and understand to write queries using SQL, PL/SQL.										
LO4	To enable the students to learn the designing of database systems, foundation on the Relational model of data and normal forms.										
LO5	To understood the concepts of database management system, design simple Database Models										
UNIT	Details								No.of Hours		
	Database Concepts: Database Systems-Data vs Information - Introducing the database -File system -Problems with file system – Database systems. Data models-Importance-Basic Building Blocks-Business rules - Evolution of Data models - Degrees of Data Abstraction								12		
II	Design Concepts: Relational database model – logical view of data-keys-Integrity rules-relational set operators – data dictionary and the system catalog-relationships-data redundancy revisited-indexes-codd's rules. Entity relationship model-ER diagram								12		
III	Normalization of Database Tables: Database tables								12		

	and Normalization – The Need for Normalization –The Normalization Process–Higher level Normal Form. Introduction to SQL: Data Definition Commands– Data Manipulation Commands–SELECT Queries–Additional Data Definition Commands– Additional SELECT Query Keywords–Joining Database Tables.	
IV	Advanced SQL: Relational SET Operators: UNION –UNIONALL–INTERSECT-MINUS. SQL Join Operators: Cross Join – Natural Join – Join USING Clause – JOIN ON Clause – Outer Join. Sub Queries and Correlated Queries: WHERE – IN – HAVING –ANY and ALL – FROM. SQL Functions: Date and Time Function–Numeric Function–String Function–Conversion Function	12
V	PL/SQL: A Programming Language: History–Fundamentals – Block Structure – Comments – Data Types – Other Data Types – Variable Declaration – Assignment operation –Arithmetic operators. Control Structures and Embedded SQL: Control Structures – Nested Blocks–SQL in PL/SQL–Data Manipulation – Transaction Control statements.PL/SQL Cursors and Exceptions: Cursors – Implicit Cursors, Explicit Cursors and Attributes–Cursor FOR loops–SELECT…FOR UPDATE – WHERE CURRENT OF clause – Cursor with Parameters – Cursor Variables –Exceptions–Types of Exceptions.	12
	Total	60

Course Outcomes CO	On completion of this course, students will	Programme Outcomes
1	Understand the various basic concepts of Data Base System. Difference between file system and DBMS And compare various data models.	PO1
2	Define the integrity constraints. Understand the Basic concepts of Relational Data Model, Entity-Relationship Model.	PO1,PO2
3	Design database schema considering normalization and relationships within database. Understand and construct database using Structured Query Language. Attain a good practical skill of managing and retrieving of data using Data Manipulation Language (DML)	PO4,PO6
4	Classify the different functions and various join operations and enhance the knowledge of handling Multiple tables.	PO4,PO5,PO6
5	Learn to design Database operations and implement using PL/SQL programs. Learn basics of PL/SQL and develop program using Cursors, Exceptions	PO3,PO8
Text Book		
1	Coronel, Morris, Rob, "Database Systems, Design, Implementation and Management", Ninth Edition	
2	NileshShah,"DatabaseSystemsUsingOracle",2ndedition,PearsonEducationIndia,2016	
Reference Books		
1.	Abraham Silberschatz, Henry F.Korth and S.Sudarshan,—DatabaseSystem Concepts‖, McGraw Hill International Publication, VI Edition	
2.	Shio Kumar Singh,—Database Systems—,Pearson publications, I Edition	
Web Resources		
1.	Web resources from NDL Library, E-content from open-source libraries	

Mapping with Programme Outcomes:

CO/PSO	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6
CO1	3	3	3	3	3	3
CO2	3	3	3	3	2	3
CO3	3	3	3	3	3	3
CO4	3	3	2	3	3	3
CO5	3	3	3	3	3	2
Weightage of course contributed to each PSO	15	15	14	15	14	14

S-Strong-3 M-Medium-2L-Low-1

Subject Code	Subject Name	Category	L	T	P	C	Credits				
23122DSC54B	Agile Project Management	Elective	4	-	-	-	3				
Course Objective											
LO1	Learning of software design, software technologies and APIs.										
LO2	Detailed demonstration about Agile development and testing techniques.										
LO3	Learning about Agile Planning and Execution.										
LO4	Learning of Agile Management Design and Quality Check.										
LO5	Detailed examination of Agile development and testing techniques.										
UNIT	Details									No. of Hours	
I	Introduction: Modernizing Project Management: Project Management Needed a Makeover–Introducing Agile Project Management. Applying the Agile Manifesto and Principles: Understanding the Agile manifesto – Outlining the four values of the Agile manifesto –Defining the 15 Agile Principles – Adding the Platinum Principles –Changes as a result of Agile Values–The Agile must test. Why Being Agile Works Better: Evaluating Agile benefits – How Agile approaches beat historical approaches – Why people like being Agile.									12	
II	Being Agile-Agile Approaches: Diving under the umbrella of Agile approaches –Reviewing the Big Three: Lean, Scrum, Extreme Programming-Summary									12	
	Agile Environments in Action: Creating the physical environment–Low –tech communicating–High-tech communicating–Choosing tools. Agile Behaviours in Action: Establishing Agile roles–Establishing new values–Changing team philosophy.										

III	Agile Planning and Execution Defining the Product Vision and Roadmap: Agile planning–Defining the product vision – Creating a product roadmap – Completing the product backlog. Planning Releases and Sprints: Refining requirements and estimates – Release planning–Sprint planning. Working Throughout the Day: Planning your day–Tracking progress – Agile roles in the sprint – Creating shippable functionality – The end of the day. Showcasing Work, Inspecting and Adapting: The sprint review – The sprint retrospective. Preparing for Release: Preparing the product for deployment (the release sprint) – Preparing the operational support–Preparing the organization for product deployment - Preparing the market place for product deployment	12
IV	Agile Management Managing Scope and Procurement: What‘s different about Agile scope management–Managing Agile scope–What‘s different about Agile procurement–Managing Agile procurement. Managing Time and Cost: What‘s different about Agile time management– Managing Agile schedules–What‘s different about Agile cost management–Managing Agile budgets. Managing Team Dynamics and Communication: What‘s different about Agile team dynamics– Managing Agile team dynamics–What‘s	12
	Different about Agile communication–Managing Agile communication. Managing Quality and Risk: What‘s different about Agile quality–Managing Agile quality–What‘s different about Agile risk management –Managing Agile risk.	

	Implementing Agile Building a Foundation: Organizational and individual commitment – Choosing the right pilot team members– Creating an environment that enables Agility–Support Agility initially and overtime. Being a Change Agent: Becoming Agile requires change–why change doesn‘t happen on its own – Platinum Edge‘s Change Roadmap –Avoiding pitfalls– Signs your changes are slipping. Benefits, Factors for Success and Metrics: Ten key benefits of Agile project management – Ten key factors for project success – Ten metrics for Agile Organizations.	12
	Total	60

Course Outcomes		Programme Outcome
CO	On completion of this course, students will	
1	Understanding of software design, software technologies and APIs using Agile Management.	PO1
2	Understanding of Agile development and testing techniques.	PO1,PO2
3	Understanding about Agile Planning and Execution using Sprint.	PO4,PO6
4	Understanding of Agile Management Design, scope, Procurement, managing Time and Cost and Quality Check.	PO4,PO5,PO6
	Analyzing of Agile development and testing techniques.	PO3,PO8

Text Book	
1	MarkC.Layton, Steven J. Ostermiller, Agile Project Management for Dummies, 2nd Edition, Wiley India Pvt. Ltd., 2018.
	Jeff Sutherland, Scrum – The Art of Doing Twice the Work in Half the Time, Penguin, 2014.
Reference Books	

1.	Mark C. Layton, David Morrow, Scrum for Dummies, 2ndEdition, Wiley India Pvt. Ltd., 2018.
2.	Mike Cohn, Succeeding with Agile–Software Development using Scrum, Addison-Wesley Signature Series, 2010.
3.	Alex Moore, Agile Project Management, 2020.
4.	Alex Moore, Scrum, 2020.
5.	Andrew Stellman and Jennifer Greene, Learning Agile: Understanding Scrum, XP, Lean, and Kanban, Shroff/O'Reilly, First Edition, 2014.
Web Resources	
1.	www.agilealliance.org/resources

Mapping with Programme Outcomes:

CO/PSO	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6
CO1	2	3	1	2	1	2
CO2	3	1	2	1	3	1
CO3	3	2	1	1	3	1
CO4	3	2	3	2	1	3
CO5	2	3	1	2	3	2
Weightage of course Contributed to each PSO	13	11	8	8	11	9

S-Strong-3 M-Medium-2L-Low-1

Subject Code	Subject Name	Category	L	T	P	C	Credits				
23122DSC54C	Cloud Computing	Elective	4	-	-	-	3				

Course Objective		
LO1	Learning fundamental concepts and Technologies of Cloud Computing.	
LO2	Learning various cloud service types and their uses and pitfalls.	
LO3	To learn about Cloud Architecture and Application design.	
LO4	To know the various aspects of application design, benchmarking and security on the Cloud.	
LO5	To learn the various Case Studies in Cloud Computing.	
UNIT	Details	No. of Hours
I	Introduction to Cloud Computing: Definition of Cloud Computing – Characteristics of Cloud Computing – Cloud Models – Cloud Service Examples–Cloud-based Services and Applications. Cloud Concepts and Technologies: Virtualization – Load balancing – Scalability and Elasticity – Deployment – Replication – Monitoring – Software Defined Networking–Network Function Virtualization– Map Reduce – Identity and Access Management–Service Level Agreements–Billing.	12
II	Cloud Services Compute Services: Amazon Elastic Computer Cloud - Google Compute Engine-Windows Azure Virtual Machines Storage Services: Amazon Simple Storage Service –Google Cloud Storage-Windows Azure storage Database Services: Amazon Relational Data Store - Amazon Dynamo DB - Google Cloud SQL - Google Cloud Data Store - Windows Azure SQL Database- Windows Azure Table Service Application Services: Application Runtimes and Frameworks – Queuing Services-Email Services-Notification Services-Media Services Content Delivery Services: Amazon Cloud Front- Windows Azure Content Delivery Network Analytics Services: Amazon Elastic Map Reduce - Google Map Reduce Service-Google Big Query-Windows Azure HD Insight	12

	Deployment and Management Services: Amazon Elastic Bean stack-Amazon Cloud Formation Identity and Access Management Services: Amazon Identity and Access Management-Windows Azure Active Directory Open Source Private Cloud Software: Cloud Stack– Eucalyptus - Open Stack	
III	Cloud Application Design: Introduction – Design Consideration forCloudApplications–Scalability–ReliabilityandAvailability–Security – Maintenance and Up gradation – Performance – Reference Architectures for Cloud Applications–Cloud Application Design Methodologies: Service Oriented Architecture(SOA),Cloud Component Model, IaaS, PaaS and SaaS Services for Cloud Applications, Model View Controller (MVC), Restful Web Services –Data Storage Approaches: Relational Approach (SQL), Non-Relational Approach(No SQL).	12
IV	Cloud Application Benchmarking and Tuning: Introduction to Benchmarking – Steps in Benchmarking – Workload Characteristics – Application Performance Metrics–Design Consideration for Benchmarking Methodology–Benchmarking Tools and Types of Tests –Deployment Prototyping. Cloud Security: Introduction – CSA Cloud Security Architecture – Authentication (SSO)–Authorization–Identity and Access Management – Data Security: Securing data at rest, securing data in motion –Key Management–Auditing.	12
V	Case Studies: Cloud Computing for Healthcare – Cloud Computing for Energy Systems - Cloud Computing for Transportation Systems – Cloud Computing for Manufacturing Industry-Cloud Computing for Education.	12
	Total	60

Course Outcomes		Programme Outcome
CO	On completion of this course, students will	
1	Understand the fundamental concepts and Technologies in Cloud Computing.	PO1
2	Able to understand various cloud service types and their uses and pitfalls.	PO1,PO2
3	Able to understand Cloud Architecture and	PO4,PO6
	Application design.	
4	Understand the various aspects of application design, benchmarking and security in the Cloud.	PO4,PO5,PO6
5	Understand various Case Studies in Cloud Computing.	PO3,PO8
Text Book		
1	Arshdeep Bahga, Vijay Madisetti, Cloud Computing–A Hands On Approach, Universities Press(India) Pvt.Ltd.,2018	
Reference Books		
1.	AnthonyT Velte,TobyJVelte, Robert Elsenpeter, Cloud Computing: A Practical Approach, Tata McGraw-Hill, 2013.	
2.	Barrie Sosinsky, Cloud Computing Bible, Wiley India Pvt. Ltd., 2013.	
3.	David Crookes, Cloud Computing in Easy Steps, Tata McGraw Hill, 2015.	
4.	Dr.Kumar Saurabh, Cloud Computing, Wiley India, Second Edition 2012.	
Web Resources		
1.	https://en.wikipedia.org/wiki/Cloud_computing	
2.	https://link.springer.com/chapter/10.1007/978-3-030-34957-8_7	
3.	https://webobjects.cdw.com/webobjects/media/pdf/solutions/cloud-computing/121838-CDW-Cloud-Computing-Reference-Guide.pdf	

Mapping with Programme Outcomes:

CO/PSO	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6
CO1	2	2	2	3	3	1
CO2	3	1	2	3	3	-
CO3	3	2	1	2	1	3
CO4	3	3	2	3	2	-
CO5	2	2	1	3	3	3
Weightage of course contributed to each PSO	13	10	8	14	12	7

S-Strong-3 M-Medium-2L-Low-1

Course Code	Course Title	L	T	P	C
23122DSC55A	Disaster Management	4	0	0	4

AIM: Disaster management aims to reduce, or avoid the potential losses from hazards, assure prompt and appropriate assistance to victims of disaster, and achieve rapid and effective recovery.

Course Objectives:

1. To provide students an understanding the need for studying the disaster management
2. Develop an understanding about the various types of disasters.
3. To expose students to the risk and vulnerability analysis
4. To create awareness about disaster prevention and risk reduction
5. To establish relationship between disasters and developments.
6. To understand Rehabilitation, Reconstruction and Recovery in the event of Disaster
7. To gain knowledge on Climate Change Adaptation and IPCC Scenario and Scenarios in the context of India.

Course Outcomes:

CO1: Understand the need and significance of studying disaster management

CO2: Understand the different types of disasters and causes for disasters.

CO3: Gain knowledge on the impacts Disasters on environment and society

CO4: Study and assess vulnerability of a geographical area.

CO5: Students will be equipped with various methods of risk reduction measures and risk mitigation.

CO6: Understand the role of Information Technology in Disaster Management

CO7: Understand Geographical Information System applications in Disaster Management

Content of Course
Unit I: Introduction to Disasters
Chapter No.1 Disaster: Concept, Meaning, and Definition Chapter No.2 History of Major Disaster Events in India Chapter No.3 Types of Disasters– Natural Disasters: Famine, Drought, Flood, Cyclone, Tsunami, Earthquake
Unit II: Disaster Mitigation and Disaster Management

Chapter No. 4 Man-made Disasters: Riots, Blasts, Industrial, Militancy Chapter No. 5 Profile, Forms and Reduction of Vulnerability Chapter No. 6 Disaster Mitigation: Concept and Principles
Unit III: Impact of Disaster
Chapter No.7 Disaster Management: Concept and Principles Chapter No.8 Pre-disaster- Prevention and Preparedness Chapter No.9 Physical, Economic, Social, Psycho-socio Aspects, Environmental Impacts
Unit IV: Disaster Process and Intervention
Chapter No.10 During Disaster-Rescue and Relief Chapter No.11 Post-disaster-Rehabilitation and Reconstruction Chapter No.12 Victims of Disaster- Children, Elderly, and Women Chapter No.13 Displacement-Causes , Effects and Impact
Unit V: Disaster Intervention
Chapter No.14 Major Issues and Dynamics in the Administration of Rescue,Relief, Reconstruction and Rehabilitation Chapter No.15 Components of Rescue, Relief, Reconstruction; Rehabilitation Chapter No.16 Disaster Policy in India; Disaster Management Authority-NDMA, SDMA, DDMA; Disaster Management Act, 2005

Key Words: Disaster, Disaster Mitigation, Disaster Management and Disaster Process

References:

Anil Sinha (2001), Disaster Management-Lessons Drawn and Strategies for Future. New Delhi, Jain Publications.

Backer, C.W. and Chapman.(ed.).(1969),Man and Society in Disasters, New Delhi,

Clarke, J.I., Peter Curson, et.al.(ed.)(1991),Population and Disaster,Oxford,Basil Blackwell Ltd.

Cuny, Frederick(1984), Disasters and Development,Oxford,Oxford University Press. Disaster Management Act 2005.

Garb,S. and Eng.(1969),Disasters Hand Book, New York, Springer.

Gupta, M.C, L.C. Gupta, B. K. Tamini and Vinod K. Sharma (2000), Manual on Natural Disaster Management in India, New Delhi, National Institute of Disaster Management. Hoff, A. (1978),People in Crisis-Understanding and Helping, California,AddisonWesley.

Maskrey, Andrew (1989), Disaster Mitigation: A Community Based Approach, Oxford, Oxfarm.

Narayan, Sachindra (ed.) (2000), Anthropology of Disaster Management, New Delhi, Gyan Publishing House.

Nidhi G Dhawan (2014), Disaster Management and Preparedness, New Delhi, Jain Publications.

Parasuraman, S. and Unnikrishnan, P.V. (2000), India Disasters Report: Towards Policy Initiative, New Delhi, and Oxford University Press.

Satendra, K.J. Anandha Kumar and V.K.Naik (2013), India's Disaster Report, New Delhi, National Institute of Disaster Management.

Singh, R.B. (ed.) (2000), Disaster Management, New Delhi, Rawat Publications.

Sinha, P.C. (ed.) (1998), Encyclopedia of Disaster Management (Vol.1-10), New Delhi, Anmol Publications.

Tata Institute of Social Sciences (2002). Special Volume on Disaster Management, Indian Journal of Social Work, Vol.63, Issue 2, April.

Subject Code	Subject Name	Category	L	T	P	C	Credits				
23122DSC55B	Artificial Neural Networks		4	-	-	-	3				
Course Objective											
LO1	Understand the basics of artificial neural networks, learning process, single layer And multi-layer perceptron networks.										
LO2	Understand the Error Correction and various learning algorithms and tasks.										
LO3	Identify the various Single Layer Perception Learning Algorithm.										
LO4	Identify the various Multi-Layer Perception Network.										
LO5	Analyze the Deep Learning of various Neural network and its Applications.										
UNIT	Details									No. of Hours	
I	Artificial Neural Model-Activation functions-Feed forward and Feedback, Convex Sets, Convex Hull and Linear Reparability, Non-Linear Separable Problem - Multilayer Networks. Learning Algorithms-Error correction-Gradient Descent Rules, Perception Learning Algorithm, Perception Convergence Theorem.									12	
II	Introduction, Error correction learning, Memory-based learning, Hebbian learning, Competitive learning, Boltzmann learning, credit assignment problem, Learning with and without teacher, learning tasks, Memory and Adaptation.									12	
III	Single layer Perception: Introduction, Pattern Recognition, Linear classifier, Simple perception, Perception learning algorithm, Modified Perception learning algorithm, Adaptive linear combiner, Continuous perception, Learning in continuous perception. Limitation of Perception.									12	
IV	Multi-Layer Perception Networks: Introduction, MLP with2hidden layers, Simple layer of a MLP, Delta learning rule of the output layer,									12	
	Multi-layer feed forward neural network with continuous perceptions, Generalized dealt a learning rule, Back propagation algorithm										

V	Deep learning- Introduction- Neuro architectures building blocks for the DL techniques, Deep Learning and Neo cognition, Deep Convolutional Neural Networks, Recurrent Neural Networks (RNN), feature extraction, Deep Belief Networks, Restricted Boltzmann Machines, Training of DNN And Applications	12
	Total	60

Course Outcomes		Programme Outcome
CO	On completion of this course, students will	
1	Students will learn the basics of artificial neural networks with single layer and multi-layer Perception networks.	PO1
2	Learn about the Error Correction and various Learning algorithms and tasks.	PO1,PO2
3	Learn the various Perception Learning Algorithm.	PO4,PO6
4	Learn about the various Multi-Layer Perception Network.	PO4,PO5,PO6
5	Understand the Deep Learning of various Neural Network and its Applications.	PO3,PO8

Text Book	
1	Neural Networks A Classroom Approach- Satish Kumar, McGraw Hill-Second Edition.
2.	―Neural Network- A Comprehensive Foundation‖-Simon Haykins, Pearson Prentice Hall, 2nd Edition,1999.

Reference Books	
1.	Artificial Neural Networks- B.Yegnanarayana, PHI, New Delhi1998.

Web Resources	
1.	https://www.w3schools.com/ai/ai_neural_networks.asp
2.	https://en.wikipedia.org/wiki/Artificial_neural_network
3.	https://link.springer.com/chapter/10.1007/978-3-642-21004-4_12

Subject Code	Subject Name	Category	L	T	P	C	Credits				
23122DSC55C	Mobile Adhoc Network		4	-	-	-	3				

UNIT-1

INTRODUCTION: Introduction to ad-hoc networks–definition, characteristics features, applications. Characteristics of wireless channel, ad-hoc mobility models: indoor and outdoor models.

UNIT-2

MEDIUM ACCESS PROTOCOLS:

MAC Protocols: Design issues, goals and classification. Contention based protocols–with reservation, scheduling algorithms, protocols using directional antennas. IEEE standards: 802.11a, 802.11b, 802.11g, 802.15.HIPERLAN.

UNIT-3

NETWORK PROTOCOLS:

Routing Protocols: Design issues, goals and classification. Proactive vs reactive routing, unicast routing algorithms, Multicast routing algorithms, hybrid routing algorithm, energy aware routing algorithm, hierarchical routing, QoSaware routing.

UNIT-4

END–END DELIVERY AND SECURITY:

Transport Layer: Issues in designing – Transport layer classification, adhoc transport protocols. Security issues in adhoc networks: issues and challenges, network security attacks, secure routing protocols.

UNIT–5

CROSS LAYER DESIGN:

Cross layer Design: Need for cross layer design, cross layer optimization, parameter optimization techniques, cross layer cautionary perspective. Integration of adhoc with Mobile IP networks.

TEXT BOOKS:

C.SivaRamMurthy and B.S.Manoj, Adhoc Wireless Networks Architecture and Protocols, 2ndedition, Pearson Edition, 2007.

Charles Perkins, Adhoc Networking, Addison–Wesley, 2000.

REFERENCES:

Stefano Basagni, MarcoConti, Silvia Giordano and Ivanstojmenovic, Mobile ad-hoc networking, Wiley-IEEE press, 2004.

Mohammad Ilyas, The handbook of ad-hoc wireless networks, CRC press, 2002.

T.Camp,J.Boleng, and V.Davies“A Survey of Mobility Models for Ad-hoc Network”

Research, “Wireless Commun, and MobileComp.Special Issue on Mobile Ad-hoc Networking Research, Trends and Applications, Vol.2, no.5, 2002, pp.483–502.

A survey of integrating IP mobility protocols and Mobile Ad-hoc networks, Fekri M.bduljalil and Shrikant K.Bodhe, IEEE communication Survey and tutorials, no: 12007.

Subject Code	Subject Name	Category	L	T	P	C					
23122AEC56L	ASP.Net Programming LAB	Core	-	-	3	3					
Course Objective											
LO1	To develop ASP.NET Web application using standard controls.										
LO2	To create rich database applications using ADO .NET.										
LO3	To implement file handling operations.										
LO4	To implement XML classes.										
LO5	To utilize ASP.NET security features for authenticating the website										
Sl. No	Programs										
1.	Create an exposure of Web applications and tools										
2.	Implement the Html Controls										
3.	Implement the Server Controls										
4.	Web application using Web controls.										
5.	Web application using List controls.										
6.	Web Page design using Rich control. Validate user input using Validation controls. Working with File concepts.										
7.	Web application using Data Controls.										
8.	Data binding with Web controls										
9.	Data binding with Data Controls.										
10.	Database application to perform insert, update and delete operations.										
11.	Database application using Data Controls to Perform insert, delete, edit, paging and sorting operation.										

12.	Implement the Xml classes.	
13.	Implement Authentication–Authorization.	
14.	Ticket reservation using ASP.NET controls.	
15.	Online examination using ASP.NET controls	
	Total	
Course Outcomes		Programme Outcome
CO	On completion of this course, students will	
1	To create web applications and implement various controls	PO1,PO2,PO6
2	Create a web pages in Rich control.	PO3,PO8
3	Develop knowledge about file handling operations	PO1,PO4,PO8
4	An ability to design XML classes	PO2,PO6,PO7
5	To develop a software to solve real-world problems using ASP.NET	PO1,PO3,PO5,PO8
Text book		
1	Svetlin Nakov, Veselin Kolev & Co, Fundamentals of Computer Programming with C#, Faber publication, 2019.	
2	Mathew, MacDonald, The Complete Reference ASP.NET, Tata McGraw-Hill, 2015.	
Reference Books		
1.	Herbert Schildt, The Complete Reference C#. NET, Tata McGraw-Hill, 2017.	
2.	Kogent Learning Solutions, C# 2012 Programming Covers .NET4.5 Black Book, Dream tech press, 2013.	
3.	Anne Boehm, Joel Murach , Murach‘s C# 2015, Mike Murach & Associates Inc.2016.	
4.	Denielle Otey, Michael Otey,ADO.NET: The Complete reference, McGraw Hill,2008.	
5.	Matthew MacDonald, Beginning ASP.NET4 in C# 2010, A PRESS, 2010.	
Web Resources		
1.	https://www.geeksforgeeks.org/introduction-to-net-framework/	
2.	https://www.javatpoint.com/net-framework	

Mapping with Programme Outcomes:

CO/PSO	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6
CO1	3	2	2	2	1	1
CO2	3	2	3	2	2	2
CO3	3	3	2	2	1	1
CO4	3	2	3	2	1	1
CO5	3	2	2	2	1	2
Weightage of course contributed to each PSO	15	11	12	10	6	7

S-Strong-3 M-Medium-2 L-Low-1

23122SEC57	Internship / Industrial Training				2

231ACLSPSL	Professional Skills	-	-	-	1

231AECCVED	Value Education	2	-	-	2

Course Objectives:

To understand the meaning of values

To interpret Indian culture in a scientific manner

To assess the values of health, mind, aestheticism, spiritualism,

To evaluate the impact of society

To appraise moral values in the society

Unit: I	Introduction to Value Education

Value Education–Definition, Views on Education–Socrates ,Plato, Aristotle, Mahatma Gandhi, Swami Vivekananda, Sri Aurbindo, Rabindrath Tagore and Dr.R.Radhakrishnan– Concept of Human Values–Family Values–Aesthetic Values–Ethical Values–Spiritual Values

Unit: II	Character Formation–Personal &Personality Development

Self-Discipline–Self-Confidence–Self-Initiative–Self-awareness–Empathy–Compassion–Forgiveness–Honestyand Courage Leadership qualities–Personality Development

Unit: III	Religious Values and Communal Harmony

Introduction to Religious Vales– Karma Yoga in Hinduism–Love and Justice in Christianity–Brotherhood in Islam–Compassion in Buddhism–Ahimsa in Jainism Courage in Sikhism–
Need for Religious Harmony

Unit :IV	The Power of Mind–Therapeutic Measures

Controlling Mind–Physical Exercise–Meditation–Mudras–Yoga–Asanas Concept of Mind in the Upanishads–Moralization of Desires–Neutralization of Anger–Five Ways to Check Worry Habit and Eradication–Benefits of Blessings The Power of Mind–the Power of Positive Thinking

Unit:V	Human Rights and Universal Values

Concept of Human Rights–Classifications–Human Rights of Women and Children–Violation and Redressal–Safeguards Universal Values– Mutual respect for different cultures, people in India and across the globe

Books for Study:

1.Materials will be prepared by Dr.V.P.Rathiand Dr.R.Meenakshi Devi

Books for References:

Das,M.S.&Gupta,V.K.:SocialValuesamongYoungadults:AchangingScenario,M.D.Publications,NewDelhi,1995.

Jash,P. Glimpses of Hindu Cults and Culture, Sundeep Prakashan, Deli,1997.NCERT,Education in Values,NewDelhi,1992.

R. C. Pradhan, "Language and Mind in the Upanishads", Language and Mind: The Classical Indian Perspective, ed. K. S. Prasad, Hyderabad Studies in Philosophy no. 5, Decent Books, New Delhi,2008.

Vincent Peale, Norman. Six Attitudes for Winners, Jaico Publishing Hose, Mumbai,2009.

Vivekananda, Swami. "Personality Development", Advaita Ashrama, Kolkata,2008.

Web Resources:

https://www.hzu.edu.in/bed/Basics-in-Education%20(NCERT).pdfhttps://nptel.ac.in/content/storage2/courses/109101003/downloads/Lecture-notes/Lecture-6.pdf

https://nptel.ac.in/content/storage2/courses/109104115/PDF/lec38.pdf

Course Outcomes		K Level
CO1:	Understand the meaning of values and culture	K2
CO2:	Develop as socially responsible citizens	K3
CO3:	Create a communal harmonious society and practice unity in diversity	K6
CO4:	Identify the power oft thoughts and words	K3
CO5:	Correlate the relationship between values and human rights	K4

Subject Code	Subject Name	Category	L	T	P	C					
23122AEC61	Computer Networks	CORE	5	1	-	4					
Course Objective											
LO1	To understand the concept of Data communication and Computer network										
LO2	To get a knowledge on routing algorithms.										
LO3	To impart knowledge about networking and inter-networking devices										
LO4	To study about Network communication.										
LO5	To learn the concept to Transport layer										
UNIT	Details										No. of Hours
I	Introduction–Network Hardware–Software–Reference Models–OSI and TCP/IP Models – Example Networks: Internet, ATM, Ethernet and Wireless LANs-Physical Layer–Theoretical Basis for Data Communication-Guided Transmission Media										15
II	Wireless Transmission- Communication Satellites–Telephone System: Structure, Local Loop, Trunks and Multiplexing and Switching. Data Link Layer: Design Issues–Error Detection and Correction.										15
III	Elementary Data Link Protocols - Sliding Window Protocols – Data Link Layer in the Internet - Medium Access Layer – Channel Allocation Problem–Multiple Access Protocols–Bluetooth										15
IV	Network Layer-Design Issues-Routing Algorithms-Congestion Control Algorithms– IP Protocol–IP Addresses–Internet Control Protocols.										15
V	Transport Layer-Services-Connection Management-Addressing, Establishing and Releasing a Connection–Simple Transport Protocol–Internet Transport Protocols (ITP)-Network Security: Cryptography.										15
Course Outcomes									Programme Outcome		
CO	On completion of this course, students will										
1	To Understand the basics of Computer Network architecture, OSI and TCP/IP reference model								PO1		

	To gain knowledge on Telephone systems using Wireless network	PO1,PO2
3	To understand the concept to fMAC	PO4,PO6
4	To analyze the characteristics of Routing and Congestion control algorithms	PO4,PO5,PO6
5	To understand network security an define various Protocols such as FTP, HTTP, Telnet, DNS	PO3,PO8
Text Book		
1	A.S. Tanenbaum, ―Computer Networks‖, 4th Edition, Prentice-Hall of India, 2008.	
Reference Books		
1.	B.A.Forouzan,―DataCommunicationsandNetworking‖,TataMcGrawHill,4th Edition,2017	
2.	F. Halsall, ―Data Communications, Computer Networks and Open Systems‖,PearsonEducation,2008	
3.	D.Bertsekasand R. Gallagher, ―Data Networks‖, 2nd Edition, PHI, 2008.	
4.	Lamarca,―Communication Networks ‖,TataMcGraw-Hill,2002	
Web Resources		
1.	https://en.wikipedia.org/wiki/Computer_network	
2.	https://citationsy.com/styles/computer-networks	

Mapping with Programme Outcomes:

CO/PSO	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6
CO1	3	2	-	2	1	-
CO2	3	2	1	2	2	-
CO3	3	-	-	2	-	2
CO4	3	1	-	2	1	-
CO5	3	3	-	2	1	-
Weightage of course Contributed to each PSO	15	8	1	10	5	2

S-Strong-3 M-Medium-2L-Low-1

Subject Code	Subject Name	Category	L	T	P	C					
23122AEC62	Data Analytics Using R Programming	Core	5	-	-	4					
Course Objective											
LO1	To understand the problem solving approaches										
LO2	To learn the basic programming constructs in R Programming										
LO3	To learn the basic programming constructs in R Programming										
LO4	To use R Programming data structures-lists, tuples, and dictionaries.										
LO5	To do input/output with files in R Programming.										
UNIT	Details										No. of Hours
I	Evolution of Big data — Best Practices for Big data Analytics — Big data characteristics — Validating —The Promotion of the Value of Big Data — Big Data Use Cases- Characteristics of Big Data Applications — Perception and Quantification of Value –Understanding Big Data Storage —A General Overview of High-Performance Architecture—HDFS— Map Reduce and YARN— Map Reduce Programming Model										18
II	CONTROL STRUCTURES AND VECTORS - Control structures, functions, scoping rules, dates and times, Introduction to Functions, preview of Some Important R Data Structures, Vectors, Character Strings, Matrices, Lists, Data Frames, Classes Vectors: Generating sequences, Vectors and subscripts, Extracting elements of a vector using subscripts, Working with logical subscripts, Scalars, Vectors, Arrays, and Matrices, Adding and Deleting Vector Elements, Obtaining the Length of a Vector, Matrices and Arrays as Vectors Vector Arithmetic and Logical										18

	Operations, Vector Indexing, Common Vector Operations	
III	LISTS- Lists: Creating Lists, General List Operations, List Indexing Adding and Deleting List Elements, Getting the Size of a List, Extended Example: Text Concordance Accessing List Components and Values Applying Functions to Lists, Data Frames, Creating Data Frames, Accessing Data Frames, Other Matrix-Like Operations	18
IV	FACTORS AND TABLES-Factors and Levels, Common Functions Used with Factors, Working with Tables, Matrix/Array-Like Operations on Tables, Extracting a Sub table, Finding the Largest Cells in a Table, Math Functions, Calculating a Probability, Cumulative Sums and Products, Minima and maxima, Calculus, Functions for Statistical Distributions R PROGRAMMING.	18
V	OBJECT-ORIENTED PROGRAMMING S Classes, S Generic Functions, Writing S Classes, Using Inheritance, S Classes, Writing S Classes, Implementing a Generic Function on an S Class, visualization, Simulation, code profiling, Statistical Analysis with R, data manipulation	18
	Total	90

Course Outcomes		Programme Outcomes
CO	On completion of this course, students will	
1	Work with big data tools and its analysis techniques.	PO1
2	Analyze data utilizing clustering and classification algorithms.	PO1,PO2

3	Learn and apply different mining algorithms and recommendation systems for large volumes of data.	PO4,PO6
4	Perform analytics on data streams.	PO4,PO5,PO6
5	Learn No SQL databases and management.	PO3,PO8
Text Book		
1	RogerD.Peng,‖RProgrammingforDataScience—,2012	
2	Norman Mat off,‖ The Art of R Programming- A Tour of Statistical Software Design‖, 2011	
Reference Books		
1.	1.GarrettGrolemund, HadleyWickham,‖Hands-OnProgrammingwithR:WriteYourOwnFunctionsand Simulations‖, 1stEdition,2014	
2.	Venables, W.N.,and Ripley,‖ Sprogramming—,Springer,2000.	
Web Resources		
1.	https://www.simplilearn.com	

Mapping with Programme Outcomes:

CO/PSO	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6
CO1	3	2	-	3	1	-
CO2	3	3	2	2	-	2
CO3	1	2	3	1	2	1
CO4	2	2	1	-	2	1
CO5	2	2	2	1	3	1
Weightage of course Contributed to ach PSO	11	11	8	7	8	5

S-Strong-3 M-Medium-2L-Low-1

Subject Code	Subject Name	Category	L	T	P	C					
23122DSC63A	Human Computer Interaction	Elective	5	-	-	3					
Course Objective											
LO1	To learn about the foundations of Human Computer Interaction.										
LO2	To learn the design and software process technologies.										
LO3	To learn HCI models and theories.										
LO4	To learn Mobile Ecosystem.										
LO5	To learn the various types of Web Interface Design.										
UNIT	Details										No. of Hours
I	FOUNDATIONS OF HCI: The Human: I/O channels–Memory Reasoning and problem solving; The Computer: Devices–Memory–processing and networks; Interaction: Models– frameworks–Ergonomics–styles– elements–interactivity-Paradigms.-Case Studies										12
II	DESIGN & SOFTWARE PROCESS: Interactive Design: Basics– process–scenarios Navigation: screen design Iteration and prototyping. HCI in software process: Software life cycle – usability engineering – Prototyping in practice–design rationale. Design rules: principles, standards, Guidelines, rules. Evaluation Techniques–Universal Design										12

III	MODELS AND THEORIES: HCI Models: Cognitive models:-Socio-Organizational issues and stakeholder requirements Communication and collaboration models-Hypertext, Multimedia and WWW.	12
IV	Mobile HCI: Mobile Ecosystem: Platforms, Application frameworks Types of Mobile Applications: Widgets, Applications, Games Mobile Information Architecture, Mobile2.0, Mobile Design: Elements of Mobile Design, Tools.-Case Studies	12
V	WEB INTERFACE DESIGN: Designing Web Interfaces – Drag & Drop, Direct Selection, Contextual Tools, Overlays, Inlays and Virtual Pages, Process Flow –Case Studies	12
	Total	60

Course Outcomes		Programme Outcome
CO	On completion of this course, students will	
1	Understand the fundamentals of HCI.	PO1
2	Understand the design and software process technologies.	PO1,PO2
3	Understand HCI models and theories.	PO4,PO6
4	Understand Mobile Ecosystem, types of Mobile Applications, mobile Architecture and design.	PO4,PO5,PO6
5	Understand the various types of Web Interface Design.	PO3,PO8

Text Book	
1	AlanDix, JanetFinlay, Gregory Abowd, RussellBeale, Human-Computer Interaction, III Edition, Pearson Education, 2004(UNIT I,II&III)
2	BrianFling,—‖Mobile Design and Development ‖,I Edition,O_Reilly MediaInc.,2009(UNIT–IV)
3	Bill Scottand Theresa Neil,—Designing Web Interfaces ‖,First Edition, O_Reilly,

	2009.(UNIT-V)
Reference Books	
1.	Shneiderman,—Designing the User Interface: Strategies for Effective Human -Computer Interaction, Edition, Pearson Education.
Web Resources	
1.	https://www.interaction-design.org/literature/topics/human-computer-interaction
2.	https://link.springer.com/10.1007/978-0-387-39940-9_192
3.	https://en.wikipedia.org/wiki/Human%E2%80%93computer_interaction

Mapping with Programme Outcomes:

CO/PSO	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6
CO1	2	-	1	2	1	2
CO2	2	1	2	1	3	1
CO3	3	2	1	1	-	1
CO4	2	-	3	2	1	3
CO5	2	3	-	2	3	2
Weightage of course contributed to each PSO	11	6	7	8	8	9

S-Strong-3 M-Medium-2L-Low-1

Subject Code	Subject Name	Category	L	T	P	C	Credits				
23122DSC63B	Introduction to Data Science	Elective	5	-	-	-	4				

Course Objective		
LO1	To learn about basics of Data Science and Big data.	
LO2	To learn about overview and building process of Data Science.	
LO3	To learn about various Algorithms in Data Science.	
LO4	To learn about Hadoop Framework.	
LO5	To learn about case study about Data Science.	
UNIT	Details	No.of Hours
I	Introduction: Benefits and uses–Facts of data–Data science process– Big data ecosystem and data science	15
II	The Data science process: Overview–research goals-retrieving data- Transformation–Exploratory Data Analysis–Model building.	15
III	Algorithms: Machine learning algorithms–Modeling process–Types –Supervised– Unsupervised-Semi-supervised	15
IV	Introduction to Hadoop: Hadoop framework–Spark–replacing Map Reduce–No SQL–ACID–CAP–BASE–types	15
V	Case Study: Prediction of Disease-Setting research goals-Data retrieval–preparation-exploration-Disease profiling-presentation and automation	15
	Total	75

Course Outcomes		Programme Outcome
CO	On completion of this course, students will	
1	Understand the basics in Data Science and Big data.	PO1
2	Understand overview and building process in Data Science.	PO1,PO2
3	Understand various Algorithms in Data Science.	PO4,PO6
4	Understand Hadoop Framework in Data Science.	PO4,PO5,PO6

5	Case study in Data Science.	PO3,PO8
Text Book		
1	DavyCielen, ArnoD.B. Meysman, MohamedAli,—Introducing Data Science‖, manningpublications2016	
Reference Books		
1.	RogerPeng, —The Art of Data Science ‖, lulu.com 2016.	
2.	MurtazaHaider,—Getting Started with Data Science–Making Sense of Data with Analytics, IBM press, E-book.	
3.	Davy Cielen, ArnoD.B.Meysman, Mohamed Ali,—Introducing Data Science: Big Data, Machine Learning, and More,Using Python Tools ‖,Dreamtech Press2016.	
4.	AnnalynNg, KennethSoo,—Numsense! Data Science for the Layman: No Math Added‖,2017,1stEdition.	
5.	CathyO'Neil,RachelSchutt,—Doing Data Science Straight Talk from the Frontline‖, O'ReillyMedia2 013.	
6.	Lillian Pierson,—Data Science for Dummies ‖,2017 II Edition	
Web Resources		
1.	https://www.w3schools.com/datascience/	
2.	https://en.wikipedia.org/wiki/Data_science	
3.	http://www.cmap.polytechnique.fr/~lepennec/en/post/references/refs/	

Mapping with Programme Outcomes:

CO/PSO	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6
CO1	3	2	`1	2	2	-
CO2	2	3	2	2	-	1
CO3	3	2	2	1	1	3
CO4	1	2	2	1	3	1
CO5	2	2	-	3	1	1
Weightage of course Contributed to each PSO	11	11	7	9	7	6

S-Strong-3 M-Medium-2L-Low-1

Subject Code	Subject Name	Category	L	T	P	C	Credits				
23122DSC63C	Internet of Things and its applications	Elective	4	-	-	-	3				
Course Objective											
C1	Use of Devices, Gateways and Data Management in IoT.										
C2	Design IoT applications in different domain and be able to analyze their performance										
C3	Implement basic IoT applications on embedded platform										
C4	To gain knowledge on Industry Internet of Things										
C5	To Learn about the privacy and Security issues in IoT										
UNIT	Details							No. of Hours			
I	IoT& Web Technology, The Internet of Things Today, Time for Convergence, Towards the IoT Universe, Internet of Things Vision, IoT Strategic Research and Innovation Directions, IoT Applications, Future Internet Technologies, Infrastructure, Networks and Communication, Processes, Data Management, Security, Privacy & Trust, Device Level Energy Issues, IoT Related Standardization, Recommendations on Research Topics.							12			
II	M2M to IoT – A Basic Perspective– Introduction, Some Definitions, M2M Value Chains, IoT Value Chains, An emerging industrial structure for IoT, The international driven global value chain and global information monopolies. M2M to IoT-An Architectural Overview– Building an architecture, Main design principles and needed capabilities, An IoT architecture outline, standards considerations.							12			

III	IoT Architecture -State of the Art – Introduction, State of the art, Architecture. Reference Model-Introduction, Reference Model and architecture, IoT reference Model, IoT Reference Architecture-Introduction, Functional View, Information View, Deployment and Operational View, Other Relevant architectural views	12
IV	IoT Applications for Value Creations Introduction, IoT applications for industry: Future Factory Concepts, Brownfield IoT, Smart Objects, Smart Applications, Four Aspects in your Business to Master IoT, Value Creation from Big Data and Serialization, IoT for Retailing Industry, IoT For Oil and Gas Industry, Opinions on IoT Application and Value for Industry, Home Management	12
V	Internet of Things Privacy, Security and Governance Introduction, Overview of Governance, Privacy and Security Issues, Contribution from FP7 Projects, Security, Privacy and Trust in IoT-Data-Platforms for Smart Cities, First Steps Towards a Secure Platform, Smartie Approach. Data Aggregation for the IoT in Smart Cities, Security	12
	Total	60

Course Outcomes		Programme Outcomes
CO	On completion of this course, students will	
1	Work with big data tools and its analysis techniques.	PO1
2	Analyze data by utilizing clustering and classification algorithms.	PO1, PO2
3	Learn and apply different mining algorithms and	PO4, PO6

	recommendation systems for large volumes of data.	
4	Perform analytics on data streams.	PO4, PO5, PO6
5	Learn NoSQL databases and management.	PO3, PO5
Text Book		
1	Vijay Madisetti and ArshdeepBahga, "Internet of Things: (A Hands-on Approach)", Universities Press (INDIA) Private Limited 2014, 1st Edition.	
Reference Books		
1.	Michael Miller, "The Internet of Things: How Smart TVs, Smart Cars, Smart Homes, and Smart Cities Are Changing the World", kindle version.	
2.	Francis daCosta, "Rethinking the Internet of Things: A Scalable Approach to Connecting Everything", Apress Publications 2013, 1st Edition,.	
3	WaltenegusDargie, ChristianPoellabauer, "Fundamentals of Wireless Sensor Networks: Theory and Practice" 4..CunoPfister, "Getting Started with the Internet of Things", O"Reilly Media 2011	
Web Resources		
1.	https://www.simplilearn.com	
2.	https://www.javatpoint.com	
3.	https://www.w3schools.com	

Mapping with Programme Outcomes:

CO/PSO	PSO 1	PSO 2	PSO 3	PSO 4	PSO 5	PSO 6
CO1	3	2	2	3	3	3
CO2	3	2	2	3	3	3
CO3	3	2	3	3	3	3
CO4	3	3	2	3	3	3
CO5	3	3	2	3	3	2
Weightage of course contributed to each PSO	15	12	11	15	15	14

S-Strong-3 M-Medium-2 L-Low-1

Subject Code	Subject Name	Category	L	T	P	C					
23122AEC64L	R Programming - LAB	Core	-	-	3	3					
Course Objective											
LO1	To understand the problem solving approaches										
LO2	To learn the basic programming constructs in R Programming										
LO3	TopracticevariouscomputingstrategiesforRProgramming-basedsolutionstorealworldproblems										
LO4	To use R Programming data structures-lists, tuples, and dictionaries.										
LO5	To do input/output with files in R Programming.										
Sl.No	Details										
1.	Program to convert the given temperature from Fahrenheit to Celsius and vice versa depending up on user‘s choice.										
2.	Program, to find the area of rectangle, square, circle and triangle by accepting suitable input Parameters from user.										
3.	Write a program to find list of even numbers from 1 to n using R-Loops.										
4.	Create a function to print squares of numbers in sequence.										
5.	Write a program to join columns and rows in a data frame using cbind() and rbind() in R.										
6.	Implement different String Manipulation functions in R.										
7.	Implement different data structures in R(Vectors, Lists, Data Frames)										

8	Write a program to read a cv file and analyze the data in the file in R.	
9	Create pie chart and bar chart using R.	
10	10.Create a data set and do statistical analysis on the data using R.	
11	Program to find factorial of the given number using recursive function	
12	Write an R program to count the number of even and odd numbers from array of N numbers.	
	Total	

Course Outcomes		Programe Outcome
CO	On completion of this course, students will	
1	Acquire programming skills in core R Programming	PO1,PO4,PO5
2	Acquire Object-oriented programming skills In R Programming.	PO1,PO4,PO8
3	Develop the skill of designing graphical-user interfaces(GUI) in R Programming	PO1,PO3,PO6
4	Acquire R Programming skills to move into Specific branches	PO3,PO4
5		PO1,PO5,PO6

Text Book	
1	RogerD.Peng,‖R Programming for Data Science—,2012
2	Norman Matloff, ‖The Art of R Programming- A To our of Statistical Software Design‖, 2011
Reference Books	
1	Garrettn Grolemund, Hadley Wickham,‖ Hands –On Programming with R:Write Your Own Functions and Simulations‖,1st Edition,2014
2.	Venables,W.N.,and Ripley,‖ R programming—,Springer,2000.
web Resources	
1.	https://www.simplilearn.com

Mapping with Programme Outcomes:

CO/PSO	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6
CO1	3	3	3	3	1	2
CO2	2	3	3	3	1	2
CO3	2	3	3	3	1	2
CO4	2	3	3	3	1	2
CO5	2	3	3	3	1	2
Weightage of course contributed to each PSO	11	15	15	15	5	10

S-Strong-3 M-Medium-2L-Low-1

Course Code	Course Title	L	T	P	C
23122PRW65	Project Work	8	0	0	4

231ACSIKWS	INDIANKNOWLEDGESYSTEM	0	0	0	2

Course Objectives:

The course design seeks to address the following issues:

• To introduce to the students the overall organization of IKS

• To develop an appreciation among the students the role and importance of Veda, Vedangas, Upa Vedas and Puraṇas.

• To show case the multi-dimensional nature of IKS and their importance in the contemporary society

• To motivate the students to take up a detailed study of some of these topics and explore their application potential

Course Outcomes:

CO1: Explain the historicity of Indian Knowledge System and the broad classification of Indian philosophical systems

CO2: Explain the potential of Sanskrit in natural language processing

CO3: Explain the features of Indian numeral system and its role in science & technology advancement

CO4: Illustrate the basic elements of the Indian calendar and the components of Indian Panchanga

CO5: Outline the science, engineering & technology heritage of ancient and medieval India

Unit I:

Introduction to Indian Knowledge System (IKS), Definition, Concept and Scope of IKS (4)

Definition, Concept and Scope of IKS

IKS based approaches on Knowledge Paradigms

IKS in ancient India and in modern India

Unit II: IKS and Indian Scholars, Indian Literature (8)

Philosophy and Literature (Maharishi Vyas, Manu, Kanad, Pingala, Parasar, Banabhatta, Nagarjuna

and Panini)

Mathematics and Astronomy (Aryabhatta, Mahaviracharya, Bodhayan,

Bhashkaracharya, Varahamihira and Brahmgupta)

Medicineand Yoga (Charak,Susruta,Maharishi Patanjaliand Dhanwantri)
Sahitya (Vedas,Upvedas,Upavedas(Ayurveda,Dhanurveda,Gandharvaveda)

Puran and Upnishad) and shaddarshan(Vedanta,Nyaya.Vaisheshik,Sankhya,MimaYoga, Adhyatma and Meditation)

Shastra(Nyaya,vyakarana,Krishi,Shilp,Vastu,Natya and Sangeet)

Unit III: Indian Traditional/tribal/ethnic communities, their livelihood and local wisdom (6)

1. Geophysical aspects, Resources and Vulnerability
2. Resource availability, utilization pattern and limitations
3. Socio-Cultural linkages with Traditional Knowledge System
4. Tangible and intangible cultural heritage.

Unit IV: Unique Traditional Practices and Applied Traditional Knowledge (8)

1. Myths, Rituals, Spirituals, Taboos and Belief System, Folk Stories, Songs, Proverbs, Dance, Play, Acts and Traditional Narratives
2. Agriculture, animal husbandry, Forest, Sacred Groves, Water Mills, Sacred Water Bodies, Land, water and Soil Conservation and management Practices
3. Indigenous Bio-resource Conservation, Utilization Practices and Food Preservation Methods, Handicrafts, Wood Processing and Carving, -Fiber Extraction and Costumes
4. Vaidya(traditional health care system), Tantra-Mantra, Amchi Medicine System
5. Knowledge of dyeing, chemistry of dyes, pigments and chemicals.

Unit V: Protection, preservation, conservation and Management of Indian Knowledge System (4)

1. Documentation and Preservation of IKS
2. Approaches for conservation and Management of nature and bio-resources
3. Approaches and strategies to protection and conservation of IKS

Mapping with Programme Outcomes:

CO/PSO	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6
CO1	3	3	3	3	3	3
CO2	3	3	3	3	2	3
CO3	3	3	3	3	3	3
CO4	3	3	2	3	3	3
CO5	3	3	3	3	3	2
Weightage of course contributed to each PSO	15	15	14	15	14	14

S-Strong-3 M-Medium-2L-Low-1