SYLLABUS

for

B.Sc., INFORMATION TECHNOLOGY

SEMESTER PATTERN-CBCS

FROM THE ACADEMIC YEAR

2023-2024

TAMIL NADU STATE COUNCIL FOR HIGHER EDUCATION

CHENNAI – 600 005

INTRODUCTION

B.Sc., INFORMATION TECHNOLOGY

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 withinandoutsideIndia.Qualityeducationingeneralandhighereducationin 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, succeedandexcelglobally.LearningOutcomes-basedCurriculumFramework(LOCF)whichmakesitstudent-centric,interactiveandoutcome- oriented withwell-definedaims, objectives and goals toachieve. LOCFalso aims at ensuring uniformeducation standard and content deliveryacross the state which will helpthe students to ensure similar quality of education irrespective of the institute and location.

Information Technology is the study of quantity, structure, space and change, focusing on problem solving, application development with wider scope of application in science, engineering, social sciences etc. throughout the world in last couple of decades and it has carved outaspaceforitselflikeanyotherdisciplines of basic science and engineering. Information Technology 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,andmanypeopleareevencomputerprogrammers.InformationTechnologycanbeseenonahigherlevel, as a science of problem solving and problemsolving requires precision, creativity, and careful reasoning. The ever-evolving discipline of Information Technology 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 applicationdomain.InformationTechnology/Computersciencehasawiderangeofspecialties.Theseinclude Computer Architecture, Software Systems, Graphics, Artificial Intelligence, Computational Science, and Software Engineering. Drawing from a common core of computer science knowledge, each specialtyarea focuses on specific challenges. Information Technology / Computer Science is practiced by mathematicians, scientistsandengineers. 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.

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 tojoin 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.

LEARNINGOUTCOMES-BASEDCURRICULUMFRAMEWORKGUIDELINESBASED REGULATIONS FOR UNDER GRADUATE PROGRAMME	
Programme:	**B.Sc.INFORMATIONTECHNOLOGY**
ProgrammeCode:	**129**
Duration:	**3years[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:** Abilityto 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;analyseandevaluateevidence,arguments,claims,beliefsonthe 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:Problemsolving:Capacity**toextrapolatefromwhatonehaslearnedand apply their competencies to solve different kinds of non-familiar problems, ratherthanreplicatecurriculumcontentknowledge;andapplyone'slearning to real life situations. **PO5: Analytical reasoning**: Ability to evaluate the reliability and relevance of evidence;identifylogicalflawsandholesintheargumentsofothers;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, synthesising and articulating; Ability to recognise cause-and-effect relationships, define problems,formulatehypotheses,testhypotheses,analyse,interpretanddraw conclusions from data, establish hypotheses, predict cause-and-effect relationships;abilitytoplan, execute and reporttheresultsof anexperiment or investigation. **PO7: Cooperation/Team work:** Ability to work effectively and respectfully with diverse teams; facilitate cooperative or coordinatedeffort on the partofagroup,andacttogetherasagrouporateamintheinterestsofacommon cause and work efficiently as a member of a team.

PO8: Scientific reasoning: Ability to analyse, interpret and draw conclusions from quantitative/qualitative data; and critically evaluate 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.

PO12Multiculturalcompetence: Possessknowledgeofthevaluesandbeliefs ofmultipleculturesandaglobalperspective;andcapabilitytoeffectivelyengage in a multicultural society and interact respectfully withdiverse groups.

PO 13: Moral and ethical awareness/reasoning: Ability to embrace moral/ethical values in conducting one's life, formulate a position/argument aboutanethicalissuefrommultipleperspectives,anduseethicalpracticesin all work. Capable of demon starting the ability to identify ethical issues relatedto one"s work, avoid unethical behaviour such as fabrication, falsification or misrepresentation of data or committingplagiarism, not adheringto 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: Capabilityfor mapping out the tasks of a team or an organization, and setting direction, formulating an inspiring vision,buildingateamwhocanhelpachievethevision,motivatingandinspiring teammemberstoengagewiththatvision,andusingmanagement   skillstoguide people to the right destination, in a smooth and efficient way.

PO15:Lifelonglearning: Abilitytoacquireknowledgeandskills, including „learninghowtolearn",thatarenecessaryforparticipatinginlearningactivities throughout life, through self-paced and self-directed learning aimed atpersonal development, meetingeconomic, social andculturalobjectives,and adaptingto changing trades and demands of work place through knowledge/skill development/reskilling.

		ProgrammeSpecificOutcomes:	
PSO1	Demonstrateand applybasicknowledge ofinformation technologytothe scientificissues andproblems beingfacedin societyand the industry.
PSO2	Analyzecriticalproblemsandprovidecomputer-basedsolutionsbyapplyingappropriate toolsandtechnology.
PSO3	Equipwithtechnicalability,problemsolvingskills,creativetalentandpowerof communicationnecessaryforvariousformsofemployment.Developarangeofgeneric skillshelpfulinemployment,internships&societalactivities.
PSO4	Graduateswillpossesstheskillstoeffectivelyplan,execute, andmanageITprojects from initiationtocompletion.Theywillbeproficientinprojectmanagementmethodologies.
PSO5	BachelorofInformationTechnologygivesanumberofopportunitieslikesoftwareprogrammer,s ystemandnetworkadministrator,webdesigner,Researcher/facultyfor InformationTechnology,computerscienceand computerapplications/etc.

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8
PSO1	Y	Y	Y	Y	Y	Y	Y	Y
PSO2	Y	Y	Y	Y	Y	Y	Y	Y
PSO3	Y	Y	Y	Y	Y	Y	Y	Y
PSO4	Y	Y	Y	Y	Y	Y	Y	Y
PSO5	Y	Y	Y	Y	Y	Y	Y	Y

3– Strong,2-Medium,1-Low

HighlightsoftheRevampedCurriculum:

- ➢ Student-centric, meeting the demands of industry & society, incorporating industrial components,hands-ontraining, skillenhancementmodules,industrialproject,projectwith 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 scientificfront, advancedprogrammingpackagesalliedwiththedisciplinetopics,practicaltraining,devising mathematicalmodelsandalgorithmsforprovidingsolutionstoindustry/reallifesituations. The curriculum also facilitates peer learning with advanced mathematical topicsinthefinal 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.

- ➢ ThecurriculumisdesignedsoastostrengthentheIndustry-Academiainterfaceandprovide more job opportunities for the students.

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

- ➢ Project with viva-voce component in the sixth 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 disciplinarynatureareincorporatedasElectivecourses,coveringconventionaltopicstothe latest - Artificial Intelligence.

ValueadditionsintheRevampedCurriculum:

Semester	NewlyintroducedComponents	Outcome/Benefits
I	**Foundation Course** To ease the transition of learning fromhighersecondarytohigher education, providing an overview of the pedagogy of learning Literature and analysing the world through the literary lens gives rise to a new perspective.	➢ Instill confidence amongstudents ➢ Createinterestforthe subject
I, II, III,IV	**Skill Enhancement papers** (Discipline centric / Generic / Entrepreneurial)	➢ Industryready graduates ➢ Skilledhumanresource ➢ Students are equippedwithessential skillsto make them employable ➢ Training on language and communication skillsenablethestudents gainknowledge and exposure in the competitive world. ➢ Discipline centric skill will improve the Technical knowhow of solving real life problems.
I, II, III,IV	**GenericElective(Allied)**	➢ Exposure to combiningorinvolvingmore than one discipline or field of study. ➢ Generates Industryreadygraduates ➢ Employmentopportunitiesenhanced
V Semester	**Electivepapers**	➢ Self-learning is enhanced ➢ Application of the concept to real situation isconceivedresultingintangible outcome
VI Semester	**Electivepapers**	➢ Enriches the studybeyond thecourse. ➢ Developing a research framework andpresentingtheirindependentand intellectual ideas effectively.
ExtraCredits: **ForAdvancedLearners/Honorsdegree**		➢ Tocatertotheneeds ofpeer learners / research aspirants
SkillsacquiredfromtheCourses		Knowledge, Problem Solving, Analyticalability, ProfessionalCompetency, ProfessionalCommunicationand Transferrable Skill

ALAGAPPAUNIVERSITY,KARAIKUDI
NEW SYLLABUS UNDER CBCS PATTERN (w.e.f.2023-24)
B.Sc. INFORMATION TECHNOLOGY 2023-2024 PROGRAMME STRUCTURE

Sem.	Part	Course Code	Courses Type	Title of the Paper	T/P	Credit	Hours/ Week	Max. Marks Int.	Max. Marks Ext.	Max. Marks Total
I	I	2311T	T/OL	தமிழ் இலக்கிய வரலாறு-l /Other Languages -I		3	6	25	75	100
	II	2312E	E	General English-I		3	6	25	75	100
	III	23BIT1C1	CC-I	Programming in C		4	5	25	75	100
		23BIT1P1	CC-II	Practical: Programming in C Lab		4	4	25	75	100
		-	Generic Elective (Allied)	Allied–I-B.Sc.Computer Science / BCA / B.Sc. Data Science / Artificial Intelligence/ Software / Electronics/Mathematics/-Theory		3	3	25	75	100
				Allied Lab-Respective Allied Theory-Practical		2	2	25	75	100
	IV	23BIT1S1	SEC-I	Office Automation		2	2	25	75	100
		23BIT1FC	Foundation Course-	Fundamentals of Computers		2	2	25	75	100
				Total		**23**	**30**	**200**	**600**	**800**
II	I	2321T	T/OL	தமிழ் இலக்கிய வரலாறு-2 /Other Languages-II		3	6	25	75	100
	II	2322E	E	General English-II		3	6	25	75	100
	III	23BIT2C1	CC-III	Java Programming		4	5	25	75	100
		23BIT2P1	CC-IV	Practical: Java Programming Lab		4	4	25	75	100
		-	Generic Elective (Allied)	Allied–I-B.Sc.Computer Science / BCA / B.Sc. Data Science / Artificial Intelligence/ Software / Electronics/Mathematics/-Theory		3	3	25	75	100
				Allied Lab-Respective Allied Theory-Practical		2	2	25	75	100
	IV	23BIT2S1	SEC-II	Basics of Internet		2	2	25	75	100
		23BIT2S2	SEC-III	Problem Solving Techniques		2	2	25	75	100
				Naan Mudhalvan Course						
				Total		**23**	**30**	**200**	**600**	**800**
III	I	2331T	T/OL	தமிழக வரலாறும் பண்பாடும் /Other Languages-III		3	6	25	75	100
	II	2332E	E	General English-III		3	6	25	75	100
	III	23BIT3C1	CC-V	PHP Programming		4	5	25	75	100
		23BIT3P1	CC-VI	Practical: PHP Programming Lab		4	4	25	75	100
		-	Generic Elective (Allied)	Allied–I-B.Sc.ComputerScience / BCA / B.Sc. Data Science / Artificial Intelligence/ Software / Electronics/Mathematics/-Theory		3	3	25	75	100
				Allied Lab-Respective Allied Theory-Practical		2	2	25	75	100
	IV	23BIT3S1	SEC-IV	Cyber Forensics		2	2	25	75	100
		233AT/ 23BIT3S2	SEC-V	Adipadai Tamil/ Enterprise Resource Planning		2	2	25	75	100
				Naan Mudhalvan Course						
				Total		**23**	**30**	**100**	**600**	**800**

IV	I	2341T	T/OL	தமிழும் அறிவியலும் /Other Languages -IV	3	6	25	75	100
	II	2342E	E	General English-IV	3	6	25	75	100
	III	23BIT4C1	CC-VII	Python Programming	4	4	25	75	100
		23BIT4P1	CC-VIII	Practical: Python Programming Lab	4	4	25	75	100
		-	Generic Elective (Allied)	Allied–I-B.Sc.ComputerScience / BCA / B.Sc. Data Science / Artificial Intelligence/ Software / Electronics/Mathematics/-Theory	3	3	25	75	100
				Allied Lab-Respective Allied Theory-Practical	2	2	25	75	100
	IV	23BIT4S1	SEC-VI	Robotics and Its Applications	2	2	25	75	100
		234AT/ 23BIT4S2	SEC-VII	Adipadai Tamil / Organizational Behaviour	2	2	25	75	100
		23BES4	E.V.S	Environmental Studies	2	2	25	75	100
				Naan Mudhalvan Course					
				Total	25	30	225	675	900

V	III	23BIT5C1	CC-IX	Data Communications and Networking	4	5	25	75	100
		23BIT5C2	CC-X	.NET Programming	4	5	25	75	100
		23BIT5P1	CC-XI	Practical: .NET Programming Lab	4	5	25	75	100
		23BIT5C3	CC-XII	E-commerce and Digital Marketing	4	5	25	75	100
		23BIT5E1/ 23BIT5E2	DSE-I	Relational Database Management System/Data Mining	3	4	25	75	100
		23BIT5E3/ 23BIT5E4	DSE-II	Artificial Intelligence/Machine Learning	3	4	25	75	100
	IV	23BVE5		Value Education	2	2	25	75	100
		23BIT5IV		Internship/Industrial Visit/Field Visit	2	-	25	75	100
				NaanMudhalvan Course					
				Total	26	30	200	600	800
VI		23BIT6C1	CC-XIII	Software Project Management	4	6	25	75	100
		23BIT6D	CC-XIV	Dissertation	8	12	50	150	200
		23BIT6E1/ 23BIT6E2	DSE-III	Internet of Things and Its Applications/Cloud Computing	3	5	25	75	100
		23BIT6E3/ 23BIT6E4	DSE-IV	Introduction to Data Science/Big Data Analytics	3	5	25	75	100
				Extension Activity/ Industrial Visit	1	-	-	-	-
		23BIT6S1		Quantitative Aptitude	2	2	25	75	100
				Naan Mudhalvan Course					
				Total	20	30	150	450	600
				GrandTotal	140	--	1175	3525	4700

- TOL-Tamil/OtherLanguages,
- E– English
- CC-Core course
- GenericElective(Allied)
- SEC-SkillEnhancementCourse
- FC-FoundationCourse
- DSE–DisciplineSpecific Elective

SUBJECT NAME	CORE–I:PROGRAMMINGINC							
SUBJECT CODE	23BIT1C1							

L	T	P	S	Credits	Inst. Hours	Marks		
						CIA	External	Total
5	-	-	-	4	5	25	75	100

Learning Objectives	
LO1	To familiarize the students with the understanding of code organization
LO2	To improve the programming skills
LO3	Learning the basic programming constructs.

Prerequisites:	

Contents	
Unit I	**Studying Concepts of Programming Languages**- Language Evaluation Criteria - Language design - Language Categories - Implementation Methods –Programming Environments - Overview of C: History of C- Importance of C-BasicStructureofCPrograms-ExecutingaCProgram-Constants,Variables and Data types- Operators and Expressions-Managing Input and Output Operations.
Unit II	**DecisionMakingandBranching**:DecisionMakingandLooping-Arrays- Character Arrays and Strings
Unit III	**User Defined Functions:** Elements of User Defined Functions- Definition of Functions- Return Values and their Types- Function Call- Function Declaration-Categories of Functions- Nesting of Functions-Recursion
Unit IV	**Structures and Unions:** Introduction- Defining a Structure- Declaring Structure Variables Accessing Structure Members- Structure Initialization- Arrays of Structures- Arrays within Structures- Unions-Size of Structures.
Unit V	**Pointers:** Understanding Pointers- Accessing the Address of a Variable- Declaring Pointer Variables- Initializing of Pointer Variables-Accessing a Variable through its Pointer-Chain of Pointers- Pointer Expressions- Pointer and Scale Factor- Pointer and Arrays- Pointers and Character Strings- Array of Pointers- Pointer as Function Arguments- Functions Returning Pointers- Pointers to Functions- File Management in C
TOTAL	**75 Hrs**

CourseOutcomes	
CO1	Outline the fundamental concepts of C programming languages, and its features
CO2	Demonstrate the programming methodology.
CO3	Identify suitable programming constructs for problem solving.
CO4	Select the appropriate data representation, control structures, functions and concepts based on the problem requirement.
CO5	Evaluate the program performance by fixing the errors.
Textbooks	
☐	Robert W. Sebesta, (2012), ―Concepts of Programming Languages‖, Fourth Edition, Addison Wesley (Unit I: Chapter– 1)
☐	E. Balaguruswamy, (2010), ―Programming in ANSIC‖, Fifth Edition, Tata McGraw Hill Publications
ReferenceBooks	
1.	Ashok Kamthane, (2009), ―Programming with ANSI & Turbo C‖, Pearson Education
2.	Byron Gottfried, (2010), ―Programming with C‖, Schaums Outline Series, Tata McGraw Hill Publications
NOTE: Latest Edition of Textbooks Maybe Used	
WebResources	
1.	http://www.tutorialspoint.com/cprogramming/
2.	http://www.cprogramming.com/
3.	http://www.programmingsimplified.com/c-program-examples
4.	http://www.programiz.com/c-programming
5.	http://www.cs.cf.ac.uk/Dave/C/CE.html
6.	http://fresh2refresh.com/c-programming/c-function/

CO/PSO	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6
CO1	3	2	2	3	2	2
CO2	3	3	2	3	2	2
CO3	3	3	3	3	2	2
CO4	3	3	2	3	2	2
CO5	3	3	2	3	2	2
Weightage of course contributed to each PSO	15	14	11	15	10	10

	SUBJECTNAME	CORE–II: Programming in C Lab						
	SUBJECTCODE	23BIT1P1						
L	T	P	S	Credits	Inst. Hours	Marks		
						CIA	External	Total
-	-	4	-	4	4	25	75	100

Learning Objectives

LO1	The Course aims to provide exposure to problem-solving through C programming
LO2	It aims to train the student to the basic concepts of the C-Programming language
LO3	Apply different concepts of C language to solve the problem

Prerequisites:

Contents
(Minimum2programsfromeachcontent)

1. Programs using Input /Output functions
2. Programs using Operators
3. Programs on conditional structures
4. Programs using Looping statements.
5. Programs using Arrays
6. Programs using String Manipulations
7. Programs using Functions & Recursive Functions
8. Programs using Structures & Unions
9. Programs using Pointers
10.Files

CO	Course Outcomes
CO1	Demonstrate the understanding of syntax and semantics of C programs.
CO2	Identify the problem and solve using C programming techniques.
CO3	Identify suitable programming constructs for problem solving.
CO4	Analyze various concepts of C language to solve the problem in an efficient way.
CO5	Develop a C program for a given problem and test for its correctness.

CO/PSO	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6
CO1	3	2	2	3	2	2
CO2	3	3	2	3	2	2
CO3	3	3	3	3	2	2
CO4	3	3	2	3	2	2
CO5	3	3	2	3	3	2
Weightage of course contributedtoeachPSO	15	14	11	15	11	10

SEC-I-Skill Enhancement Course

Subject Code	Subject Name	Category	L	T	P	S	Credits	Inst.Hours	Marks		
									CIA	External	Total
23BIT1S1	**OFFICE AUTOMATION**	Skill Enhancement Course	-	Y	-	-	2	2	25	75	100

	Course Objective	
C1	Understand the basics of computer systems and its components.	
C2	Understand and apply the basic concepts of a word processing package.	
C3	Understand and apply the basic concepts of electronic spread sheet software.	
C4	Understand and apply the basic concepts of database management system.	
C5	Understand and create a presentation using Power Point tool.	
	Details	**No.of Hours**
UNITI	**Introductory concepts:** Memory unit– CPU-Input Devices: Keyboard, Mouse and Scanner. Output devices: Monitor, Printer. Introduction to Operating systems & its features: DOS– UNIX–Windows. Introduction to Programming Languages.	6
UNITII	**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
UNITIII	**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
UNITIV	**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
UNIT 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**

	CourseOutcomes	ProgrammeOutcomes
CO	Oncompletionofthiscourse,studentswill	

1	Possesstheknowledgeonthebasicsofcomputers and its components	PO1,PO2,PO3,PO6,PO8
2	GainknowledgeonCreatingDocuments,spreadsheet and presentation.	PO1,PO2,PO3,PO6
3	LearntheconceptsofDatabaseandimplementthe Query in Database.	PO3,PO5,PO7
4	Demonstratetheunderstandingofdifferent automation tools.	PO3,PO4,PO5,PO7
5	Utilizetheautomationtoolsfordocumentation, calculation and presentation purpose.	PO4,PO6,PO7,PO8
TextBook		
1	PeterNorton,"IntroductiontoComputers"–TataMcGraw-Hill.	
ReferenceBooks		
1.	JenniferAckermanKettel,GuyHat-Davis,CurtSimmons,"Microsoft2003",Tata McGrawHill.	
WebResources		
1.	https://www.udemy.com/course/office-automation-certificate-course/	
2.	https://www.javatpoint.com/automation-tools	

Mapping with Programme Outcomes:

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8
CO1	M	S	M			M		L
CO2	S	M	S			M		
CO3		S	S		M		L	
CO4			S	L	M		M	
CO5				M		S	M	S

S-Strong   M-Medium   L-Low

	SUBJECT NAME	Foundation Course-I Fundamentals of Computers						
	SUBJECT CODE	23BIT1FC						
L	**T**	**P**	**S**	**Credits**	**Inst. Hours**	**Marks**		
						CIA	**External**	**Total**
2	**-**	**-**	**-**	**2**	**2**	**25**	**75**	**100**

<table>
<tr><td colspan="3" align="center">Learning Objectives</td></tr>
<tr><td>LO1</td><td colspan="2">To analyze a problem with appropriate problem solving techniques</td></tr>
<tr><td>LO2</td><td colspan="2">To understand the main principles of imperative, functional and logic oriented programming languages and</td></tr>
<tr><td>LO3</td><td colspan="2">To increase the ability to learn new programming languages.</td></tr>
<tr><td colspan="3">Pre requisites: Basic knowledge about programming concepts</td></tr>
<tr><td></td><td align="center">Contents</td><td>No.of Hours</td></tr>
<tr><td>Unit I</td><td>Introduction: Characteristics of Computers - Evolution of Computers
Basic Computer Organization: I/O Unit - Storage Unit – Arithmetic Logic Unit-Control Unit-Central Processing Unit</td><td>6</td></tr>
<tr><td>Unit II</td><td>Computer Software: Types of Software-System Architecture Computer Languages: Machine Language-Assembly Language- High Level Language - Object Oriented Languages</td><td>6</td></tr>
<tr><td>Unit III</td><td>Problem Solving Concepts: Problem Solving in Everyday life - Types of Problems - Problem solving with computers - Difficulties with Problem Solving</td><td>6</td></tr>
<tr><td>Unit IV</td><td>Problem Solving concepts for the computer: Constant Variables - Data Types - Functions -Operators - Expressions and Equations – Organizing the Solution: Analyzing the problem-Algorithm- Flowchart-Pseudocode</td><td>6</td></tr>
<tr><td>Unit V</td><td>Programming Structure: Structuring a solution-Modules and their function-Local and Global variables-Parameters-Return values-Sequential Logic Structure – Problem solving with Decision - Problem Solving with Loops</td><td>6</td></tr>
<tr><td colspan="2" align="center">TOTAL</td><td>30</td></tr>
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CourseOutcomes	
CO1	OutlinetheComputerfundamentalsandvariousproblemsolvingconceptsinComputers
CO2	Describe the basic computer organization, software, computer languages, softwaredevelopment life cycle and the need of structured programming in solving acomputer problem
CO3	Identifythe types of computer languages, software, computer problems and examinehowto set up expressions and equations to solve the problem.
CO4	Choose most appropriate programminglanguages, constructs and features to solve theproblems in diversified domains.
CO5	Analyze the design of modules and functions in structuringthe solution and variousOrganizingtools in problem solving.
Textbooks	
☐	PradeepK.SinhaandPritiSinha,(2004)―ComputerFundamentals‖,SixthEdition, BPBPublications.(UnitI:Chapter1&2,UnitII:Chapter10&12)
☐	Maureen Sprankle and Jim Hubbard, (2009) ―Problem Solving and Programming Concept,Ninth Edition, Prentice Hall. (Unit III: Chapter 1,2 &3) Unit IV : Chapter 3, UnitV:Chapter4,5,6,7&8)
ReferenceBooks	
1.	R.G.Dromey,(2007),―HowtoSolveitbyComputer‖,PrenticeHallInternational SeriesinComputerScience.
2.	C.S.V.Murthy,(2009),―FundamentalsofComputers‖,ThirdEdition,Himalaya PublishingHouse.
NOTE:LatestEditionofTextbooksMaybeUsed	
WebResources	
1.	http://www.tutorialspoint.com/computer_fundamentals/
2.	http://www.comptechdoc.org/basic/basictut/
3.	http://www.homeandlearn.co.uk/
4.	http://www.top-windows-tutorials.com/computer-basics/
5.	https://www.programiz.com/article/flowchart-programming(Algorithmandflow chart)

CO/PSO	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6
CO1	3	2	2	2	2	3
CO2	3	2	2	2	3	2
CO3	3	3	3	3	2	2
CO4	3	2	2	2	2	3
CO5	3	3	2	2	3	2
Weightageofcoursecontributed toeach PSO	15	12	11	11	12	12

SUBJECT NAME	CORE–III:JAVAPROGRAMMING						
SUBJECT CODE	23BIT2C1						

L	T	P	S	Credits	Inst. Hours	Marks		
						CIA	External	Total
5	-	-	-	4	5	25	75	100

Learning Objectives	
LO1	• To provide fundamental knowledge of object-oriented programming. • To equip the student with programming knowledge in Core Java from the basics up.
LO2	• To enable the students to use AWT controls, Event Handling.

Pre requisites: Basic knowledge about programming concepts

Contents	
Unit I	Fundamentals of Object- Oriented Programming: Introduction– Object Oriented Paradigm – Concepts of Object – Oriented Programming – Benefits of OOP – Evolution: Java History- Java Features-DiffersfromCandC++-OverviewofJavaLanguage:JavaProgram-Structure–Tokens–Java Statements–Java Virtual Machine–Command Line Arguments
Unit II	Constants,Variables and Data Types–Operators and Expressions–Decision making and Branching – Looping –Arrays-Strings–Collection Interfaces and classes
Unit III	Classes objects and methods: Introduction–Defining a class–Method Declaration–Constructors -MethodOverloading–StaticMembers–Nestingofmethods–Inheritance–Overriding– Final variables and methods – Abstract methods and classes
Unit IV	Multiple Inheritance: Defining Interfaces–Extending Interfaces–Implementing Interfaces– Packages: Creating Packages–Accessing Packages–Using a Package–Managing Errors and Exceptions-Multi threaded Programming
Unit V	AWT Controls: The AWT class hierarchy - user interface components- Labels - Button - Text - Check Box - Check Box Group - Choice - List Box - Panels – Scroll Pane - Menu - Scroll Bar. Working with Frame class - Colour - Fonts and layout managers-Handling Mouse and Keyboard Events-Graphics Class – Lines and Rectangles – Circles and Ellipses – Drawing Arcs –Drawing Polygons – Line Graphs – Using Control Loops in Applets – Drawing Bar Charts.

Course Outcomes	
CO1	Understand the basic Object-oriented concepts.
CO2	Implement the basic constructs of Core Java.
CO3	Implement Method, classes and inheritance of Core Java.
CO4	Implement Packages, Managing Errors and Exceptions, multi-threading of Core Java.
CO5	Understand and use the components of AWT and Event handling.
Textbooks	
•	ProgrammingwithJava-SixthEdition-EBalagurusamy-McGraw-HillEducation,2019
•	Java The Complete Reference-EleventhEdition-HerbertSchildt-Paperback–McGrawHill,2020
Reference Books	
•	IntroductiontoProgrammingwithJava:AProblemSolvingApproach -ThirdEdition-JohnDean,Ray Dean-McGraw-Hill Education, 2020
•	J2EE:TheCompleteReference‖,JimKeogh―TataMcGrawHillEdition.
NOTE:LatestEditionofTextbooksMaybeUsed	
WebResources	
•	http://www.w3schools.com/java
•	http://www.tutorialspoint.com/java/
•	http://beginnersbook.com/java-tutorial-for-beginners-with-examples/
•	http://www.javatpoint.com/awt-program-in-java
•	http://www.javatpoint.com/java-awt

MappingwithProgrammeOutcomes:

	PO1	PO2	PO3	PO4	PO5	PO6
CO 1	L	M	S	M	M	S
CO 2	S	L	S	M	S	L
CO 3	M	S	L	M	M	S
CO 4	L	S	S	L	S	M
CO 5	S	M	M	S	L	S

S-Strong   M-Medium   L-Low

						Marks		
SUBJECT NAME				**CORE–IV:JAVA PROGRAMMING LAB**				
SUBJECT CODE				**23BIT2P1**				
L	**T**	**P**	**S**	**Credits**	**Inst. Hours**	**CIA**	**External**	**Total**
-	-	4	-	4	4	**25**	**75**	**100**

LO1	To design and develop applications using different Java programming language techniques
LO2	To become proficient in the use of AWT, Event Handling

Contents

1. Write a program tofind thebigger oftwo numberusingcommandlineargument.

2. Writeaprogramtofind thesumandaverageof theN numbersusing Command line argument

3. Writea mark listprogramtofind the total,average, resultand grade.

4. Writea programto preparetheEBBill calculation.

5. Writea programto findthe factorialvalue ofthe given number.

6. Writeaprogramto printtheMultiplication Table.

7. Writea programto printthe Fibonacci Series.

8. Writeaprogramtofindthe givennumberis primenumber or not.

9. Writea programtofind the givennumber is perfectnumberor not.

10. Writea programtofindthe givennumber isArmstrong or Not.

11. Writea programtoReversethe GivenNumber.

12. Writea programtofind the Sumof Digit.

13. Writeaprogramtoarrange thenumbersinDescending order.

14. Writea programtofind the Sumofeach Rowin the givenmatrix.

15. Writea programfor Matrix Addition.

16. Writea programfor Matrix Subtraction.

17. Write a program to perform the following string operations using String class:

     a.StringConcatenationb.Searchasubstringc.Toextractsubstringfromgivenstring

18. Writeaprogramtofindthe givenstringis PalindromeorNot.

19. Writea programtoCountthe no of Vowelsin the given string.

20. Writea programtoarrange the String an Ascending order.

21. WriteaprogramtocalculateAreaof Square,RectangleusingMethod Overloading.

22. Writea programusing Single Inheritance.

23. Writeaprogramtohandle theExceptionusingtryandmultiple catchblock.

24. Writea programtogenerate PrimeandPerfectnumberusing thread.

25. Writea programtoimplementaMark Listprogramusingpackage.

26. Write a Java program that works as a simple calculator. Use a grid layout to arrange buttons for the digits and forthe +, -,*, % operations. Add a text field to display the result. Handle any possible exceptions like divide by zero.

27. 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" shouldappear above the buttons in a selected color. Initially there is no message shown.

28. Writea programtodraw a human face.

29. Writea programtodraw our national flag.

30. Writea programtodraw a Bar-chart.

CourseOutcomes	
CO1	Useappropriatesoftwaredevelopmentenvironmenttowrite,compileandexecute object-oriented Java programs
CO2	Analyzeandidentifynecessarymechanismsof Javaneededtosolvereal-worldproblem
CO3	ImplementInheritance,package.
CO4	Implementmulti-threadingandexception-handling.
CO5	ExecuteGUI ,AWT andapplyeventhandling.

Mappingwith Programme Outcomes:

	PO1	PO2	PO3	PO4	PO5	PO6
CO 1	L	M	S	M	L	S
CO 2	S	S	L	M	L	M
CO 3	M	L	M	L	M	L
CO4	L	L	S	M	L	S
CO 5	M	M	S	S	L	M

S-Strong   M-Medium   L-Low

Subject Code	SubjectName	Category	L	T	P	S	Credits	Marks		
								CIA	External	Total
23BIT2S1	**BASICS OF INTERNET**	Skill Enhancement Course	2	-	-		2	25	75	100

LearningObjectives	
LO1	Knowledgeof Internetmedium
LO2	Internetasamass medium
LO3	FeaturesofInternetTechnology,
LO4	Internetassourceof infotainment
LO5	Studyofinternetaudiences andaboutcybercrime

UNIT	Contends	No.Of. Hours
UNIT I	The emergence of internet as a mass medium–the world of‗ world wide web'.	6
UNIT II	Features of internet as a technology.	6
UNIT III	Internet as a source of infotainment–classification based on content and style.	6
UNIT IV	Demographic and psychographic descriptions of internet‗audiences'– effect of internet on the values and life-styles.	6
UNIT V	Present issues such as cybercrime and future possibilities.	6
	TOTALHOURS	30

CO	CourseOutcomes	
CO1	Knowsthe basicconceptin HTMLConceptof resourcesinHTML	
CO2	KnowsDesignconcept.ConceptofMetaData Understand the concept of save the files.	
CO3	Understandthepageformatting.Concept oflist	
CO4	CreatingLinks.-Knowtheconceptofcreatinglinktoemailaddress	
CO5	Conceptofaddingimages-Understandthetable creation.	

Textbooks	
1	MasteringHTML5andCSS3Made Easy‖,TeachUCompInc.,.
2	ThomasMichaud,"FoundationsofWebDesign:IntroductiontoHTML& CSS"

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

Subject Code	SubjectName	Category	L	T	P	S	Credits	Inst.Hours	Marks		
									CIA	External	Total
23BIT2S2	**PROBLEM SOLVING TECHNIQUES**	Skill Enhancement Course	Y	-	-	-	2	2	25	75	100

CourseObjective	
C1	Understandthesystematicapproachtoproblemsolving.
C2	Knowtheapproachandalgorithmstosolvespecificfundamental problems.
C3	Understandtheefficientapproachtosolvespecificfactoring-relatedproblems.
C4	Understandtheefficientarray-relatedtechniquestosolvespecificproblems.
C5	Understandtheefficientmethodstosolvespecificproblemsrelatedtotextprocessing. Understand how recursion works.

UNIT	Details	No.of Hours
UNIT I	**Introduction:** Notion of algorithms and programs – Requirements for solving problems by computer – The problem-solving aspect: Problem definition phase, Getting started on a problem, The use of specific examples, Similarities among problems, Working backwards from the solution – General problem-solving strategies - Problem solving using top-down design – Implementation of algorithms – The concept of Recursion.	6
UNIT II	**Fundamental Algorithms**: Exchanging the values of two variables – Counting - Summation of a set of numbers - Factorial computation - Sine function computation - Fibonacci Series generation - Reversing the digits of an integer – Base Conversion.	6
UNIT III	**Factoring Methods**: Finding the square root of a number – The smallest divisor of an integer – Greatest common divisor of two integers - Generating prime numbers – Computing the prime factors of an integer – Generation of pseudo-random numbers-Raising a number to a large power – Computing the nth Fibonacci number.	6
UNIT IV	**Array Techniques**: Array order reversal – Array counting or histograming – Finding the maximum number in a set - Removal of duplicates from an ordered array - Partitioning an array – Finding the kth smallest element – Longest monotone subsequence.	6
UNIT V	**Text Processing and Pattern Searching**: Text line length adjustment – Left and right justification of text – Keyword searching in text – Text line editing – Linear pattern search. **Recursive algorithms**: Towers of Hanoi – Permutation generation.	6
	Total	**30**

	CourseOutcomes	ProgrammeOutcome
CO	Oncompletionofthiscourse,studentswill	
1	Understandthelogicofproblemandanalyses implementationofalgorithmandTopDown approach and concept of Recursion	PO1,PO6

2	AbletounderstandtheSequenceofNumbersand Series Fibonacci, Reversing ,Base Conversion.	PO2
3	AbletodoAlgebraicoperations	PO2,PO4
4	CoverageofArraysanditsLogics	PO6,PO8
5	TextProcessingand PatternSearchingApproach	PO7

TextBook	
1	R.G.Dromey, *HowtoSolveitbyComputer*,PearsonIndia,2007

Referenceooks	
1.	GeorgePolya,JeremyKilpatrick,*TheStanfordMathematicsProblemBook:WithHintsand Solutions*, Dover Publications, 2009 (Kindle Edition 2013).
2.	GregW.Scragg,*ProblemSolvingwithComputers*,Jones&Bartlett1st edition, 1996.

Webresources	
1.	https://www.studytonight.com/
2.	https://www.w3schools.com/

MappingwithProgrammeOutcomes:

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8
CO1	M					S		
CO2		M						
CO3		S		L				
CO4						S		M
CO5							M	

S-Strong   M-Medium   L-Low

SUBJECT NAME	CORE–V:PHP PROGRAMMING						
SUBJECTCODE	23BIT3C1						

L	T	P	S	Credits	Inst. Hours	Marks		
						CIA	External	Total
5	-	-	-	4	5	25	75	100

LearningObjectives	
LO1	Toprovidethe necessaryknowledgeon basicsof PHP.
LO2	TodesignanddevelopdynamicwebapplicationsusingPHP.
LO3	TolearnthenecessaryconceptsforworkingwiththefilesusingPHP

Prerequisites:

Contents	
Unit I	**Introductionto PHP:** Introduction to PHP -Scope of PHP -XAMPP / WAMP Installation, Basic Syntax, Defining variable and constant, Data type, Operator and Expression. Introduction to Control Structures – Conditional and Looping Statements. HandlingHtmlFormwithPHP-CapturingForm,GET-POSTmethodand redirectingaformafter submission.
Unit II	**Array:** Anatomy of an Array, Creating index based and Associative array, Modifying Array Elements - Processing Arrays with Loops. **String:** StringSearching&ReplacingString,FormattingString,StringRelatedLibrary Function and regular expression.
Unit III	**Function:** Definefunction,userdefinedfunction,CallbyvalueandCallbyreference, Recursive function, Date and Time Function, **Working with file and Directories:** Understanding file & directory, Opening and closing a file, Reading andWritingFiles–Reading DatafromaFile,Copying,renaminganddeletingafile, working with directories, Creating and deleting folder,
Unit IV	**Exception Handling:** UnderstandingExceptionanderror,Try,catch,throw.Errortrackinganddebugging. Oops - Security tags.
Unit V	**Session and Cookie:** Introduction to Session Control, Session Functionality, What is a Cookie, Setting Cookies, Storing Data in Cookies, Deleting Cookies, , Destroying the variables and Session.
TOTAL	**75 Hrs**

CourseOutcomes

CO1	ToimplementPHPscriptusingDecisionsandLoops
CO2	TodevelopPHPapplicationsusingArrays & Strings
CO3	Manipulatefilesanddirectories.
CO4	ToimplementPHPscriptusing ExceptionHandlingandoops
CO5	TodevelopPHPapplicationsusingSessionandCookie

Textbooks	
1.	PHP:TheCompleteReference-StevenHolzner-McGrawHillEducation-2017
2.	PHPProgramming-TheCompleteGuide-CodeAcademy-2022

ReferenceBooks	
1.	HeadFirstHTML 5Programming-EricFreeman-O'Reilly
2.	LearningPHP,MySQL&JavaScript-5th Edition-RobinNixon-O'ReillyMedia,Inc.

NOTE:LatestEditionof TextbooksMaybeUsed

WebResources	
1.	https://www.w3schools.com/php/
2.	https://www.geeksforgeeks.org/php-tutorial/
3.	https://www.javatpoint.com/php-tutorial
4.	https://www.tutorialspoint.com/php/index.htm
5.	https://www.guru99.com/php-tutorials.html
6.	https://www.w3resource.com/php-exercises/php-basic-exercises.php

CO/PSO	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6
CO1	3	2	2	3	2	2
CO2	3	3	2	3	2	2
CO3	3	3	3	3	2	2
CO4	3	3	2	3	2	2
CO5	3	3	2	3	2	2
Weightageof course contributedtoeach PSO	15	14	11	15	10	10

						Marks		
SUBJECT NAME			**CORE–VI:PHP PROGRAMMING LAB**					
SUBJECT CODE			**23BIT3P1**					
L	**T**	**P**	**S**	**Credits**	**Inst. Hours**	**CIA**	**External**	**Total**
-	-	4	-	4	4	25	75	100

Learning Objectives	
LO1	To design and develop web applications using PHP elements.
LO2	Tobecomeproficientindynamicpagecreation&redirectingapageandformvalues after submission

Prerequisites:

Contents

1. Write a Program to design a web page with links to different pages and allow navigation between web pages.

2. Write a Program to design a webpage with a form that uses all types of controls.

3. WriteaProgramtocreateapageusingfunctionsforcomparingthreeintegersandprintthe largest number.

4. Write a function to calculate the factorial of a number(non-negativeinteger).The function accept the number as an argument.

5. Write a Program to convert Number into Word.

6. Write a Program to check whether the given number is prime or not.

7. Write a Program that checks whether a passed string is palindrome or not.

8. Write aProgram tocreate aPHP page whichacceptsnamefrom user.After submissionthat pagewilldisplaygoodmorningorgoodeveningmessagealongwithusernamebasedontime functions.

9. WriteaProgramtocreateasimple'birthdaycountdown'script,thescriptwillcountthenumber of days between current day and birth day.

10. Writeaprogram tocheck theemail-idisvalidornotusingregular expression.

11. WriteaProgram topreparethe Marklist usingFile Handling.

12. WriteaProgramtoprepare theEBBill usingFile Handling.

13. WriteaProgramtoprepare the SalaryBillusingFile Handling.

14. WriteaProgram tocopyafile&implementwithexceptionhandlingtechniques.

15. WriteaProgram toimplementtheSessionManagement.

16. WriteaProgramtoimplementtheCOOKIES concepts.

CO	**CourseOutcomes**
CO1	Demonstratesimple programsusingPHPscript-Toimplementusing Decisions andLoops

CO2	TodevelopPHPapplicationsusingArrays& Strings
CO3	TodevelopPHPapplicationsusingFunctions,fileandDirectories
CO4	ToimplementPHPscriptusing ExceptionHandlingandoops
CO5	TodevelopPHPwebapplicationsusingSessionandCookie

Mappingwith Programme Outcomes:

	PO1	PO2	PO3	PO4	PO5	PO6
CO 1	L	M	S	M	L	S
CO 2	S	S	L	M	L	M
CO3	M	L	M	L	M	L
CO 4	L	L	S	M	L	S
CO 5	M	M	S	S	L	M

S-Strong   M-Medium   L-Low

SEC-IV-Skill Enhancement Course

Subject Code	SubjectName	Category	L	T	P	S	Credits	Inst.Hours	Marks		
									CIA	External	Total
23BIT3S1	**Cyber Forensics**	Skill Enhancement Course	Y	-	-	-	2	2	25	75	100

	CourseObjective
C1	Understandthedefinitionofcomputerforensicsfundamentals.
C2	Tostudyabout theTypesof ComputerForensicsEvidence
C3	Understandand applytheconceptsofDuplicationandPreservationofDigital Evidence
C4	UnderstandtheconceptsofElectronicEvidenceandIdentificationof Data
C5	TostudyabouttheDigitalDetective, NetworkForensicsScenario, Damaging ComputerEvidence.

UNIT	Details	No.of Hours	Course Objective
UNIT I	**Overview of Computer Forensics Technology:** Computer Forensics Fundamentals: Whatis Computer Forensics? Use of Computer Forensics in Law Enforcement, Computer Forensics Assistance to Human Resources/Employment Proceedings, Computer Forensics Services, Benefits of professional Forensics Methodology, Steps taken by Computer Forensics Specialists. Types of Computer. Forensics Technology: Types of Business Computer Forensic, Technology–Types of Military Computer Forensic Technology–Types of Law Enforcement– Computer Forensic. Technology–Types of Business Computer Forensic Technology.	6	C1
UNIT II	**Computer Forensics Evidence and capture:** Data Recovery: Data Recovery Defined, Data Back–up and Recovery, TheRole of Back –up in Data Recovery,TheData – Recovery Solution. Evidence Collection and Data Seizure: Collection Options, Obstacles, Types of Evidence, The Rules of Evidence, Volatile Evidence, General Procedure, Collection and Archiving, Methods of Collections, Artefacts, Collection Steps, Controlling Contamination: The chain of custody.	6	C2

UNIT III	**Duplication and Preservation of Digital Evidence:** Processing steps, Legal Aspects of collecting and Preserving Computer forensic Evidence. Computer image Verification and Authentication: Special needs of Evidential Authentication, Practical Consideration, Practical Implementation.	6	C3
UNIT IV	**Computer Forensics Analysis:** Discovery of Electronic Evidence: Electronic Document Discovery: A Powerful New Litigation Tool. Identification of Data: Time Travel, Forensic Identification and Analysis of Technical Surveillance Devices.	6	C4
UNIT V	**Reconstructing Past Events:** How to Become a Digital Detective, Useable File Formats, Unusable File Formats, Converting Files. Networks: Network Forensics Scenario, a technical approach, Destruction Of E–Mail, Damaging Computer Evidence, Documenting The Intrusion on Destruction of Data, SystemTesting.	6	C5
	TOTAL	30	

CourseOutcomes		ProgrammeOutcomes
CO	Oncompletionofthiscourse,studentswill	
1	Understandthedefinitionofcomputerforensics fundamentals.	PO1
2	Evaluatethedifferenttypesofcomputerforensics technology.	PO1,PO2
3	Analyzevariouscomputerforensicssystems.	PO4,PO6
4	Applythemethodsfordatarecovery,evidence collection and data seizure.	PO4,PO5, PO6
5	Gainyourknowledgeofduplicationandpreservation of digital evidence.	PO3,PO8
TextBook		

1	CyberForensicsbyDejey,Murugan(Author)-OxfordUniversityPress-June2018
2	CyberForensicsbyJr.Marcella,AlbertJ.-CRCPress;1stedition(September2021)

	ReferenceBooks
1.	JohnR.Vacca,―ComputerForensics:ComputerCrimeInvestigation‖,3/E,Firewall Media, New Delhi, 2002.
2.	Nelson, Phillips Enfinger, Steuart,―Computer Forensics and Investigations‖ Enfinger, Steuart, CENGAGE Learning, 2004.
3.	AnthonySammesandBrianJenkinson,‖ForensicComputing:APractitioner's Guide‖, Second Edition, Springer–Verlag London Limited, 2007.
4.	.RobertM.Slade,‖SoftwareForensics CollectingEvidencefromtheSceneof aDigital Crime‖, TMH 2005.

	WebResources
1.	https://www.hackingarticles.in/best-of-computer-forensics-tutorials/
2.	https://intellipaat.com/blog/what-is-cyber-forensics/
3.	https://www.vskills.in
4.	https://alison.com/tag/computer-forensics

MappingwithProgrammeOutcomes:

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8
CO1	S							
CO2	M	S						
CO3				S		S		
CO4				S	S	M		
CO5		**S-Strong**S		**M-Medium**	**L-Low**			S

SEC-V-Skill Enhancement Course

Subject Code	SubjectName	Category	L	T	P	S	Credits	Inst.Hours	Marks		
									CIA	External	Total
23BIT3S2	Enterprise Resource Planning	Skill Enhancement Course	Y	-	-	-	2	2	25	75	100

CourseObjectives	
CO1	Tounderstandthebasicconcepts,Evolutionand Benefitsof ERP.
CO2	ToknowtheneedandRoleofERPinlogicalandPhysical Integration.
CO3	Identifytheimportantbusinessfunctionsprovidedbytypicalbusiness softwaresuchasenterpriseresourceplanningandcustomerrelationship management
CO4	TotrainthestudentstodevelopthebasicunderstandingofhowERPenriches thebusinessorganizationsinachievingamultidimensionalgrowth
CO5	Toaimatpreparingthestudentstechnologicalcompetitiveandmakethem readytoself-upgradewiththehighertechnicalskills

UNIT	Details	No.of Hours
UNIT 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
UNIT 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. BusinessProcessReengineering,DatawareHousing,DataMining, Online Analytic Processing (OLAP), Product Life Cycle Management (PLM), LAP, Supply chain Management.	6
UNIT III	ERP Marketplace and Marketplace Dynamics: Market Overview, Market place Dynamics, 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, Management, Material Management, Financial Module,CRM and Case Study.	6
UNIT 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
UNIT V	ERP & E-Commerce, Future Directives- in ERP, ERP and Internet, Critical success and failure factors, Integrating ERP into or-ganizational culture. Using ERP tool: either SAP or ORACLE	6

	format to case study.		
	Total		**30**

<table>
<tr><td colspan="3" align="center">CourseOutcomes</td></tr>
<tr><td>Course Outcomes</td><td colspan="2">Oncompletionofthiscourse,studentswill;</td></tr>
<tr><td>CO1</td><td colspan="2">UnderstandthebasicconceptsofERP.</td></tr>
<tr><td>CO2</td><td colspan="2">Identifydifferenttechnologiesusedin ERP</td></tr>
<tr><td>CO3</td><td colspan="2">Understandand applytheconceptsofERPManufacturingPerspectiveandERP Modules</td></tr>
<tr><td>CO4</td><td colspan="2">Discussthebenefits ofERP</td></tr>
<tr><td>CO5</td><td colspan="2">Applydifferenttoolsused in ERP</td></tr>
<tr><td colspan="3">ReferenceText:</td></tr>
<tr><td>1.</td><td colspan="2">EnterpriseResourcePlanning–Alexis Leon,TataMcGrawHill.</td></tr>
<tr><td>2.</td><td colspan="2">EnterpriseResourcePlanningbyAshimRajSingla(Author)-CengageIndia Private Limited-July 2016</td></tr>
<tr><td colspan="3">References:</td></tr>
<tr><td>1.</td><td colspan="2">EnterpriseResourcePlanning–DiversifiedbyAlexis Leon, TMH.</td></tr>
<tr><td>2.</td><td colspan="2">EnterpriseResource Planning–RaviShankar &S.Jaiswal, Galgotia</td></tr>
<tr><td colspan="3">WebResources</td></tr>
<tr><td>1.</td><td colspan="2">1.https://www.tutorialspoint.com/management_concepts/enterprise_resource_planning.htm</td></tr>
<tr><td>2.</td><td colspan="2">1.https://www.saponlinetutorials.com/what-is-erp-systems-enterprise-resource-planning/</td></tr>
<tr><td>3.</td><td colspan="2">1.https://www.guru99.com/erp-full-form.html</td></tr>
<tr><td>4.</td><td colspan="2">2.https://www.oracle.com/in/erp/what-is-erp/</td></tr>
</table>

MappingwithProgrammeOutcomes:

	PO1	PO2	PO3	PO4	PO5	PO6
CO 1	M		L			M
CO 2	M	S			L	M
CO 3		L	M			
CO 4				M		L
CO 5	M		L		M	
S-Strong		**M-Medium**		**L-Low**		

SUBJECT NAME	CORE–VII:PYTHON PROGRAMMING							
SUBJECT CODE	23BIT4C1							

L	T	P	S	Credits	Inst. Hours	Marks		
						CIA	External	Total
5	-	-	-	4	5	25	75	100

LearningObjectives	
LO1	UnderstandtheconceptsofPythonprogramming.
LO2	Illustratetheprocessofstructuringthedatausinglists,dictionaries,tuplesandsets.
LO3	ToapplythefileconceptinPython programming

Prerequisites:	
Contents	
Unit I	**Introduction to Python:** History of Python- Futures of Python-Application of Python-Installation of Python-Keywords-Identifiers-Statements-Indentation-Data types-Literal Variable-Operators and Expression-Input/Output Statements. **ControlFlowstatements:**ConditionalandLooping Statements.
Unit II	**Sequences**–Lists-Methods-Slicing-Cloning-NestedList-Mutability-Creatingtuple-Accessing/Updating/Deleting elements in Tuple- Nested Tuples– Making a Dictionary-Adding and Modifying an Item in a Dictionary-Sorting Items-Looping over a Dictionary-Sets
Unit III	**Functions-**Defining a Function-Calling Function – Type of Arguments –return statement -Recursive functions-Modules-Importing-Creating Modules-Name spacing- Reloading- Installing Packages. Strings and Regular Expressions-Files andDirectoryAccess-Openingafilemodes-Reading/WritingOperationsona File-File Position-Renaming and Deleting File-Directory methods.
Unit IV	**Object Oriented Programming**-Class–Methods-Self variable-Data Hiding-Constructor-Method Over loading-In heritance-Operator Over loading. **Errors and Exceptions**-Handling Exceptions-Try-Finally-With and Except-Statements-Assert Statement-Custom Exceptions.
Unit V	**GUI Programming with Tkinter:** Widget-Label-Button-Text-Checkbutton-Entry-Listbox-Combobox - Scrollbar –Radio Button- Container -Frame-Menu-Message-Scale-Canvas-Events-Keyboard and Mouse Events-Graphics using Turtle.
TOTAL	**75Hrs**

CourseOutcomes	
CO1	Outline the basic concepts in python language. Interpret different looping and conditional Statements in python language.
CO2	WorkwithList, tuplesanddictionary,Writeprogramusing list,tuplesanddictionary.
CO3	Conceptoffunction,Implementingtheconceptstringsinvariousapplication, Significance of Modules, Concept of reading and writing files.
CO4	ToimplementExceptionHandlingandoops.
CO5	TodevelopGUIapplicationsusingTkinter,Turtle.

Textbooks	
1.	PythonProgramming-ChSatyanarayana,MRadhikaMani,BNJagadesh-UniversitiesPress.
2.	ProgrammingandProblemSolvingwithPython-AshokNamdevKamthane-Amit Ashok Kamthane -Second Edition-2020.

ReferenceBooks	
1.	PythonProgrammingUsingProblemSolvingApproach-ReemaThareja-Oxford University Pres
2.	VamsiKurama,―PythonProgramming:AModernApproach‖,PearsonEducation.

NOTE:LatestEditionof TextbooksMaybeUsed

WebResources	
1.	https://www.w3schools.com/python/
2.	https://www.geeksforgeeks.org/python-programming-language/
3.	https://www.tutorialspoint.com/python/index.htm
4.	https://www.programiz.com/python-programming
5.	https://www.guru99.com/python-tutorials.html
6.	https://www.learnpython.org/

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

				SUBJECT NAME	CORE–VIII:PYTHON PROGRAMMING LAB		
				SUBJECT CODE	23BIT4P1		
L	**T**	**P**	**S**	**Credits**	**Inst. Hours**	**Marks**		
						CIA	**External**	**Total**
-	-	4	-	4	4	**25**	**75**	**100**

<table>
<tr><td colspan="2" align="center">Learning Objectives</td></tr>
<tr><td>LO1</td><td>UnderstandthefundamentalsofprogrammingusingPython,suchasvariables,data types,controlstructures,andfunctions.</td></tr>
<tr><td>LO2</td><td>LearnhowtousePythonlibrariesandmodulestosolveproblems.</td></tr>
</table>

Prerequisites:

Contents

1. WriteaPython Programforchecking whetherthegiven numberisan oddorevennumber.

2. WriteaPythonProgramtocheckleapyear.

3. WriteaPythonProgramtoCheck thegivennumberisPrime Numberornot.

4. WriteaPythonProgramtoCheck thegivennumberisPerfectNumberor not.

5. WriteaPythonprogramtogenerate list ofFibonaccinumber uptonnumbers.

6. WriteaPythonprogramtogeneratemultiplication table.

7. WriteaPythonprogramtoprinttheArmstrongnumberbetweenthetwo range.

8. Writeapythonprogramtocreate, appendand removelistsin python.

9. Writeaprogramto demonstrateworkingwithtuplesin python.

10. Writeaprogramtodemonstrate workingwithdictionariesin python.

11. WriteapythonprogramtodefineamoduletofindFactorialNumbersandimportthemoduleto another program.

12. WriteaPythonprogramtofind thegivenstringisPalindromeorNot

13. Writea python programbyusing exception handlingmechanism.

14. WriteapythontoImplementpythonscripttoacceptlineoftextandfindthenumberof characters, number of vowels and number of blank spaces in it.

15. Writea programtocopyfile contents fromone file toanother.

16. Writea programto preparethemarklist using files.

17. Writeaprogramtoprepare the eb billusing files.

18. CreateagraphicalapplicationinPythonTkinter topreparethesalarybillusing widgets.

19. Writea programto drawing acartoonor house using turtle.

20. Writea programto drawing acolouring shapes turtle.

CO	CourseOutcomes
CO1	Understandthesignificanceofcontrolstatements,loopsandfunctionsincreating Simpleprograms.
CO2	Interpretthecoredatastructuresavailableinpythontostore,processandsortthedata.
CO3	Developtherealtimeapplicationsusingpythonprogramming language.
CO4	Analyzetherealtimeproblemusingsuitablepythonconcepts.
CO5	AssesstheGUIapplicationusingappropriateconceptsinpython.

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

SEC-VI-Skill Enhancement Course

Subject Code	Subject Name	Category	L	T	P	S	Credits	Inst.Hours	Marks		
									CIA	External	Total
23BIT4S1	**Robotics and Its Applications**	Skill Enhancement Course	Y	-	-	-	2	2	25	75	100

CourseObjective	
C1	To understand the robotics fundamentals
C2	Understand the sensors and matrix methods
C3	Understand the Localization: Self-localizations and mapping
C4	Tostudyabout the conceptofPathPlanning, Visionsystem
C5	Tolearnaboutthe conceptofrobotartificialintelligence

UNIT	Details	No.of Hours	Course Objective
UNIT I	Introduction: Introduction, brief history, components of robotics, classification, workspace, work-envelop, motion of robotic arm, end- effectors and its types, service robot and its application, Artificial Intelligence in Robotics.	6	CO1
UNIT II	Actuators and sensors :Types of actuators, stepper-DC-servo-and brushless motors- model of a DC servo motor-types of transmissions- purpose of sensor-internal and external sensor-common sensors- encoders tachometers-strain gauge based force torque sensor- proximity and distance measuring sensors Kinematics of robots: Representation of joints and frames, frames transformation, homogeneous matrix, D-H matrix, Forward and inverse kinematics: two link planar (RR) and spherical robot (RRP). Mobile robot Kinematics: Differential wheel mobile robot	6	CO2
UNIT III	Localization: Self-localizations and mapping - Challenges in localizations –IRbasedlocalizations –visionbasedlocalizations – Ultrasonic based localizations - GPS localization systems.	6	CO3
UNIT IV	PathPlanning:Introduction,pathplanning-overview-roadmap pathplanning-celldecompositionpathplanningpotentialfieldpath planning-obstacle avoidance-case studies Vision system: Robotic vision systems-image representation-object recognition-and categorization-depth measurement- image data compression-visual inspection-software considerations	6	CO4
UNIT V	Application: Ariel robots-collision avoidance robots foragriculture-mining-exploration-underwater-civilian- and military applications-nuclear applications-space Applications-Industrial robots-artificial intelligence in robots-application of robots in materialhandling-continuousarcwelding-spotwelding-spray painting-assemblyoperation-cleaning-etc.	6	CO5

CourseOutcomes		Programme Outcomes
CO	Oncompletionofthiscourse,studentswill	
1	Describethedifferentphysical formsofrobotarchitectures.	PO1
2	Kinematicallymodelsimplemanipulator andmobilerobots.	PO1,PO2
3	Mathematicallydescribeakinematicrobotsystem	PO4,PO6
4	Analyzemanipulationandnavigationproblemsusingknowledgeof coordinateframes,kinematics,optimization,control,anduncertainty.	PO4,PO5, PO6
5	Programroboticsalgorithmsrelatedtokinematics,control,optimization, and uncertainty.	PO3,PO8
TextBook		
1	Introduction toRobotics,4ebyJohn Craig(Author)-PearsonEducation-April2022	
2	Robotics:FieldofApplications:ForBeginnersbyDr.S.Uma(Author),Dr.V.Saranya (Author) December 2022	
3	IntroductiontoRobotics,3ed,AnIndianAdaptationbySaeedB.Niku(Author),Wiley Editorial Team -January 2024	
4	RicharedD.Klafter.ThomasAchmielewskiandMickaelNegin,RoboticEngineeringand IntegratedApproach,PrenticeHallIndia-Newdelhi-2001	
ReferenceBooks		
1.	Industrial robotic technology-programming and application by M.P.Groover et.al, McGrawhill2008	
2.	Roboticstechnologyand flexibleautomationbyS.R.Deb,THH-2009	
WebResources		
1.	https://www.tutorialspoint.com/artificial_intelligence/artificial_intelligence_robotics.htm	
2.	https://www.geeksforgeeks.org/robotics-introduction/	

MappingwithProgrammeOutcomes:

	PO1	PO2	PO3	PO4	PO5	PO6
CO1	S					
CO2	M	S				
CO3				S		S
CO4				S	S	M
CO5			S			
S-Strong			**M-Medium**		**L-Low**	

Subject Code	SubjectName	Category	L	T	P	O	Credits	Inst.Hours	Marks		
									CIA	External	Total
23BIT4S2	**Organizational Behaviour**	Skill Enhancement Course	Y	-	-	-	2	2	25	75	100

LearningObjectives	
LO1	TohaveextensiveknowledgeonOBandthe scopeof OB.
LO2	TocreateawarenessofIndividualBenaviour.
LO3	ToenhancetheunderstandingofGroup Behaviour
LO4	ToknowthebasicsofOrganisaitonalCultureandOrganisationalStructure
LO5	TounderstandOrganisationalChange,ConflictandPower

UNIT	Details	No.of Hours
UNIT I	INTRODUCTION:ConceptofOrganizationalBehavior(OB): Nature, Scope and Role of OB: Disciplines that contribute to OB; Opportunities for OB (Globalization, Indian workforce diversity, customer service,innovationandchange,networkedorganizations,work-lifebalance, peopleskills,positiveworkenvironment,ethics)	6
UNIT II	INDIVIDUALBEHAVIOUR: 1. Learning, attitude and Job satisfaction: Concept of learning, conditioning, shaping and reinforcement. Concept of attitude,components, behavior and attitude. Job satisfaction: causation; impact of satisfied employees on workplace. 2. Motivation : Concept; Theories (Hierarchy of needs, X and Y, Two factor, McClelland, Goal setting, Self-efficacy, Equity theory); Job characteristics model; Redesigning jobs, 3. Personality and Values : Concept of personality; Myers-Briggs Type Indicator (MBTI); Big Five model. Relevance of values; Linking personality and values to the workplace (person-job fit, person-organization fit) 4. Perception,DecisionMaking:PerceptionandJudgements; Factors;Linkingperceptiontoindividualdecision making:	6
UNIT III	GROUP BEHAVIOUR : 1. Groups and Work Teams : Concept : Five Stage model of group development; Group norms, cohesiveness ; Group think and shift ; Teams; types of teams; Creating team players from individuals and team based work(TBW) 2. Leadership : Concept; Trait theories; Behavioral theories(OhioandMichiganstudies);Contingencytheories(Fiedler,Hersey andBlanchard,Path-Goal);	6
UNIT IV	ORGANISATIONALCULTUREANDSTRUCTURE: Concept of culture; Impact (functions and liability); Creating andsustaining culture: Concept of structure, Prevalent organizationaldesigns: New design options	6

UNIT V	ORGANISATIONAL CHANGE,CONFLICTANDPOWER: Forces of change; Planned change; Resistance; Approaches (Lewin'smodel, Organisational development);.Concept of conflict, Conflict process; Types, Functional/Dysfunctional. Introduction to power and politics.	6

Course Outcomes	OnCompletionofthecoursethestudents will
CO1	TodefineOrganisationalBehaviour,UnderstandtheopportunitythroughOB.
CO2	Toapplyself-awareness,motivation,leadershipandlearningtheoriesat workplace.
CO3	Toanalyzethecomplexitiesandsolutionsofgroupbehaviour.
CO4	Toimpactandbringpositivechangeinthecultureoftheorganisaiton.
CO5	Tocreateacongenialclimateinthe organization.

ReadingList	
1.	NeharikaVohra Stephen P. Robbins, Timothy A. Judge, *Organizational Behaviour*,PearsonEducation,18thEdition,2022.
2.	FredLuthans,*OrganizationalBehaviour*,TataMcGrawHill,2017.
3.	RayFrench,CharlotteRayner,GaryRees&SallyRumbles,*Organizational Behaviour*,John Wiley&Sons, 2011
4.	LouisBevoc,AllisonShearsett,RachaelCollinson,*OrganizationalBehaviour Reference*,NutriNicheSystemLLC(28 April2017)
5.	Dr.Christopher P. Neck, JefferyD. Houghton and Emma L. Murray, *OrganizationalBehaviour:ASkill-BuildingApproach,*SAGEPublications,Inc; 2nd edition (29 November 2018).
ReferencesBooks	
1.	UmaSekaran, OrganizationalBehaviourText&cases,2ndedition,Tata McGraw HillPublishingCO.Ltd
2.	GangadharRao,Narayana,V.S.PRao,OrganizationalBehaviour1987,Reprint 2000, Konark Publishers Pvt. Ltd, 1st edition
3.	S.S.Khanka,OrganizationalBehaviour,S.Chand&Co,NewDelhi.
4.	J.Jayasankar,OrganizationalBehaviour, MarghamPublications,Chennai, 2017.

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8
CO1	S							
CO2	M	S						
CO3				S		S		
CO4				S	S	M		
CO5			S					S

SUBJECT NAME	CC-IX-DATA COMMUNICATIONS AND NETWORKING							
SUBJECT CODE	23BIT5C1							
L	**T**	**P**	**S**	**Credits**	**Inst. Hours**	**Marks**		
						CIA	**External**	**Total**
5	-	-	-	**4**	**5**	**25**	**75**	**100**

Learning Objectives	
LO1	Thiscourseistoprovidestudentswithan overviewoftheconceptsandfundamentals ofdatacommunicationandcomputernetworks
LO2	Tofamiliarizethestudentwiththebasic taxonomyandterminologyofthe computer.
LO3	Studentwillbeabletounderstandvarioustypesoftransmissionmedia,network devices;andparametersofevaluationofperformanceforeachmediaanddevice.

Prerequisites:	

Contents	
Unit I	Introduction:DataCommunication-Networks:DistributedProcessing-Network CriteriaPhysicalStructures–NetworkModels-CategoriesofNetwork-Internetwork -TheInternetProtocolsandStandards–NetworkModels:LayersintheOSI Model - TCP/IP Protocol Suite.
Unit II	Data and Signals: Analog and Digital Data - Analog and Digital Signals– Performance - Digital Transmission: Transmission Modes – Multiplexing: FDM – WDM-Synchronous TDM-StatisticalTDM-TransmissionMedia:Guidedmedia- Unguided Media
Unit III	Switching: Circuit Switched Networks - Datagram Networks-Virtual Circuit Network - Error Detection and Correction: Introduction - Block Coding - Linear Block Codes - Cyclic Codes: CyclicRedundancyCheck - Checksum. Data Link Control:Framing-FlowControlandErrorControl-NoiselessChannel:Stop- and-waitProtocol.
Unit IV	Wired LANs: Standard Ethernet-GIGABIT Ethernet-Wireless LAN: Bluetooth Connecting LANs: Connecting Devices**:** Passive Hubs- Repeaters-Active Hubs- Bridges-TwoLayerSwitches-Routers-ThreelayerSwitches-Gateway-Network Layer:InternetProtocol:IPv4–Ipv6-TransitionfromIPv4toIPv6.
Unit V	Network Layer: Delivery, Forwarding and Routing- Unicast Routing Protocols: Distance Vector Routing-Link state routing- Future & Current Trends in Computer Networks: 5G Network: Salient Features- Technology-Applications-Advanced Features-Advantages&Disadvantages-CommonUses-Applications-WiFi-WiMax Lifi-LifivsWifi.
TOTAL	**75 Hrs**

CO	CourseOutcomes
CO1	Understandthefundamentalconceptsofcomputernetworksanditsapplicationareas
CO2	Identifyandusevariousnetworkingtechniquesandcomponentstoestablish networkingconnectionandtransmission
CO3	Analyzetheservices performedbydifferentnetworklayersandrecentadvancements innetworking
CO4	Comparevariousnetworkingmodels,layers,protocolsand technologies.
CO5	Selecttheappropriatenetworkingmechanismstobuildareliablenetwork

	Textbooks
➤	DataCommunicationsandNetworkingwithTCPIPProtocolSuitebyBehrouzA. Forouzan (Author) -McGraw-Hill- 6th Edition-August 2022
➤	CommunicationNetworks:AConciseIntroduction,SecondEditionbyJeanWalrand, Shyam Parekh -Springer International Publishing AG-2018

	ReferenceBooks
1.	DataCommunicationandComputerNetworks-AjitPal-PhiLearningPvt.Ltd..

NOTE:LatestEditionofTextbooksMaybeUsed

	WebResources
1.	http://www.tutorialspoint.com/data_communication_computer_network/
2.	https://www.geeksforgeeks.org/computer-network-tutorials/
3.	https://www.guru99.com/data-communication-computer-network-tutorial.html
4.	http://www.slideshare.net/zafar_ayub/data-communication-and-network-11903853

CO/ PSO	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6
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 contributedtoeachPSO	15	14	11	15	15	10

							Marks		
SUBJECT NAME					CC-X– .NET Programming				
SUBJECT CODE					23BIT5C2				
L	**T**	**P**	**S**	**Credits**	**Inst. Hours**	**Marks**			
						CIA	**External**	**Total**	
5	**-**	**-**	**-**	**4**	**5**	**25**	**75**	**100**	

	Learning Objectives
LO1	Understandthecoreprinciplesof.NETFramework.
LO2	Toprovidesufficientknowledgeindevelopingwindows/webapplicationsusing VB.NETand ASP.NET.
LO3	CreateaSQLServerdatabaseand utilize EntityFrameworkfordata access.

Prerequisites:

	Contents
Unit I	Introductionto.NET–The.NETFramework–Benefitsof.NET–Common LanguageRuntime–FeaturesofCLR-CompilationandMSIL–The.NET Frameworklibraries –TheVisualStudioIntegratedDevelopmentEnvironment.
Unit II	Introduction to VB.NET – VB.NET fundamentals – Branching and Looping Statements -Classes and Objects – Constructors – Overloading- Inheritance and Polymorphism–Interfaces–Arrays–Strings–Exceptions–Delegatesand Events.
Unit III	Building Windows Applications – Creating a Windows Applications using window controls- Windows Forms - Text Boxes - Rich Text boxes – Labels and link labels – Buttons -Check boxes - Radio buttons - Panels and Group Boxes - List Boxes - Checked List boxes -Combo boxes and Picture boxes - Scroll bars – Calendar control - Timer control – Handling Menus – Dialog boxes –Report Viewer- Graphics- Deploying an Application.
Unit IV	ASP.NET Basics: Features of ASP.NET – ASP.NET Page directives - BuildingFormswithWebserverControls–ValidationServerControls–RichWeb Controls-CustomControls–Collectionsand Lists.
Unit V	Data Management with ADO.NET - Introducing ADO.NET - ADO.NET features – Using SQL Server with VB.NET – Using SQL Server with ASP.NET.
TOTAL	75 Hrs
CO	**CourseOutcomes**

CO1	Understandtheconceptof.Net Framework
CO2	EvaluateArrays, Strings,ExceptionsandOOPs concept.
CO3	Buildanddebug theWindows FormswithVB.NETControls.
CO4	Identifythevarious stagesindevelopingaweb forms
CO5	UseADO.NetFrameworkinaWindows/Webapplicationtoread,insert,andupdate data in a database.

Textbooks

➢	VisualStudio 2019 In Depth-byOckertJ. du Preez (Author)-BPBPublications
➢	Programmingwith Microsoft VisualBasic-DianeZak -Cengage Learning
➢	ProgrammingASP.NETCore ByDinoEsposito-Pearson Education
➢	ADO.NETinaNutshell-BillHamilton, Matthew MacDonald-O'Reilly

ReferenceBooks

1.	VisualBasic2019-Dr.Liew Voon
2.	KiongASP.NETCoreinAction-SecondEdition-AndrewLock-Manning

NOTE:LatestEditionofTextbooksMaybeUsed

WebResources

1.	https://dotnet.microsoft.com/en-us/learn
2.	https://www.javatpoint.com/net-framework
3.	https://www.geeksforgeeks.org/introduction-to-net-framework/
4.	https://www.w3schools.com/asp/default.ASP

CO/ PSO	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6
CO1	3	2	2	3	3	3
CO2	3	3	2	3	3	3
CO3	3	3	3	3	3	3
CO4	3	3	2	3	3	3
CO5	3	3	2	3	3	3
Weightage of course contributedtoeachPSO	15	14	11	15	15	15

SUBJECT NAME	CC-XI-.NET Programming Lab							
SUBJECT CODE	23BIT5P1							

L	T	P	S	Credits	Inst. Hours	Marks		
						CIA	External	Total
-	-	5	-	4	5	25	75	100

LearningObjectives

LO1	ToprovidesufficientknowledgeindevelopingWindows/Webapplications.
LO2	To manipulatedata fromSQLServerusingMicrosoftADO.NET.

Prerequisites:

Contents

1. WriteaprogramtocreatetheStudentMark Listusing VB.NET.

2. Writeaprogramto create theEB-Billusing VB.NET.

3. Designanddevelopa PuzzleGameusing VB.NET

4. DesignanddevelopaCalculatorusing VB.NET

5. Writean ImageScrollingprogramusing VB.NET.

6. Writeaprogramto ResizetheImageheightandWidthusingScrollbarin VB.NET

7. Writeaprogramto DrawaPictureusing mouse eventsinVB.NET

8. WriteaprogramtoDrawa Homeusinggraphics function in VB.NET

9. DesignanddevelopaTextEditorusing VB.NET.

10. Writea programtoMaintainthe Book Details UsingVB.NET&ADO.NET

11. Writea ASP.NET programusing AdRotator

12. Writea ASP.NET programusing Cookies

13. WriteaASP.NETprogramtofind thePageCountdetailsusingApplication Object.

14. WriteaASP.NET programto prepare the SalaryBill.

15. Writea ASP.NET programtofindthe AirwayTariff Details.

16. Writea ASP.NETprogramto displaythe price Listof theItem.

17. WriteaASP.NET programto design theBio dataformwithvalidation control.

18. Writeaprogramtocreatethewebpageusing MasterPage withnavigation control.

19. WriteaprogramtoDisplaytheSalesItemRecordsusinggridviewcontrolwithdata binding controls.

20. WriteaprogramtomaintaintheAddressBookusingASP.NET& ADO.Net.

CO	CourseOutcomes
CO1	DemonstrateMSVisualStudio.NETIDEtoCreateapplications.
CO2	ApplyVB.NETandASP.NETconcepts todesign applications.
CO3	Buildawebapplicationconceptstosolvetheproblem
CO4	Evaluatetheapplicationtofixtheerrors.
CO5	UseADO.NetFrameworkinaWindows/Webapplicationtoread,insert,andupdate data in a database.

CO/ PSO	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6
CO1	3	2	2	3	3	3
CO2	3	3	2	3	3	3
CO3	3	3	3	3	3	3
CO4	3	3	2	3	3	3
CO5	3	3	2	3	3	3
Weightage of course contributedtoeachPSO	15	14	11	15	15	15

SUBJECT NAME	CC-XII-E-Commerce and Digital Marketing						
SUBJECT CODE	23BIT5C3						

L	T	P	S	Credits	Inst. Hours	Marks		
						CIA	External	Total
5	-	-	-	4	5	25	75	100

LearningObjectives

LO1	ToUnderstandthefundamentalsofe-commerceand itssignificancein the modern business landscape.
LO2	TounderstandthebasicConceptsofDigitalmarketingandthe road mapforsuccessful Digitalmarketingstrategies.
LO3	Applyethicalandlegalconsiderationsin e-commerceanddigitalmarketing practices.

Prerequisites:

Contents

Unit I	Introduction to E– commerce: History of E– Commerce – E– commerce v/s Traditional Commerce-EDI – Importance, features & benefits of E– Commerce – E– Business & E– Commerce –Impacts, Challenges & Limitations of E– Commerce–Supply chain management &E–Commerce–E–Commerce Infra structure.
Unit II	Business models of E–Commerce: Business to Business–Business to customers–Customers to Customers–Business to Government–Business to Employee – E–Commerce strategy–Influencing factors of successful E– Commerce.
Unit III	Electronic Payment System : Introduction – Online payment systems – prepaid and postpaid payment systems – e– cash, e– cheque, Smart Card, Credit Card , Debit Card, Electronic purse – Security issues on electronic payment system – Solutions to security issues–Biometrics–Types of biometrics. Legal and ethical issues in E– Commerce: Security issues in E– Commerce–Regulatory framework of E– commerce.
Unit IV	Fundamentals of Digital marketing & Its Significance-Traditional marketing Vs Digital Marketing, Evolution of Digital Marketing-Digital Marketing Landscape-Digital marketing Strategy- Consumer Decision journey-POEM Framework, Segmenting&Customizingmessages-DigitaladvertisingMarketinIndia-Skills In Digital Marketing-Digital marketing Plan.
Unit V	Terminology used in Digital Marketing-PPC and online marketing through social media-Social Media Marketing-SEO techniques-Keyword advertising-Google web-master and analytics overview-Affiliate Marketing-Email Marketing-Mobile Marketing, Display adverting-Buying Models-different type of ad tools-Display advertisingterminology-typesofdisplayads-differentadformats-Adplacement techniques-importantadterminology-ProgrammaticDigitalAdvertising.
TOTAL	75 Hrs
CO	**CourseOutcomes**

CO1	Understand the fundamental concepts and principles of e-commerce, including its evolution, types, and business models.
CO2	Gain knowledge of managing e-commerce platforms, payment gateways, and security measures.
CO3	Helps to identify core concepts of marketing and the role of marketing in society.
CO4	Explore the role of digital marketing in sales for e-commerce businesses.
CO5	Gain insights into the ethical and legal considerations in e-commerce and digital marketing practices, including privacy, data protection, and regulatory compliance.

Textbooks
➤ E-Commerce 2021: Business, Technology, and Society - by Carol Guercio Traver Kenneth C. Laudon - Pearson Education.
➤ E-Commerce: An Indian Perspective - by S.J.P.T. Joseph - 6th Edition - PHI Learning Pvt. Ltd.
➤ Digital Marketing - Nitin Kamat and Chinmay Nitin Kamat - Himalaya Publishing House.
➤ Digital Marketing - Seema Gupta - McGraw-Hill

Reference Books
1. E-Business & E- Commerce– Dr.P.Rizwan Ahmed- Margham Publication
2. Quickwin Digital Marketing, H.Annmarie, A.Joanna, Paperback edition

NOTE: Latest Edition of Textbooks May be Used

Web Resources
1. https://www.tutorialspoint.com/e_commerce/index.htm
2. https://www.javatpoint.com/e-commerce-definition
3. https://www.hostinger.in/tutorials/what-is-ecommerce
4. https://skillshop.exceedlms.com/student/collection/654330-digital-marketing
5. https://www.tutorialspoint.com/digital_marketing/index.htm

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

	SUBJECT NAME	DSE-I- Relational Database Management System					
	SUBJECT CODE	23BIT5E1					

L	T	P	S	Credits	Inst. Hours	Marks		
						CIA	External	Total
4	-	-	-	3	4	25	75	100

Learning Objectives

LO1	TounderstandthebasicDBMSmodelsand architecture
LO2	Tolearn howtoqueryand normalizethedatabase.
LO3	Tostudythedatabasedesign,transactionProcessingandManagementandSecurity Issues.

Prerequisites:

Contents

UnitI	Introduction to Databases: Introduction – Characteristics of the Database Approach – Actors on the Scene – Workers behind the scene– Advantages of using DBMS Approach. Overview of database and Architectures: Data Models, Schemas, and Instances – Three-schema Architecture and Data Independence – Database languages&Interfaces–DatabaseSystemEnvironment–Centralized&Client Server Architecture for DBMS-Classification of DBMS.
UnitII	Basic Relational Model: Relational Model Concepts – Relational Model Constraints and Relational Database Schemas – Update Operations, Tractions, Dealing with Constraint Violations – Formal Relational Languages: Unary Relational Operations: SELECT and PROJECT – Relational Algebra Operations fromSetTheory–BinaryRelationalOperations:JOINandDIVISION– ExamplesofQueriesinRelationalAlgebra.
UnitIII	Conceptual Data Modeling using the ER Model: Using High-Level Conceptual Data Models for Database Design – An example DB application – Entity Types, Entity Sets, Attributes, and Keys– Relationship Types, Relationship sets, Roles, and Structural Constraints –Weak entity types – Example- Mapping a Conceptual DesignintoLogicalDesign:RelationalDatabaseDesignusingER-Relational Mapping– MappingEER ModelConstructs to Relations
UnitIV	Functional Dependencies and Normalization for Relational Database: Functional Dependencies – Definition of Functional Dependency– Normal Forms based on Primary Keys – Normalization of Relations– First Normal Form – Second NormalForm–ThirdNormalForm–BCNF-FourthNormalForm-FifthNormal Form.
UnitV	PL/SQL: Introduction to PL/SQL – More on PL/SQL – Error Handling in PL/SQL –Named Exception Handlers – Stored Procedures and Functions – Execution of Procedures and Functions – Advantages – Procedures Vs. Functions – Syntax for CreatingProceduresandFunctions–DeletingaStoredProcedureorFunction– Packages – Database Triggers – Types Of Triggers – Deleting a Trigger – Raise-Application Error Procedure
TOTAL	75 Hrs

CO	CourseOutcomes
CO1	OutlinethefundamentalRDBMSconceptsandPL/SQL
CO2	Applydatabaseoperations, mapping,normalization,SQLand PL/SQL
CO3	Analyzetherequirementstoimplementrelationaldatabaseconcepts
CO4	Evaluatethedatabasebasedonvariousmodelsand normalization.
CO5	DesignandconstructnormalizedtablesandmanipulateiteffectivelyusingSQLand PL/SQL database objects
Textbooks	
➤	RamezElmasri,ShamkantB.Navathe(2014),―DatabaseSystems‖,Sixthedition, PearsonEducation, NewDelhi.
➤	SQL,Pl/SQLTheProgrammingLanguageOfOracleByIvanBayross- VISIONIAS - 2020.
ReferenceBooks	
1.	AbrahamSilberschatz,HenryF.Korth,S.Sudarshan,DatabaseSystemConcepts,Tata McGraw Hill Publication, 7th Edition.

NOTE:LatestEditionofTextbooksMaybeUsed

WebResources	
1.	https://www.javatpoint.com/dbms-tutorial
2.	https://www.tutorialspoint.com/dbms/index.htm
3.	https://www.tutorialspoint.com/sql/index.htm
4.	http://ecomputernotes.com/database-system/rdbms
5.	https://www.guru99.com/dbms-tutorial.html

CO/ PSO	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6
CO1	3	2	2	3	3	3
CO2	3	3	2	3	3	3
CO3	3	3	3	3	3	2
CO4	3	3	2	3	3	3
CO5	3	3	2	3	3	2
Weightage of course contributedtoeachPSO	15	14	11	15	15	13

				SUBJECT NAME		DSE-I-Data Mining		
				SUBJECT CODE		23BIT5E2		
L	**T**	**P**	**S**	**Credits**	**Inst. Hours**	**Marks**		
						CIA	**External**	**Total**
4	**-**	**-**	**-**	**3**	**4**	**25**	**75**	**100**

	Learning Objectives
LO1	Toidentifytheunderlyingconceptsand the fundamentaldata miningmethodologies withtheabilitytoformulate andsolve problems
LO2	Understand the data sets, data preprocessing and demonstrate the working of algorithms for data mining tasks such as association rule mining, classification, clustering and regression.

Prerequisites:

	Contents
Unit I	**Introduction:** Data Mining – Kinds of Data and Patterns to be Mined – Technologies used –Kinds of Applications are Targeted - Major Issues – Data objects and Attribute types – Basic statistical Descriptions of Data- **Data Preprocessing**:DataCleaning–DataIntegration-DataReduction-Data Transformation.
Unit II	**Association Rules Mining**: Introduction – Frequent Itemset Mining Methods: Apriori Algorithm-Generating Association Rules from Frequent Itemsets-ImprovingtheefficiencyofApriori-APattern–Growth-Approachformining FrequentItemsets-PatternEvaluationMethods.
Unit III	**Classification:** Introduction –Basic concepts – Logistic regression –Decisiontree induction–Bayesianclassification,Rule–basedclassification-ModelEvaluation and selection.
Unit IV	**Cluster Analysis:** Introduction-Requirements for Cluster Analysis - **Partitioning Methods**: The K-Means method - **Hierarchical Method**: Agglomerative method - **Densitybasedmethods:**DBSCAN-**EvaluationofClustering**:Determiningthe NumberofClusters–MeasuringClusteringQuality.
Unit V	**Outlier Detection:** Outliers and Outlier Analysis – Outlier DetectionMethods - **Data Visualization:** Pixel-oriented visualization – Geometric Projection visualizationtechnique-Icon-based-Hierarchicalvisualization-Visualizingcomplex data and relations.
TOTAL	**60 Hrs**

CO	CourseOutcomes
CO1	Outline the fundamentals and the principles of Data Mining
CO2	Apply suitable different preprocessing for datamining
CO3	Classify data-mining techniques based on the different applications
CO4	Analyze the various datamining algorithms with respect to functionality
CO5	Recommend appropriate data models for datamining techniques to solve real world problems
Textbooks	
➢	DataMining:TheDataMiningGuideforBeginners,IncludingApplicationsforBusiness, Data Mining Techniques, Concepts, and More by Herbet Jones 2020.
➢	DataMining:Concepts andTechniques-JiaweiHan ,MichelineKamber &Jian Pei -MorganKaufmann-Edition:2019
ReferenceBooks	
1.	IanH.WittenandEibeFrank,(2005),―DataMining:PracticalMachineLearningTools andTechniques(SecondEdition)‖,MorganKaufmann.
2.	ArunKPujari,―DataMiningTechniques‖, 10impression, UniversityPress,2008.
3.	DanielT.Larose,ChantalD. Larose,"DataminingandPredictiveanalytics,"Second Ed.,WileyPublication, 2015.
4.	G.K.Gupta,―IntroductiontoDataminingwithcasestudies‖,2nd Edition,PHIPrivate limited,NewDelhi, 2011.

NOTE:LatestEditionof TextbooksMaybeUsed	
WebResources	
1.	https://www.javatpoint.com/data-mining
2.	https://www.geeksforgeeks.org/what-is-data-mining-a-complete-beginners-guide/
3.	https://www.guru99.com/data-mining-tutorial.html

CO/ PSO	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6
CO1	2	2	2	2	3	3
CO2	3	3	2	3	3	2
CO3	2	3	3	2	3	3
CO4	3	3	2	2	3	3
CO5	3	3	2	2	3	3
Weightage of course contributedtoeachPSO	13	14	11	11	15	14

				SUBJECT NAME	DSE-II- Artificial Intelligence			
				SUBJECT CODE	23BIT5E3			
L	**T**	**P**	**S**	**Credits**	**Inst. Hours**	**Marks**		
						CIA	**External**	**Total**
4	**-**	**-**	**-**	**3**	**4**	**25**	**75**	**100**

LearningObjectives

LO1	TolearnvariousconceptsofAITechniques&Algorithm.
LO2	TolearnprobabilisticreasoningandmodelsinAI.
LO3	TolearnvarioustypeofReinforcementlearning.

Prerequisites:

Contents

Unit I	Overview:foundations,scope,problems,andapproachesofAI.Intelligentagents: reactive,deliberative,goal-driven,utility-driven,andlearningagents,Artificial Intelligence programming techniques.
Unit II	Problem Spaces / Problem solving methods: problem solving through Search:State space search- Strategies for search space- Data driven, goal driven, breadth first,depthfirst. HeuristicSearches:"Best"firstsearches.Heuristicin Games:The MinMax procedure-Alpha– Beta procedure.
Unit III	Knowledge Representation: Principles of KR using predicate logic - Overview of KR using other logics Structured representations of knowledge.
Unit IV	Planning and Construction: planning as search, partial order planning,construction and use of planning graphs, Representing and Reasoning with Uncertain Knowledge:probability,connectiontologic,independence,Bayesrule,Bayesian networks,probabilisticinference,sample applications.
Unit V	Decision Making: Decision- Making: basics of utility theory, decision theory, sequential decision problems, elementary game theory, sample applications. MachineLearningandKnowledgeAcquisition:learningfrommemorization, examples,explanation,andexploration.
TOTAL	**60 Hrs**

CourseOutcomes		ProgrammeOutcome
CO	Oncompletionofthiscourse,studentswill	
1	Understandthevariousconceptsof AITechniques.	PO1
2	Understandvariousproblemsolving methodinAI.	PO1,PO2
3	Understandthelogicprediction inAI.	PO4,PO6
4	UnderstandPlanningConstructioninAI.	PO4,PO5, PO6
5	UnderstandvarioustypeofDecisionMaking techniques.	PO3,PO8
TextBook		
1	ArtificialIntelligence:AModernApproach-byRussell/Norvig-4thEdition-Pearson Education	
2.	ArtificialIntelligencebyKevinKnight(Author),ElaineRich (Author),ShivashankarB. Nair(Author)-3rdEdition-McGrawHillEducation	
ReferenceBooks		
1.	ArtificialIntelligence 10 - byShivani(2024 Edition)-KipsLearning PvtLtd	
2.	Saroj Kaushik,—Artificial Intelligence‖,Cengage LearningIndia,2011	
3.	Trivedi,M.C.,—AClassicalApproachtoArtificalIntelligence‖,KhannaPublishing House, Delhi.	
WebResources		
1.	NPTEL&MOOCcoursestitledArtificialIntelligenceandExpert Systems	
2.	https://nptel.ac.in/courses/106106140	
3.	https://nptel.ac.in/courses/106106126	
4.	https://www.javatpoint.com/artificial-intelligence-ai	

MappingwithProgrammeOutcomes:

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8
CO1	S							
CO2	S	S						
CO3				S		S		
CO4				S	S	S		

SUBJECT NAME				DSE-II- Machine Learning				
SUBJECTCODE				23BIT5E4				
L	**T**	**P**	**S**	**Credits**	**Inst. Hours**	**Marks**		
						CIA	**External**	**Total**
4	**-**	**-**	**-**	**3**	**4**	**25**	**75**	**100**

LearningObjectives

LO1	Tocomprehendtheraw dataandtodesignthesamewiththeappropriate machine learningalgorithmsfora meaningfulrepresentationofdata..
LO2	Understandhowtoevaluatemodelsgeneratedfrom data
LO3	Understanda widevarietyof learningalgorithms

Prerequisites:

Contents

UnitI	**Introduction:** Machine Learning – Examples of Machine Learning Applications. **Supervised Learning:** Learning a Class from Examples–Vapnik-Chervonenkis (VC)Dimension–Probably Approximately Correct(PAC)Learning–Noise– Learning Multiple Classes–Regression –Model Selection and Generalization– Dimensions of a Supervised Machine Learning Algorithm. **Bayesian Decision Theory:** Introduction–Classification–Losses and Risks–Discriminant Functions – Association Rules.
UnitII	**Parametric Methods:** Maximum Likelihood Estimation – Evaluating anEstimator: Bias and Variance – The Bayes' Estimator – Parametric Classification – Regression – Tuning Model Complexity: Bias/Variance Dilemma – Model Selection Procedures. **Nonparametric Methods:** Nonparametric Density Estimation – Generalization toMultivariate Data – Nonparametric Classification – CondensedNearestNeighbor–Distance-BasedClassification–OutlierDetection –NonparametricRegression:SmoothingModels
UnitIII	**Linear Discrimination** – Generalizing the Linear Model – Geometry ofthe Linear Discriminant–PairwiseSeparation –GradientDescent– LogisticDiscrimination – Discrimination by Regression – Learning to Rank. **Multilayer Perceptrons:** The Perceptron – Training a Perceptron–Learning Boolean Functions– Multilayer Perceptrons–MLPasa Universal Approximator – Backpropagation Algorithm
UnitIV	**Combining Multiple Learners:** Generating Diverse Learners – ModelCombinationSchemes–Voting–Bagging–Boosting–Stacked Generalization – Fine-Tuning an Ensemble – Cascading Reinforcement Learning: Elementsof ReinforcementLearning–Model-BasedLearning– TemporalDifferenceLearning–Generalization–PartiallyObservable States
UnitV	**Machine Learning with Python**: Data Pre-processing, Analysis & Visualization - Training Data and Test Data – Techniques – Algorithms:List of Common Machine LearningAlgorithms-DecisionTreeAlgorithm-NaïveBayesAlgorithm-K-Means-Random Forest- Dimensionality Reduction Algorithm- Boosting Algorithms – Applications:SocialMedia-RefinementofSearchEngineResults-Product Recommendations-Detection of Online frauds.
TOTAL	**60 Hrs**

CO	CourseOutcomes
CO1	Outline the importance of machine learning in terms of designing intelligent machines
CO2	Identify suitable machine learning techniques for the realtime applications
CO3	Analyze the theoretical concepts and how they relate to the practical aspects of machine learning.
CO4	Assess the significance of principles, algorithms and applications of machine learning through a hands-on approach
CO5	Compare the machine learning techniques with respective functionality
Textbooks	
➤	(UnitI–UnitIV): IntroductiontoMachineLearning-EthemAlpaydın—PHILearning (**Unit V:** Machine learning with python tutorial) https://www.tutorialspoint.com/machine_learning_with_python/machine_learning_with_python_tutorial.pdf
ReferenceBooks	
1.	DesigningMachineLearningSystems:AnIterativeProcessforProduction-Ready Applications-byChipHuyen-Shroff/O'Reilly-2022
2.	MachineLearninginDataScienceUsingPython-byDr.R.NageswaraRao-Dreamtech Press-2022
3.	MachineLearning: Hands-OnforDevelopersandTechnical Professionals-JasonBell-WileyPublication,2015.
NOTE:LatestEditionofTextbooksMaybeUsed	
WebResources	
1.	https://www.expertsystem.com/machine-learning-definition/
2.	https://searchenterpriseai.techtarget.com/definition/machine-learning-ML

CO/ PSO	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6
CO1	3	2	2	2	2	2
CO2	2	3	3	3	3	2
CO3	2	2	3	3	3	3
CO4	3	2	2	3	2	3
CO5	3	3	3	2	3	3
Weightageofcourse contributedtoeach PSO	13	12	13	13	13	13

Subject Code	SubjectName	Category	L	T	P	S	Credits	Inst.Hours	Marks		
									CIA	Ext	Total
23BIT5IV	Internship / IndustrialVisit/ Field Visit		-	-	-	-	2	-	25	75	100

							Marks		
	SUBJECT NAME			CC-XIII-Software Project Management					
	SUBJECT CODE			23BIT6C1					
L	**T**	**P**	**S**	**Credits**	**Inst. Hours**		**CIA**	**External**	**Total**
4	-	-	-	4	6		25	75	100

Learning Objectives

LO1	Todefineandhighlight importanceofsoftwareproject management.
LO2	Toformulateanddefinethesoftwaremanagementmetrics&strategyin managing projects
LO3	Understandtoapplysoftwaretestingtechniquesincommercial environment

Prerequisites:

Contents

UnitI	Evaluation and project planning-Importance of software project management-Activities-Methodologies-Categorization of software projects-setting objectives-Management principles-Management control-Project portfolio management-Cost benefit evaluation technology-Risk Evaluation-Strategic program management-Step wise project planning.
UnitII	Project life cycle and effort estimation-Software process and process models-Choice of process models-Rapid application development-Agile methods-Dynamic system development methods-Extreme Programming-Managing interactiveprocesses-Basicsofsoftwareestimation-Effortandcostestimation techniques-cosmic full function points.
UnitIII	Objectives of activity planning-Project schedule Activities-Sequencing and Scheduling-Network planning models-Formulating network model-Forward pass and backward pass techniques-Critical path method-Risk identification-Risk Planning-Riskmanagement-PERTtechnique-MontoCarloSimulation-Resource Allocation-Creation of critical paths-Cost Schedules.
UnitIV	Framework for management and control-Collection of data-Visualizing progress-Cost monitoring-Earned value analysis-Prioritizing monitoring-Project tracking-changecontrol-Softwareconfigurationmanagement-Managingcontracts-Contract management,
UnitV	Staffing in software projects-Managing people-organizational behavior-best methods of staff selection-motivation-The Oldham-Hack man job characteristics model-stress-health and safety-ethical professional concerns-working in teams-Decisionmaking-organizationalstructures-communicationgenres-communication plans-Leadership.
TOTAL	**90 Hrs**

CO	CourseOutcomes
CO1	Understandtheprinciplesandconceptsofprojectmanagement
CO2	Knowledgegainedtotrainsoftwareprojectmanagers
CO3	Applysoftwareprojectmanagement methodologies
CO4	Abletocreatecomprehensiveproject plans
CO5	Evaluateandmitigaterisksassociatedwithsoftwaredevelopmentprocess

Textbooks
➢ SoftwareProjectManagement-BobHughes, MikeCotterell, RajibMall -TMH 6th - 2018
➢ ProjectManagementandTools&Technologies:Anoverview-ShaileshMehta SPD 1st 2017

ReferenceBooks
1. SoftwareProjectManagement:AUnifiedFramework -WalkerRoyce -Pearson
2. Effectivesoftwareprojectmanagement -RobertK.Wysocki, wileypublications

NOTE:LatestEditionofTextbooksMaybeUsed

WebResources
1. NPTEL&MOOCcourses titledSoftwareProjectManagement
2. https://www.studocu.com/in/document/anna-university/software-project-management/software-project-management-notes-1st-unit/19435686
3. https://www.geeksforgeeks.org/software-engineering-software-project-management-spm/

CO/ PSO	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6
CO1	3	2	2	3	3	3
CO2	3	3	2	3	3	3
CO3	3	3	3	3	3	2
CO4	3	3	2	3	3	3
CO5	3	3	2	3	3	2
Weightageofcoursecontributed to each PSO	15	14	11	15	15	13

Subject Code	SubjectName	Category	L	T	P	S	Credits	Inst.Hours	CIA	External	Total
										Marks	
23BIT6D	CC-XIV-Dissertation	Core-XIV	-	-	12	-	8	12	50	150	200

Course Objective	
LO1	Thestudentswillbeallowedtoworkonanyprojectbasedontheconcepts studied incore/elective courses.
LO2	The project work should be compulsorily done in the college only under the supervision of the department staff.
LO3	Thecombinedprojectshallbeundertakenbythestudentsasateamoftwo.
LO4	ThenumberofteamsshouldbeequallyassignedtoexistingStaffmembers.
LO5	Thefollowing listofparameterstakenintoaccountfortheevaluationofProject workandViva-voce.TotalMarks:200(Internal:50marks,External:150Marks)

Contents	No.of Hours
Parameters: ForInternalMarks: Tworeviewmeetings-2×10=20Marks Debugging =10Marks Execution =10Marks Output =10Marks _____ Total =50Marks _____ ForExternalMarks: Project Report =50Marks Project demo & Presentation =50Marks Viva-Voce =50Marks _____ Total =150Marks _____	180

Total	
	180

Course Outcomes	ProgrammeOutcome
CO	Oncompletionofthiscourse,
CO1	Students will demonstrate creativity and innovationinthedesignandimplementationof ITsolutions,andintheexplorationofnew ideasandapproacheswithinthefield..	PO1
CO2	Students will gain knowledge about technological components of the software's	PO1, PO2
CO3	Identifying,analyzing,anddesigningsystems to solve information technology problems	PO1, PO3

	SUBJECT NAME	DSE-III-Internet of Things and Its Applications					
	SUBJECT CODE	**23BIT6E1**					
L	**T**	**P**	**S**	**Credits**	**Inst. Hours**	**Marks**		
						CIA	**External**	**Total**
5	**-**	**-**	**-**	**3**	**5**	**25**	**75**	**100**

	LearningObjectives	
LO1	To gainknowledgeon IndustryInternetofThings	
LO2	ToLearn aboutthe privacyand SecurityissuesinIoT	
LO3	ToImplementbasicIoTapplications	

Prerequisites:

Contents	
Unit 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.
UnitII	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 principlesandneededcapabilities,AnIoTarchitectureoutline,standards considerations.
UnitIII	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.
UnitIV	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,IoTforRetailingIndustry,IoTForOilandGasIndustry,Opinions onIoTApplicationandValueforIndustry,HomeManagement.
UnitV	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 TowardsaSecurePlatform,SmartieApproach.DataAggregationfortheIoTin SmartCities, Security.
TOTAL	**75 Hrs**

CO	CourseOutcomes
CO1	Understand the basics of IoT.
CO2	Interpret the impact and challenges by IoT.
CO3	Compare different Application protocols for IoT.
CO4	Analyze applications of IoT in real time scenario.
CO5	Understand the Privacy and Security Issues.
Textbooks	
➤	Internet of Things - A hands on Approach - Arshdeep Bahga, Vijay Madisetti Publisher: Universities press.
➤	Internet of Things by Shriram K Vasudevan, Abhishek S Nagarajan, RMD Sundaram -Wiley -2020
ReferenceBooks	
1.	Internet of Things - Srinivasa K.G., Siddesh G.M.Hanumantha Raju R. Publisher: Cengage Learning India pvt.Ltd(2018)
NOTE:Latest Edition of Textbooks May be Used	
WebResources	
1.	NPTEL&MOOC courses titled InternetOfThings and Its Applications.
2.	https://www.tutorialspoint.com/internet_of_things/index.htm
3.	https://www.tutorialsfreak.com/internet-of-things-iot-tutorial

MappingwithProgrammeOutcomes:

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8
CO1	S							
CO2	M	S						
CO3				S		S		
CO4				S	S	M		
CO5			S					S

S-Strong   M-Medium   L-Low

						Marks		
		JECTNAME			**DSE-III-Cloud Computing**			
		SUBJECT CODE			**23BIT6E2**			
L	**T**	**P**	**S**	**Credits**	**Inst. Hours**	**CIA**	**External**	**Total**
5	**-**	**-**	**-**	**3**	**5**	**25**	**75**	**100**

	LearningObjectives
LO1	TolearnthefundamentalsandessentialsofCloudComputing.
LO2	TolearnaboutArchitectureandApplicationdesignofCloudComputing.

Prerequisites:

	Contents
UnitI	Understanding Cloud Computing: Origins and Influences – Basic Concepts And Terminology – Goals And Benefits – Risks And Challenges. Fundamental Concepts And Models: Roles And Boundaries– Cloud Characteristics – Cloud Delivery Models – Cloud Deployment Models.
UnitII	Cloud – Enabling Technology: Broadband Networks And Internet Architecture – Data Center Technology – Virtualization Technology – Web Technology – Multitenant Technology –Service Technology. Cloud Infrastructure Mechanisms: Logical Network Perimeter– Virtual Server – Cloud Storage Device – Cloud Usage Monitor – Resource Replication – Readymade Environment.
UnitIII	Cloud Architecture, Services and Storage: Layered Cloud Architecture Design – NIST Cloud Computing Reference Architecture – Public, Private and Hybrid Clouds – IaaS – PaaS– SaaS – ArchitecturalDesign Challenges – Cloud Storage – Storage-as-a-Service – Advantages of Cloud Storage – Cloud Storage Providers – S3.
UnitIV	Cloud Resource Management : Inter Cloud Resource Management – Resource Provisioning and Resource Provisioning Methods – Global Exchange of Cloud ResourcesCloudSecurity Mechanism:Encryption–Hashing–Digitalsignature– Public key Infrastructure – Identity and Access Management – single Sign – On(SSO) – Cloud – Based Security Groups – Hardened Virtual server Images.
UnitV	Working With Clouds : Cloud Delivery Models :The Cloud Provider Perspective: Building Iaas Environments – Equipping Paas Environments – Optimizing Saas Environments. Cloud Delivery Models :The Cloud Consumer Perspective : Working With Iaas Environments –Working WithPaas Environments – Working WithSaas Services.
TOTAL	**75 Hrs**

CO	CourseOutcomes
CO1	Explainthecoreconceptsofthecloudcomputingparadigm.
CO2	Outlinethevirtualizationtechnologyanddeterminetheiruses.
CO3	Applythefundamentalconceptsindatacenterstounderstandthetradeoffsinpower,efficiency and cost.
CO4	Identifyresourcemanagementfundamentals,i.e.resourceabstraction,sharingand sandboxingandoutlinetheirroleinmanaginginfrastructurein cloudcomputing.
CO5	Analyzevariouscloudprogrammingmodelsandapplythemtosolveproblemsonthe cloud.
Textbooks	
➤	CloudComputing:Implementation,ManagementandSecurity-Rittinghouse,JohnW., and James F. Ransome- CRC Press, 2017.
➤	CloudComputingbySunilkumarManvi, GopalShyam -CRCPress-2021
ReferenceBooks	
1.	TheCloudComputing BookbyDouglasComer-Chapman and Hall/CRC-2021
2.	CloudComputingforDummiesbyJudith Hurwitz, DanielKirsch -Wiley-2020

NOTE:LatestEditionofTextbooksMaybeUsed

WebResources	
1.	NPTEL&MOOCcoursestitledcloudcomputing.
2.	https://www.javatpoint.com/cloud-computing
3.	https://k21academy.com/cloud-blogs/cloud-fundamentals/

MappingwithProgrammeOutcomes:

CO/ PSO	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6
CO1	3	2	2	2	2	2
CO2	2	3	3	3	3	2
CO3	2	2	3	3	3	3
CO4	3	2	2	3	2	3
CO5	3	3	3	2	3	3
Weightageofcourse contributedtoeach PSO	13	12	13	13	13	13

SUBJECT NAME	DSE-IV-Introduction to Data Science							
SUBJECT CODE	23BIT6E3							

L	T	P	S	Credits	Inst. Hours	Marks		
						CIA	External	Total
5	-	-	-	3	5	25	75	100

LearningObjectives

LO1	Identifyanddescribethe methodsand techniquescommonlyused indata science.
LO2	TolearnaboutModel development.

Prerequisites:

Contents

UnitI	Introduction to Data Science – Evolution of Data Science – Data Science Roles – Stagesin aData ScienceProject– Applicationsof DataScienceinvarious fields– DataSecurityIssues.
UnitII	DataCollectionandDataPre-Processing-DataCollectionStrategies–DataPre-Processing Overview– Data Cleaning– Data Integrationand Transformation– Data Reduction – Data Discretization.
UnitIII	Exploratory Data Analytics Descriptive Statistics – Mean, Standard Deviation, Skewness and Kurtosis – Box Plots – Pivot Table – Heat Map – Correlation Statistics – ANOVA.
UnitIV	ModelDevelopmentSimpleandMultipleRegression–ModelEvaluationusing Visualization–ResidualPlot–DistributionPlot–PolynomialRegressionand Pipelines– MeasuresforIn-sampleEvaluation –PredictionandDecisionMaking.
UnitV	Model Evaluation Generalization Error – Out-of-Sample Evaluation Metrics – Cross Validation – Overfitting – Under Fitting and Model Selection – Prediction by using Ridge Regression – Testing Multiple Parameters by using Grid Search.
TOTAL	75 Hrs

CO	CourseOutcomes
CO1	UnderstandthebasicsinDataScience .
CO2	UnderstandoverviewandbuildingprocessinData Science.
CO3	UnderstandDataCollectionandDataPre-Processing .
CO4	UnderstandtheDataAnalytics/ Statistics.
CO5	AnalyzevariousModelDevelopment/Evaluation.

Textbooks
➢ "DoingDataScience"-CathyO'Neiland RachelSchutt-O'Reilly, 2015
➢ ManagingDataScienceEffectiveStrategiestoManageDataScienceProjectsand Build a Sustainable Team By Kirill Dubovikov-Packt Publishing-2019
➢ An introductiontoDataSciencebyJeffrey Stanton.

ReferenceBooks
1. IntroductiontoDataScience EssentialConceptsByPetersMorgan-CreateSpace IndependentPublishing Platform
2. TheElements ofDataAnalytic StylebyJeff Leek

NOTE:LatestEditionofTextbooksMaybeUsed

WebResources
1. NPTEL&MOOC coursestitledData Science.
2. https://www.simplilearn.com/tutorials/data-science-tutorial
3. https://www.w3schools.com/datascience/

MappingwithProgrammeOutcomes:

CO/ PSO	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6
CO1	3	2	2	2	2	2
CO2	2	3	3	3	3	2
CO3	2	2	3	3	3	3
CO4	3	2	2	3	2	3
CO5	3	3	3	2	3	3
Weightageofcourse contributedtoeach PSO	13	12	13	13	13	13

SUBJECT NAME	DSE-IV-DSE-IV-Big Data Analytics							
SUBJECT CODE	23BIT6E4							

L	T	P	S	Credits	Inst. Hours	Marks		
						CIA	External	Total
5	-	-	-	3	5	25	75	100

LearningObjectives	
LO1	To know the fundamental concepts of big data and analytics.
LO2	To explore tools and practices for working with big data.

Prerequisites:

Contents	
UnitI	Introduction to Big Data Analytics – Data Analytics – Analytics Terminology – Types of Analytics – Analytics LifeCycle - DataStore – Getting Started with R – Data Exploration – Data Preparation
Unit II	Introduction to machine learning –Dimensionality reduction –Hardware Acceleration for Machine Learning and Big Data Analytics–Social Network Analytics. Descriptive analytics.
UnitIII	Market Basket Analysis– Kernel Density Estimation– Regression– Relational Logistics Regression –Relational Neighbor Classifiers –Bigraphs – Collective Inferencing.
UnitIV	Common predictive Modeling Techniques: RFM – Regression – Generalised Linear Models – Neural Network – Decision and Regression trees – Support vector Machines – Bayesian Methods Network Classification – Ensemble Methods.
UnitV	SegmentationandHadoop–ClusterAnalysis –DistanceMeasures –Evaluating Clustering – Number of Clusters – K-means Algorithm – Hierarchical Clustering –Introduction to Neural Networks – Support Vector Machines - K NearestNeighborclassification-Ensemblelearning.Hadoopconcepts-Hadoopdistributedfilesystem (HDFS)basics.
TOTAL	75 Hrs

CO	CourseOutcomes
CO1	UnderstandBigDataanditsanalyticsin therealworld.
CO2	ExposuretoDataAnalyticswith R.
CO3	Understandtheusage ofMachineLearningin BigData Analytics.
CO4	UnderstandCommonpredictiveModeling Techniques.
CO5	AnalyzetheBigDataframeworklikeHadoop .

Textbooks
➢ AnalyticsinaBigDataWorld-BartBaesens-Wiley
➢ BigDataandAnalytics bySubhashiniChellappanSeemaAcharya -Wiley-2019
➢ Hadoop2Quick-StartGuide:LearntheEssentialsofBigDataComputingintheApache Hadoop 2 Ecosystem- Douglas Eadline-Addison-Wesley Educational Publishers Inc

ReferenceBooks
1. BigData,DataMining,MachineLearning-JaredDean-Wiley
2. BigDataAnalytics: Introduction toHadoop,Spark, andMachine-Learning-by Raj Kamal,PreetiSaxena-McGrawHillEducation-2019
3. BigDataAnalytics-LakshmiPrasad.Y-NotionPress.

NOTE:LatestEditionofTextbooksMaybeUsed

WebResources
1. NPTEL&MOOCcourses titledBigData Analytics.
2. https://www.simplilearn.com/tutorials/big-data-tutorial
3. https://www.tutorialspoint.com/big_data_analytics/index.htm
4. https://intellipaat.com/blog/big-data-tutorial-for-beginners/
5. https://www.edureka.co/blog/big-data-tutorial

MappingwithProgrammeOutcomes:

CO/ PSO	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6
CO1	3	2	2	2	2	2
CO2	2	3	3	3	3	2
CO3	2	2	3	3	3	3
CO4	3	2	2	3	2	3
CO5	3	3	3	2	3	3
Weightageofcourse contributedtoeach PSO	13	12	13	13	13	13

SEC-VIII-Skill Enhancement Course

Subject Code	SubjectName	Category	L	T	P	S	Credits	Inst.Hours	CIA	External	Total
									Marks		
23BIT6S1	**Quantitative Aptitude**	Professional Competency Skill	Y	-	-	-	1	2	25	75	100
CourseObjective											
C1	Tounderstandthebasicconcepts ofnumbers										
C2	Understandand applytheconceptofpercentage,profit&loss										
C3	Tostudythe basicconceptsoftime and work, interests										
C4	Tolearntheconceptsof permutation,probability,discounts										
C5	Tostudyaboutthe conceptsof datarepresentation, graphs										
UNIT	**Details**										
UNIT I	Numbers-HCFandLCMofnumbers-Decimalfractions-Simplification-Squarerootandcuberoots-Average-problemsonNumbers.										
UNIT II	ProblemsonAges-SurdsandIndices-percentage-profitsandloss-ratio andproportion-partnership-Chainrule.										
UNIT III	Timeandwork-pipesandcisterns -TimeandDistance-problemson trains -Boatsandstreams-simpleinterest-compoundinterest-Logarithms- Area-Volume and surface area -races and Games of skill.										
UNIT IV	Permutationandcombination-probability-TrueDiscount-BankersDiscount –HeightandDistances-Oddmanout&Series.										
UNIT V	Calendar-Clocks-stocksandshares-Datarepresentation-Tabulation–BarGraphs-Piecharts-Linegraphs.										

CO	Oncompletionofthiscourse,studentswill	
1	understandtheconcepts,applicationandtheproblemsof numbers	PO1
2	Tohavebasicknowledgeandunderstandingabout percentage, profit &loss related processing	PO1,PO2
3	Tounderstandtheconceptsoftimeandwork	PO4,PO6
4	Speaksabouttheconceptsofprobability,discount	PO4,PO5, PO6
5	Understandingtheconceptofproblemsolvinginvolvedin stocks & shares, graphs	PO3,PO8
TextBook		
1	QuantitativeAptitudeforCompetitiveExaminationsAllGovernmentand entranceExamsbyR.SAggarwal(Banking,SSC,Railway,Police,Civil Service,etc.)SolvedExamples|10000+PracticeQuestions-April 2022	
ReferenceBooks		
1.	QuantitativeAptitudeForCompetitive Examinations |Latest questionsIFreevideo solutionof eachquestion onYoutube byPinnaclepublications-January2024	
2.	OswaalObjectiveQuantitativeAptitude ForAllCompetitiveExaminationsChapter-wise &Topic-wise, A Complete Book byOswaalEditorialBoard-June 2023	
WebResources		
1.	https://www.javatpoint.com/aptitude/quantitative	
2.	https://www.toppr.com/guides/quantitative-aptitude/	
3.	https://www.geeksforgeeks.org/quantitative-aptitude/	
4.	https://nptel.ac.in	

MappingwithProgrammeOutcomes:

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8
CO1	S							
CO2	M	S						
CO3				S		S		
CO4				S	S	M		
CO5			S					S

S-Strong   M-Medium   L-Low

Allied paper offered by B.Sc. Information Technology from 2023-2024 onwards

Subject Code	Subject Name	Category	L	T	P	S	C	Inst. Hours	Marks		
									CIA	External	Total
23BITA1	**Digital Logic Fundamentals**	Allied	3	-	-	-	3	3	25	75	100

	Learning Objective	
LO1	It aims to train the student to the basic concepts of Digital ComputerFundamentals	
LO2	To impart the in-depth knowledge of logic gates, Boolean algebra, combinational circuits and sequential circuits.	

	Contents	
UNIT I	Number Systems and Codes: Number System – Base Conversion – Binary Codes – Code Conversion. Digital Logic: Logic Gates – Truth Tables – Universal Gates.	
UNIT II	Boolean Algebra: Laws and Theorems – SOP, POS Methods – Simplification of Boolean Functions – Using Theorems, K-Map, Prime – Implicant Method – Binary Arithmetic: Binary Addition – Subtraction – Various Representations of Binary Numbers – Arithmetic Building Blocks – Adder – Subtractor.	
UNIT III	Combinational Logic: Multiplexers – Demultiplexers – Decoders –Encoders – Code Converters – Parity Generators and Checkers.	
UNIT IV	Sequential Logic: RS, JK, D, and T Flip-Flops – Master-Slave Flip-Flops. Registers: Shift Registers – Types of Shift Registers.	
UNIT V	Counters: Asynchronous and Synchronous Counters - Ripple, Mod, Up- Down Counters– Ring Counters. Memory: Basic Terms and Ideas – Typesof ROMs – Types of RAMs.	

	Course Outcomes
CO1	Identify the logic gates and their functionality.
CO2	Perform number conversions from one system to another system
CO3	Understand the functions of combinational circuits
CO4	Perform number conversions.
CO5	Perform Counter design and learn its operations.

Text Book	
1	D.P.Leach and A.P.Malvino, *Digital Principles and Applications* – TMH – FifthEdition – 2002.
Reference Books	
1.	V.Rajaraman and T.Radhakrishnan, *Digital Computer Design*, Prentice Hallof India, 2001
2.	M. Moris Mano, *Digital Logic and Computer Design*, PHI, 2001.
3.	T.C.Bartee, *Digital Computer Fundamentals*, 6th Edition, Tata McGraw Hill,1991.

Allied			L	T	P	C	H/W
Subject code:	23BITAP1	**DIGITAL ELECTRONICS LAB**	-	-	2	2	2

Objectives	● To Understand the Digital Electronics Practically ● To know how to solve gates and other functions.

1. AND, OR and NOT Gate using Truth Table
2. Universality of NAND & NOR gates.
3. Verification of Boolean laws using NAND gates (Associative, Commutative & Distributive Laws)
4. Verification of Boolean laws using NOR gates (Associative, Commutative & Distributive Laws)
5. Sum of Products using NAND gates and Product of Sums using NOR Gates.
6. 4-bit binary parallel adder and Subtractor IC 7483
7. Counter using IC 7473
8. Study of RS, D, T and JK Flip-Flops with IC's.
9. Study of Encoder & Decoder.
10. Study of Multiplexer & De-Multiplexer.
11. Half and Full Adder using Simple & NAND Gates.
12. Half and Full Subtractor using Simple & NAND Gates.

Outcomes	● Students were able to solve simple gate functions. ● Students were able to solve and Design circuits using IC.

Subject Code	Subject Name	Category	L	T	P	S	C	Inst. Hours	Marks CIA	External	Total
23BITA2	**Internet and Web Design**	Allied	3	-	-	-	3	3	25	75	100

Learning Objectives

LO1	To learn more about markup languages
LO2	To understand various web services

Unit -I	Internet and the World Wide Web: What is Internet? Introduction to internet and its applications, E-mail, telnet, FTP, e-commerce, video conferencing, e-business. Internet service providers, domain name server, internet address, World Wide Web and its evolution, uniform resource locator (URL), browsers, search engine, web server, HTTP protocol, Routers, Gateways, Bridge, Switches, Subnet and Intranet.
Unit-II	HTML: Introduction, Why HTML5? Formatting text by using tags, using lists and backgrounds, Creating hyperlinks and anchors. Style sheets, CSS formatting text using style sheets, formatting paragraphs using style sheets. Creating navigational aids: planning site organization, creating text based navigation bar, creating graphics based navigation bar, creating graphical navigation bar, creating image map, redirecting to another URL, creating division based layouts: HTML5 semantic tags, creating divisions, creating HTML5 semantic layout, positioning and formatting divisions.
Unit -III	Creating tables: creating simple table, specifying the size of the table, specifying the width of the column, merging table cells, using tables for page layout, formatting tables: applying table borders, applying background and foreground fills, changing cell padding, spacing and alignment, creating user forms: creating basic form, using check boxes and option buttons, creating lists, additional input types in HTML5, Incorporating sound and video: audio and video in HTML5, HTML multimedia basics, embedding video clips, incorporating audio on web page.
Unit -IV	Java Script: Introduction, Client-Side JavaScript, Server-Side JavaScript, JavaScript Objects, JavaScript Security, Operators , Conditional and Looping Statements-Break, continue, User Defined Function. Array, Date, Math, Number, Object, String, regExp.
Unit =V	Document and its associated objects: document, Link, Area, Anchor, Image, Applet, Layer . Events and Event Handlers : General Information about Events,Defining Event Handlers, event, onAbort, onBlur, onChange, onClick,onDblClick, onDragDrop, onError, onFocus, onKeyDown,onKeyPress, onKeyUp, onLoad, onMouseDown, onMouseMove,onMouseOut, onMouseOver, onMouseUp, onMove, onReset,onResize, onSelect, onSubmit, onUnload.

Reference and Textbooks:

➢ Web Design The Complete Reference-Thomas Powell -Tata McGraw Hill

HTML5 Step by Step -Faithe Wempen-Microsoft Press

➢ HTML 5 Black Book-2nd Edition - Dreamtech Press -

2016Head First HTML 5 Programming-Eric Freeman-

O'Reilly

➢ Web Technologies--A Computer Science Perspective-Jeffrey C. Jackson- Pearson Education.

Course Outcome	
CO1	Understand web essential concepts and to design simple web pages using markup language.
CO2	Understand style properties and able to build dynamic web pages usingscripting language.
CO3	Understand Java Script Basics
CO4	Understand Regular Expressions
CO5	Understand Event handling Techniques

Mapping with Programme Outcomes:

CO/PSO	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6
CO1	3	3	2	2	2	2
CO2	3	3	3	2	3	2
CO3	3	3	3	3	3	2
CO4	3	3	3	3	3	2
CO5	3	3	3	2	3	2

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

Subject Code 23BITAP2	Allied LAB	T/P	C	H/W
	Web Designing Lab	P	2	2

1. Design a web page using different text formatting tags.

2. Design a web page with links to different pages and allow navigation between web pages.

3. Design a web page demonstrating all Style sheet types .

4. Design a web page with Image maps.

5. Design a web page demonstrating different semantics.

6. Design a web page with different tables.

7. Design a web page with a form that uses all types of input controls.

8. Design a web page embedding with multimedia features.

9. Write a JavaScript program to find the factorial value.

10. Write a JavaScript program to print the Fibonacci series.

11. Design a form and validate all the controls placed on the form using Java Script.

12. Write a JavaScript program to display all the prime numbers between 1 and 100.

13. Write a JavaScript program to accept a number from the user and display the sum of its digits.

14. Write a program in JavaScript to accept a sentence from the user and display the number of words in it. (Do not use split () function).

15. Write a java script program to design simple calculator.

Outcomes	• Students can create the webpage with formatting tags. • Students can design the page with style sheets • Students can use java script elements for client side validation

Subject Code	Subject Name	Category	L	T	P	S	C	Inst. Hours	Marks		
									CIA	External	Total
23BITA3	**Microprocessor and Microcontroller**	Allied	3	-	-	-	3	3	25	75	100

Learning Objectives	
LO1	To introduce the internal organization of Intel 8085 Microprocessor.
LO2	To know about various instruction sets and classifictions
LO3	To enable the students to write assembly language programs using 8085.
LO4	To interface the peripheral devices to 8085 using Interrrupt controller and DMA interface.
LO5	To provide real-life applications using microcontroller.

	Contents	No. of Hours
UNIT I	Microprocessor Architecture and its operations – Microprocessor initiated operations and 8085 Bus organization – Internal Data operations and 8085 registers - Peripheral or External initiated operations.	9
UNIT II	8085 Microprocessor – Pinout and Signals – Functional block diagram - 8085 Instruction Set and Classifications.	9
UNIT III	The 8085 Interrupts – RIM AND SIM instructions-8259 Programmable Interrupt Controller-Direct Memory Access (DMA) and 8257 DMA controller.	9
UNIT IV	Introduction to Microcontroller - Microcontroller Vs Microprocessor - 8051 Microcontroller architecture - 8051 pin description.	9
UNIT V	Timers and Counters – Operating Modes- Control Registers. Interrupts – Interrupts in 8051 - Interrupts Control Register – Execution of interrupt.	9
	Total	**45**

Course Outcomes		Programme Outcomes
CO	On completion of this course, students will	
CO1	Remember the Basic binary codes and their conversions. Binary concepts are used in Microprocessor programming and provide a good understanding of the architecture of 8085o introduce the internal organization of Intel 8085 Microprocessor..	PO1
CO2	Understanding the 8085 instruction set and their classifications, enables the students to write the programs easily on their own using different logic	PO1,PO2
CO3	Applying different types of instructions to convert binary codes and analyzing the outcome. The instruction set is applied to develop programs on multibyte arithmetic operations.	PO4,PO6
CO4	Analyze how peripheral devices are connected to 8085 using Interrupts and DMA controller.	PO4,PO5,PO6
CO5	An exposure to create real time applications using microcontroller.	PO3,PO6

Text Book	
1	R. S. Gaonkar- "Microprocessor Architecture- Programming and Applications with 8085"- 5th Edition- Penram International Publications,2009. [For unit I to unit IV]
2	Soumitra Kumar Mandal -"Microprocessors and Microcontrollers – Architectures, Programming and Interfacing using 8085, 8086, 8051", Tata McGraw Hill Education Private Limited. [for unit V].

Reference Books	
1.	Mathur- "Introduction to Microprocessor"- 3rd Edition- Tata McGraw-Hill -1993.

2.	Raj Kamal - "Microcontrollers: Architecture, Programming, Interfacing and System Design", Pearson Education, 2005.
3.	Krishna Kant, "Microprocessors and Microcontrollers – Architectures, Programming and System Design 8085, 8086, 8051, 8096", PHI, 2008
Web Resources	
1.	E-content from open source libraries
2.	https://www.bing.com/, https://theopennotes.in/

Mapping with Programme Outcomes:

CO/PSO	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6
CO1	3	3	2	2	2	2
CO2	3	3	3	2	3	2
CO3	3	3	3	3	3	2
CO4	3	3	3	3	3	2
CO5	3	3	3	2	3	2

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

Subject Code 23BIT AP3	Subject Name	Category	L	T	P	S	Credits	Inst. Hours	Marks		
									CIA	External	Total
Allied Lab	Microprocessor and microcontroller Lab	Allied	-	-	2	-	2	2	25	75	100

Learning Objectives

LO1	To introduce the internal organization of Intel 8085 Microprocessor.
LO2	To know about various instruction sets and classifications.
LO3	To enable the students to write assembly language programs using 8085.
LO4	To interface the peripheral devices to 8085 using Interrrupt controller and DMA interface.
LO5	To provide real-life applications using microcontroller.

	Details	No. of Hours
	List of Exercises:	
1	Write an assembly language program to perform 8 - bit addition	
2	Write an assembly language program to perform 16 - bit addition	30
3	Write an assembly language program to perform 8 - bit subtraction	
4	Write an assembly language program to perform 8 - bit multiplication	
5	Write an assembly language program to perform 8 - bit division	
6	Write an assembly language program to searching for an element in an array.	
7	Write an assembly language program to perform Ascending and Descending order.	
8	Write an assembly language program to find the largest and smallest elements in an array.	
9	Write an assembly language program to reversing array elements.	
Total		**30**

Course Outcomes		Programme Outcome
CO	On completion of this course, students will	
CO1	Remember the Basic binary codes and their conversions. Binary concepts are used in Microprocessor programming and provide a good understanding of the architecture of 8085o introduce the internal organization of Intel 8085 Microprocessor..	PO1
CO2	Understanding the 8085 instruction set and their classifications, enables the students to write the programs easily on their own using different logic	PO1,PO2

CO3	Applying different types of instructions to convert binary codes and analyzing the outcome. The instruction set is applied to develop programs on multibyte arithmetic operations.	PO4,PO6
CO4	Analyze how peripheral devices are connected to 8085 using Interrupts and DMA controller.	PO4,PO5,PO6
CO5	An exposure to create real time applications using microcontroller.	PO3,PO5
Text Book		
1	R. S. Gaonkar- "Microprocessor Architecture- Programming and Applications with 8085"- 5th Edition- Penram International Publications,2009. [For unit I to unit IV]	
2	Soumitra Kumar Mandal -"Microprocessors and Microcontrollers – Architectures, Programming and Interfacing using 8085, 8086, 8051", Tata McGraw Hill Education Private Limited. [for unit V].	
Reference Books		
1.	Mathur- "Introduction to Microprocessor"- 3rd Edition- Tata McGraw-Hill -1993.	
2.	Raj Kamal - "Microcontrollers: Architecture, Programming, Interfacing and System Design", Pearson Education, 2005.	
3.	Krishna Kant, "Microprocessors and Microcontrollers – Architectures, Programming and System Design 8085, 8086, 8051, 8096", PHI, 2008	
Web Resources		
1.	E-content from open source libraries	
2.	https://www.bing.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	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

Subject Code	Subject Name	Category	L	T	P	S	C	Inst. Hours	Marks		
									CIA	External	Total
23BITA4	**MULTIMEDIA AND ITS APPLICATIONS**	Allied	3	-	-	-	3	3	25	75	100

Learning Objectives	
LO1	To learn multimedia basics.
LO2	To know about Multimedia applications

Unit - I	Multimedia Definitions – Delivering - Uses of multimedia. **Text :** The Power of Meaning – About Fonts and Faces –Using Text in Multimedia – Computers and Text – Font Editing and Design Tools – Hypermedia and Hypertext.
Unit -II	**Images:** Making Still Images –Understating natural light and color- Image File formats. **Sound:** The Power of Sound – Multimedia System Sounds- Digital Audio - MIDI Versus Digital Audio – Making MIDI Audio – Audio file formats – Adding Sound– Copyright Issues.
Unit – III	**Animation:** The Power of motion – Principles of Animation – Making Animation. **Video:** Using video – How it works – Broadcast Video Standards – Integrating Computers and Television – shooting and Editing Video – Video Tips – Recording Formats – Digital video.
Unit – IV	Making Multimedia - Hardware Peripherals: Connection - Memory and storage Devices – Input / Output Devices - Communication Devices - Software-Editing tools for Text, Image, Sound, Animation and Video- Multimedia Skills-Designing for the World Wide Web.
Unit - V	**Adobe Animate**: Animate Interface-Managing workspaces and Panels- Customizing the tools and Timeline panels- Animating with Diverse Techniques-Working with Shapes-Tweens-Symbols-Interactive Motion Graphics for the Web-Character design through Layer.

TEXT BOOK:
- Multimedia: Making It Work-Ninth Edition-Tay Vaughan-McGraw Hill

  Mastering Adobe Animate 2021-Joseph Labrecque - Packt Publishing Limited

- Multimedia Application and Web Designing - Dinesh Maidasani- Laxmi Publications

- Ultimedia Programming: A Practical Approach- Dr. Siddhartha Bhattacharyya & Dr. Paramartha Dutta - Vikas Publishing

Course Outcome	
CO1	Understand the multimedia usage and text elements
CO2	Understand the Image and sound elements of multimedia
CO3	Understand Animation and video recording formats
CO4	Understand the requirements to create the multimedia application
CO5	Understand to create the animation using Adobe animate

Mapping with Programme Outcomes:

CO/PSO	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6
CO1	3	3	2	2	2	2
CO2	3	3	3	2	3	2
CO3	3	3	3	3	3	2
CO4	3	3	3	3	3	2
CO5	3	3	3	2	3	2

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

Subject Code 23BIT AP4	Subject Name	Category	L	T	P	S	Credits	Inst. Hours	Marks		
									CIA	External	Total
Allied Lab	**MULTIMEDIA LAB**	Allied	-	-	2	-	2	2	25	75	100

<div align="center">LIST OF PRACTICAL PROGRAMS</div>

1. Draw an animation to show a bouncing ball.
2. Draw an animation to show a moving stick man.
3. Draw an animation with banana.
4. Draw an animation to show sunrise and sunset.
5. Draw an animation to show a disappearing house.
6. Draw an animation to show two boats sailing in river
7. Draw an animation to show a scene of cricket match.
8. Draw an animation to help teach a poem or a song
9. Draw an animation to show cartoon with a message
10. Draw an animation to move Butterfly from one flower to other.
11. Draw an animation for health tips.
12. Draw an animation for Kids Mathematics.
13. Make a movie showing Shape Tweening.
14. Make a movie showing Motion Tweening.
15. Add sound and button to the movie.

Outcomes	● Students can create the Animation. ● Students can add sound effects

Semester I - Allied -I Theory for other departments

Subject Code	Subject Name	Category	L	T	P	S	Credits	Inst. Hours	CIA	External	Total
										Marks	
23BSOA1	**OFFICE AUTOMATION**	Allied I Theory	3	-	-	-	3	3	25	75	100

	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.

	Contents	No. of Hours
UNIT I	Introductory concepts: Memory unit– CPU-Input Devices: Key board, Mouse and Scanner.Outputdevices:Monitor,Printer.IntroductiontoOperatingsystems&itsfeatures:DOS– UNIX–Windows. IntroductiontoProgrammingLanguages.	6
UNIT II	**Word Processing:** Open, Save and close word document; Editing text – tools, formatting, bullets;SpellChecker - Document formatting – Paragraph alignment, indentation, headers and footers,numbering;printing– Preview,options,merge.	6
UNIT III	**Spreadsheets:**Excel– opening,enteringtextanddata,formatting,navigating;Formulas– entering,handlingand copying;Charts–creating,formatting and printing,analysistables,preparationoffinancialstatements,introductiontodataanalytics.	6
UNIT 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 datafiles; Understanding Programming environment in DBMS; Developing menu drive applicationsinquerylanguage(MS–Access).	6
UNIT V	**Power point:** Introduction to Power point - Features – Understanding slide typecasting &viewingslides – creating slide shows. Applying special object – including objects & pictures – Slidetransition– Animationeffects,audioinclusion,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	PO1,PO2,PO3,PO6

	presentation.	
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,"IntroductiontoComputers"–TataMcGraw-Hill.

Reference Books	
1.	Jennifer Ackerman Kettel, Guy Hat-Davis, Curt Simmons, "Microsoft 2003", Tata McGrawHill.

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

Semester I - Allied -I Practical for other departments

Subject Code	Subject Name	Category	L	T	P	S	Credits	Inst. Hours	Marks		
									CIA	External	Total
23BSOAP1	**OFFICE AUTOMATION LAB**	Allied Lab	-	-	2	-	2	2	25	75	100

	Learning Objectives										
LO1	Understand the basics of computer system, operating system and I/O devices
LO2	Understand the basics of Word Processor tool and able to create letters, reports, tables
LO3	Understand the basics of Excel Spreadsheet tool and able to perform visible calculations and data analysis.
LO4	Understand the basics of ACCESS database management system tool and able to create database for specific application.
LO5	Understand the basics PowerPoint tool and able to create slide shows.

	Contents	No. of Hours
UNIT I	1. Working with windows and menus 2. Creating Folders and working with files 3. Creating Shortcuts for applications and files 4. Copying and moving files between folders 5. Deleting files and understanding recycle bin 6. Creating opening and saving text in files	6
UNIT II	**MS – WORD** 7. Preparing an Official Letter / Business Letter / Circular Letter Covering formatting commands - font size and styles - bold, underline, upper case, lower case, superscript, subscript, indenting paragraphs, spacing between lines and characters, tab settings etc., 8. Preparing a newsletter: To prepare a newsletter with borders, two columns text, header and footer and inserting a graphic image and page layout. 9. Creating and editing the table to create a table using table menu, to create a monthly calendar using cell editing operations like inserting, joining, deleting, splitting and merging cells, to create a simple statement for math calculations viz. Totalling the column. 10. Creating numbered lists and bulleted lists to create numbered list with different formats (with numbers, alphabets, roman letters), to create a bulleted list with different bullet characters. 11. Printing envelopes and mail merge, to print envelopes with from addresses and to addresses, to use mail merge facility for sending a circular letter to many persons, to use mail merge facility for printing mailing labels. 12. Using the special features of word to find and replace the text, to spell check and correct, to generate table of contents for a document.	6

UNIT III	**MS - EXCEL** 13. Using formulas and functions: To prepare a Worksheet showing the monthly sales of a company in different branch offices (Showing Total Sales, Average Sales). 14. Creating a Chart: To create a chart for comparing the monthly sales of a company in different branch offices. 15. Sorting Data, Filtering Data and creation of Pivot tables. 16. Create a sales table using the following data :	6

Item	Year1	Year2	Year3	Year4
Rice	1000	1050	1100	1200
Sugar	950	1050	1150	1200
Dal	1100	1200	1200	1300

a. Draw the bar graph to compare the sales of the three items for four years.
b. Draw a line graph to compare the sales of three items for four years using insert option.
c. Use condition, to highlight all the cells having value >=1000 with red color (Use conditional formatting).

UNIT IV	**MS - ACCESS**
	
	17. Create a database "Student" with
	   a. Atleast one table named "Mark Sheet" with field name "Student Name, Roll Number, Mark1, Mark2, Mark3, Mark4, Total"
	   b. The data types are, Student Name : text, Roll Number : number, Mark1 to Mark4 : number, Total : number. Make Roll Number the primary key.
	   c. Enter data in the table. The total must be calculated using update query.
	   d. Use query for sorting the table according to the descending/ascending order of the total marks.
	18. In addition to the table above,
	   a. Add an additional field "Result" to the "Mark Sheet" table.
	   b. Enter data for at least 10 students.
	   c. Calculate the result for all the students using update query. (If total $>= 200$, then pass, else fail).
	   d. Search the students, whose name starts with "An".
	Show the names and total marks of the students who have passed the examination.
		6

UNIT V	**MS - POWERPOINT** 19. Creating a new presentation based on a template – Using Auto content wizard, design template and plain blank presentation. 20. Creating a presentation with slide transition – Automatic and Manual with different effects. 21. Creating a presentation applying custom animation effects – applying multiple effects to the same object and changing to a different effect and removing effects. 22. Creating and printing handouts.	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,"IntroductiontoComputers"–TataMcGraw-Hill.	
	Reference Books	
1.	Jennifer Ackerman Kettel, Guy Hat-Davis, Curt Simmons, "Microsoft 2003", Tata McGrawHill.	
	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

Semester II – Allied II Theory for other departments

Subject Code	Subject Name	Category	L	T	P	S	Credits	Inst. Hours	Marks		
									CIA	External	Total
23BSOA2	**PROGRAMMING IN C**	A-I Allied Theory	3	-	-	-	3	3	25	75	100

	Learning Objective										
LO1	To familiarize the students with the Programming basics and the fundamentals of C, Datatypes in C, Mathematical and logical operations.										
LO2	To understand the concept using if statements and loops										
LO3	This unit covers the concept of Arrays and Functions										
LO4	This unit covers the concept of Structurs and unions and Preprocessors										
LO5	To understand the concept of implementing pointers.										

	Contents	**No. of Hours**
UNIT 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**: Arithmetic, Relational, logical, assignment, increment, decrement, conditional, bitwise and special operators, arithmetic expressions, operator precedence, type conversions, mathematical functions **Managing Input and Output Operators**: Reading and writing a character, formatted input, formatted output.	6
UNIT 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
UNIT III	**Arrays**: Declaration and accessing of one & two-dimensional arrays, initializing two-dimensional arrays, multidimensional arrays. **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
UNIT IV	**Structures and Unions**: Defining, giving values to members, initialization and comparison of structure variables, arrays of structure, arrays within structures, structures within structures, structures and functions, unions. **Preprocessors**: Macro substitution, file inclusion.	6
UNIT 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
Total		**30**

	Course Outcomes	**Programme Outcome**
CO	On completion of this course, students will	
CO1	Remember the program structure of C with its syntax and semantics	PO1,PO3,PO5
CO2	Understand the programming principles in C (data types, operators, branching and looping, arrays, functions, structures, pointers and files)	PO2,PO3,PO6

CO3	Apply the programming principles learnt in real-time problems	PO3,PO4,PO5
CO4	Analyze the various methods of solving a problem and choose the best method	PO4,PO5,PO6
CO5	Code, debug and test the programs with appropriate test cases	PO5,PO6

Text Book		
1	E. Balagurusamy, Programming in ANSI C, 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.	YashavantKanetkar, 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	PSO 1	PSO 2	PSO 3	PSO 4	PSO 5	PSO 6
CO 1	3	3	3	3	3	3
CO 2	3	3	3	2	3	3
CO 3	2	3	2	3	3	2
CO 4	3	3	3	3	3	3
CO 5	3	3	3	3	3	2
Weight age of course contributed to each PSO	14	15	14	14	15	13

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

Subject Code	Subject Name	Category	L	T	P	S	Credits	Inst. Hours	Marks		
									CIA	External	Total
23BSOAP2	**PROGRAMMING IN C LAB**	A-I Allied Practical	-	-	2	-	2	2	25	75	100

	Course Objective
LO1	To familiarize the students with the Programming basics and the fundamentals of C, Datatypes in C, Mathematical and logical operations.
LO2	To understand the concept using if statements and loops
LO3	This unit covers the concept of Arrays and Functions
LO4	This unit covers the concept of Structurs and unions and Preprocessors
LO5	To understand the concept of implementing pointers and files

	List of Excercises	No. of Hours	Course Objectives
UNIT I	**Variables, Data types, Constants and Operators** 1.Evaluation of expression ex: $((x+y)^2 * (x+z))/w$ 2.Temperature conversion problem (Fahrenheit to Celsius) 3.Program to convert days to months and days (Ex: 364 days = 12 months and 4 days) 4.Solution of quadratic equation 5.Salesman salary (Given: Basic Salary, Bonus for every item sold, commission on the total monthly sales)	6	
UNIT II	**Decision making Statements** 6.Maximum of three numbers 7.Calculate Square root of five numbers (using gototatement) 8.Pay-Bill Calculation for different levels of employee (Switch statement) 9. Fibonacci series 10.Floyds Triangle 11.Pascal's Triangle	6	
UNIT III	**Arrays, Functions and Strings** 12.Prime numbers in an array 13.Sorting data (Ascending and Descending) 14.Matrix Addition and Subtraction 15.Matrix Multiplication 16.Function with no arguments and no return values 17.Function that convert lower case letters to upper case 18. Factorial using recursion. 19.Perform String Operations using Switch Case.	6	
UNIT IV	**Structures and Macros** 20.Structure that describes a Hotel (name, address, grade, avg room rent, number of rooms) Perform some operations (list of hotels of a given grade etc.) 21. Using Pointers in Structures. 22.Cricket team details using Union. 23.Write a macro that calculates the max and min of two numbers 24.Nested macro to calculate Cube of a number.	6	

UNIT V	**Pointers and Files** 25.Evaluation of Pointer expressions 26.Function to exchange two pointer values 27.Creation, insertion and deletion in a linked list 28.Program to read a file and print the data. 29.Program to receive a file name and a line of text as command line arguments and write the text to the file 30. Program to copy the content of one file to another file.	6
	Total	**30**

	Course Outcomes	**Programme Outcome**
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
3	Apply the programming principles learnt in real-time problems	PO3,PO4
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	PO4,PO6

	Text Book
1	E. Balagurusamy, Programming in ANSI C, 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.	YashavantKanetkar, 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	PSO 1		PSO 2	PSO 3	PSO 4	PSO 5	PSO 6
CO 1	3		3	3	3	3	3
CO 2	2		3	3	3	3	3
CO 3	3		3	2	3	3	2
CO 4	3		3	3	3	3	3
CO 5	3		3	3	3	3	3
Weight age of course contributed to each PSO	14		15	14	15	15	14

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

Semester III - Allied – III Theory (offered by B.Sc. Software Dept to other departments)

Subject Code	Subject Name	Category	L	T	P	S	Credits	Inst. Hours	CIA	External	Total
										Marks	
23BSOA3	**Internet and Web Design**	A-III Allied Theory	3	-	-	-	3	3	25	75	100

	Learning Objective
LO1	To familiarize the internet and its capabilities
LO2	To understand the structure Hyper Text Markup Language and handle basic tags for text and image display
LO3	To understand the use of lists and tables
LO4	To understand the necessity of dynamic content on web and screen space management using framesets
LO5	To understand the features of DOM (Document Object Model) and its elements for data capture

UNIT	Contents	No. of Hours
I	**UNIT I : Introduction to the Internet** Electronic mail – Resource Sharing – Remote Login – World Wide Web – Search Engine – Browsers – Introduction to static, dynamic and active web pages. Introduction to HTML: Designing a Home page - History of HTML - HTML Generations - HTML Documents - Anchor Tag - Hyper links	6
II	**UNIT II : Head and Body Sections** Header Section – Title – Links - Colorful Web page - Comment Lines - Designing the Body Section: Heading – Printing - Aligning the Headings - Horizontal Rule - Paragraph-Tab Settings - Images and Pictures - Embedding Images	6
III	**UNIT III: Ordered and Un Ordered Lists:** Lists – Un Ordered Lists - Headings in a List - Ordered Lists - Nested Lists - Table Handling: Table creation in HTML - width of the Table and Cells - Cells Spanning Multiple Rows/Columns - Coloring Cells - Column Specification	6
IV	**UNIT IV : DHTML and Style Sheets** Defining Styles - Elements of Styles - Linking a Style Sheet to an HTML Document – In-line Styles - Internal and External Style Sheets - Multiple Styles - Frames: Frameset Definition - Frame Definition - Nested Framesets	6
V	**UNIT V: Forms** Action Attribute - Method Attribute - Enctype Attribute - Drop down list - Check Boxes - Radio Buttons - Text Field - Text area - Password and Hidden Fields - Submit and Reset Buttons - Designing Sample Forms	6
	Total	**30**

	Course Outcomes	Programme Outcome
CO	On completion of this course, students will	
CO1	To appreciate the use of internet and design of web pages	PO1,PO3,PO5
CO2	To be able to use all the basic HTML tags used to design web content with multimedia elements	PO2,PO3,PO6
CO3	To be able to create and format different types of lists and tables	PO3,PO4,PO5
CO4	To be able to specify styles for web pages and dynamically	PO4,PO5,PO6

	change the appearance of web pages and manage screen space by defining multiple frames	
CO5	To be able to design web forms for data capture and transmit to the server	PO5,PO6

Text Books	
1	C. Xavier(2000), World Wide Web design with HTML - Tata McGraw Hill Publishing Company Limited ISBN 9780074639719
2	Ivan Bayross (2012) HTML 5 and CSS 3 Made Simple, BPB Publications ISBN 9788183334419

Reference Books	
1.	Jon Duckett (2011),HTML and CSS: Design and Build Webs Illustrated, Wiley

Web Resources	
1.	http://www.pagetutor.com/html_tutor/index.html
2.	http://www.tutorialspoint.com/html/html_tutorial.pdf
3.	http://www.htmlcodetutorial.com/
4.	http://www.w3schools.com

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

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

Semester III - Allied – III Practical (Offered by B.sc. Software Dept to other departments)

Subject Code	Subject Name	Category	L	T	P	S	Credits	Inst. Hours	CIA	External	Total
										Marks	
23BSOAP3	**INTERNET AND WEB DESIGN LAB**	A-III Allied Practical	-	-	2	-	2	2	25	75	100

	Course Objective
LO1	To be familiar with internet principles and HTML tags
LO2	Learn to design web pages with simple static text displays
LO3	Learn to design web pages with lists and tables
LO4	Learn to dynamically control the appearance of the website with style sheets
LO5	Learn to manage screen space with multiple contents and design forms to capture data from user

List of Excercises	**No. of Hours**
1. Cretae HTML file with tags using an editor and display your name and address in different colors and fonts centered across the screen. 2. Write HTML tags to display images in different height and widths 3. Write HTML tags to play audio file when play button is pressed 4. Write HTML tags to create list of courses availbe in a college and show their features in definition list. 5. Write HTML tags to link another web page to your page 6. Write HTML tags to create a table with text content and format it suitably with colors and features. 7. Write HTML tags to create a table with photographs of animals and show their lifesspan and habits in a different page when mouse is clicked over the photos. 8. Write HTML tags to define inline style sheet and test it. 9. Write HTML tags to define internal style sheet and test it. 10. Write HTML tags to define external style sheet and test it. 11. Write HTML tags to divide the screen space into horizontal and vertical partitions and load a different html file in each partitiion. 12. Write HTML tags to design a form to enable a student to fill up application form for admission to a degree programme in a college. 13. Write HTML tags to design a simple personal website with three or more pages accessible from home page. 14. Write HTML tags to design a simple website to promote a product of a company.	30

	15. Write HTML tags to design a simple website showing images of cover page of books and display the details about the book in their own pages when mouse is clicked over the respective photographs	
	Total	**30**

	Course Outcomes	**Programme Outcome**
CO	On completion of this course, students will	
1	be able to appreciate the use and necessity of intenet and websites	PO1,PO3,PO5
2	be able to master the HTML tags and display text and multimedia contents on web pages	PO2,PO3,PO6
3	be able to design lists and display them on web pages	PO3,PO4
4	be able to design tables and display colourful and hypertext leading to other pages	PO4,PO5,PO6
5	be able to manage screen space effectively with multiple frames and design web forms	PO4,PO6
	Web Resources	
1.	http://www.pagetutor.com/html_tutor/index.html	
2.	http://www.tutorialspoint.com/html/html_tutorial.pdf	
3.	http://www.htmlcodetutorial.com/	
4.	http://www.w3schools.com	

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	2		3	3	3	3	3
CO 3	3		3	2	3	3	2
CO 4	3		3	3	3	3	3
CO 5	3		3	3	3	3	3
Weight age of course contributed to each PSO	14		15	14	15	15	14

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

Allied Theory 4 offered by B.sc. Software Dept for other department students

Subject Code	Subject Name	Category	L	T	P	S	Credits	Inst. Hours	Marks		
									CIA	External	Total
23BSOA4	**ADVANCED EXCEL**	Allied IV Theory	**3**	-	-	-	3	3	25	75	100

	Learning Objectives	
LO1	Handle large amounts of data	
LO2	Aggregate numeric data and summarize into categories and subcategories	
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	Contents	No. of Hours
UNIT 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
UNIT 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	6
UNIT III	Creating Pivot tables Formatting and customizing Pivot tables- advanced options of Pivot tables- Pivot charts- 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 Subtotal under Pivot- Creating Slicers.	6
UNIT 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- WhatIf Analysis - Goal Seek- Data Tables- Scenario Manager.	6
UNIT 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 Sparklines, Inline Charts, data Charts- Overview of all the new features.	6
	Total	**30**

	Course Outcomes	Programme Outcomes
CO	On completion of this course, students will	
CO1	be able to create worksheets to compute formulae automatically by copying	PO1,PO2,PO3,PO6,PO8
CO2	be able to validate data and perform sorting and filtering data	PO1,PO2,PO3,PO6
CO3	be able to perform What-If analysis with pivot tables.	PO3,PO5,PO7

CO4	be able to put built-in function for effective use in computations	PO3,PO4,PO5,PO7
CO5	be able to present data in the form of charts and share with other packages	PO4,PO6,PO7,PO8

Text Book	
1	Ritu Arora (2023) Mastering Advanced Excel, BPB publishers

Reference Books	
1.	Ken Bluttman (2020), Microsoft Excel Formulas $ Functions, 5th Edition, Learning Made Easy, Wiley

Web Resources	
1.	https://www.tutorialspoint.com/advanced_excel/index.htm
2.	https://sunsreynat.wordpress.com/wp-content/uploads/2014/06/excel-2010-advanced.pdf
3.	https://www.yashada.org/yashada_2019/pdfs/e_library_cit/excel_Microsoft_Excel_2010_intermediate_YASHADA%20_June_2014%20(2).pdf
4.	https://www.w3schools.com/excel/index.php

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

Semester IV Allied Practical offered by B.Sc. Software dept to other department students

Subject Code	Subject Name	Category	L	T	P	S	Credits	Inst. Hours	Marks		
									CIA	External	Total
23BSOAP4	**ADVANCED EXCEL LAB**	A-IV Allied Practical	-	-	2	-	2	2	25	75	100

	Course Objective
LO1	Handle large amounts of data
LO2	Aggregate numeric data and summarize into categories and subcategories
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

List of Excercises	No. of Hours
1. Enter data Roll.Nos. & Marks in 5 subject of a student in a worksheet. Calculate his grades as per the following using HLOOKUP() functoin: **Marks** **Grades** 0-40 4 40-50 3 50-60 2 60 & above 1 **2.** Enter Names & Sales value for 10 salesmen. Calculate their bonus using VLOOKUP() function as per the following : **Sale** **Bonus** 0-30000 0 30000-40000 3000 40000-50000 4000 50000-60000 5000 60000-70000 6000 70000-80000 7000 80000 & above 8000 NAME SALE BONUS Deep 30000 **3.** A worksheet contains Roll Number , Marks in 2 subjects for 50 students in a class. Calculate Result and Grade using the following: A student is declared as PASS if he gets 40 or more in both the subjects , Otherwise FAIL. All FAILED students will be given Grade IV. For PASSED students Grade will be obtained as follows : AVERAGE GRADE >=60 I <60 but >=50 II <50 but >=40 III	30

```
ROLL   SUB1  SUB2 AVERAGE  RESULT          GRADE
ARUN      50       60       55      PASSED          II
```

4. The following worksheet contains Name & Sales of 10 salesmen .

```
NAME        SALE      COMMISSION
BABY        20000
```

Calculate commission (using nested IF statements) as per the following:

	Sales	Commission
	First 30,000	5%
	Next 40,000	10%
	Above 70,000	15%

```
NAME        SALE      COMMISSION
BABY        20000     1000
```

5. The following worksheet contains Name & Taxable Income for 50 employees .

```
NAME | TAXABLE INCOME |  INCOME TAX         |
SURCHARGE | TOTALTAX
RAVI  |  300000
MARY | 600000
```

CalculateIncome Tax Surcharge and Total Tax.

Income Tax is calculated as follows :

```
First 1,50,000     Nil
Next 1,00,000     10%
Next 75,000       20%
Above 3,25,000   30%
```

Surcharge is 3% on Income Tax if Taxable income is above 5,00,000

```
NAME | TAXABLE INCOME |  INCOME TAX        |
SURCHARGE |  TOTALTAX
RAVI  | 300000              |          20000   0  |        20000
MARY | 600000              |          107500            3225 |
110725
```

6. Enter data in a worksheet as shown below:

	A	B	C	D	E
1	NAME	GENDER	CLASS	CATEGORY	FEES
2	Deep	M	FY	Open	3000
3	Jayesh	M	SY	Reserved	1000
4	Yash	M	TY	Reserved	1000
5	Sara	F	FY	Reserved	500
6	Gita	F	FY	Open	3000
7	Jinal	F	TY	Open	5000
8	Kavita	F	SY	Open	4000
9	Minal	F	SY	Reserved	1000
10	Karan	M	TY	Reserved	1000
11	Abhay	M	TY	Open	5000
12	Bina	F	FY	Open	3000
13	Seema	F	FY	Reserved	500
14	Naresh	M	FY	Reserved	500
15	Rima	F	TY	Open	5000
16	Gajendra	M	SY	Open	4000

Filter the worksheet to show

a) Female students from Reserved category
b) Male students from TY
c) Open category students paying fees > 3000

7. Create a worksheet with the following data:

SLNO	REGNO	NAME	AGE
1	1785	ARUN	20
2	1784	MARY	23
3	1781	SURESH	21
4	1783	ZAVIER	18
5	1782	ARUN	22

Sort the table data in the following ways:
a) Sort in the ascending order of REGNO
b) Sort in the alphabetical order of NAME
c) Sort in alphabetical order of NAME and by descending order of AGE(two students with the same name ARUN should be sorted as
ARUN 22
ARUN 20
(with **same names ARUN they were sorted by descending order of AGE**)
d) Sort the data back to orginal order using SLNO column

8. Create a worksheet for sales of products by salesman in different cities as given below:

Saleman code	Salesman Name	City	PRODUCT CODE	PRODUCT NAME	QUALITY	SALE AMOUNT
1021	ARUN	TRICHY	13071	TV	1	22000
1022	BALU	TRICHY	13088	FRIDGE	1	16000
1018	MARY	CHENNAI	13090	W MACHINE	1	23000
1021	ARUN	CHENNAI	13071	TV	1	22000

Add data for 5 different CITIES (DELHI, BOMBAY, TRICHY,

CHENNAI, MADURAI) 5 salesmen and 5 different products TV, FFRIDGE, WASHING MACHINE, GRINDER and MIXIE. Consolidate the data in the following ways:
  a) Find salesman wise total quantity and sales amount.
  b) Find product wise total quantity and sales amount.
  c) Find city wise total quantity and sales amount.

9. Create a worksheet with student data REGNO, NAME, marks in 5 different subject. Find total marks. Create bar chart showing each subject mark and total mark for each student. Find subjectwise maximum and minimum marks scored by students.

10. Create a worksheet showing votes polled by 4 political parties in 3 constituencies. Create PIE exploded PIE charts for each constitutency showing votes polled by different parties in that constituency.

11. Create a line chart showing employees age in the X axis and their income in Y axis. Display Legend and data labels with background grid lines.

12. Enter the following data once, as shown below:

Sell Price | Cost Price | Profit

120 | 90 | 30

Create a pivot table showing Selling prices in rows and Cost Price in Columns. Generate profits as pivot table entries. Refer the formula entered once in a cell to find the profit. Fill up the entire pivot table with command.

COST PRICE

	70	80	90	100	110	120
60	-10	-20	-30	-40	-50	-70
70	0	-10	-20	-30	-40	-50
80	10	0	-10	-20	-30	-40
90	20	10	0	-10	-20	-30
100	30	20	10	0	-10	-20
110	40	30	20	10	0	-10
120	50	40	30	20	10	0

↑**Sale Price**

	Total	30

	Course Outcomes	Programme Outcome
CO	On completion of this course, students will	
1	be able to create worksheets to compute formulae automatically by copying	PO1,PO3,PO5
2	be able to perform data sorting and filtering	PO2,PO3,PO6
3	be able to perform What-If analysis with pivot tables.	PO3,PO4
4	be able to employ built-in functions for effective computations	PO4,PO5,PO6
5	be able to present data in the form of charts and share with other packages	PO4,PO6
	Web Resources	
1.	https://www.w3schools.com/EXCEL/index.php	
2.	https://www.geeksforgeeks.org/excel-tutorial/	
3.	https://www.tutorialspoint.com/excel/index.htm	
4.	https://www.javatpoint.com/advanced-excel-tutorial-how-to-master-microsoft-excel	

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	2		3	3	3	3	3
CO 3	3		3	2	3	3	2
CO 4	3		3	3	3	3	3
CO 5	3		3	3	3	3	3
Weight age of course contributed to each PSO	14		15	14	15	15	14

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

Title of the Course		NUMERICAL METHODS WITH APPLICATIONS					
Paper Number		ELECTIVE EC1					
Category	Allied	Year	I	Credits	3	Course Code	23BMAA1
		Semester	I				
Instructional Hours per week		Lecture		Tutorial	Lab Practice	Total	
		1			2	3	
Pre-requisite		12th Standard Mathematics					
Objectives of the Course		• To expose the students to various tools in solving numerical problems. • To prepare the students for competitive Examinations like CSIR ,NET etc.					
Unit I		Solution of Algebraic and Transcendental equations- introduction, Bisection method- Iteration method –Method of False Position Method –Newtob Raphson Method.					
Unit II		**Interpolation :** Finite differences –Forward differences –Backward differences –Central differences-Sympolic relations –Newton formula for interpolation-Interpolation with unevenly spaced points – Lagrange 's interpolation formula.					
Unit III		Numerical differentiation and integration-Introduction Numerical Differentiation –Cubic spline Method –Maximum and Minimum values of a tabulated function –Numerical integration –Trapezoidal rule and simpson's rule1/3 and 3/8 rules.					
Unit IV		Matrices and Linear system of equations –Guassian Elimination method –Modification of the Guass Method to compute the inverse –Iterative Method –Jacobi and Guass Seidal Method.					
Unit V		Numerical Solution of Ordinary differential equation –Solution by taylor Series –Picard's Method of Successive Approximations – Runge-kutta Methods.					
Extended Professional Component (is a part of internal component only, Not to be included in the External Examination question paper)		Questions related to the above topics, from various competitive examinations UPSC / TNPSC / others to be solved (To be discussed during the Tutorial hour)					
Skills acquired from this course		Knowledge, problem solving, analytical ability, professional competency, professional communication and transferable skill.					
Recommended Text		1.Sastry S.S (2012) Introductory methods of Numerical Analysis.New Delhi : PHI Learning Pvt.Ltd					
Reference Books		1.Kandasamy .P., Thilagavathi.K., & Gunavathy.k (2008) Numerical Methods .S.Chand Publications 2Arumugam.S., Thangapandi Isaac.A & Somasundaram .A(2013) Nmerical Analysis with Programming C, Palayamkottai: New Gamma Publishing House					

Course Learning Outcome (for Mapping with POs and PSOs)

Students will be able to

CLO 1: Classify and Solve Bisection Method and False Position Method

CLO 2: Find the Finite difference, Forward and Backward Differences

CLO 3: Find Numerical Differentiation and Integration,Maximum and Minimum Values

CLO 4: Find Guassian Elimination Method, Guass Seidal Method

CLO 5: Find Picard's Method, Runge-Kutta Method

	POs						PSOs		
	1	2	3	4	5	6	1	2	3
CLO1	3	1	3	-	1	-	3	2	1
CLO2	2	1	3	1	1	1	3	2	1
CLO3	3	1	3	1	-	2	3	2	1
CLO4	3	1	3	1	2	-	3	2	1
CLO5	3	1	3	-	-	-	3	2	1

- Offered by B.Sc., Mathematics to B.Sc., Mathematics student.

Title of the Course	NUMERICAL METHODS WITH APPLICATIONS PRACTICAL					
Paper Number	ELECTIVE EC1					
Category	Allied	**Year**	I	**Credits**	2	**Course Code**	23BMAAP1
		Semester	I				

Instructional Hours per week	**Lecture**	**Tutorial**	**Lab Practice**	**Total**
	1		1	2

Pre-requisite	12th Standard Mathematics
Objectives of the Course	• To expose the students to various tools in solving numerical problems. • To prepare the students for competitive Examinations like CSIR ,NET etc.
	1. Solve Bisection Method and False Position Method with examples 2. Find the Forward and Backward Differences with examples 3. Find Numerical Differentiation and Integration with examples 4. Find Guassian Elimination Method, Guass Seidal Method with examples 5. Find R.K Method and Euler Method with Examples

Title of the Course	ANCILLARY MATHEMATICS - I						
Paper Number	Allied Course – EC1						
Category	Core	Year	I	Credits	3	Course Code	23BMAA2
		Semester	I				
Instructional Hours per week	Lecture		Tutorial		Lab Practice	Total	
	2		1		--	3	
Pre-requisite	12th Standard Mathematics						
Objectives of the Course	- To learn the basic concepts and problem solving in differential equations - To explore trigonometry as a tool in solving problems..						
Unit I	**Matrices –** Characteristic Equation and Cayley - Hamilton Theorem (Proof not included) – Finding the inverse of a matrix using Cayley – Hamilton Theorem – Eigen values and Eigen vectors.						
Unit II	Equations of the first order but of Higher Degree – Equations solvable for dy/dx – Equations solvable y, x – Clairaut's form – Linear equations with constant coefficients – Finding the complementary function and particular integral of the type eax cosax sinax..						
Unit III	Differential Calculus – Successive Differentiation – n th derivative of standard functions (Derivation not needed) problems – Leibnitz formula for the nth derivative of a product (proof not needed) simple problems only – Curvature and Radius of Curvature in Cartesian coordinates only – problems. .						
Unit IV	Integral Calculus – Integration by Parts – Bernoulli's formula – Definite integrals – Properties – problems. , $\cos n\theta$, $\sin n\theta$ and $\tan n\theta$, $\cos n\theta$						
Unit V	(n being $a\theta$, $\cos n\theta$, $\sin n\theta$ and $\tan n\theta$, $\cos n\theta$ Trigonometry : Expression for sinn (only problems in allθ in powers of θ, $\tan\theta$, $\cos\theta$+ve integer) Expansion of sin the above)						

Extended Professional Component (is a part of internal component only, Not to be included in the External Examination question paper)	Questions related to the above topics, from various competitive examinations UPSC / TNPSC / others to be solved (To be discussed during the Tutorial hour)
Skills acquired from this course	Knowledge, problem solving, analytical ability, professional competency, professional communication and transferable skill.
Recommended Text	1. Arumugam, S., & Thangapandi Isaac, A. (2002). Ancillary Mathematics Paper I (Revised). Palayamkottai: New Gamma Publishing House 2. Arumugam, S., & ThangapandiIssac, A. (2003). Modern Algebra. Chennai: Scitech Publications. 3. Narayanan, S., & ManickavachagomPillay, T. K. (2006). Calculus. (Volume I). S.Viswanathan (Printers & Publishers) Pvt. Ltd 4. . Narayanan, S., & ManickavachagomPillay, T. K. (2014). Calculus. (Volume II). S.Viswanathan (Printers & Publishers) Pvt. Ltd 5. . Narayanan, S., & ManickavachagomPillay, T. K. (2015). Differential Equations and its Applications. S.Viswanathan (Publishers & Printers)Pvt. Ltd.
Website and e-Learning Source	https://nptel.ac.in

Course Learning Outcome (for Mapping with POs and PSOs)

Students will be able to

CLO 1: Classify and Solve reciprocal equations

CLO 2: Find the sum of binomial, exponential and logarithmic series

CLO 3: Find Eigen values, eigen vectors, Clairaut's form and diagonalize a given matrix

CLO 4: Expand the powers and multiples of trigonometric functions in terms of sine and cosine

	SEMESTER I			
COURSE CODE	ALLIED COURSE I	T/P	C	H/W
23BMAAP2	**PRACTICAL**	P	2	2
	ANCILLARY MATHEMATICS - I			

Q1. Find the rank of a 3 into 3 matrix.

Q2. Finding inverse of a given matrix using Cayley- Hamilton Theorem.

Q3. Finding complementary functions and particular integral of given differential equations with right hand side consisting of exponential, trigonometry and algebraic function and its combinations.

Q4. Finding nth derivative of a product of functions using Leibnitz formula.

Q5. Finding Integration by parts two or more times using Bernoulli's formula.

Q6. Express $\sin m\theta \cos n\theta$ in terms of either $\sin\theta$ or $\cos\theta$.

Title of the Course		ASTRONOMY						
Paper Number		Elective II						
Category	Elective	Year	I	Credits	3	Course Code 23BMAA3		
		Semester	II					
Instructional Hours per week		Lecture		Tutorial	Lab Practice		Total	
		3		1	--		3	
Pre-requisite		12ᵗʰ Standard Mathematics						
Objectives of the Course		• To provide Knowledge about the universe ,scientific thinking to problems in astronomy , the observational foundations of astronomy's greatest discoveries and the nature of galaxy.						
UNIT-I:		Celestial sphere and diurnal motion –celestial coordinates – sidereal time						
UNIT-II:		Morning and evening stars =circumpolar stars –Zones of earth-Perpetual day -Twilight.						
UNIT-III:		Refraction –Laws of Refraction –Tangent formula – orizontal refraction –Geocentric parallax-horizontal parallaxs						
UNIT-IV:		Kepler's Law- anomalies-Kepler's equation-calendar.						
UNIT-V:		Moon-Sidereal and synodic months –elongation –phase of moon –Eclipses- umbraand penumbra-Lunar and solar eclipses-Maximum and minimum number of eclipses in a year						
Extended Professional Component (is a part of internal component only, Not to be included in the External Examination question paper)		Questions related to the above topics, from various competitive examinations UPSC / TNPSC / others to be solved (To be discussed during the Tutorial hour)						
Skills acquired from this course		Knowledge, Problem Solving, Analytical ability, Professional Competency, Professional Communication and Transferrable Skill						
Recommended Text		S.kumaravel and susheelakumaravel, Astronomy ,Prentice Hall(2000)						

Title of the Course	**ASTRONOMY PRACTICAL**						
Paper Number	**ELECTIVE PRACTICAL**						
Category	ELECTIVE	**Year**	I	**Credits**	2	**Course Code**	
		Semester	II			**23BMAAP3**	
Instructional Hours per week		**Lecture**		**Tutorial**	**Lab Practice**		**Total**
		1			1		2
Pre-requisite		12ᵗʰ Standard Mathematics					
		•					
Course Outline		1.If the hour angles of a slar of declination delta be H when its azimuth is Δ and H when its azimuth is 180+A show that the latitude φ of the place of observation can be pound from the equation cos H-H'/2 = tan δ cos H-H' /2 2.A circumpolar star (a, δ) crosses the some vertical cirlcle at altitudes α1 and α2 and the meridian between the zenith and pole .Show that the latitude of the place is given by Sin α1+ α2 /2 sin δ = sin φcosα1- α2 /2 3.if r'' be the horizontal refraction , show that the point on the horizon where the sun rises is shifted by r''sinφ(sec(φ - δ)sec(φ+ δ))$^{1/2}$ where δ is the declination of the sun and φ, the latitude oof the place 4. Show that the angle between the direction of motion of a planet and the radius vector joining it to the sun is given by tan^{-1} (1-e^2)$^{1/2}$/ e sin u where u is eccentric anomaly 5.if the interior ecliptic limits be +β and if the moon revolves n times as fast as the sun, and its nodes regress θ for everybrevolutionthe moon makes round the earth, show that the minimum number of solar eclipsesx occurring at or near a node is 2(n-l)β / nθ+2Π						

Title of the Course	**ANCILLARY MATHEMATICS II**						
Paper Number	**ALLIED**						
Category		**Year**	I	**Credits**	3	**Course Code**	
		Semester	II			**23BMAA4**	
Instructional Hours per week	**Lecture**		**Tutorial**	**Lab Practice**		**Total**	
	3		1	-		3	
Objectives of the Course	• To learn vector differentiation and vector integration and solve differential equations						
UNIT-I:	Vector Calculus –Vector differentiation-gradient-Divergence-curl-Properties-Result						
UNIT-II:	Linear equations with constant coefficients with Right hand side of the from $e^{ax}v$ where v is any function of x-x^m m be a positive integer – Linear equations with variable coefficients (Homogeneous Differential equations only).						
UNIT-III:	Fourier series –definition –Fourier series expansion of periodic function with period 2π- Even and odd functions –half range fourier series –Problems						
UNIT-IV:	Interpolation-Newton's interpolation formula- Centrql difference – Interpolation formulae-Lagrange's interpolation formulae						
UNIT-V:	Correlation –Rank correlqtion –Regression Lines and Regression coefficietns.						
Skills acquired from this course	Studnets relating the concepts of compound interest and simple interest						
Recommended Text	1.Dr S.arumugam and A.Thangapandi Isaac(2006) Analytical Geometry 2D and Vector Calculus,Palayamkottai, New Gamma Publishing House 2. Dr S.arumugam and A.Thangapandi Isaac(2006),Statisticss,Palayamkottai, New Gamma Publishing House. 3. Dr S.arumugam and A.Thangapandi Isaac(2006) Numerical Analysis with Programming in c,Palayamkottai, New Gamma Publishing House 4.S.Narayanan and T.Manickamvasagampillai ,(2014), Calculus (Vol III) ,Vishwanathan printers and publishers S.Narayanan and T.Manickamvasagampillai ,(2014), Differentail Equation and its application ,Vishwanathan printers and publishers						
Website and e-Learning Source	https://nptel.ac.in						

Title of the Course	ANCILLARY MATHEMATICS II PRACTICAL				
Paper Number	**ELECTIVE PRACTICAL**				
Category	ELECTIVE	**Year**	I	**Credits**	2	**Course Code**
		Semester	II			**23BMAAP4**
Instructional Hours per week		**Lecture**		**Tutorial**	**Lab Practice**	**Total**
		1			1	2
Pre-requisite	12ᵗʰ Standard Mathematics				
	•				
Course Outline	1.To find the Fourier coefficients of periodic functions of period 2 pi 2.. Solving problems using Newton's Interpolation formula 3.Solving Problem using Lagrange'sinterpolation formula 4.Solvinng problem Rank Correlation 5.Solving problem regression line and regression coefficients 4. Solving probemscorrelation coefficients				

Title of the Course	MATHEMATICAL STATISTICS-I				
Paper Number	ELECTIVE M5				
Category	Elective	Year	II	Credits	3	Course Code
		Semester	III			23BMAA5

Instructional Hours per week	Lecture		Tutorial	Lab Practice	Total
	2		1	--	3

Pre-requisite	12th Standard Mathematics
Objectives of the Course	• To provide an understanding of the fundamental concepts of probability theory • To develop skills in applying probability theory and statitstical inference to sole real world
UNIT-I:	Definition of sample space –Events –Definition of probability – addition and Multiplication laws of probability –Independence of events –Conditional probability –Baye's theorem –simple problems.
UNIT-II:	Distribution Function-Mathematical Expectation –Conditional Expectation and conditional Variance-Moment Generating Function –Probability Generating Function –Cumulants – Characteristic function-Simple problems
UNIT III	Discrete Distribution Binomial ,Poisson Continuos Distribution and Normal
UNIT IV	Sampling Distribution & Test of Significance Sampling –Tests of Significance –Null Hypothesis –Tests of significance for Large Samples
UNIT V	Test of Significance for Small Samples : Using the Chi-Square distribution- Students t-distributio-F-distribution
Course Outcome	On Completion of this course, students will able to Define Sammple space .events, and probability and apply the addition and multiplication Laws of probability to calculate probabilities of events
Recommended Book	S.C Gupta &V.K.Kapoor, Fundamental Mathematical Statistics , Sultan & sons

Title of the Course	MATHEMATICAL STATISTICS-I PRACTICAL					
Paper Number	ELECTIVE					
Category	Elective	Year	II	Credits	2	Course Code
		Semester	III			23BMAAP5

Instructional Hours per week	Lecture		Tutorial	Lab Practice	Total
	-		-	--	2

	•
Course Outline	1.Find the Skewness and kurtosisof a given data set distribution 2.Applying Baye's theorem to solve simple problems 3.Find the binomial distribution with n=20 ,p=0.4 4.Using the normal distribution to calculate confidence intervals fir the mean when the standard deviation is known 5.Perform Z testfor difference in mean 6.Conducting a hypothesis test for the difference between two variance using the F-distribution 7.Perform t-test for equality of mean 8.Conducting a hypothesis testfor a sample mean with a known population variance .
Course Outcome	

Title of the Course	OPERATION RESEARCH 1 (ANCILLARYMATHEMAICS III						
Paper Number							
Category	Core	Year	II	Credits	4	Course Code	23BMAA6
		Semester	III				
Instructional Hours per week		Lecture		Tutorial	Lab Practice	Total	
		4		1	--	4	
Pre-requisite		12th Standard Mathematics					
Objectives of the Course		Identify and characterize sets and functions and Understand, test and analyze the convergence and divergence of sequences, series					
Unit 1:		Introduction –origin and development of OR-Nature and features of OR-Scientific method in OR-Modelling in OR-Advantage and Limitation of Model-General Solution methods of OR Models-Applications of OR-LPP-Mathematical formulation of the problem-Illustration on Mathematic formulation of LPP-Graphical Solution Method-General LPP-Canonical and Standard forms of LPP					
Unit II		Use of Artificial Variables (Big M Method-Two Phase Method)Duality in Linear Programming-General primal and dual Pair –Formulating a dual Problem-Primal –Dual Pair in a Matrix form –Duality theorems-Complementary slackness theorem-Duality and simplex method –Dual simplex method					
Unit III		Introduction – L.P formulation of T.P-Existence solution in T.P- The transportation table-Loops in T.P-Solution of a Transportation problem-Finding an initial basic-feasible solution (NWCM-LCM-VAM0-Degeneracy in TP-Transportation Algorithm (MODI Method)-Unbalanced T.P-Maximization T.P					
Unit IV		Assignment problem-Introduction-Mathematical formulation of the problem –Test for optimality by using Hungarian Method-Maximization case in Assignment Problem					
Unit V		Sequencing problem-Introduction –Problem of Sequencing –Basic terms used in sequencing –n jobs to be operated on two machines –problems –n jobs to be operated on K machines –problems –Two jobs operated on K machines (Graphical Method)-Problems					
Recommended Text		1, Operation Research (14th Edition)by Kantiswarub, P.K.Gupta and Man Mohan Sultan Chand & sons , New Delhi ,2008					
Website and e-Learning Source		https://nptel.ac.in					

Title of the Course	ANCILLARY MATHEMATICS III PRACTICAL					
Paper Number	ELECTIVE PRACTICAL					
Category	ELECTIVE	Year	II	Credits	2	Course Code
		Semester	III			23BMAAP6
Instructional Hours per week		Lecture		Tutorial	Lab Practice	Total
		1			1	2
Pre-requisite	12th Standard Mathematics					
	•					
Course Outline	1.Solving Problem using Big –M method 2 Solvinng problem using Two Phase Methodntrol 3.Solvingn Transportation Problem, 4. Solving Assignment probems 5. Solving Mathemtical formulation problem 6.Solving problems using Graphical Method					

Title of the Course	TRANSFORMATION TECHNIQUES				
Paper Number	ELECTIVE M7				
Category	Core	Year	II	Credits	4	Course Code 23BMAA7
		Semester	IV			
Instructional Hours per week	Lecture		Tutorial	Lab Practice	Total
	3		1	--	4
Pre-requisite	12ᵗʰ Standard Mathematics				
Objectives of the Course	Identify and characterize sets and functions and Understand, test and analyze the convergence and divergence of sequences, series				
Course Out line	Unit 1: Laplace Transform-Definition-Laplace Transform of Standard function –Laplace Transform of Periodic functions. Unit II Inverse Laplace Transform –Standard formulae-Solving Ordinarry Differential Equation with constant Coefficients –variable coefficients of periodic functions of period 2 pi Unit III Fouriers series –Definition –To find the Fourier coefficients of periodic functions of period 2 pi Unit Iv Fourier transforms –Complex form of Fourier integral formula –Fourier integral theorem –Fourier sine and cosine Unit V Z transforms – Definition –Properties - z Transforms of some basic functions and problems –Inverse Z transforms –Method to fid the inverse Z Transfroms				
Recommended Text	1, Narayanan .S &ManicavachagamPillai .T.K Calculus (Vol III) S.Viswanathan (Printers and Publishers) PVT Ltd 1. Veerarajan .T (2004) Engineering Mathematics , New Delhi Tata MacGraw Hill Publishing Limited.				
Website and e-Learning Source	https://nptel.ac.in				

Title of the Course	**TRANSFORM TECHNIQUE PRACTICAL**					
Paper Number	**ELECTIVE PRACTICAL**					
Category	ELECTIVE	**Year**	II	**Credits**	2	**Course Code**
		Semester	IV			23BMAAP7
Instructional Hours per week		**Lecture**		**Tutorial**	**Lab Practice**	**Total**
		1			1	2
Pre-requisite	12ᵗʰ Standard Mathematics					
	•					
Course Outline	1.Laplace transform s of student functions qnd periodic functions 2.Solving ordinary differential Equations with constant coefficients ,Variable coefficients 3.Solving Simultaneous linear equations using laplace transform 4. –To find the Fourier coefficients of periodic functions of period 2 pi 5. Solving problems of Complex form of Fourier integral formula 6. Solving z Transforms of some basic functions and problems					

Title of the Course	OPERATION RESEARCH II (ANCILLARY MATHEMATICS IV)				
Paper Number	ELECTIVE M5				
Category	Elective	Year	II	Credits	4	Course Code 23BMAA8
		Semester	IV			
Instructional Hours per week	Lecture		Tutorial	Lab Practice	Total
	3		1	--	4
Pre-requisite	12ᵗʰ Standard Mathematics				
Objectives of the Course	• Replace Problem • Inventory Control • Queuing System				
UNIT-I:	Replace Problem and System Reliability-Introduction – Replacement of Equipment/ Assert that Deteriorates gradually—replacement of Equipment that fails suddenly.				
UNIT-II:	Inventory control-Types of inventories-Reason for carrying inventories-Costs Associated with inventories-Factors affecting Inventory Control-The Concept of EOQ-Deterministic Inventory Problems with no shortages with shortages problem of EOQ with price Breaks.				
Unit III:	Queuing theory-Introduction-Queuing System –Elements of Queuing System-Operating characteristics of a Queuing system-Deterministic Queuing system-Probability Distributions of Queuing system Classification of queuing Models –Definition of transient and steady states-Poisson Queuing System- $(M/M/1)::(\infty/FIFO)$. $(M/M/I)::(\infty/SIRO),(M/M/I)\oslash N/FIFO)$ Generlized model Birth-Death process				
Unit IV	Network Scheduling by PERT/CPM-Network Basic Components –Drawing network-Critical path Analysis-PERT Analysis-Distinction between PERT and CPM				
Unit V	Game theory –Two person zero –Sum Games-Basic terms-Maximum-Minimax Principle-Games without saddle points – Mixed strategies-Graphical solution of 2xn and mx2 games-Deterministic property- General solution of mxn rectangular games				
Recommended BookRecommended Text	1, Operation Research (14th Edition)by Kantiswarub, P.K.Gupta and Man Mohan Sultan Chand & sons , New Delhi ,2008				
Website and e-Learning Source	https://nptel.ac.in				

Title of the Course	ANCILLARY MATHEMATICS IV PRACTICAL				
Paper Number	ELECTIVE PRACTICAL				
Category	ELECTIVE	Year	II	Credits	2	Course Code
		Semester	IV			23BMAAP8
Instructional Hours per week		Lecture		Tutorial	Lab Practice	Total
		1			1	2
Pre-requisite		12ᵗʰ Standard Mathematics				
		•				
Course Outline		1.Solving Replace Problem and System Reliability- 2 Solvinng problem Inventory control 3.Explain(M/M/1)::(∞/FIFO). (M/M/I)::(∞/SIRO), 4. Solving probemsNetwork Scheduling by PERT/CPM method. 5.Solving problems of Two person zero –Sum Games 6. Solving problems Graphical solution of 2xn and mx2 games				

Title of the Course	MATHEMATICAL STATISTICS-II							
Paper Number	ALLIED							
Category	Elective	Year	I	Credits	3	Course Code		
		Semester	II			23BMAA9		
Instructional Hours per week		Lecture		Tutorial	Lab Practice			Total
		2		1	--			3
Pre-requisite		12th Standard Mathematics						
Objectives of the Course		• To provide an understanding of the fundamental concepts of probability theory • To develop skills in applying probability theory and statitstical inference to sole real world						
Course Outline		UNIT-I: Definition of sample space –Events –Definition of probability –addition and Multiplication laws of probability – Independence of events –Conditional probability –Baye's theorem – simple problems.						
		UNIT-II: Distribution Function-Mathematical Expectation – Conditional Expectation and conditional Variance-Moment Generating Function –Probability Generating Function –Cumulants – Characteristic function-Simple problems UNIT III Discrete Distribution Binomial ,Poisson Continuos Distribution and Normal UNIT IV Sampling Distribution & Test of Significance Sampling – Tests of Significance –Null Hypothesis –Tests of significance for Large Samples UNIT V Test of Significance for Small Samples : Using the Chi-Square distribution- Students t-distributio-F-distribution						
Course Outcome		On Completion of this course, students will able to Define Sammple space .events, and probability and apply the addition and multiplication Laws of probability to calculate probabilities of events						
Recommended Book		S.C Gupta &V.K.Kapoor, Fundamental Mathematical Statistics , Sultan & sons S.Arumugam&Thangapandi Isaac, Statistics ,New Gamma Publsihing House,						

Title of the Course	MATHEMATICAL STATISTICS PRACTICAL-II						
Paper Number	ELECTIVE						
Category	Elective	Year	II	Credits	1	Course Code	
		Semester	IV			23BMAAP9	

Instructional Hours per week	Lecture	Tutorial	Lab Practice		Total
	-	-	--		1
	•				

Course Outline	1.Applying Baye's theorem to solve simple problems
	2.Find the binomial distribution with n=20 ,p=0.4
	4.Using the normal distribution to calculate confidence intervals fir the mean when the standard deviation is known
	5.Explain Poisson distribution with Exampl
	6.Conducting a hypothesis test for the difference between two variance using the F-distribution
	7.Perform t-test for equality of mean
	8.Conducting a hypothesis testfor a sample mean with a known population variance
	9.Explain F-distribution with example .

Allied Subjects offered by B.Sc. Data Science department to other department students
Semester I :   Allied I: Theory : Database Management System
                    Allied I Practical : Database Management System Lab
Semester II: Allied II: Theory: Office Automation
                    Allied II Practical : Office Automation Lab
Semester III: Allied III: Theory: Operations Research
                    Allied III : Practical: Operations Research Lab
Semester IV: Allied IV: Theory: Internet and Web Design
                    Allied IV : Practical: Internet and Web Design Lab

Subject Code	Subject Name	Category	L	T	P	S	Credits	Inst. Hours	Marks		
									CIA	External	Total
23BDSA1	**Database Management System**	Allied	3	-	-	-	3	3	25	75	100

	Learning Objectives
LO1	To enable the students to learn the designing of data base systems, foundation on the relational model of data and normal forms.
LO2	To understood the concepts of data base management system, design simple Database models
LO3	To learn and understand to write queries using SQL, PL/SQL.
LO4	To enable the students to learn the designing of data base systems, foundation on the relational model of data and normal forms.
LO5	To understood the concepts of data base management system, design simple Database models

	Contents	No. of Hours
UNIT I	**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	6
UNIT 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	6
UNIT III	**Normalization of Database Tables**: Database tables 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.	6
UNIT IV	**Advanced SQL**:Relational SET Operators: UNION – UNION ALL – 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	6
UNIT 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.	6

	Total	30
	Course Outcomes	**Programme Outcomes**
CO	On completion of this course, students will	
CO1	Understand the various basic concepts of Data Base System. Difference between file system and DBMS and compare various data models.	PO1
CO2	Define the integrity constraints. Understand the basic concepts of Relational Data Model, Entity-Relationship Model.	PO1, PO2
CO3	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
CO4	Classify the different functions and various join operations and enhance the knowledge of handling multiple tables.	PO4, PO5, PO6
CO5	Learn to design Data base operations and implement using PL/SQL programs. Learn basics of PL/SQL and develop programs using Cursors, Exceptions	PO3, PO5
Text Book		
1	Coronel, Morris, Rob, "Database Systems, Design, Implementation and Management", Ninth Edition	
2	Nilesh Shah, "Database Systems Using Oracle", 2nd edition, Pearson Education India, 2016	
Reference Books		
1.	Abraham Silberschatz, Henry F.Korth and S.Sudarshan,"Database System Concepts", McGraw Hill International Publication ,VI Edition	
2.	Shio Kumar Singh , "Database Systems ",Pearson publications ,II Edition	
Web Resources		
1.	Web resources from NDL Library, E-content from open-source libraries	

Mapping with Programme Outcomes:

CO/ PSO	PSO 1	PSO 2	PSO 3	PSO 4	PSO 5	PSO 6
CO1	3	2	1	2	1	2
CO2	3	3	2	2	3	3
CO3	3	3	2	3	3	2
CO4	3	2	3	2	2	3
CO5	3	2	2	2	3	3
Weightage of course contributed to each PSO	15	12	10	11	12	13

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

Subject Code	Subject Name	Category	L	T	P	S	Credits	Inst. Hours	CIA	External	Total
										Marks	
23BDSAP1	**Database Management System lab**		-	-		-	2	2	25	75	100

	Learning Objectives	
LO1	To enable the students to learn the designing of data base systems, foundation on the relational model of data and normal forms.	
LO2	To understood the concepts of data base management system, design simple Database models	
LO3	To learn and understand to write queries using SQL, PL/SQL.	
LO4	To enable the students to learn the designing of data base systems, foundation on the relational model of data and normal forms.	
LO5	To understood the concepts of data base management system, design simple Database models	

	List of Exercises:	**No. of Hours**	**Course Objective**
II	*I. SQL* 1. DDLCOMMANDS 2. DMLCOMMANDS 3. TCLCOMMANDS *II. PL/SQL* 4. FIBONACCI SERIES 5. FACTORIAL 6. STRING REVERSE 7. SUM OF SERIES 8. TRIGGER *III. CURSOR* 9. STUDENT MARK ANALYSIS USING CURSOR *IV. APPLICATION* 10. LIBRARY MANAGEMENTSYSTEM 11. STUDENT MARK ANALYSIS	30	
	Total	**30**	

	Course Outcomes	**Programme Outcomes**
CO	On completion of this course, students will	
CO1	Understand the various basic concepts of Data Base System. Difference between file system and DBMS and compare various data models.	PO1
CO2	Define the integrity constraints. Understand the basic concepts of Relational Data Model, Entity-Relationship Model.	PO1, PO2
CO3	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	PO4, PO6

	retrieving of data using Data Manipulation Language (DML)	
CO4	Classify the different functions and various join operations and enhance the knowledge of handling multiple tables.	PO4, PO5, PO6
CO5	Learn to design Data base operations and implement using PL/SQL programs. Learn basics of PL/SQL and develop programs using Cursors, Exceptions	PO3, PO4
Text Book		
1	Coronel, Morris, Rob, "Database Systems, Design, Implementation and Management", Ninth Edition	
2	Nilesh Shah, "Database Systems Using Oracle", 2nd edition, Pearson Education India, 2016	
Reference Books		
1.	Abraham Silberschatz, Henry F.Korth and S.Sudarshan,"Database System Concepts", McGraw Hill International Publication ,VI Edition	
2.	Shio Kumar Singh , "Database Systems ",Pearson publications ,II Edition	
Web Resources		
1.	Web resources from NDL Library, E-content from open-source libraries	

Mapping with Programme Outcomes:

CO/ PSO	PSO 1	PSO 2	PSO 3	PSO 4	PSO 5	PSO 6
CO1	3	2	3	3	3	2
CO2	3	3	1	2	2	2
CO3	2	2	3	3	3	3
CO4	2	2	3	3	3	1
CO5	2	3	3	3	3	3
Weightage of course contributedto each PSO	12	12	13	14	14	11

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

Allied II (Offered by B.Sc. Data Science Dept to other departmentS)

Subject Code	Subject Name	Category	L	T	P	S	Credits	Inst. Hours	Marks		
									CIA	External	Total
23BDSA2	**Office Automation**	A-II Allied Theory	3	-	-	-	3	3	25	75	100

	Learning Objective										
LO1	To acquire basic knowledge on word, spread sheet, Access and powerpoint software packages.										
LO2	To learn and use the features of Word processor										
LO3	To learn and use the features of Excel										
LO4	To learn and use the features of Access										
LO5	To learn and use the features of Power Point										

	Contents	No. of Hours
UNIT I	MS Word: Working in the Word Environment – Opening, Moving Around in, and closing Document – Creating and Saving A Document – Previewing and Printing Document – Editing and Proofreading Documents: Making Changes to document – Inserting Saved Text – Finding the Most Appropriate Word – Reorganizing a Document Outline – Finding and Replacing Text – Correcting spelling and Grammatical errors – Finalizing Document.	15
UNIT II	Word: Changing the Look of Text: Quickly Formatting Text and Paragraphs – Manually changing the look of characters – Manually changing the look of paragraphs – Creating and modifying Lists- Presenting Information in Columns and Tables : Presenting Information in Columns – Creating Tabular List – Presenting Information in a Table – Formatting Table Information – Performing Calculations in a Table- Using a Table to control Page Layout.	15
UNIT III	Excel Setting Up a Workbook : Creating Workbooks – Modifying Workbooks - Modifying Worksheets – Working with Data and Data Tables : Entering and Revising Data – Moving Data within a Workbook- Finding and Replacing Data – Correcting and Expanding Upon Worksheet Data – Defining a Table – Performing Calculations on Data : Naming Groups of Data – Creating Formulas to Calculate Values – Summarizing Data that meets Specific Conditions –Finding and Correcting Errors in Calculations- Changing Document Appearance.	15
UNIT-IV	Access: Introduction – Parts of an Window: - Creating a New Data Base – Table Wizard – Renaming – Saving the Database – Relationships – Query – Form – Reports – Exiting MS-Access.	15
UNIT-V	PowerPoint Starting a New Presentation – Working with Slide Text : Entering Text – Editing Text – Adding and Manipulating Text Boxes – Correcting and Sizing text – Checking Spelling – Finding and replacing text and fonts – Changing the size, Alignment, Spacing – Adjusting the Slide Layout, Order and Look : Changing the Layout of a slide – Rearranging Slides in a Presentation – Applying a theme -Switching to a Different Color Scheme – Adding Shading and texture to the background of a slide – Delivering a Presentation Electronically.	15

		Total	75
	Course Outcomes		**Programme Outcome**
CO	On completion of this course, students will		
CO1	Learn to use MS office software suite		PO1,PO3,PO5
CO2	Create reports, letters, mailmerge using Word Processor		PO2,PO3,PO6
CO3	Learn data sorting, filtering and analysis using Excel		PO3,PO4,PO5
CO4	Learn to create database, reports and forms using Access		PO4,PO5,PO6
CO5	Learn to create business presentation using Power Point		PO5,PO6
Text Book			
1	Joan Lambert, Joyce Cox, Curtis Frye, Microsoft Office Professional Step by Step, Pearson Education , 2010		
Reference Books			
1.	David W. Beskeen, Carol Cram, Jennifer Duffy, Lisa Friedrichsen, Elizabeth Eisner Reding, Microsoft Office 2010 Illustrated Introductory, First Course, Course Technology, 2012		
Web Resources			
1.			
2	E-Book: https://abiiid.files.wordpress.com/2011/01/microsoft-office-professional-2010-step-by-step.pdf		

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	3	2	3	3
CO 3	2	3	2	3	3	2
CO 4	3	3	3	3	3	3
CO 5	3	3	3	3	3	2
Weight age of course contributed to each PSO	14	15	14	14	15	13

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

Allied – 1I Practical (Offered by B.Sc. Data Science to other departments)

Subject Code	Subject Name	Category	L	T	P	S	Credits	Inst. Hours	Marks		
									CIA	External	Total
23BDSAP2	**Office Automation Lab**	A-II Allied Practical	-	-	2	-	2	2	25	75	100

	Course Objective
LO1	To learn the operations to create, save and close documents in MS-Office
LO2	To learn formatting features of Word and Mailmerge
LO3	To learn data analysis features of Excel
LO4	To learn creation of database and adding objects to them
LO5	To learn to make colourful power points for business presentations

	List of Excercises	**No. of Hours**	**Course Objectives**

	MS-WORD Exercises:
	1. Create a document and perform formatting/font operations.
	2. Design a Greeting Card using Word Art for different festivals.
	3. Create your Bio-Data and use page borders and Shading
	4. Write steps and perform following tasks:
	    Find and replace, Go to,Spelling& grammer check,Hyperlink, Bookmark
	5. Write steps and perform the following taks:
	    Header & footer,Watermark,Page color,Page border, Endnote & footnote
	6. Write steps to create a table of 10-15 students using columns:
	    Serial No., students name, roll no, contact number
	7. Write steps to insert images/pictures in a word document.
	8. Perform mailmerge operation to merge address of students into body of the letter and create form letters.
		10	

	MS-Excel Exercises: 9. Create a new worksheet in Excel and perform the following tasks: a. Copy an existing Sheet b. Rename the old sheet c. Insert new sheet into an existing workbook d. Delete the renamed sheet 10. Prepare an attendance sheet of 10 students for four subjects in your degree. Calculate total attendance, percentage of attendance and average attendance for each student. 11. Create student worksheet with columns Regno, Name, Degree and total marks obtained by them in an examination. a. Sort data by Name b. Filter data by degree c. Sub total of number of students in a particular degree 12. Perform computations on excel worksheet data using mathematical functions.	8	
	MS-PowerPoint Exercises: 13. Apply themes and layouts to powerpoint slides and insert pictures. 14. Add transition and animation. Work with master slides 15. Create Slide notes and hand outs.	6	
	MS-Access Exercises: 16. Create a student database and perform query operations on it.	6	

	17, Create two tables and relate them using primary keys 18. Design a colourful form for data entry 119. Create a report using data in tables.	
	Total	**30**

	Course Outcomes	**Programme Outcome**
CO	On completion of this course, students will	
1	Handle MS-Office software package suite	PO1,PO3,PO5
2	Create letters, reports, greeting cards and books, mailmerge and format them suitably	PO2,PO3,PO6
3	Create spreadsheets and perform computations and data analysis	PO3,PO4
4	Create database tables for an applications and perform query operations, form design and data report preparation	PO4,PO5,PO6
5	Create colourful presentation for education and business presentations.	PO4,PO6

Text Book	
1	E-Book: Rajeev Gandhi Youth Computer Saksharta Mission. Download PDF from: https://www.rgycsm.org/uploads/books/MICROSOFT-OFFICE-BOOK.pdf

Web Resources	
1.	https://tuto-computer.com/office/3-microsoft-excel-2013.html
2.	Free office tutorial at : https://edu.gcfglobal.org/en/topics/office/

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	2	3	3	3	3	3
CO 3	3	3	2	3	3	2
CO 4	3	3	3	3	3	3
CO 5	3	3	3	3	3	3
Weight age of course contributed to each PSO	14	15	14	15	15	14

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

Allied – III Theory (offered by B.Sc. Data Science Dept to other departments)

Subject Code	Subject Name	Category	L	T	P	S	Credits	Inst. Hours	Marks		
									CIA	External	Total
23BDSA3	**OPERTAIONS RESEARCH**	A-III Allied Theory	3	-	-	-	3	3	25	75	100

	Learning Objective										
LO1	To familiarize the students with optimization techniques
LO2	To understand LP Model and formulate objectives and constraints
LO3	To understand the ways of solving Linear Programming Problems
LO4	To understand and solve transporation problems in different ways
LO5	To understand game theory and strategies for solving them

UNIT	Contents	No. of Hours
I	**UNIT I : Introduction** Operations Research- Meaning-Definition - Origin and History- Characteristic Features – Need-Scope –Steps- Techniques- Application- Limitations	6
II	**UNIT II : Linear Programming Problem (LPP)** Meaning- Requirements- Assumptions- Applications- Formulating Lpp – Advantages- Limitations Formulating LP Model (Simple Problems Only)	6
III	**UNIT III: Methods Of LPP** Obtaining Optimal Solution for Linear Programming Problem (LPP)-Graphical Method - Problems --Simplex Method for Type of LPP and for Slack Variable Case -Maximization Function -Minimization Function (Simple Problem Only)	6
IV	**UNIT IV : Transportation Problems** Meaning –(Initial Basic Feasible Solution)Assumptions -Degenerate Solution - North -West Corner Method- Least Cost Method -Vogels Approximation Method - Assignment Problems- Features -Transportation Problem Vs Assignment Problem - Hungarian Method (Simple Problems Only)	6
V	**UNIT V: Game Theory** Meaning- Types of Games- Basic Assumptions- Finding Value of Game for Pure Strategy - Mixed Strategy -Indeterminate Matrix and Average Method -Graphical Method -Pure Strategy- Saddle Point Payoff Matrix Value of Game (Simple Problems Only)	6
	Total	**30**

	Course Outcomes	Programme Outcome
CO	On completion of this course, students will	
CO1	To appreciate the use of operation research in decision making	PO1,PO3,PO5
CO2	To formulate linear programming problems	PO2,PO3,PO6
CO3	To solve LP Problems and find optimal solution	PO3,PO4,PO5
CO4	To formulate and solve transportation problems	PO4,PO5,PO6
CO5	To solve different types of game problems using different strategies	PO5,PO6
	Text Book	

1	M. Sreenivasa Reddy, Operations Research Designed for Computer Science Students, (2019), Cengage Learning India Private Limited
2	S.Gurusamy(2017),Elements of Operations Research,Vijay Nicole Imprints private Limited, Chennai
Reference Books	
1.	Agarwal NP and Sonia Agarwal, Operations Research and Quantitative Techniques, RBS A Publishers, New Delhi ,2009
2.	Anand Sharma, Operations Research, Himalayan Publishing House, 2014 ,Mumbai
3.	Gupta Pk And Gupta SP(2014), Quantitative Techniques and Operations Research, Sultan Chand and Sons,New Delhi
4.	Kapoor V.K(2012), Operations Research Techniques For Management,Sultan Chand And Sons, New Delhi
5.	Kanti Swarup,P.K. Gupta Man Mohan(2014) ,Operation research, Jain book agency, New Delhi
6.	Sarangi, SK (2014), Applied operations research and Quantitative methods, Himalayan publishing house, Mumbai.
Web Resources	
1.	http://www.learnaboutor.co.uk/
2.	http://www.theorsociety.com/
3.	www.orcompleate.com/
4.	http://www.orsi.in/

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	3	2	3	3
CO 3	2	3	2	3	3	2
CO 4	3	3	3	3	3	3
CO 5	3	3	3	3	3	2
Weight age of course contributed to each PSO	14	15	14	14	15	13

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

Allied – III Practical (offered by B.Sc. Data Science to other departments)

Subject Code	Subject Name	Category	L	T	P	S	Credits	Inst. Hours	Marks		
									CIA	External	Total
23BDSAP 3	**OPERATIONS RESEARCH LAB**	A-III Allied Practical	-	-	2	-	2	2	25	75	100

	Course Objective
LO1	Learning to formulate an operations research problem
LO2	Learn to formulate and write a program to solve Linear Programming Problem
LO3	Learn to formulate and write a program to solve Assignment Problem
LO4	Learn to formulate and write a program to solve Transportation Problem
LO5	Learn to understand gaming problems

	List of Excercises	**No. of Hours**	**Course Objectives**
	1. Write a program to find solution to LPP using Simplex method MAX Z = 3x1 + 5x2 + 4x3 subject to 2x1 + 3x2 <= 8 2x2 + 5x3 <= 10 3x1 + 2x2 + 4x3 <= 15 and x1,x2,x3 >= 0 **2.** Write a program to find solution to LPP using Simplex(BigM) method MIN Z = x1 + x2 subject to 2x1 + 4x2 >= 4 x1 + 7x2 >= 7 and x1,x2 >= 0 **3.** Write a program to find solution to LPP using Two-Phase method MIN Z = x1 + x2 subject to 2x1 + x2 >= 4 x1 + 7x2 >= 7 and x1,x2 >= 0 **4.** Write a program to solve the following transporation problem using north-west corner method	10 x 3 = 30	

	D1	D2	D3	D4	Supply
S1	19	30	50	10	7
S2	70	30	40	60	9
S3	40	8	70	20	18
Demand	5	8	7	14	

5. Write a program to solve the following transporation problem using Least-Cost method

	D1	D2	D3	D4	Supply
S1	19	30	50	10	7
S2	70	30	40	60	9
S3	40	8	70	20	18
Demand	5	8	7	14	

6. Write a program to solve the following transporation problem using Vogel's Approximation method

	D1	D2	D3	D4	Supply
S1	19	30	50	10	7
S2	70	30	40	60	9
S3	40	8	70	20	18
Demand	5	8	7	14	

7. A department has five employess with five jobs to be permormed. The time (in hours) each men will take to perform each job is given in the effectiveness matrix

			Employees			
		I	II	III	IV	V
	A	10	5	13	15	16
	B	3	9	18	13	6
Jobs	C	10	7	2	2	2
	D	7	11	9	7	12
	E	7	9	10	4	12

How should the jobs be allocated, one per employee, so as to minimize the total man-hours?

8. A computer centre has four expert programmers and needs to develop four application programmes. The head of the computer centre, estimates the computer time (in minutes) required by the respective experts to develop the application programs as follows:

<div align="center">

Programmes

		A	B	C	D
Programmers	1	120	100	80	90
	2	80	90	110	70
	3	110	140	120	100
	4	90	90	80	90

</div>

Find the assignment pattern that minimises the time required to develop the
application programs.

9. A travelling salesman has to visit five cities. He wishes to start from a particular city, visit each city only once and then return to his starting point. The travelling cost of each city from a particular city is given below.

		To city				
		A	B	C	D	E
	A	x	2	5	7	1
	B	6	x	3	8	2
From city	C	8	7	x	4	7
	D	12	4	6	x	5
	E	1	3	2	8	x

10. Solve the following game with payoff matrix using Saddle Point calculation

<div align="center">

Player B

$$\begin{array}{c} & B_1 & B_2 & B_3 \\ \text{Player } A \quad \begin{array}{c} A_1 \\ A_2 \end{array} & \left[\begin{array}{ccc} -1 & 2 & -2 \\ 6 & 4 & -6 \end{array}\right] \end{array}$$

</div>

determine the best strategies for players A and B. Also determine the value of game. Is this game saddle point?

	Total	30

	Course Outcomes	**Programme Outcome**
CO	On completion of this course, students will	
1	be able to formulate real life problems using operation research strategies	PO1,PO3,PO5
2	be able to formulate LP problems and identify optimal	PO2,PO3,PO6

	solutions	
3	be able to solve LP problem using various methods	PO3,PO4
4	be able to solve assignment and transportation problems with different methods.	PO4,PO5,PO6
5	be able to solve game theory based problems in order to minimize overall cost.	PO4,PO6
	Web Resources	
1.	Solutions for all the 10 lab problems are available at https://cbom.atozmath.com/Menu/CBomMenu.aspx	
2.	http://www.learnaboutor.co.uk/	
3.	http://www.theorsociety.com/	
4.	www.orcompleate.com/	
5.	http://www.orsi.in/	

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	2		3	3	3	3	3
CO 3	3		3	2	3	3	2
CO 4	3		3	3	3	3	3
CO 5	3		3	3	3	3	3
Weight age of course contributed to each PSO	14		15	14	15	15	14

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

Allied – IV Theory (offered by B.Sc. Data Science Dept to other departments)

Subject Code	Subject Name	Category	L	T	P	S	Credits	Inst. Hours	Marks		
									CIA	External	Total
23BDSA4	**Internet and Web Design**	A-IV Allied Theory	3	-	-	-	3	3	25	75	100

	Learning Objective
LO1	To familiarize the internet and its capabilities
LO2	To understand the structure Hyper Text Markup Language and handle basic tags for text and image display
LO3	To understand the use of lists and tables
LO4	To understand the necessity of dynamic content on web and screen space management using framesets
LO5	To understand the features of DOM (Document Object Model) and its elements for data capture

UNIT	Contents	No. of Hours
I	**UNIT I : Introduction to the Internet** Electronic mail – Resource Sharing – Remote Login – World Wide Web – Search Engine – Browsers – Introduction to static, dynamic and active web pages. Introduction to HTML: Designing a Home page - History of HTML - HTML Generations - HTML Documents - Anchor Tag - Hyper links	6
II	**UNIT II : Head and Body Sections** Header Section – Title – Links - Colorful Web page - Comment Lines - Designing the Body Section: Heading – Printing - Aligning the Headings - Horizontal Rule - Paragraph-Tab Settings - Images and Pictures - Embedding Images	6
III	**UNIT III: Ordered and Un Ordered Lists:** Lists – Un Ordered Lists - Headings in a List - Ordered Lists - Nested Lists - Table Handling: Table creation in HTML - width of the Table and Cells - Cells Spanning Multiple Rows/Columns - Coloring Cells - Column Specification	6
IV	**UNIT IV : DHTML and Style Sheets** Defining Styles - Elements of Styles - Linking a Style Sheet to an HTML Document – In-line Styles - Internal and External Style Sheets - Multiple Styles - Frames: Frameset Definition - Frame Definition - Nested Framesets	6
V	**UNIT V: Forms** Action Attribute - Method Attribute - Enctype Attribute - Drop down list - Check Boxes - Radio Buttons - Text Field - Text area - Password and Hidden Fields - Submit and Reset Buttons - Designing Sample Forms	6
	Total	**30**

	Course Outcomes	Programme Outcome
CO	On completion of this course, students will	
CO1	To appreciate the use of internet and design of web pages	PO1,PO3,PO5
CO2	To be able to use all the basic HTML tags used to design web content with multimedia elements	PO2,PO3,PO6
CO3	To be able to create and format different types of lists and tables	PO3,PO4,PO5
CO4	To be able to specify styles for web pages and dynamically	PO4,PO5,PO6

	change the appearance of web pages and manage screen space by defining multiple frames	
CO5	To be able to design web forms for data capture and transmit to the server	PO5,PO6

	Text Books
1	C. Xavier(2000), World Wide Web design with HTML - Tata McGraw Hill Publishing Company Limited ISBN 9780074639719
2	Ivan Bayross (2012) HTML 5 and CSS 3 Made Simple, BPB Publications ISBN 9788183334419

	Reference Books
1.	Jon Duckett (2011),HTML and CSS: Design and Build Webs Illustrated, Wiley

	Web Resources
1.	http://www.pagetutor.com/html_tutor/index.html
2.	http://www.tutorialspoint.com/html/html_tutorial.pdf
3.	http://www.htmlcodetutorial.com/
4.	http://www.w3schools.com

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

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

Allied – IV Practical (Offered by B.sc. Data Science Dept to other departments)

Subject Code	Subject Name	Category	L	T	P	S	Credits	Inst. Hours	Marks		
									CIA	External	Total
23BDSAP 4	**INTERNET AND WEB DESIGN LAB**	A-IV Allied Practical	-	-	2	-	2	2	25	75	100

	Course Objective
LO1	To be familiar with internet principles and HTML tags
LO2	Learn to design web pages with simple static text displays
LO3	Learn to design web pages with lists and tables
LO4	Learn to dynamically control the appearance of the website with style sheets
LO5	Learn to manage screen space with multiple contents and design forms to capture data from user

List of Excercises	No. of Hours	Course Objectives
1. Cretae HTML file with tags using an editor and display your name and address in different colors and fonts centered across the screen. 2. Write HTML tags to display images in different height and widths 3. Write HTML tags to play audio file when play button is pressed 4. Write HTML tags to create list of courses availbe in a college and show their features in definition list. 5. Write HTML tags to link another web page to your page 6. Write HTML tags to create a table with text content and format it suitably with colors and features. 7. Write HTML tags to create a table with photographs of animals and show their lifesspan and habits in a different page when mouse is clicked over the photos. 8. Write HTML tags to define inline style sheet and test it. 9. Write HTML tags to define internal style sheet and test it. 10. Write HTML tags to define external style sheet and test it. 11. Write HTML tags to divide the screen space into horizontal and vertical partitions and load a different html file in each partitiion. 12. Write HTML tags to design a form to enable a student to fill up application form for admission to a degree programme in a college. 13. Write HTML tags to design a simple personal website with three or more pages accessible from home page. 14. Write HTML tags to design a simple website to promote a product	30	

		of a company. 15. Write HTML tags to design a simple website showing images of cover page of books and display the details about the book in their own pages when mouse is clicked over the respective photographs	
		Total	**30**

	Course Outcomes	**Programme Outcome**
CO	On completion of this course, students will	
1	be able to appreciate the use and necessity of intenet and websites	PO1,PO3,PO5
2	be able to master the HTML tags and display text and multimedia contents on web pages	PO2,PO3,PO6
3	be able to design lists and display them on web pages	PO3,PO4
4	be able to design tables and display colourful and hypertext leading to other pages	PO4,PO5,PO6
5	be able to manage screen space effectively with multiple frames and design web forms	PO4,PO6
	Web Resources	
1.	http://www.pagetutor.com/html_tutor/index.html	
2.	http://www.tutorialspoint.com/html/html_tutorial.pdf	
3.	http://www.htmlcodetutorial.com/	
4.	http://www.w3schools.com	

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	2		3	3	3	3	3
CO 3	3		3	2	3	3	2
CO 4	3		3	3	3	3	3
CO 5	3		3	3	3	3	3
Weight age of course contributed to each PSO	14		15	14	15	15	14

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

Subject Code	SubjectName	Category	L	T	P	S	Credits	Inst.Hours	Marks		
									CIA	External	Total
23BCEA1	**Digital Logic Fundamentals**	Allied	3	-	-	-	3	3	25	75	100

Learning Objective	
LO1	It aims to train the student to the basic concepts of Digital Computer Fundamentals
LO2	To impart the in-depth knowledge of logic gates, Boolean algebra, combinational circuits and sequential circuits.

	Contents
UNIT I	Number Systems and Codes: Number System – Base Conversion – Binary Codes – Code Conversion. Digital Logic: Logic Gates – Truth Tables – Universal Gates.
UNIT II	Boolean Algebra: Laws and Theorems – SOP, POS Methods– Simplification of Boolean Functions – Using Theorems, K-Map, Prime – Implicate Method – Binary Arithmetic: Binary Addition – Subtraction – Various Representations of Binary Numbers –Arithmetic Building Blocks–Adder–Subtractor.
UNIT III	Combinational Logic: Multiplexers – Demultiplexers – Decoders – Encoders – Code Converters – Parity Generators and Checkers.
UNIT IV	Sequential Logic: RS, JK, D, and T Flip-Flops – Master-Slave Flip-Flops. Registers: Shift Registers – Types of Shift Registers.
UNIT V	Counters: Asynchronous and Synchronous Counters - Ripple, Mod, Up-Down Counters– Ring Counters. Memory: Basic Terms and Ideas – Typesof ROMs – Types of RAMs.

CourseOutcomes	
CO1	Identifythelogicgatesandtheirfunctionality.
CO2	Performnumberconversionsfromonesystemtoanothersystem
CO3	Understandthe functionsofcombinationalcircuits
CO4	Performnumberconversions.
CO5	PerformCounterdesign andlearnitsoperations.

TextBook	
1	D.P.Leach and A.P.Malvino,*Digital Principles and Applications*–TMH – Fifth Edition – 2002.
ReferenceBooks	
1.	V.Rajaraman and T.Radhakrishnan,*Digital Computer Design*,Prentice Hall of India, 2001
2.	M.Moris Mano,*Digital Logic and Computer Design*,PHI,2001.
3.	T.C.Bartee,*Digital Computer Fundamentals*, 6th Edition,Tata McGraw Hill,1991.

CC		Allied	L	T	P	C	H/W
Coursecode:	**23BCEAP1**	**DIGITAL ELECTRONICS LAB**	2	-	-	2	2

Objectives	● To Understand the Digital Electronics Practically ● To know how to solve gates and other functions.

1. AND, OR and NOT Gate using TruthTable
2. Universality of NAND& NORgates.
3. VerificationofBooleanlawsusingNANDgates(Associative,Commutative&Distributive Laws)
4. VerificationofBooleanlawsusingNORgates(Associative,Commutative&DistributiveLaws)
5. Sum of Products using NAND gates and Product of Sums using NORGates.
6. 4-bitbinaryparalleladderandSubtractorIC7483
7. CounterusingIC7473
8. Study of RS, D,T and JK Flip-Flops with IC's.
9. Study of Encoder &Decoder.
10. Study of Multiplexer &De-Multiplexer.
11. Half and Full Adder using Simple & NAND Gates.
12. Half and Full Subtractor using Simple &NAND Gates.

Outcomes	● Studentswereabletosolvesimplegatefunctions. ● StudentswereabletosolveandDesigncircuitsusingIC.

Subject Code	Subject Name	Category	L	T	P	S	Credits	Inst. Hours	Marks		
									CIA	External	Total
23BCEA2	**Resource Management Techniques**	**Allied**	3	-	-	-	3	3	25	75	100

Course Objective	
CO 1	Describe the fundamental concepts of operations research and linear programming concepts.
CO 2	Understand the mathematical formulation and optimality test.
CO 3	Describe the concept of transhipment problem and assignment problem.
CO 4	Classify the sequencing problems.
CO 5	Demonstrate the use of network scheduling by PERT/CPM.

	Details	No. of Hours
UNIT I	**Basics of Operations Research:** Introduction – Scope of Operations Research – Phases of Operations Research -**Linear Programming:** Introduction – Formulation of LP Problems – **Graphical Method:** Procedure for Solving LPP by Graphical Method.	6
UNIT II	**Transportation Problem:** Introduction – Mathematical Formulation – Definitions – Optimal Solution – North-West Corner Rule – Least Cost or Matrix Minima Method – Vogel's Approximation Method – Optimality Test – MODI Method.	6
UNIT III	**Transhipment and Assignment Problems:** Introduction – Transhipment Problem – Assignment Problem – Hungarian Method Procedure – Unbalanced Assignment Problem- Maximization in Assignment Problem.	6
UNIT IV	**Sequencing Problems:** Introduction – Definition – Terminology and Notations – Principal Assumptions – Type I: Problems with n Jobs through Two Machines – Type II: Processing n Jobs through Three Machines A, B, C – Type III: Problems with n Jobs and k Machines – Type IV: Problems with 2 Jobs through k Machines.	6
UNIT V	**Network Scheduling by PERT/CPM:** Introduction - Basic Terms - Common Errors - Rules of Network Construction - Numbering the Events (Fulkerson's Rule) - Time Analysis – Critical Path Method (CPM).	6
	Total	**30**

	Course Outcomes	Programme Outcome
CO	Upon completion of the course the students would be Able to:	
CO 1	Remember the fundamental concepts of operations research and linear programming concepts.	PO1, PO6
CO 2	Understand the mathematical formulation and optimality test.	PO2
CO 3	Apply the concept of transhipment problem and assignment problem	PO4, PO7
CO 4	Analyze the sequencing problems.	PO6
CO 5	Understand the use of network scheduling by PERT/CPM.	PO7, PO8
Text Book		
1	S.D. Sharma, Operations Research (Theory, Method & Applications) - Kedar Nath Ram Nath & Co – 1997.	
Reference Books		
1.	Hamdy A. Taha, Operations Research- An Introduction, Pearson Education, 10th Edition, 2019.	
2	Frederick S. Hillier, Gerald J. Lieberman et al., Introduction to operations Research, 11th Edition, TATA McGraw Hill, 2021	
Web Resources		
1.	https://www.mooc-list.com/tags/operations-research	

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

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

Code	Subject Name	Category	L	T	P	S	Credits	Inst. Hours	Marks		
									CIA	External	Total
23BCE AP2	Resource Management Techniques Lab (Using C/C++/Python)	Allied Lab	-	-	2	-	2	2	25	75	100

Course Objective	
CO1	Describe the linear programming model.
CO2	Understand the basic function of drawing the feasible region.
CO3	Describe the concept of north west corner rule.
CO4	Classify the Vogel's approximation rule and assignment problem.
CO5	Demonstrate the job sequencing problem and network scheduling by PERT/CPM.

S. No	List of Lab Programs	No. of Hours
1	Write a program to formulate the Linear Programming Model	30
2	Write a Program to represent the feasible region graphically	
3	Write a program to Implement the North-West Corner Rule	
4	Write a program to implement the Vogel's Approximation method	
5	Write a program to implement the assignment problem	
6	Write a program to implement the Hungarian Method	
7	Write a program to implement Job sequencing Problem	
8	Write a program to implement the Network Scheduling by PERT/CPM	

Course Outcomes		Programme Outcome
CO	Upon completion of the course the students would be able to:	
CO1	Remember the linear programming model.	PO1, PO6
CO 2	Understand the programming basic function of drawing the feasible region	PO2
CO 3	Apply the programming concept of north west corner rule	PO4, PO7
CO 4	Analyze the Vogel's approximation rule and assignment problem.	PO6
CO 5	Know the job sequencing problem and network scheduling by PERT/CPM.	PO7, PO8

Text Book	
1	S.D. Sharma, Operations Research (Theory, Method & Applications) - Kedar Nath Ram Nath & Co – 1997.

Reference Books	
1.	Hamdy A. Taha, Operations Research- An Introduction, Pearson Education, 10th Edition, 2019.
2.	Frederick S. Hillier, Gerald J. Lieberman et al., Introduction to operations Research, 11th Edition, TATA McGraw Hill, 2021

Web Resources	
1.	https://www.mooc-list.com/tags/operations-research

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

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

Subject Code	SubjectName	Category	L	T	P	S	Credits	Inst.	CIA	External	Total
									Marks		
23BCEA3	Markup and Scripting Languages	Allied		T	-	-	3	3	25	75	100

	Learning Objective
LO1	Learn scripting language to validate web page forms
LO2	Learn the basics of HTML, DHTML, XML, CSS, JavaScript, AJAX

	Contents
UNITI	**HTML:** HTML-Introduction-tag basics- page structure-adding comments working with texts, paragraphsandlinebreaks.Emphasizingtest-headingandhorizontalrules-list-fontsize,face andcolor-alignment-links-tables-frames
UNITII	**Forms&ImagesUsingHtml:** Graphics: Introduction-How to work efficiently with images in web pages, image maps, GIF animation, adding multimedia, data collection with HTML forms textbox, password, list box, combo box, text area, tools for building web page front page.
UNITIII	**XML & DHTML:** Cascading style sheet (CSS)-what isCSS-Whywe use CSS-addingCSSto your web pages-Grouping styles-extensible markup language (XML). Dynamic HTML: Documentobjectmodel(DCOM)-AccessingHTML &CSSthroughDCOMDynamiccontent styles& positioning.
UNITIV	**JavaScript:**JavaScript:Introduction,Client-SideJavaScript,Server-SideJavaScript, JavaScriptObjects,JavaScriptSecurity,Operators,ConditionalandLoopingStatements-Break, continue, User Defined Function. Array, Date, Math, Number, Object, String, regExp.
UNITV	Document and its associated objects: document, Link, Area, Anchor, Image, , Layer . Events andEventHandlers:GeneralInformationaboutEvents,DefiningEventHandlers,event.**AJAX** :Introduction,advantages&disadvantages,Purposeofit,ajaxbasedwebapplication,alternatives of ajax.

	CourseOutcomes
CO1	DevelopandpublishWebpagesusingHypertextMarkupLanguage(HTML).
CO2	OptimizepagestylesandlayoutwithCascadingStyle Sheets(CSS).
CO3	Analyze andapplytherole of languagesto create acapstone
CO4	Developwebsitesusingclient-sidewebprogrammingslanguageslikeHTML,DHTML,CSS, XML, JavaScript, and AJAX.
CO5	Create webapplicationsusingformsandvalidation offormfields

	TextBook
1	MASTERINGHTML,CSS&JavaScriptWebPublishing-2016byLaura Lemay(Author), Rafe Colburn (Author), Jennifer Kyrnin (Author)
2	HTML,CSS,andJavaScriptAllinOne–2020byJulieC.Meloni(Author),JenniferKyrnin (Author)
3	WebDesign With HTML&CSS :HTML&CSSCompleteBeginner's Guide-2021 byPrem Kumar (Author)

CC		Allied	L	T	P	C	H/W
Coursecode:	23BCEAP3	Markup and Scripting Languages LAB		-	P	2	2
Objectives		➢ LearnwebpageimplementationusingbasicandadvancedHTML ➢ LearnFormsonthewebpageandformvalidationusingclient-side scripting					

1. Design a web page using different text formatting tags.

2. Designawebpagewithlinkstodifferentpagesandallownavigationbetweenweb pages.

3. Design a web page demonstrating all Style sheet types.

4. Design a web page with Image maps.

5. Design a web page demonstrating different semantics.

6. Design a web page with different tables.

7. Design a webpage with a form that uses all types of input controls.

8. Design a web page embedding with multimedia features.

9. Write a JavaScript program to find the factorial value.

10. Write a Java Script program to print the Fibonacci series.

11. Design a form and validate all the controls placed on the form using Java Script.

12. Write a JavaScript program to display all the prime numbers between1and100.

13. Write a JavaScript program to accept a number from the user and display the sum of its digits.

14. WriteaprograminJavaScripttoacceptasentencefromtheuseranddisplaythenumberof words in

it. (Do not use split () function).

15. Write a javascript program to design simple calculator.

CourseOutcomes:

CO-NO.	COURSEOUTCOMES
CO-1	StudyandImplementWebPagesusingBasicandAdvancedHTML
CO-2	DifferentiatebetweenfunctionalitiesofBasicCSSandAdvancedCSS
CO-3	Implementbasic JavaScript.
CO-4	Developprogramusingbasic functionsinJavascriptand XHTML
CO-5	Create webapplicationsusingformsandvalidation offormfields

Subject Code 23BCEA4	Subject Name	Category	L	T	P	S	Credits	Inst.	MARKS		
									CIA	External	Total
	Operating system	**ALLIED**	3	-	-	-	3	3	25	75	100

Objectives	➢ Understand the basic components of Operating Systems and their interactions. ➢ Understand the basics of Process Management, Memory Management, Deadlock Management and File Systems.
Unit –I	Introduction: What is an operating system? History of operating system, computer hardware, different operating systems, operating system concepts, system calls, operating system structure. Processes and Threads: Processes, threads, interprocess communication, scheduling, IPC problems.
Unit – II	Memory Management: No memory abstraction, memory abstraction: address spaces, virtual memory, page replacement algorithms, design issues for paging systems, implementation issues, segmentation. File Systems: Files, directories, file system implementation, file-system management and optimization, MS-DOS file system, UNIX / Linux file system, CD ROM file system.
Unit – III	Deadlocks: Resources, introduction to deadlocks, the ostrich algorithm, deadlock detection and recovery, deadlock avoidance, deadlock prevention, issues. Case Study: Overview of Linux, Linux Goals , Interfaces to Linux ,The Shell , Linux Utility Programs , Kernel Structure. Android and Google - History of Android - Design Goals - Android Architecture - Linux Extensions -Android Applications.History of Windows-MS-DOS-based Windows,NT-based Windows , Modern Windows.
Unit – IV	Linux :Basic features, advantages, installing requirement, basic architecture of Linux system. Commands for files and directories cd, cp, mv, rm, mkdir,more, less, creating and viewing files, using cat, file comparisons, View files, disk related commands, checking disk free spaces, Essential linux commands.
Unit – V	Understanding shells, Processes in linux – scheduling of processes at command, batch commands, kill, ps, who,sleep, Printing commands, grep, fgrep, find, sort,cal, banner, touch, file related commands – ws, sat, cut, grep, dd, etc. Mathematical commands – bc, expr, factor,units. Vi, joe, vim editor. Shell programming: Shell programming basic, various types of shell, shell programming in bash, conditional and looping statements, case statements, parameter passing and arguments, shell variables, shell keywords, use of grep in shell, awk programming.
Books for Reference:	
	Modern Operating Systems-Andrew S. Tanenbaum,Herbert Bos- 4th Edition-Pearson Prentice Hall *Operating Systems Concepts*-Abraham Silberschatz-Peter Baer Galvin- Greg Gagne-8th Edition *Operating Systems Internals And Design Principles*- William Stallings-Eighth Edition Linux Command Line and Shell Scripting Bible-Christine Bresnahan and Richard BLUM
Outcomes	➢ Explain the structure and functions of operating systems along with their components, types and working. ➢ Elaborate the system calls for process management and file management. ➢ Make use of appropriate Linux commands.

Course Code: 23BCEAP4	Allied Operating System Lab	T/P	C	H/W
		P	2	2

1. Linux commands: Working with Directories:

a   pwd, cd, absolute and relative paths, ls, mkdir, rmdir

b   file, touch, rm, cp. mv, rename, head, tail, cat, tac, more, less, strings, chmod

2. Linux commands: Working with files:

a   ps, top, kill, pkill, bg, fg

b   grep, locate, find, locate

c   date, cal, uptime, w, whoami, finger, uname, man, df, du, free, whereis, which

d   Compression: tar, gzip

3. Windows (DOS) Commands

a   Date, time, prompt, md, cd, rd, path.

b   Chkdsk, copy, xcopy, format, fidsk, cls, defrag, del, move.

c   Diskcomp, diskcopy, diskpart, doskey, echo

d   Edit, fc, find, rename, set, type, ver

4. Write a Shell script that displays list of all the files in the current directory to which the user has read, write and execute permissions.?

5. Write a shell script that takes argument and reports on whether it is directory, a file, or something else.

6. Write a Shell script to list all of the directory files in a directory.

7. Write a awk script to find the number of characters, words and lines in a file?

8. Write a shell script to perform the following string operations:

(a) To extract a sub-string from a given string

(b) To find the length of a given string

9. Write a shell script that accepts a file name, starting and ending line numbers as arguments and displays all the lines between the given line numbers.

10. Write a shell script that accepts one or more file name as arguments and converts all of them to uppercase, provided they exist in the current directory.

11. Write a Shell script to find factorial of a given integer.

12. Write a Shell script to find biggest no from two nos.

13. Write a Shell script to find the give no is odd or even.

14. Installation of Linux operating system on virtual machine.

15. Installation of Windows operating system.

Subject Code	Subject Name	Category	L	T	P	S	Credits	Marks		
								CIA	External	Total
23BCAA1	DIGITAL LOGIC FUNDAMENTALS	Elective Course 1	3	-	-	-	3	25	75	100

	Course Objective	
CO1	To introduce the fundamentals of number systems and Digital logic.	
CO2	To understand Boolean algebra, conversions and Binary arithmetic operations.	
CO3	To get exposure to combinational logic circuits.	
CO4	To understand the concept of sequential logic and flipflops	
CO5	To study the design of counters and understand the memory types.	

	Contents	No. of Hours
UNIT I	**NUMBER SYSTEMS AND DIGITAL LOGIC** Number Systems and Codes: Number System – Base Conversion – Binary Codes – Code Conversion. Digital Logic: Logic Gates – Truth Tables – Universal Gates.	15
UNIT II	**BOOLEAN ALGEBRA** Boolean Algebra: Laws and Theorems – SOP, POS Methods – Simplification of Boolean Functions – Using Theorems, K-Map, Prime – Implicant Method – Binary Arithmetic: Binary Addition – Subtraction – Various Representations of Binary Numbers – Arithmetic Building Blocks – Adder – Subtractor.	15
UNIT III	**COMBINATIONAL LOGIC** Combinational Logic: Multiplexers – Demultiplexers – Decoders – Encoders – Code Converters – Parity Generators and Checkers.	15
UNIT IV	**SEQUENTIAL LOGIC** Sequential Logic: RS, JK, D, and T Flip-Flops – Master-Slave Flip-Flops. Registers: Shift Registers – Types of Shift Registers.	15
UNIT V	**COUNTERS AND MEMORY** Counters: Asynchronous and Synchronous Counters - Ripple, Mod, Up-Down Counters– Ring Counters. Memory: Basic Terms and Ideas –Types of ROMs – Types of RAMs.	15
	Total Hours	75

CO	Course Outcome	Programme Outcome
	On completion of this course, students will	
1	Identify the logic gates and their functionality.	PO1, PO3,PO5
2	Perform number conversions from one system to another system.	PO2, PO3, PO6, PO7
3	Understand the functions of combinational circuits.	PO3, PO4, PO7
4	Perform number conversions.	PO4, PO5, PO6
5	Perform Counter design and learn its operations.	PO7, PO8

	Text Book
1	D.P.Leach and A.P.Malvino, Digital Principles and Applications – TMH – Fifth Edition – 2002.

	Reference Books
1.	V.Rajaraman and T.Radhakrishnan, Digital Computer Design, Prentice Hall of India, 2001
2.	M. Moris Mano, Digital Logic and Computer Design, PHI, 2001.
	T.C.Bartee, Digital Computer Fundamentals, 6th Edition, Tata McGraw Hill, 1991.

Mapping with Programme Outcomes

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8
CO1	S	S	S	S	S	M	S	M
CO2	S	S	S	M	S	S	M	S
CO3	S	S	S	S	M	S	S	S
CO4	S	S	S	S	S	S	S	S
CO5	S	S	S	S	S	S	S	S

PO – Programme Outcome, CO – Course outcome
S – Strong, M – Medium, L – Low

Subject Code	Subject Name	Category	L	T	P	S	Credits	Marks		
								CIA	External	Total
23BCAAP1	Digital Principles & Computer Organization -LAB	Allied Lab	-	-	2	-	2	25	75	100

Course Objectives:
1. To Understand the Digital Electronics Practically
2. To know how to solve gates and other functions.
3. To create Boolean laws.
4. Be able to work with flip-flops.
5. Be able to build multiplexer and de-multiplexer.

LAB EXERCISES	Required Hours
AND,OR and NOT Gate using Truth Table Universality of NAND & NOR gates. Verification of Boolean laws using NAND gates (Associative Commutative & Distributive Laws) Verify De-Morgans theorem Verification of Boolean laws using NOR gates (Associative, Commutative & Distributive Laws) Sum of Products using NAND gates and Product of Sums using NOR Gates. 4-bit binary parallel adder and Subtractor IC7483 Counter using IC7473 Study of RS, D, T and JK Flip-Flops with IC's. Study of Encoder & Decoder. Study of Multiplexer & De-Multiplexer. Half and Full Adder using Simple & NAND Gates. Half and Full Subtractor using Simple & NAND Gates.	60

Course Outcomes	
On completion of this course, students will	
CO1	Demonstrate the understanding of digital electronics
CO2	Identify the problem and solve using gates and other functions.
CO3	Identify suitable programming Boolean laws.
CO4	Learners can be work with flip-flops.
CO5	Develop multiplexer and de-multiplexer.

Mapping with Programme Outcomes:

CO/PSO	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6
CO1	2	2	2	2	3	2
CO2	2	1	3	2	-	2
CO3	3	3	1	1	1	2
CO4	2	3	3	1	-	1
CO5	3	2	3	1	1	-
Weightage of course contributed to each PSO	12	11	12	7	5	7

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

Subject Code	Subject Name	Category	L	T	P	S	Credits	Inst. Hours	CIA	External	Total
									Marks		
23BCAA2	Resource Management Techniques	Allied	3	-	-	-	3	3	25	75	100

	Course Objective
CO 1	Describe the fundamental concepts of operations research and linear programming concepts.
CO 2	Understand the mathematical formulation and optimality test.
CO 3	Describe the concept of transhipment problem and assignment problem.
CO 4	Classify the sequencing problems.
CO 5	Demonstrate the use of network scheduling by PERT/CPM.

	Details	No. of Hours
UNIT I	**Basics of Operations Research:** Introduction – Scope of Operations Research – Phases of Operations Research -**Linear Programming:** Introduction – Formulation of LP Problems – **Graphical Method:** Procedure for Solving LPP by Graphical Method.	6
UNIT II	**Transportation Problem:** Introduction – Mathematical Formulation – Definitions – Optimal Solution – North-West Corner Rule – Least Cost or Matrix Minima Method – Vogel's Approximation Method – Optimality Test – MODI Method.	6
UNIT III	**Transhipment and Assignment Problems:** Introduction – Transhipment Problem – Assignment Problem – Hungarian Method Procedure – Unbalanced Assignment Problem- Maximization in Assignment Problem.	6
UNIT IV	**Sequencing Problems:** Introduction – Definition – Terminology and Notations – Principal Assumptions – Type I: Problems with n Jobs through Two Machines – Type II: Processing n Jobs through Three Machines A, B, C – Type III: Problems with n Jobs and k Machines – Type IV: Problems with 2 Jobs through k Machines.	6
UNIT V	**Network Scheduling by PERT/CPM:** Introduction - Basic Terms - Common Errors - Rules of Network Construction - Numbering the Events (Fulkerson's Rule) - Time Analysis – Critical Path Method (CPM).	6
	Total	30

	Course Outcomes	Programme Outcome
CO	Upon completion of the course the students would be Able to:	
CO 1	Remember the fundamental concepts of operations research and linear programming concepts.	PO1, PO6
CO 2	Understand the mathematical formulation and optimality test.	PO2
CO 3	Apply the concept of transhipment problem and assignment problem	PO4, PO7
CO 4	Analyze the sequencing problems.	PO6
CO 5	Understand the use of network scheduling by PERT/CPM.	PO7, PO8

	Text Book
1	S.D. Sharma, Operations Research (Theory, Method & Applications) - Kedar Nath Ram Nath & Co – 1997.
	Reference Books
1.	Hamdy A. Taha, Operations Research- An Introduction, Pearson Education, 10th Edition, 2019.
2	Frederick S. Hillier, Gerald J. Lieberman et al., Introduction to operations Research, 11th Edition, TATA McGraw Hill, 2021
	Web Resources
1.	https://www.mooc-list.com/tags/operations-research

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

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

Code	Subject Name	Category	L	T	P	S	Credits	Inst. Hours	Marks		
									CIA	External	Total
23BCAAP2	Resource Management Techniques Lab (Using C/C++/Python)	Allied Lab	-	-	2	-	2	2	25	75	100

Course Objective	
CO1	Describe the linear programming model.
CO2	Understand the basic function of drawing the feasible region.
CO3	Describe the concept of north west corner rule.
CO4	Classify the Vogel's approximation rule and assignment problem.
CO5	Demonstrate the job sequencing problem and network scheduling by PERT/CPM.

S. No	List of Lab Programs	No. of Hours
1	Write a program to formulate the Linear Programming Model	30
2	Write a Program to represent the feasible region graphically	
3	Write a program to Implement the North-West Corner Rule	
4	Write a program to implement the Vogel's Approximation method	
5	Write a program to implement the assignment problem	
6	Write a program to implement the Hungarian Method	
7	Write a program to implement Job sequencing Problem	
8	Write a program to implement the Network Scheduling by PERT/CPM	

Course Outcomes		Programme Outcome
CO	Upon completion of the course the students would be able to:	
CO1	Remember the linear programming model.	PO1, PO6
CO 2	Understand the programming basic function of drawing the feasible region	PO2
CO 3	Apply the programming concept of north west corner rule	PO4, PO7
CO 4	Analyze the Vogel's approximation rule and assignment problem.	PO6
CO 5	Know the job sequencing problem and network scheduling by PERT/CPM.	PO7, PO8

Text Book	
1	S.D. Sharma, Operations Research (Theory, Method & Applications) - Kedar Nath Ram Nath & Co – 1997.

Reference Books	
1.	Hamdy A. Taha, Operations Research- An Introduction, Pearson Education, 10th Edition, 2019.
2.	Frederick S. Hillier, Gerald J. Lieberman et al., Introduction to operations Research, 11th Edition, TATA McGraw Hill, 2021

Web Resources	
1.	https://www.mooc-list.com/tags/operations-research

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

Illustration for B.C.A. Allied Paper II Year – Semester – III & IV

Subject Code	Subject Name	Category	L	T	P	S	Credits	Inst. Hours	Marks		
									CIA	External	Total
23BCAA3	**Discrete Mathematics**	**Allied**	3	-	-	-	3	3	25	75	100

Course Objective	
CO 1	Describe the fundamental concepts of set theory, functions and relations.
CO 2	Understand the mathematical formulation, Conditional Statements, Atomic and Compound Statements.
CO 3	Describe the concept and Principles of Normal Forms, Theory of Inference.
CO 4	Classify the insights of graph theory.
CO 5	Demonstrate the trees and Boolean algebra.

UNIT	Details	No. of Hours
UNIT I	**Fundamental Structures:-** Set Theory, Sets, Venn Diagrams, Complements, Cartesian Products, Power Sets, Finite and Infinite Sets. **Functions:-** Surjections, Injections, Inverses, Composition. **Relations:-** Reflexivity, Symmetry, Transitivity, Equivalence Relations.	6
UNIT II	**Logic:-** TF Statements, Connective, Disjunction, Negation, Conditional Statements, Bi Conditional Statements, Atomic and Compound Statements, Well formed Formulae, The Truth Table, Tautology, Tautological Implication Formulae with Distinct Truth Tables.	6
UNIT III	**Normal Forms:-** Principles of Normal Forms, Theory of Inference, Open Statements, Quantifiers, Valid Formulae and Equivalence, Theory of Inference for Predicate Calculus.	6
UNIT IV	**Graph Theory:-** Definition, Degrees, Sub Graph, Isomorphism, Complete Graph, Bipartite Graph – Representation of a Graph – Adjacency Matrix.	6
UNIT V	**Trees:** Spanning Tree – Kruskal's Algorithm, Prim's Algorithm, Dijkstra's Algorithm, **Boolean Algebra:-** Boolean Algebra, Boolean Functions.	6
	Total	30

	Course Outcomes	Programme Outcome
CO	Upon completion of the course the students would be Able to:	
CO 1	Remember the fundamental concepts of set theory, functions and relations.	PO1, PO6
CO 2	Understand the mathematical formulation Conditional Statements, Atomic and Compound Statements..	PO2
CO 3	Describe the concept and Principles of Normal Forms, Theory of Inference.	PO4, PO7
CO 4	Analyze and Classify the insights of graph theory.	PO6
CO 5	Understand the use trees and Boolean algebra.	PO7, PO8
Text Book		
1	Jean-Paul Trembly & Manohar, R. (2017). *Discrete Mathematics Structures with Applications to Computer Science.* Tata Mc Graw-Hill.	
Reference Books		
1.	Venkataraman, M.K., Sridharan, N., & Chandrasekaran, N. (2009). *Discrete Mathematics*. National Publishing co.	
Web Resources		
1.	https://mathworld.wolfram.com/DiscreteMathematics.html	

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

Code	Subject Name	Category	L	T	P	S	Credits	Inst. Hours	Marks		
									CIA	External	Total
23BCAA P3	Excel & C++ Lab for Discrete Mathematics	Allied Lab	-	-	2	-	2	2	25	75	100

	Course Objective
CO1	To impart the knowledge about solving Logical problems
CO2	Understand and create truth table using spreadsheets.
CO3	Understand and create spreadsheets for demorgan's theorem.
CO4	Classify the various set operations.
CO5	Demonstrate and implement prim's algorithms.

S. No	List of Lab Programs	No. of Hours
1	Create a truth table using spreadsheet for AND, OR and NOT functions.	30
2	Create a truth table using spreadsheet for XOR of two variables, using your spreadsheet's AND, OR, and NOT functions to calculate the truth value.	
3	Create a truth table, using your spreadsheet's logical functions, for the expression: **((P ∧7Q) ∨ (7P ∧Q).**	
4	Create a truth table using your spreadsheet for demorgan's theorem.	
5	Create a truth table using spreadsheet to check whether the given expression is tautology or not (P ∧Q) ∨ (7P ∧Q) ∨ (P∧7Q) ∨ (7P ∧7Q)	
6	Write a C++ Program to implement various set operations (union, intersection, difference, symmetric difference).	
7	Write a C++ Program to find power set of a set with size n.	
8	Write a C++ program to perform following operation: a) is the given relation is reflexive? b) is the given relation is symmetric? c) is the given relation is Transitive?	
9	Write C++ Program to implement Prim's Algorithm.	
10	Write a C++ Program to check whether a given graph is bipartite or not.	

Course Outcomes		Programme Outcome
CO	Upon completion of the course the students would be able to:	
CO1	Remember the truth table using spreadsheets.	PO1, PO6
CO 2	Understand the programming basic function and knowledge about solving Logical problems.	PO2
CO 3	Apply the programming concept of spreadsheets for demorgan's theorem.	PO4, PO7
CO 4	Analyze the various set operations and problem.	PO6
CO 5	Know to demonstrate and implement prim's algorithms..	PO7, PO8

	Text Book
1	Jean-Paul Trembly & Manohar, R. (2017). Discrete Mathematics Structures with Applications to Computer Science. Tata Mc Graw-Hill.

Reference Books

1.	Venkataraman, M.K., Sridharan, N., & Chandrasekaran, N. (2009). *Discrete Mathematics*. National Publishing co.

Web Resources	
1.	https://mathworld.wolfram.com/DiscreteMathematics.html

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

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

Subject Code	Subject Name	Category	L	T	P	S	Credits	Inst. Hours	Marks		
									CIA	External	Total
23BCAA4	**STATISTICS METHODS AND ITS APPLICATIONS**	**Allied**	3	-	-	-	3	3	25	75	100

Course Objective	
CO 1	Describe the fundamental concepts of collecting and presenting statistical data.
CO 2	Understand the measures of central tendency and dispersion
CO 3	Describe the concept and Measures of Skewness, Kurtosis and Moments.
CO 4	Classify the insights of correlation and Concurrent deviation method.
CO 5	Demonstrate the regression.

UNIT	Details	No. of Hours
UNIT I	**Collection and Presentation of Statistical Data**: Nature, Scope and Limitations of Statistics – Data sources – Methods of collection of statistical data – Census – Sample Survey – Measurement of Scales – Nominal, Ordinal, Interval and Ratio scales – Classification and Tabulation – Formation of frequency distribution – Cumulative frequency distribution – Diagrammatic and Graphical representation of Data.	6
UNIT II	**Measures of Central Tendency and Dispersion:** Arithmetic mean, Median, Mode, Geometric mean and Harmonic mean for raw and grouped data – Properties – Quartiles, Deciles and Percentiles – Absolute and relative measures of Dispersion – Range – Quartile deviation – Mean deviation - Standard deviation – Coefficient of Variation – Lorenz Curve.	6
UNIT III	**Measures of Skewness, Kurtosis and Moments**: Definition – Calculation of Karl Pearson's, Bowley's and Kelly's coefficient of Skewness – Moments – Raw and Central Moments – Relation between raw and central moments – Measures of Skewness and Kurtosis 15 based on Moments.	6
UNIT IV	**Correlation:** Definition of Correlation – Types of correlation – Methods of correlation – Scatter diagram – Karl Pearson's correlation coefficient – Spearman's rank correlation coefficient – Properties – Concurrent deviation method – Correlation coefficient for ungrouped and grouped bivariate data.	6
UNIT V	**Regression:** Meaning of Regression – Regression lines – Regression coefficients – Regression coefficients for ungrouped and grouped bivariate data – Properties of regression coefficient – Finding the two regression equations of X on Y and Yon X and estimating the unknown values of X and Y.	6
	Total	30

	Course Outcomes	**Programme Outcome**
CO	Upon completion of the course the students would be Able to:	
CO 1	Remember the fundamental concepts of collecting and presenting statistical data.	PO1, PO6
CO 2	Understand the measures of central tendency and dispersion.	PO2
CO 3	Describe the concept and and Measures of Skewness, Kurtosis and Moments.	PO4, PO7
CO 4	Analyze the correlation and Concurrent deviation method.	PO6
CO 5	Understand the use of regression.	PO7, PO8

	Text Book
1	Gupta S. P (2002), Statistical Methods, Sultan Chand and Sons, New Delhi.
2	Gupta S. C and Kapoor V. K, Fundamentals of Mathematical Statistics, Sultan Chand and Sons, New Delhi.
3	Goon A. M, Gupta M. K and Dasgupta B (2008), Fundamentals of Statistics, (Vol. - I), World Press Ltd, Calcutta.
4	Bhat B. R, Srivenkataramana T and Madhava Rao K. S (1996), Statistics a Beginner's Text, (Vol. – I), New Age International Publishers, New Delhi.
	Reference Books
1.	Hogg R. V and Craig A. T (2006), Introduction to Mathematical Statistics, MacMillan, London
2	Saxena H. C, Elementary Statistics, Sultan Chand and Sons, New Delhi.
3	Sancheti D. C and V.K Kapoor, Statistics, Sultan Chand and Sons, New Delhi.
4	Agarwal B. L (1996), Basic Statistics (Third Edition), New Age International Publishers, New Delhi.
	Web Resources
1.	https://www.tutorialspoint.com/statistics/data_collection.htm
2	https://www.surveysystem.com/correlation.htm
3	https://www.investopedia.com/terms/r/regression.asp
4	https://course-notes.org/statistics/sampling_theory

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

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

Code	Subject Name	Category	L	T	P	S	Credits	Inst. Hours	Marks		
									CIA	External	Total
23BCAA P4	Computer-Oriented Statistical Methods Lab	Allied Lab	-	-	2	-	2	2	25	75	100

	Course Objective
CO1	To introduce basic statistical methods for the analysis of significance differences in data using C++ programming Language through Excel.
CO2	To introduce various statistical method such as regression, Skewness, etc.
CO3	Understand and perform correlation coefficient.
CO4	Classify the linear regression.
CO5	Demonstrate and compute multi regression.

S. No	List of Lab Programs	No. of Hours
1	Write a C++ program to execute the basic commands of an array.	30
2	Write a C++ program to Create a Matrix and Perform the operations addition, inverse, transpose, and multiplication operations.	
3	Write a C++ program to Execute the statistical functions: mean, median, mode.	
4	Write a C++ program to Execute the statistical functions: Standard Deviation, variance, and covariance.	
5	Write a C++ program to draw the skewness.	
6	Write a C++ program to obtain the correlation coefficient	
7	Write a C++ program to perform the binomial and normal distribution on the data.	
8	Write a C++ program to Perform the Linear Regression.	
9	Write a C++ program to Compute the Least squares means.	
10	Write a C++ program to Compute the Multi Regression.	

Course Outcomes		Programme Outcome
CO	Upon completion of the course the students would be able to:	
CO1	Students will able to understand statistical methods for computer analysis	PO1, PO6
CO 2	Students will able to programming with application of Statistical methods	PO2
CO 3	Apply and perform correlation coefficient.	PO4, PO7
CO 4	Analyze the various linear regression program.	PO6
CO 5	Know to compute multi regression.	PO7, PO8

	Text Book
1	Goyal, M. (2008). *Computer-based Numerical & Statistical Techniques*. Laxmi Publications, Ltd.
2	Gupta, S. C., & Kapoor, V. K. (2020). *Fundamentals of Mathematical*. Sultan Chand statistics & Sons.

	Reference Books
1.	Walpole, R. E., Myers, R. H., Myers, S. L., & Ye, K. (1993). *Probability and Statistics for Engineers and Scientists* (Vol. 5). New York: Mac-millan.

	Web Resources
1.	https://www.tutorialspoint.com/statistics/data_collection.htm
2	https://www.surveysystem.com/correlation.htm

Subject Code	Subject Name	Category	L	T	P	S	Credits	Inst. Hours	Marks		
									CIA	External	Total
23BCAA5	**Graph Theory and its Applications**	EC - 4 Allied	3	-	-	-	3	3	25	75	100

Learning Objectives	
LO1	Definition of Graph, sub graph their representations, degree and algebraic operations.
LO2	Connected graphs, weighted graphs and shortest paths
LO3	Trees: Characterizations, spanning tree, minimum spanning trees
LO4	Eulerian and Hamiltonian graphs: Characterization, Necessary and sufficient conditions
LO5	Special classes of graphs: Bipartite graphs, line graphs, chordal graphs.

UNIT	Contents	No. of Hours
UNIT I	**INTRODUCTION**: Graph-mathematical definition- Introduction – sub graphs –Walks, paths, Circuits connectedness- Components- Euler Graphs- Hamiltonian paths and circuits-Trees- properties of Trees- Distance and centres in Tree- Rooted and Binary Trees	15
UNIT II	**CONNECTIVITY AND PLANARITY:** Introduction to circuits - cut set- properties of cut set- All cut sets –connectivity and separability – Network Flows - 1-Isomorphism - 2-Isomorphism- Combinatorial and Geometric graphs- Planar Graphs – Different representation of planar graph.	
UNIT III	**COLORING AND DIRECTED GRAPH:** Basics of Colouring &Chromatic number – Chromatic partitioning – Graph Colouring – four colour Problem Chromatic polynomial - Matching – Covering - Directed graphs - Types of Directed Graphs – Diagraphs and binary relations – Directed paths- Euler Graph.	15
UNIT IV	**MATRIX REPRESENTATION IN GRAPH:** Matrix representation of graphs, Sub graphs& Quotient Graphs, Transitive Closure digraph, Euler's Path & Circuit (only definitions and examples), spanning Trees of Connected Relations, Prim's Algorithm to construct Spanning Trees, Weighted Graphs, Minimal, Spanning Trees by Prim's Algorithm & Kruskal's Algorithm.	15
UNIT V	**APPLICATIONS OF GRAPH:** Travelling Sales Person Problem with Directed and Un directed Graph, - Graph with n vertices and k colours- Shortest path from one to many Cities with directed graph- Shortest Paths with Un directed Graphs-Connected Components.	15
	Total	**75**

Course Outcomes		Programme Outcome
CO	On completion of this course, students will	
CO1	To Introduce the fundamental concepts in graph theory Graphs, subgraphs, walks, Euler graphs, Hamiltonian Paths Tree Properties, Hamiltonian paths and circuits.	PO1,PO6
CO2	Understanding the concepts of Circuits, Cut set and its Properties, Network Flows, Isomorphism and Combinatorial and Planar Graphs.	PO2
CO3	Applying the concept of Colouring with Chromatic Number, Directed Graphs, Matching, Covering Pattern and Euler Graphs.	PO2,PO4
CO4	Analyzing the Various Concepts of Representation of Graphs, Euler Paths Circuit, Kruskals and Prims Algorithms, Connected Components.	PO4,PO6
CO5	Implementation of an application using All Types of Graphs and evaluate the Applications with travelling sales person Problem, K colour Problem with n vertices in a Graph and Shortest Path finding Problem using Directed and Undirected Graphs.	PO5,PO6

	Text Book
1	Narsingh Deo , " Graph Theory with Application to Engineering and Computer Science" Prentice Hall of India 2010(Reprint)
2	Rosen H "Discrete Mathematics and Its Application " Mc Graw Hill , 2007
	Reference Books
1.	Discrete Maths for Computer Scientists & Mathematicians by Mott, Kandel, Baker
2.	Clark J and Holton DA " First look at Graph Theory" Allied Publishers 1995
	Web Resources
1.	Web resources from NDL Library, E-content from open source libraries
2.	1) https://d3gt.com/ 2) https://www.coursera.org/courses?query=graph%20theory

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	3
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	15

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

Subject Code	Subject Name	Category	L	T	P	S	Credits	Inst. Hours	Marks		
									CIA	External	Total
23BCA AP5	**Graph Theory and its applications Lab**	EC – 5 Allied	-	-	2	-	2	2	25	75	100

Learning Objectives

LO1	Definition of Graph, sub graph their representations, degree and algebraic operations.
LO2	Connected graphs, weighted graphs and shortest paths
LO3	Special classes of graphs: Bipartite graphs, line graphs, chordal graphs.
LO4	Trees: Characterizations, spanning tree, minimum spanning trees
LO5	Eulerian and Hamiltonian graphs: Characterization, Necessary and sufficient conditions

Sl. No.	Details	No. of Hours
1	Write a Program to find the number of vertices, even vertices, odd vertices and number of edges in a Graph.	60
2	Write a Program to find connectivity in a graph between two vertices is directed or indirected.	
3	Write a program to find degree of the vertices in a graph.	
4	Write a Program to Find Minimum Spanning tree Using Prim's Algorithm	
5	Write a Program to Find Minimum Spanning tree Using Kruskal's Algorithm	
6	Write a Program to find Shortest Path between 2 Vertices using Dijkstra Algorithm	
7	Write a Program to find Shortest Path between every pair of vertices in a graph using Floyd-Warshall's Algorithm.	
8	Write a Program to implement Graph Colouring.	
	Total	**60**

	Course Outcomes	Programme Outcome
CO	To Introduce the fundamental concepts in graph theory Graphs, sub graphs, walks, Euler graphs, Hamiltonian Paths Tree Properties, Hamiltonian paths and circuits.	
CO1	Understanding the concepts of Circuits, Cut set and its Properties, Network Flows, Isomorphism and Combinatorial and Planar Graphs.	PO1
CO2	Applying the concept of Colouring with Chromatic Number, Directed Graphs, Matching, Covering Pattern and Euler Graphs.	PO1, PO2
CO3	Analysing the Various Concepts of Representation of Graphs, Euler Paths Circuit, Kruskals and Prims Algorithms, Connected Components.	PO4, PO6
CO4	Implementation of an application using All Types of Graphs and evaluate the Applications with travelling sales person Problem, K colour Problem etc.	PO4, PO5, PO6
CO5	To Introduce the fundamental concepts in graph theory Graphs, subgraphs, walks, Euler graphs, Hamiltonian Paths Tree Properties, Hamiltonian paths and circuits.	PO3, PO5

Text Book

1	Narsingh Deo , " Graph Theory with Application to Engineering and Computer Science" Prentice Hall of India 2010 (Reprint)
2	Rosen H "Discrete Mathematics and Its Application " Mc Graw Hill , 2007

Reference Books

1.	Discrete Maths for Computer Scientists & Mathematicians by Mott, Kandel, Baker
2.	Clark J and Holton DA " First look at Graph Theory" Allied Publishers 1995

Web Resources

1.	Web resources from NDL Library, E-content from open source libraries
2.	1) https://d3gt.com/ 2) https://www.coursera.org/courses?query=graph%20theory

Subject Code	Subject Name	Category	L	T	P	S	Credits	Inst. Hours	Marks		
									CIA	External	Total
23BCAA6	**Computer Oriented Numerical Methods**	EC – 6 Allied	3	-	-	-	3	3	25	75	100

	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	**Contents**	**No. of Hours**
UNIT 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 .	15
UNIT 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	
UNIT III	**INTERPOLATION WITH EQUAL INTERVAL:** Difference operators and relations. - Interpolation with equal intervals – Newton's forward and backward difference formulae.	15
UNIT IV	**NUMERICAL DIFFERENTIATION AND INTEGRATION:** Approximation of derivatives using interpolation polynomials – Numerical integration using Trapezoidal, Simpson's 1/3 rule	15
UNIT V	**INITIAL VALUE PROBLEMS FOR ORDINARY DIFFERENTIAL EQUATIONS:** Single step methods – Taylor's series method – Euler's method – Modified Euler's method - Runge Kutta method for solving(first, second , Third and 4th) order equations – Multi step methods	15
	Total	**75**

Course Outcomes		Programme Outcome
CO	On completion of this course, students will	
CO1	Know how to solve various problems on numerical methods	PO1, PO6
CO2	Use approximation to solve problems	PO2
CO3	Differentiation and integration concept are applied	PO2, PO4
CO4	Apply , direct methods for solving linear systems	PO4, PO6
CO5	Numerical solution of ordinary differential equations	PO5, PO6

	Text Book
1	Balagurusamy, E., Numerical Methods, Tata McGraw Hill, 1999.
2	Rajaraman V., Computer Oriented Numerical Methods, 3rd Edition, Prentice Hall India, New Delhi, 1998.

	Reference Book
1.	Stoor, Bullrich, Computer Oriented Numerical Methods, Springer-Verlag, 1998.
2.	Krishnamurthy, E.V., Sen, S.K., Computer Based Numerical Algorithms, East West Press, 1998.
3.	Jain, M.K., Iyengar, S.R.K., Jain R.K., Numerical Methods : Problems and Solutions, New Age Int.(P) Ltd., New Delhi, 1997.
4.	Jain, M.K., Iyengar, S.R.K., Jain R.J., Numerical Methods for Scientific and Engineering Competition, New Age Int. (P)Ltd., New Delhi, 1997

	Web Resources	
1.	https://www.udemy.com/course/computer-oriented-numerical-techniques/	

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	3
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	15

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

Subject Code	Subject Name	Category	L	T	P	S	Credits	Inst. Hours	Marks		
									CIA	External	Total
23BCAA P6	**Computer Oriented Numerical Methods Lab (using C)**	EC – 7 Allied	-	-	2	-	2	2	25	75	100

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.

	Details	**No. of Hours**
1	Write a C Program to find the roots of non-linear equation using bisection method.	60
2	Write a C Program to find the roots of non-linear equation using newton's method	
3	Write a C Program to solve the system of linear equations using gauss - elimination method.	
4	Write a C Program to integrate numerically using Trapezoidal Rule.	
5	Write a C Program to integrate numerically using Simpson's rule.	
6	Write a C Program for Newtons forward difference.	
7	Write a C Program to implement Lagrange's interpolation method for finding f(x) for a given x	
8	Write a C Program to find the largest eigen value of a matrix by power - method.	
9	Write a C Program to find numerical solution of ordinary differential equations by euler's method.	
10	Write a C Program to find numerical solution of ordinary differential equations by runge- kutta method.	
	Total	**60**

Course Outcomes		Programme Outcome
CO	On completion of this course, students will	
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, PO5

Text Book	
1	Balagurusamy, E., Numerical Methods, Tata McGraw Hill, 1999.
2	Rajaraman V., Computer Oriented Numerical Methods, 3rd Edition, Prentice Hall India, New Delhi, 1998.

Reference Books	
1.	Stoor, Bullrich, Computer Oriented Numerical Methods, Springer-Verlag, 1998.

2.	Krishnamurthy, E.V., Sen, S.K., Computer Based Numerical Algorithms, East West Press, 1998.
3.	Jain, M.K., Iyengar, S.R.K., Jain R.K., Numerical Methods: Problems and Solutions, New Age Int. (P) Ltd., New Delhi, 1997.
4.	Jain, M.K., Iyengar, S.R.K., Jain R.J., Numerical Methods for Scientific and Engineering Competition, New Age Int. (P) Ltd., New Delhi, 1997
Web Resources	
1.	https://www.udemy.com/course/computer-oriented-numerical-techniques/

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	3
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	15

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

<div align="center">அடிப்படைத்தமிழ் –I</div>

Course Code	BA 233AT	அடிப்படைத்தமிழ் –I	L	T	P	C	
Core/Elective/Supportive			3	2	0	2	
Pre-Requisite	தமிழ்க் கற்கும் ஆர்வம்		Syllabus version			2022	
Course Objectives							
பிறமொழி மாணவியர்க்குத் தமிழ்மொழி பயிற்றுவித்தல்.							
தமிழ் எழுத்துக்களை, வடிவங்களை அறிவர். உச்சரிக்கவும் எழுதவும் அறிவர்.							
இப்பாடத்தைக் கற்பதால் பின்வரும் பயன்களை மாணவர்அடைவர்.							
On the Successful completion of the Course,Students will be able to							
CO 1	தமிழ் உயிரெழுத்து வடிவங்களை அறிந்துகொள்வர்				K1,K2		
CO 2	மெய்யெழுத்துக்கள் வடிவங்களை அறிந்துகொள்வர்				K1,K3,K4		
CO 3	எழுதும் பயிற்சிபெறுவர்				K1,K2,K4		
CO 4	சொற்களை அறிவர்				K1,K4,K5,K6		
CO 5	எழுத்துக்கள்ஒலிக்கும் முறைஅறிவர்				K1,K4,K5,K6		
K1 - Remember; K2 - Undestand; K3 - Apply; K4 - Analyze; K5 - Evaluate; K6 - Create							
Unit -1	உயிரெழுத்துக்கள்			6 Contact hours			
Unit -2	மெய்யெழுத்துக்கள்			6 Contact hours			
Unit -3	உயிர்மெய் எழுத்துக்கள்			6 Contact hours			
Unit -4	சொற்களை அறிதல்			6 Contact hours			
Unit -5	ஒலிப்புப் பயிற்சி, எழுத்துப்பயிற்சி			6 Contact hours			
Total Lecture Hours				6 Contact hours			
Related Online Contents [MOOC, SWAYAM, NPTEL, Websites etc.]							
	https://www.languagetrainers.com/blog/tamil-words/						
	https://www.outsourcingtranslation.com/resources/phrases/tamil-sentences.php						
	https://ilearntamil.com/basic-tamil-vocabulary/						
	https://ling-app.com/ta/basic-words-in-tamil/						

Course Code	BA-234AT	அடிப்படைத்தமிழ் – II	L	T	P	C	
Core/Elective/Supportive			3	2	0	2	
Pre-Requisite		தமிழ் எழுத்துக்கள் அறிந்திருத்தல்	Syllabus version			2022	
Course Objectives							

பிறமொழி மாணவியர்க்குத் தமிழ்மொழி பயிற்றுவித்தல்.

தமிழ் எழுத்துக்களை, வடிவங்களை அறிவர். உச்சரிக்கவும் எழுதவும் அறிவர்.

இப்பாடத்தைக் கற்பதால் பின்வரும் பயன்களை மாணவர்அடைவர்.

On the Successful completion of the Course,Students will be able to		
CO 1	அறம் உணர்தல்	K1,K2
CO 2	அறச் சிந்தனைகளைப் புரிந்து கொள்ளுதல்	K1,K3,K4
CO 3	குறள் கூறும் அறத்தைப் பொருத்திப் பார்த்தல்	K1,K2,K4
CO 4	தமிழறிஞர்களை அறிதல்	K1,K4,K5,K6
CO 5	சுயமாக எழுதத் தொடங்குதல்	K1,K4,K5,K6

K1 - Remember; K2 - Undestand; K3 - Apply; K4 - Analyze; K5 - Evaluate; K6 - Create

Unit -1	ஆத்திசூடி (1-12) அறம் செய விரும்பு முதல் - ஒளவியம் பேசேல் வரை	6 Contact hours
Unit -2	வெற்றி வேற்கை (1-15) எழுத்து அறிவித்தவன் இறைவன் ஆகும் முதல் வறிஞுர்க்கு அழகு வறுமையில் செம்மை வரை	6 Contact hours
Unit -3	திருக்குறள் : கடவுள் வாழ்த்து அதிகாரம்- 5 குறள்கள்	6 Contact hours
Unit -4	தமிழ் அறிஞர்கள் சிலரை அறிமுகம் செய்தல்	6 Contact hours
Unit -5	விளையாட்டுகள், விழாக்கள் பற்றிய குறிப்புகள் எழுதுதல்	6 Contact hours
Total Lecture Hours		6 Contact hours

Related Online Contents [MOOC, SWAYAM, NPTEL, Websites etc.]	
	https://www.languagetrainers.com/blog/tamil-words/
	https://www.outsourcingtranslation.com/resources/phrases/tamil-sentences.php

	https://ilearntamil.com/basic-tamil-vocabulary/
	https://ling-app.com/ta/basic-words-in-tamil/
	https://thirutamil.com/article/20-easy-thirukkural-in-tamil/ https://www.chennailibrary.com/avvai/kondraivendan.html

ARABIC

PART - I

SYLLABUS

FROM THE ACADEMIC YEAR

2023 - 2024

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TAMILNADU STATE COUNCIL FOR HIGHER EDUCATION, CHENNAI - 600 005

TAMIL NADU STATE COUNCIL
FOR HIGHER EDUCATION (TANSCHE)

U.G. AND FIVE YEAR INTEGRATED P.G. DEGREE PROGRAMS
SYLLABUS FOR FOUNDATION COURSE: PART I – ARABIC

Programme:	U.G. AND FIVE YEAR INTEGRATED P.G. DEGREE PROGRAMS FOUNDATION COURSE: PART I – ARABIC
Duration:	4 Semesters

On successful completion of this program, the graduates are expected to achieve the following:

Programme Outcomes:	1. Acquire the knowledge of the structure of Arabic words 2. Acquaint with the knowledge of basic Arabic grammar 3. Become familiar with the knowledge of phonetic system of Arabic language 4. Able to communicate in Arabic 5. Have the knowledge of moral values in the light of Quran and Hadith
Programme Specific Outcomes:	1. Understand the sounds and phrasing of Arabic language. 2. Learn the basic Arabic grammar 3. Develop communication skills in Arabic 4. Acquire new vocabulary in Arabic 5. Learn the moral values of the Holy Quran and Sunnah

List of Courses:

Semester	Course Code	Title of the Course	Foundation Course	Credits
I	2311A	Paper I : Prose	FC	3
II	2321A	Paper II : Grammar	FC	3
III	2331A	Paper III : Communication Skill in Arabic	FC	3
IV	2341A	Paper IV : Quran and Hadith	FC	3

Course I	Course Code	Title of the Course		Credits
FC	2311A	Paper I : Prose		3
Course Outcomes		1. Understand the correct pronunciation of Arabic letters 2. Understand the structure-based composition. 3. Acquire new vocabulary in Arabic 4. Read the Arabic sentences without diacritical marks 5. Able to write the simple sentences in Arabic without errors.		
Pre-requisites, if any:		Nil		
Course Objectives		1. Understand basic Arabic grammar. 2. Understand the structure of Arabic language. 3. Employ sentence making. 4. Enhance vocabulary. 5. Improve reading and writing skills.		
Unit I		(دروس اللغة العربية لغير الناطقين بها، الجزء الألول، الدكتور ف. عبد الرحيم) من الدرس الألول إلى الدرس الرابع		
Unit II		من الدرس الخامس إلى الدرس الثامن		
Unit III		من الدرس التاسع إلى الدرس الثالث عشر		
Unit IV		من الدرس الرابع عشر إلى الدرس الثامن عشر		
Unit V		من الدرس التاسع عشر إلى الدرس الثالث والعشرين		
Prescribed Text Book		دروس اللغة العربية لغير الناطقين بها، الجزء الألول، الدكتور ف. عبد الرحيم		

	Duroos Al-Lugha Al-Arabiyya – Part I, By Dr. V. Abdur Rahim
Reading List (Print and online)	معجم الكلمات الواردة ني دروس اللغة العربية لغير الناطنِين بها مفتاح دروس اللغة العربية لغير الناطقين بها ءة الراشدة – الشيخ أبو الحسن علي الحسني الندوي القراءة المفيدة – الدكتور دمحم يوسف كوكن العمريمنهاج العربية – السيد النبي حيدرآبادي
	www.alnahw.com

Method of Evaluation:

Internal Assessment	End Semester Examination	Total	Grade
25	75	100	

Methods of assessment:

Recall (K1) - Simple definitions, MCQ, Recall steps, Concept definitions

Understand/ Comprehend (K2) - MCQ, True/False, Short essays, Concept explanations, Short summary or overview

Application (K3) - Suggest idea/concept with examples, Suggest formulae, Solve problems, Observe, Explain

Analyse (K4) - Problem-solving questions, Finish a procedure in many steps, Differentiate between various ideas, Map knowledge

Evaluate (K5) - Longer essay/ Evaluation essay, Critique or justify with pros and cons

Create (K6) - Check knowledge in specific or offbeat situations, Discussion, Debating or Presentations

Mapping with Programme Outcomes:

	PO 1	PO 2	PO 3	PO 4	PO 5
CO1	S	S	S	M	L
CO2	S	S	S	M	L
CO3	S	S	S	M	L
CO4	S	S	S	M	L
CO5	S	S	S	M	L

3-Strong   2-Medium   1-Low

Course II	Course Code	Title of the Course	Credits
FC	2321A	Paper II : Grammar	3

Course Outcomes	1. Able to use basic grammatical structure. 2. Develop reading skills and reading speed 3. Acquire new vocabulary in Arabic 4. Understand the different types of sentences. 5. Able to construct simple sentences in Arabic
Pre-requisites, if any:	Nil
Course Objectives	1. Understand basic Arabic grammar. 2. Understand the correct usage of Arabic grammar. 3. Employ sentence making. 4. Enhance vocabulary. 5. Improve reading and writing skills.
Unit I	)قواعد اللغة العربية الأساسية، الدكتور سيد رحمة هلال(من الدرس الأول إلى الدرس الرابع
Unit II	من الدرس الخامس إلى الدرس الثامن
Unit III	من الدرس التاسع إلى الدرس الثاني عشر
Unit IV	من الدرس الثالث عشر إلى السادس عشر
Unit V	من الدرس السابع عشر إلى الدرس العشرين
Prescribed Text Book	قواعد اللغة العربية الأساسية، الدكتور سيد رحمة هلال Basic Arabic Grammar, By Dr. Syed Rahmathullah

Reading List (Print and online)	النحو الواضح – علي الجارم ومصطفى أمين دليل النحو الواضح – الدكتور بشير أحمد جمالي سهل العوامل _ الدكتور تاج الدين المناني النحو الميسر للكبار والصغار – علي محمود عقيلي القواعد التطبيقية في اللغة العربية – الدكتور نديم دعكور www.alnahw.com

Method of Evaluation:

Internal Assessment	End Semester Examination	Total	Grade
25	75	100	

Methods of assessment:

Recall (K1) - Simple definitions, MCQ, Recall steps, Concept definitions

Understand/ Comprehend (K2) - MCQ, True/False, Short essays, Concept explanations, Short summary or overview

Application (K3) - Suggest idea/concept with examples, Suggest formulae, Solve problems, Observe, Explain

Analyse (K4) - Problem-solving questions, Finish a procedure in many steps, Differentiate between various ideas, Map knowledge

Evaluate (K5) - Longer essay/ Evaluation essay, Critique or justify with pros and cons
Create (K6) - Check knowledge in specific or offbeat situations, Discussion, Debating or Presentations

Mapping with Programme Outcomes:

	PO 1	PO 2	PO 3	PO 4	PO 5
CO1	S	S	S	S	L
CO2	S	M	S	S	M
CO3	S	S	S	S	M
CO4	S	S	S	S	L
CO5	S	S	S	S	M

3-Strong   2-Medium   1-Low

Course III	Course Code	Title of the Course	Credits
FC	2331A	Paper III : Communication Skill in Arabic	3
Course Outcomes		1. Understand the basics of Arabic language. 2. Learn the structure of Arabic words. 3. Familiarize with the phonetic system of Arabic. 4. Able to communicate in Arabic 5. Able to translate from Arabic to English and vice versa	
Pre-requisites, if any:		Nil	
Course Objectives		1. Understand the sounds and phrasing of Arabic language. 2. Acquire new vocabulary and apply in context. 3. Develop communication skills in Arabic. 4. Understand the different aspects of communication. 5. Learn to communicate in everyday interactions.	
Unit I		الكتاب الأساسي في تعليم اللغة العربية لغير الناطقين بها، الجزء الأول – السعيد محمد بدوي وفتحي علي يونس) التعارف ـ في المطار)1(	
Unit II		في الفندق ـ في المطعم	
Unit III		في البنك ـ عند الطبيب)1(	
Unit IV		في الطريق ـ في مكتب البريد	
Unit V		في السوق)1(ـ في السوق)2(	
Prescribed Text Book		الكتاب الأساسي في تعليم اللغة العربية لغير الناطقين بها، الجزء الأول – السعيد محمد بدوي وفتحي علي يونس Al Kitaab Al Asaasi Fi Taleem Al Lugha Al Arabiyya Li Ghair An Naatiqeena Biha - Part I, By Sayeed Muhaamad Badawi and Fathi Ali Yunus	

Reading List (Print and online)	A Practice Book on Gulf Arabic, By Dr. Abdul Jaleel. T
	Arabic Conversation Book, By Mohd. Harun Rashid and Khalid Perwez
	A Hand book of Commercial Arabic by Dr. Aboobacker K.P
	العربية لغير العرب ـ د. مصطفى حسن الريس، الأزهر
	العربية للحياة ـ جامعة الملك سعودالؤراءة
	العربية لغير العرب ـ وزارة التربية بالكويت
	www.talkinarabic.com

Method of Evaluation:

Internal Assessment	End Semester Examination	Total	Grade
25	75	100	

Methods of assessment:

Recall (K1) - Simple definitions, MCQ, Recall steps, Concept definitions
Understand/ Comprehend (K2) - MCQ, True/False, Short essays, Concept explanations, Short summary or overview

Application (K3) - Suggest idea/concept with examples, Suggest formulae, Solve problems, Observe, Explain

Analyse (K4) - Problem-solving questions, Finish a procedure in many steps, Differentiate between various ideas, Map knowledge

Evaluate (K5) - Longer essay/ Evaluation essay, Critique or justify with pros and cons

Create (K6) - Check knowledge in specific or offbeat situations, Discussion, Debating or Presentations

Mapping with Programme Outcomes:

	PO 1	PO 2	PO 3	PO 4	PO 5
CO1	S	S	S	M	L
CO2	S	S	S	M	M
CO3	S	S	S	M	M
CO4	S	S	S	M	M
CO5	S	S	S	M	M

3-Strong   2-Medium   1-Low

Course IV	Course Code	Title of the Course	Credits
FC	2341A	Paper IV : Quran and Hadith	3

Course Outcome	1. Know the principal textual sources of the Islamic tradition: The Qur'an and the Hadith.
	2. Know the role of Quran and Hadith in the synthesis of Islamic faith and practice.
	3. Understand the structure of Arabic grammar through Quran and Hadith.
	4. Understand the methodology of translation of Quran and Hadith.
	5. Understand the moral values of Quran and Hadith
Pre-requisites, if any:	Nil
Course Objectives	1. Know the importance of Quran and Hadith.
	2. Understand the style of Quran and Hadith.
	3. Understand the role of Quran and Hadith in the Islamic faith and law.
	4. Know the structure of Arabic grammar through the examples from Quran and Hadith.
	5. Learn the cultural and moral values.
Unit I	1)سورة لقمان من القرآن الكريم 2. أحاديث سهلة للدكتور ف. عبد الرحيم(سورة لقمان من الآية 1 إلى الآية 11
Unit II	من الآية 11 إلى 21
Unit III	من الآية 21 إلى 43

Unit IV	أحاديث سهلة من الحديث 1 إلى الحديث 11
Unit V	من الحديث 11 إلى الحديث 21
Prescribed Text Book	1. سورة لقمان من القرآن الكريم 2. أحاديث سهلة للدكتور ف. عبد الرحيم 1) Sooratu Luqman 2) Ahadeeth Sahlah By Dr. V. Abdur Rahim
Reading List (Print and online)	Tafsir Al-Jalalain The Noble Quran, Dr. Muhammad Muhsin Khan and Muhammad Taqi-Ud-Dhin Al-Hilali الأربعون النووية نصوص من الحديث النبوي الشريف، الدكتور ف. عبد الرحيمشرح أحاديث سهلة، الدكتور ش. عبد المالك https://quran.com/ https://sunnah.com/nawawi40

Method of Evaluation:

Internal Assessment	End Semester Examination	Total	Grade
25	75	100	

Methods of assessment:

Recall (K1) - Simple definitions, MCQ, Recall steps, Concept definitions

Understand/ Comprehend (K2) - MCQ, True/False, Short essays, Concept explanations, Short summary or overview

Application (K3) - Suggest idea/concept with examples, Suggest formulae, Solve problems, Observe, Explain

Analyse (K4) - Problem-solving questions, Finish a procedure in many steps, Differentiate between various ideas, Map knowledge

Evaluate (K5) - Longer essay/ Evaluation essay, Critique or justify with pros and cons

Create (K6) - Check knowledge in specific or offbeat situations, Discussion, Debating or Presentations

Mapping with Programme Outcomes:

	PO 1	PO 2	PO 3	PO 4	PO 5
CO1	L	M	S	S	S
CO2	L	M	S	S	S
CO3	M	M	S	S	S
CO4	M	M	S	L	S
CO5	S	M	S	S	S

3-Strong   2-Medium   1-Low

பொதுத்தமிழ்

பி.ஏ., பி.எஸ்ஸி., பி.காம், பி.பி.ஏ.
(முதலாம் மற்றும் இரண்டாம் ஆண்டிற்கான நான்கு பருவங்களுக்கு)

பாடத்திட்டம்

2023 - 2024

தமிழ்நாடுமாநிலஉயர்கல்விமன்றம்
600 005

பொதுத்தமிழ்-1

தமிழ் இலக்கிய வரலாறு -1

முதலாம் ஆண்டு – முதற் பருவம்

Course Code	Course Name	category	L	T	P	S	Credits	Ins.Hrs	CIA	External	Total
2311T	பொதுத்தமிழ் -1 தமிழ் இலக்கிய வரலாறு -1	Supportive	Y	-	-	-	3	6	25	75	100

Pre-Requisite	பன்னிரெண்டாம் வகுப்பில் தமிழை ஒரு பாடமாகப் பயின்றிருக்க வேண்டும்	SV 2023	

Learning Objectives

- முதலாமாண்டுப் பட்ட வகுப்பு மாணவர்களுக்குத் தமிழ் மொழி இலக்கியங்களை அறிமுகம் செய்தல்
- தமிழ் இலக்கியப் போக்குகளையும், இலக்கணங்களையும் மாணவர் அறியுமாறு செய்து அவர்களின் படைப்பாற்றலைத் தூண்டுதல்
- தமிழ் இலக்கியம் சார்ந்த போட்டித் தேர்வுகளுக்கு ஏற்ப கற்பித்தல் நடைமுறைகளை மேற்கொள்ளுதல்

Expected Course Outcomes

On the Sucessful completion of the Course, Students will be able to

இப்பாடத்தைக் கற்பதால் பின்வரும் பயன்களை மாணவர் அடைவர்

CO 1	சங்க இலக்கியத்தில் காணப்பெறும் வாழ்வியல் சிந்தனைகளை அறிந்து கொள்வர்	K4
CO 2	அற இலக்கியம் மற்றும் தமிழ் காப்பியங்களின்வழி வாழ்வியல் சிந்தனையைப் பெறுவர்	K5, K6
CO 3	பக்தி இலக்கியங்களைக் கற்பதன் மூலம் பக்தி நெறியினையும், பகுத்தறிவு இலக்கியங்களைக் கற்பதன் வழி நல்லிணக்கத்தையும் தெரிந்து பின்பற்றுவர்	K3
CO 4	மொழியறிவோடு சிந்தனைத்திறனைப் பெறுவர்	K3
CO 5	மொழிப்பயிற்சிக்குத் தேவையான இலக்கணங்களைக் கற்பர்.	K2

K1 - Remember; K2 - Undestand; K3 - Apply; K4 - Analyze; K5 - Evaluate; K6 - Create

அலகு-1	தமிழ் இலக்கிய, இலக்கண வரலாறு அறிமுகம்.

1. இலக்கணம்;

அ.தொல்காப்பியம், இறையனார் களவியல் உரை , நம்பியகப் பொருள், புறப்பொருள் வெண்பா மாலை, நன்னூல், தண்டியலங்காரம், யாப்பருங்கலக்காரிகை- நூல்கள்

ஆ.மொழிப் பயிற்சி- ஒற்றுப்பிழை தவிர்த்தல்

- வல்லினம் மிகும் இடங்கள்
- வல்லினம் மிகா இடங்கள்
- ஈரொற்று வரும் இடங்கள்
- ஒரு, ஓர் வரும் இடங்கள்
- அது, அஃது வரும் இடங்கள்
- தான், தாம் வரும் இடங்கள்

பயிற்சி : வல்லினம் மிகும் இடங்கள், மிகா இடங்கள் தவறாக வரும்வகையில் ஒரு பத்தி கொடுத்து ஒற்றுப் பிழை திருத்தி எழுதச் செய்தல்.

2. சங்க இலக்கியம் - எட்டுத்தொகை, பத்துப்பாட்டு
3. அற இலக்கியம்-பதினெண்கீழ்கணக்கு நூல்கள்
4. காப்பிய இலக்கியம் - ஐம்பெருங் காப்பியங்கள், ஐஞ்சிறு காப்பியங்கள், சமயக் காப்பியங்கள்
5. பக்தி இலக்கியமும் (பன்னிரு திருமுறைகள், நாலாயிர திவ்வியப் பிரபந்தம் -- பகுத்தறிவு இலக்கியமும் (சித்தர் இலக்கியங்கள், புலவர் குழந்தையின் இராவண காவியம்)

அலகு-2	சங்க இலக்கியம்

எட்டுத்தொகை ;எ

1. நற்றிணை-முதல் பாடல் -நின்ற சொல்லர்
2. குறுந்தொகை 3 ஆம் பாடல் -நிலத்தினும் பெரிதே
3. ஐங்குறுநூறு –நெல் பல பொலிக! பொன் பெரிது சிறக்க!' (முதல் பாடல்)-வேட்கைப் பத்து
4. கலித்தொகை- 51 - சுடர்த்தொடிஇக் கேளாய் -குறிஞ்சிக் கலி
5. புறநானூறு -189 தென்கடல் வளாகம் பொதுமையின்றி, நாடா கொன்றோ -187

பத்துப்பாட்டு;

1. முல்லைப்பாட்டு (முழுவதும்)

அலகு-3	அற இலக்கியம்

1.திருக்குறள் -அறன் வலியுறுத்தல் அதிகாரம்

2.நாலடியார்-பாடல்: 131 (குஞ்சியழகும்)

3.நான்மணிக்கடிகை-நிலத்துக்கு அணியென்ப

4.பழமொழி நானூறு- தம் நடை நோக்கார்

5.இனியவை நாற்பது- 37. இளமையை மூப்பு என்று

அலகு-4	காப்பிய இலக்கியம்

1. சிலப்பதிகாரம் – வழக்குரைகாதை
2. மணிமேகலை- பாத்திரம் பெற்ற காதை

3.	பெரியபுராணம் - பூசலார் நாயனார்புராணம்
4.	கம்பராமாயணம்- குகப் படலம்
5.	சீறாப்புராணம் – மானுக்குப் பிணை நின்ற படலம்
6.	இயேசு காவியம் -ஊதாரிப்பிள்ளை
அலகு-5	பக்தி இலக்கியமும், பகுத்தறிவு இலக்கியமும்

பக்தி இலக்கியம்;

1. திருநாவுக்கரசர் தேவாரம் - நாமார்க்கும் குடியல்லேம் எனத் தொடங்கும் பாடல் மட்டும்
2. மாணிக்கவாசகர் திருவாசகம் - நமச்சிவாய வாஅழ்க நாதன்தாள் வாழ்க முதல் சிரம்குவிவார் ஓங்குவிக்கும் சீரோன் கழல் வெல்க வரை
3. பொய்கையாழ்வார்-வையந் தகளியா வார்கடலே
4. பூதத்தாழ்வார்-அன்பே தகளியா
5. பேயாழ்வார்-திருக்கண்டேன் பொன்மேனி கண்டேன்
6. ஆண்டாள் – திருப்பாவை மார்கழித் திங்கள் (முதல் பாடல்)

பகுத்தறிவு இலக்கியம்;

* திருமூலர் – திருமந்திரம் (270,271, 274, 275 285)
* பட்டினத்தார் -திருவிடை மருதூர் (காடே திரிந்து – எனத் தொடங்கும் பாடல் பா.எண ;.279, 280)
* கடுவெளி சித்தர் - *பாபஞ்செய் யாதிரு மனமே* (பாடல் முழுவதும்)
* இராவண காவியம் – தாய்மொழிப் படலம் - 18.   ஏடுகை யில்லா ரில்லை முதல் - 22. செந்தமிழ் வளர்த்தார். வரை

Text books
* .

Reference Books
* மு. வரதராசன், தமிழ் இலக்கிய வரலாறு, சாகித்ய அக்காதெமி, புதுடெல்லி.
* மது. ச. விமலானந்தன், தமிழ் இலக்கிய வரலாறு, மீனாட்சி புத்தக நிலையம், மதுரை.
* தமிழண்ணல், புதிய நோக்கில் தமிழ் இலக்கிய வரலாறு, மீனாட்சி புத்தக நிலையம், மதுரை.
* தமிழ் இலக்கிய வரலாறு –முனைவர்.சிற்பி பாலசுப்ரமணியம், முனைவர்.சொ.சேதுபதி
* புதிய தமிழ் இலக்கிய வரலாறு– முனைவர்.சிற்பி பாலசுப்ரமணியம்,நீல.பத்மநாபன்
* தமிழ் இலக்கிய வரலாறு - டாக்டர்.அ.கா.பெருமாள்
* தமிழ் இலக்கிய வரலாறு –முனைவர். ப.ச.ஏசுதாசன்
* தமிழ் இலக்கிய வரலாறு – ரீ குமார்
* வகைமை நோக்கில் தமிழ் இலக்கிய வரலாறு–பாக்கியமேரி

	தமிழ் பயிற்றும் முறை, பேராசிரியர் ந. சுப்புரெட்டியார் - மணிவாசகர் பதிப்பகம், சிதம்பரம்

Related Online Contents [MOOC, SWAYAM, NPTEL, Websites etc.]

Web Sources

- https://www.chennailibrary.com/
- https://www.sirukathaigal.com
- https://www.tamilvirtualuniversity.org
- https://www.noolulagam.com
- https://www.katuraitamilblogspot.com

	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PSO 1	PSO 2	1.
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	2	2	2	3	2	3	2	3	3	
CLO5	3	3	2	2	2	3	3	2	2	2	3	3	

Strong -3,Medium-2,Low-1

பொதுத்தமிழ்- 2

தமிழ் இலக்கிய வரலாறு -2

முதலாம் ஆண்டு – இரண்டாம் பருவம்

Course Code	Course Name	category	L	T	P	S	Credits	Ins.Hrs	CIA	Externa	Total
2321T	பொதுத்தமிழ் -2 தமிழ் இலக்கிய வரலாறு -2	Supportive	Y	-	-	-	3	6	25	75	100

| Pre-Requisite | | பன்னிரெண்டாம் வகுப்பில் தமிழை ஒரு பாடமாகப் பயின்றிருக்க வேண்டும் | SV 2023 | |

Learning Objectives

- முதலாமாண்டுப் பட்ட வகுப்பு மாணவர்களுக்குத் தமிழ் மொழி இலக்கியங்களை அறிமுகம் செய்தல்
- தமிழ் இலக்கியப் போக்குகளையும், இலக்கணங்களையும் மாணவர் அறியுமாறு செய்து அவர்களின் படைப்பாற்றலைத் தூண்டுதல்
- தமிழ் இலக்கியம் சார்ந்த போட்டித் தேர்வுகளுக்கு ஏற்ப கற்பித்தல் நடைமுறைகளை மேற்கொள்ளுதல்

Expected Course Outcomes

On the Sucessful completion of the Course, Students will be able to

இப்பாடத்தைக் கற்பதால் பின்வரும் பயன்களை மாணவர் அடைவர்

CO 1	சிற்றிலக்கியங்களின்வழி இலக்கியச் சுவையினையும் பண்பாட்டு அறிவினையும் பெறுவர்	K4
CO 2	புதுக்கவிதை வரலாற்றினை அறிந்து கொள்வர்	K5, K6
CO 3	திராவிட இயக்க இலக்கியங்களைக் கற்பதன் மூலம் மொழி உணர்வு , இன உணர்வு, சமத்துவம் சார்ந்த சிந்தனைகளைப் பெறுவர்	K3
CO 4	தமிழ்மொழியைப் பிழையின்றி எழுதவும், புதிய கலைச்சொற்களை உருவாக்கவும் அறிந்து கொள்வர்	K3
CO 5	போட்டித் தேர்வுகளில் வெற்றி பெறுவதற்குத் தமிழ்ப் பாடத்தினைப் பயன்கொள்ளும் வகையில் பயிற்சி பெறுவர்.	K2

K1 - Remember; K2 - Undestand; K3 - Apply; K4 - Analyze; K5 - Evaluate; K6 - Create

| அலகு-1 | தமிழ் இலக்கிய வரலாறு அறிமுகம். |

1. சிற்றிலக்கியம்; குறவஞ்சி, கலம்பகம், உலா, பரணி, பள்ளு, பிள்ளைத்தமிழ், தூது, அந்தாதி.
2. தனிப்பாடல் அறிமுகம்
3. இக்கால இலக்கியம் ;கவிதை, சிறுகதை,நாடகம், உரைநடை. , திராவிட இயக்கம் வளர்த்த

	தமிழ்.
அலகு-2	சிற்றிலக்கியக்கமும்,தனிப்பாடலும்

சிற்றிலக்கியம்;

- கலிங்கத்து பரணி- விருந்தினரும் வறியவரு நெருங்கி யுண்ணரும் - முதல் - கேட்பாரைக் காண்மின் காண்மின் - வரை
- திருக்குற்றாலக் குறவஞ்சி - வானரங்கள் கனிகொடுத்து
- முக்கூடற் பள்ளு - ஆற்று வெள்ளம் நாளை வரத்
- அபிராமி அந்தாதி- கலையாத கல்வியும் குறையாத வயதும் (பதினாறு செல்வங்கள்)
- திருவரங்கக் கலம்பகம் – மறம் -பிள்ளைப் பெருமாள் ஐயங்கார்-பேசவந்த தூத செல்லரித்த ஓலை செல்லுமோ
- தமிழ்விடு தூது முதல் பத்து கண்ணிகள்

தனிப்பாடல்;

- வான்குருவி யின்கூடு –ஒளவையார்
- ஆமணக்குக்கும் யானைக்கும் சிலேடை ;முத்திருக்கும் கொம்பசைக்கும் மூரித்தண் டே - காளமேகப் புலவர்
- இம்பர் வான் எல்லை இராமனையே பாடி -வீரராகவர்
- நாராய் நாராய் -சத்தி முத்தப் புலவர்

அலகு-3	இக்கால இலக்கியம்- 1

1. பாரதியார் பாரத சமுதாயம் வாழ்கவே
2. பாரதிதாசன் - சிறுத்தையே வெளியில் வா
3. நாமக்கல் கவிஞர்-கத்தியின்றி
4. தமிழ் ஒளி – மீன்கள் (அந்தி நிலா பார்க்க வா)
5. ஈரோடு தமிழன்பன் – எட்டாவது சீர் (வணக்கம் வள்ளுவ)

சிறுகதைகள்;_

1. புதுமைப்பித்தன் - கடிதம்
2. ஜெயகாந்தன் -வாய்ச் சொற்கள் (மாலை மயக்கம் தொகுப்பு)
3. ஆர். சூடாமணி - அந்நியர்கள்

உரைநடை ;

1. மு வ கடிதங்கள் - தம்பிக்கு நூலில் முதல் இரண்டு கடிதங்கள்

அலகு-4	இக்கால இலக்கியம்- 2

1. தந்தை பெரியார் – திருக்குறள்(மாநாட்டு) உரை
2. பேரறிஞர் அண்ணா – இரண்டாம் உலகத் தமிழ் மாநாட்டு உரை
3. கலைஞர் மு. கருணாநிதி – தொல்காப்பிய பூங்கா –எழுத்து -முதல் நூற்பா கட்டுரை

நாடகம் / திரைத்தமிழ் :

1. வேலைக்காரி –திரைப்படம்
2. ராஜா ராணி -சாக்ரடீஸ் -ஓரங்க நாடகம்

இதழியல் தமிழ் ;

முரசொலி கடிதம்

1. செம்மொழி வரலாற்றில் சில செப்பேடுகள்

அலகு-5	மொழிப் பயிற்சி

<u>சொல் வேறுபாடு / பிழை தவிர்த்தல்</u>

- வாசிப்பது – வாசிப்பவர்
- சுவர்- சுவரில்
- வயிறு - வயிற்றில்
- கோயில்- கோவில்
- கறுப்பு – கருப்பு
- இயக்குநர்-இயக்குனர்
- சில்லறை-சில்லரை
- முறித்தல் – முரித்தல்
- மனம்-மனசு- மனது
- அருகில்-அருகாமையில்
- அக்கரை- அக்கறை
- மங்கலம்- மங்களம்.

பயிற்சி :

- பிழையான சொற்களை ஒரு பத்தியில் கொடுத்து அந்தப் பிழையான சொற்களைச் சரியாக எழுதச் செய்தல்
- சிறிய பத்தி ஒன்றை ஆங்கிலத்தில் கொடுத்து அதனைத் தமிழில் மொழிபெயர்க்க வைத்தல்.

Text books

- .

Reference Books

- மு. வரதராசன், தமிழ் இலக்கிய வரலாறு, சாகித்ய அக்காதெமி, புதுடெல்லி.
- மது. ச. விமலானந்தன், தமிழ் இலக்கிய வரலாறு, மீனாட்சி புத்தக நிலையம், மதுரை.
- தமிழண்ணல், புதிய நோக்கில் தமிழ் இலக்கிய வரலாறு, மீனாட்சி புத்தக நிலையம், மதுரை.
- தமிழ் இலக்கிய வரலாறு –முனைவர்.சிற்பி பாலசுப்ரமணியம், முனைவர்.சொ.சேதுபதி
- புதிய தமிழ் இலக்கிய வரலாறு– முனைவர்.சிற்பி பாலசுப்ரமணியம்,நீல.பத்மநாபன்
- தமிழ் இலக்கிய வரலாறு - டாக்டர்.அ.கா.பெருமாள்

- தமிழ் இலக்கிய வரலாறு –முனைவர். ப.ச.ஏசுதாசன்
- தமிழ் இலக்கிய வரலாறு - □ரீ குமார்
- வகைமை நோக்கில் தமிழ் இலக்கிய வரலாறு–பாக்கியமேரி
- தமிழ் பயிற்றும் முறை, பேராசிரியர் ந. சுப்புரெட்டியார் - மணிவாசகர் பதிப்பகம், சிதம்பரம்

Related Online Contents [MOOC, SWAYAM, NPTEL, Websites etc.]

Web Sources

- https://www.chennailibrary.com/
- https://www.sirukathaigal.com
- https://www.tamilvirtualuniversity.org
- https://www.noolulagam.com
- https://www.katuraitamilblogspot.com

	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PSO 1	PSO 2	2.
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	2	2	2	3	2	3	2	3	3	
CLO5	3	3	2	2	2	3	3	2	2	2	3	3	

Strong -3,Medium-2,Low-1

பொதுத்தமிழ் -3
தமிழக வரலாறும் பண்பாடும்
இரண்டாம் ஆண்டு – மூன்றாம் பருவம்

Course Code	Course Name	category	L	T	P	S	Credits	Ins.Hrs	CIA	External	Total
2331T	பொதுத்தமிழ் -3 தமிழக வரலாறும் பண்பாடும்	Supportive	Y	-	-	-	3	6	25	75	100

Pre-Requisite	பன்னிரெண்டாம் வகுப்பில் தமிழை ஒரு பாடமாகப் பயின்றிருக்க வேண்டும்	SV 2023	

Learning Objectives

- தமிழக வரலாற்றை அறிந்துகொள்ளுதல்.
- தமிழரின் வாழ்வியல் தொன்மையை அறிதல்.
- தமிழரின் பண்பாட்டினை அறிந்துகொள்ளல்.
- தமிழர்மேல் நிகழ்ந்த பிற பண்பாட்டுத் தாக்கங்களை அறிதல்.
- தமிழ் இலக்கியம் சார்ந்த போட்டித் தேர்வுகளுக்கு ஏற்ப கற்பித்தல் நடைமுறைகளை மேற்கொள்ளுதல்

Expected Course Outcomes

On the Sucessful completion of the Course, Students will be able to

இப்பாடத்தைக் கற்பதால் பின்வரும் பயன்களை மாணவர் அடைவர்

CO 1	தமிழக வரலாற்றை அறிந்துகொள்வர்.	K4
CO 2	தமிழரின் வாழ்வியல் தொன்மையை அறிவர்.	K5, K6
CO 3	தமிழரின் பண்பாட்டுக் கூறுகளை அறிந்துகொள்வர்	K3
CO 4	பிற பண்பாட்டுத் தாக்கம் மற்றும் அணுகுமுறைகளை அறிவர்.	K3
CO 5	மொழிப்பயிற்சிக்குத் தேவையான இலக்கணங்களைக் கற்பர்.	K2

K1 - Remember; K2 - Undestand; K3 - Apply; K4 - Analyze; K5 - Evaluate; K6 - Create

அலகு-1	தொல் பழங்கால வரலாறும் சங்ககால வரலாறும்

1. தொல் தமிழர்
2. பழைய கற்காலம்
3. புதிய கற்காலம்
4. உலோகக் காலம்
5. அகழ்வாராய்ச்சியில் தமிழும் தமிழரும் (கீழடி வரை)
6. திணை வாழ்வியல் (களவு வாழ்க்கை, கற்பு வாழ்க்கை, உணவு, அணிகலன்கள், வாணிகம்,விளையாட்டுகள்)

7. கல்வியும், கலைகளும்	
8. தமிழ் வளர்த்த சங்கம்	
9. சங்க கால ஆட்சி முறை	
10 . அயல்நாட்டுத் தொடர்புகள்	
அலகு-2	**ஆட்சியர் வரலாறு**
1. மூவேந்தர் வரலாறு 2. பல்லவர் வரலாறு 3. நாய்க்கர் ஆட்சி 4. முகம்மதியர் ஆட்சி 5. மராட்டியர் ஆட்சி	
அலகு-3	**ஐரோப்பியர் கால வரலாறு**
1. போர்த்துக்கீசியர் 2. டச்சுக்காரர்கள் 3. டேனிஸ்காரர்கள் 4. பிரெஞ்சுக்காரர்கள் 5. ஆங்கிலேயர்கள் 6. பாளையக்காரர்கள் 7. இந்திய விடுதலைப் போராட்டத்தில் தமிழ்நாடு	
அலகு-4	**விடுதலைக்குபின் தமிழ்நாட்டு வரலாறு**
7. மொழிப்போராட்டம் 8. சமூக மறுமலர்ச்சி 9. தொழில்நுட்ப வளர்ச்சி	
அலகு-5	**மொழிப்பயிற்சி**
• நிறுத்தக் குறிகள் • கலைச்சொற்கள் • மொழிபெயர்ப்பு	
பயிற்சி :ஆங்கிலக் கலைச் சொற்களைக் கொடுத்து அவற்றைத் தமிழில் மொழிபெயர்க்கச் செய்தல்.	
Text books	
• தமிழக வரலாறும் பண்பாடும் - கே.கே. பிள்ளை, உலகத் தமிழாராய்ச்சி நிறுவனம், சென்னை, • தமிழர் நாகரிகமும் பண்பாடும் - அ. தட்சிணாமூர்த்தி, யாழ் வெளியீடு, சென்னை,. • தமிழக வரலாறும் பண்பாடும் - வே.தி. செல்லம், மணிவாசகர் பதிப்பகம், சென்னை, • ஆதிச்சநல்லூர் முதல் கீழடி வரை நுவேதா லூயிஸ், கிழக்குப் பதிப்பகம், சென்னை. • பண்பாட்டு மானிடவியல் - பக்தவத்சல பாரதி, அடையாளம் பதிப்பகம், திருச்சி. • .தமிழர் மேல் நிகழ்ந்த பண்பாட்டுப் படையெடுப்புகள், க.ப. அறவாணன், தமிழ்க்கோட்டம், சென்னை.	

Reference Books
• தமிழக சமுதாய பண்பாட்டு கலை வரலாறு - கு. சேதுராமன், என்.சி.பி.எச், சென்னை,
• தமிழர் கலையும் பண்பாடும் - அ.கா. பெருமாள், என்.சி.பி.எச், சென்னை.
• ஒரு பண்பாட்டின் பயணம்: சிந்து முதல் வைகை வரை - ஆர். பாலகிருஷ்ணன், ரோஜா முத்தையா ஆராய்ச்சி நூலகம், சென்னை.
• தமிழும் பிற பண்பாடும் - தெ.பொ. மீனாட்சி சுந்தரனார், நியூ செஞ்சுரி புக் ஹவுஸ், சென்னை
• தமிழர் வரலாறும் பண்பாடும் - நீலகண்ட சாஸ்திரி, ஸ்ரீசெண்பகா பதிப்பகம், சென்னை
• தமிழர் வரலாறும் தமிழர் பண்பாடும் - மா.இராசமாணிக்கனார்
• தமிழர் நாகரிக வரலாறு - க.த.திருநாவுக்கரசு, தொல்காப்பியர் நூலகம், சென்னை.

Related Online Contents [MOOC, SWAYAM, NPTEL, Websites etc.]

Web Sources

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- https://www.sirukathaigal.com
- https://www.tamilvirtualuniversity.org
- https://www.noolulagam.com
- https://www.katuraitamilblogspot.com

	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PSO 1	PSO 2
CLO 1	3	2	3	2	2	3	2	2	2	2	3	3
CLO 2	2	2	2	3	3	2	2	3	3	2	2	2
CLO 3	3	3	3	2	2	3	3	2	3	3	3	3
CLO 4	3	2	3	3	3	3	2	2	2	2	3	2
CLO 5	2	2	3	3	2	2	3	3	2	3	3	2

Strong -3,Medium-2,Low-1

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பொதுத்தமிழ் -4

தமிழும் அறிவியலும்

இரண்டாம் ஆண்டு – நான்காம் பருவம்
</div>

Course Code	Course Name	category	L	T	P	S	Credits	Ins.Hrs	CIA	External	Total
2341T	பொதுத்தமிழ் -4 தமிழும் அறிவியலும்	Supportive	Y	-	-	-	3	6	25	75	100

Pre-Requisite	பன்னிரெண்டாம் வகுப்பில் தமிழை ஒரு பாடமாகப் பயின்றிருக்க வேண்டும்	SV 2023	

Learning Objectives

- தாய்மொழி வழியாக அறிவியல் பற்றிய சிந்தனைகளை வளர்த்தல்.
- அறிவியல் கலைச் சொல்லாக்கம் பற்றிப் பயிற்றுவித்தல்.
- மாணவர்களுக்கு அறிவியல் பார்வையை ஏற்படுத்துதல்.
- தமிழில் அறிவியல் படைப்பிலக்கியங்களை உருவாக்கத் தூண்டுதல்
- தமிழ் இலக்கியம் சார்ந்த போட்டித் தேர்வுகளுக்கு ஏற்ப கற்பித்தல் நடைமுறைகளை மேற்கொள்ளுதல்

Expected Course Outcomes

On the Sucessful completion of the Course, Students will be able to

இப்பாடத்தைக் கற்பதால் பின்வரும் பயன்களை மாணவர் அடைவர்

CO 1	தாய்மொழி வழியாக அறிவியல் பற்றிச் சிந்திக்கும் திறன் பெற்றிருப்பர்.	K4
CO 2	அறிவியல் கலைச் சொல்லாக்கம் பற்றிய விதிகள், நுணுக்கங்களைத் தெரிந்திருப்பர்.	K5, K6
CO 3	அறிவியல் தமிழ் வளர்ச்சியில் மொழிபெயர்ப்பின் பங்கு குறித்து அறிந்திருப்பர்.	K3
CO 4	மொழியறிவோடு சிந்தனைத்திறனைப் பெறுவர்	K3
CO 5	மொழிப்பயிற்சிக்குத் தேவையான இலக்கணங்களைக் கற்பர்.	K2

K1 - Remember; K2 - Undestand; K3 - Apply; K4 - Analyze; K5 - Evaluate; K6 - Create

அலகு-1	தமிழரின் அறிவியல் சிந்தனைகள்

- அறிவியலும் மனித வாழ்வும்
- ஐந்திணைப் பகுப்பும் சூழலியலும்
- தொழில்நுட்ப மேலாண்மை
- நீர் நில மேலாண்மை

அலகு-2	பழந்தமிழ் இலக்கியங்களில் அறிவியல் சிந்தனைகள்

1. நிலவியல்
2. உலோகவியல்

3. வானவியல்	
4. உயிரியல்	
5. உளவியல்	
அலகு-3	**இடைக்கால இலக்கியங்களில் அறிவியல் சிந்தனைகள்**
1. காப்பியங்களில் அறிவியல்	
2. சிற்றிலக்கியங்களில் அறிவியல்	
3. உரைநூல்களில் அறிவியல்	
அலகு-4	**இணையத் தமிழ்**
1. இணையத் தமிழ் பயன்பாடு - அறிமுகம்	
2. இணையத்தமிழ்க் கல்விக்கழகம்	
3. இணைய நூலகம்	
4. செயற்கை நுண்ணறிவியல்	
5. தமிழ்நாட்டு அறிவியல் ஆளுமைகள்	
அலகு-5	**கடிதம் எழுதுதலும் கட்டுரை எழுதுதலும்**
• உறவு முறைக் கடிதப் பயிற்சி	
• அலுவலகக் கடிதப் பயிற்சி	
• விண்ணப்பப் படிவம் எழுதும் பயிற்சி	
• தன் விவரப் படிவம் எழுதும் பயிற்சி	
• கருத்து விளக்கக் கட்டுரைகள் எழுதும் பயிற்சி	
• பத்திரிகைகளுக்குக் கட்டுரை எழுதும் பயிற்சி	

Text books

- அறிவியல் தமிழ் இன்றைய நிலை - இராதா செல்லப்பன், உலகத் தமிழாராய்ச்சி நிறுவனம், சென்னை.
- மணவை முஸ்தபா, தமிழில் அறிவியல் படைப்பிலக்கியம், மணவை பப்ளிகேஷன், சென்னை.
- கலைச்சொல்லாக்கம் - மங்கை, ரங்கராசபுரம், சென்னை .
-

Reference Books

1.தமிழர் வேளாண்மை மரபுகள் - இல).செ.கந்தசாமி

- 2. சங்க இலக்கியத்தில் வேளாண் சமுதாயம், பெ.மாதையன், நியூ செஞ்சுரி புக் ஹவுஸ்

 3. தமிழில் அறிவியல் இதழ்கள்சாமுவேல்- ரா.பார்வேந்தன் ஃபிஷ்கிறீன் பதிப்பகம், கோவை

4. அறிவியல் தமிழ் - பதிப்பாசிரியர் இராதா செல்லப்பன்,பாரதிதாசன் பல்கலைக்கழகம், திருச்சிராப்பள்ளி.

5. இணையத் தமிழ் வரலாறு, மு.பொன்னவைக்கோ, பாரதிதாசன் பல்கலைக்கழகம்

6. இணையத் தமிழ், சந்திரிகா சுப்பிரமணியம் - சந்திரோதயம் பதிப்பகம்

7. இணையமும் இனிய தமிழும் - துரை. மணியரசன், இசை பதிப்பகம்

8. கணினித் தமிழ், இல. சுந்தரம் - விகடன் பிரசுரம்

9. மாண்புமிகு மண், பாமயன், வம்சி புக்ஸ்

10. தமிழ் இலக்கியத்தில் அறிவியல் சிந்தனைகள் வானதி பதிப்பகம், சென்னை

| Related Online Contents [MOOC, SWAYAM, NPTEL, Websites etc.] |
| Web Sources |

- https://www.chennailibrary.com/
- https://www.sirukathaigal.com
- https://www.tamilvirtualuniversity.org
- https://www.noolulagam.com
- https://www.katuraitamilblogspot.com

	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PSO 1	PSO 2	3.
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	2	2	2	3	2	3	2	3	3	
CLO5	3	3	2	2	2	3	3	2	2	2	3	3	

Strong -3,Medium-2,Low-

PART – II
ENGLISH
FOR B.A., B.SC., B.COM., B.B.A., PROGRAMMES

MODEL SYLLABUS

FROM THE ACADEMIC YEAR
2023 – 2024

TAMILNADU STATE COUNCIL FOR HIGHER

EDUCATION, CHENNAI – 600 005

Under Graduate Programme

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: 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.

PO3: Problem Solving: Capacity to extrapolate from what one has learned and apply their competencies to solve different kinds of non-familiar problems, rather than replicate curriculum content knowledge; and apply one's earning to real life situations.

PO4: 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.

PO5: Scientific Reasoning: Ability to analyze, interpret and draw conclusions from quantitative / qualitative data; and critically evaluate ideas, evidence, and experiences from an open minded and reasoned perspective.

PO6: Self-directed & Lifelong Learning: Ability to work independently, identify and manage a project. Ability to acquire knowledge and skills, including "learning how to learn", through self-placed and self-directed learning aimed at personal development, meeting economic, social and cultural objectives.

PO7:Reflective Thing: Critical sensibility to lived experiences, with self awareness and reflexivity of both self and society

PO8:Reading & Projects: Document their reading and interpretive practices in assignments, translation works, and independent projects.

PO9:Confidence & Effectiveness: Confidently and effectively articulate their literary and textual experiences.

PO10: **Social Skills & Empathetic Approach**: Reorganize a professional and reflective approach to leadership, responsibility, personal integrity, empathy, care and respect for others, accountability and self regulation.

PAPER II –GENERAL ENGLISH

Programme Specific Outcomes:

PSO1: Identify words, grammar items and structures in English to use them in specific contexts.

PSO2: Recognise, explore and use a range of vocabulary to formulate sentences, paragraphs, letters and other forms of narratives.

PSO3: List, distinguish and practice different ways of sharing ideas in spoken and written forms.

PSO4: Prepare written composition in real life contexts and engage in a range of interactions in the real world

FIRST YEAR - SEMESTER I

PAPER II –GENERAL ENGLISH-I

Subject Code	Category	L	T	P	S	Credits	Inst. Hours	Marks		
								CIA	External	Total
2312E	Part II	Y	Y	-	-	3	6	25	75	100

	Learning Objectives
LO1	To enable learners to acquireself awareness and positive thinking required in various life situations.
LO2	To help them acquire the attribute of empathy
LO3	To assist them in acquiring creative and critical thinking abilities
LO4	To enable them to learn the basic grammar
LO5	To assist them in developing LSRW skills

Unit No.	Unit Title & Text	No. of Periods for the Unit
Unit I	**SELF-AWARENESS(WHO)&POSITIVE THINKING(UNICEF)** **Life Story** 1.1 Chapter 1 from MalalaYousafzai, I am Malala 1.2 An Autobiography or The Story of My Experiments with Truth (Chapters 1, 2 & 3) M.K.Gandhi **Poem** 1.3 Where the Mind is Without Fear – Gitanjali 35 – Rabindranath Tagore 1.4 Love Cycle – Chinua Achebe	20
Unit II	**EMPATHY** **Poem** 2.1 Nine Gold Medals – David Roth 2.2 Alice Fell or poverty – William Wordsworth **Short Story** 2.3 The School for Sympathy – E.V. Lucas 2.4 Barn Burning – William Faulkner	20
Unit III	**CRITICAL & CREATIVE THINKING** **Poem** 3.1 The Things That Haven't Been Done Before – Edgar Guest 3.2 Stopping by the Woods on a Snowy Evening – Robert Frost **Readers Theatre** 3.3 The Magic Brocade – A Tale of China 3.4 Stories on Stage – Aaron Shepard (Three Sideway Stories from Wayside School" by Louis Sachar)	20

Unit IV	**Part of Speech** 4.1 Articles 4.2 Noun 4.3 Pronoun 4.4 Verb 4.5 Adverb 4.6 Adjective 4.7 Preposition	15
Unit V	**Paragraph and Essay Writing** 5.1 Descriptive 5.2 Expository 5.3 Persuasive 5.4 Narrative **Reading Comprehension**	15

Course Outcomes		
Course Outcomes	On completion of this course,students will:	
CO1	Acquire self awareness and positive thinking required in various life situations	PO1,PO7
CO2	Acquire the attribute of empathy.	PO1,PO2,PO10
CO3	Acquire creative and critical thinking abilities.	PO4,PO6,PO9
CO4	Learn basic grammar	PO4,PO5,PO6
CO5	Development and integrate the use of four language skills i.e., listening, speaking, readingand writing.	PO3,PO8

	Text books (Latest Editions)
1.	MalalaYousafzai. I am Malala, Little, Brown and Company, 2013.
2.	M.K. Gandhi. An Autobiography or The Story of My Experiments with Truth (Chapter – I), Rupa Publications, 2011.
3.	Rabindranath Tagore. "Gitanjali 35" from Gitanjali (Song Offerings): A Collection of Prose Translations Made by the Author from the Original Bengali. MacMillan, 1913.
4.	N.Krishnasamy. Modern English: A Book of Grammar, Usage and Composition Macmillan, 1975.
5.	Aaron Shepard. Stories on Stage, ShepardPublications, 2017.
6.	J.C. Nesfield. English Grammar Composition and Usage, Macmillan, 2019.

Web Resources	
1	MalalaYousafzai. I am Malala (Chapter 1) https://archive.org/details/i-am-malala

2	M.K Gandhi. An Autobiography or The Story of My Experiments with Truth(Chapter-1)- Rupa Publication, 2011 https://www.indiastudychannel.com/resources/146521-Book-Review-An-Autobiography-or-The-story-of-my-experiments-with-Truth.aspx
3	Rabindranath Tagore. "Gitanjali 35" from Gitanjali (Song Offerings)https://www.poetryfoundation.org/poems/45668/gitanjali-35
4	Aaron Shepard.Stories on Stage, Shepard Publications, 2017 https://amzn.eu/d/9rVzlNv
5	J C Nesfield. Manual of English Grammar and Composition. https://archive.org/details/in.ernet.dli.2015.44179

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
CO1	3	3	3	3
CO2	3	3	3	3
CO3	3	3	3	3
CO4	3	3	3	3
CO5	3	3	3	3
Weightage	15	15	15	15
Weighted percentage of Course Contribution to POS	3.0	3.0	3.0	3.0

3 – Strong, 2 – Medium, 1 - Low

FIRST YEAR - SEMESTER II
PAPER II –GENERAL ENGLISH-II

Subject Code	Category	L	T	P	S	Credits	Inst. Hours	Marks		
								CIA	External	Total
2322E	Part II	Y	Y	-	-	3	6	25	75	100

Learning Objectives	
LO1	To make students realize the importance of resilience
LO2	To enable them to become good decision makers
LO3	To enable them to imbibe problem-solving skills
LO4	To enable them to use tenses appropriately
LO5	To help them use English effectively at the work place.

Unit No.	Unit Title & Text	No. of Periods for the Unit
Unit I	**RESILIENCE** **Poem** 1.1 Don't Quit – Edgar A. Guest 1.2 Still Here – Langston Hughes **Short Story** 1.3 Engine Trouble – R.K. Narayan 1.4 Rip Van Winkle – Washington Irving	20
Unit II	**DECISION MAKING** **Short Story** 2.1 The Scribe – Kristin Hunter 2.2 The Lady or the Tiger - Frank Stockton **Poem** 2.3 The Road not Taken – Robert Frost 2.4 Snake – D. H Lawrence	20
Unit III	**PROBLEM SOLVING** **Prose life Story** 3.1 How I taught My Grandmother to Read – Sudha Murthy **Autobiography** 3.3 How frog Went to Heaven – A Tale of Angolo 3.4 Wings of Fire (Chapters 1,2,3) by A.P.J Abdul Kalam	20

Unit IV	**Tenses** 4.1 Present 4.2 Past 4.3 Future 4.4 Concord	15
Unit V	**English in the Workplace** 5.1 E-mail – Invitation, Enquiry, Seeking Clarification 5.2 Circular 5.3 Memo 5.4 Minutes of the Meeting	15

Course Outcomes		
Course Outcomes	On completion of this course, students will;	
CO1	Realize the importarice of resilience	PO1,PO7
CO2	Become good decision-makers	PO1,PO2,PO10
CO3	Imbibe problem-solving skills	PO4,PO6,PO9
CO4	Use tenses appropriately	PO4, PO5,PO6
CO5	Use English effectively at the work place.	PO3,PO8

TextBooks (LatestEditions)

ReferencesBooks	
1	Martin Hewings. Advanced English Grammar. Cambridge University Press, 2000
2	SP Bakshi, Richa Sharma. Descriptive English.Arihant Publications (India) Ltd., 2019.
3.	Sheena Cameron, Louise Dempsey. The Reading Book: A Complete Guide to Teaching Reading. S & L. Publishing, 2019.
4	Barbara Sherman. Skimming and Scanning Techniques, Liberty University Press, 2014.
5.	Phil Chambers. Brilliant Speed Reading: Whatever you need to read, however. Pearson, 2013.
6.	Communication Skills : Practical Approach Ed.ShaikhMoula

	Ramendra Kumar. Stories of Resilience, Blue Rose Publications, 2020.	

Web Sources

1	Langston Hughes. Still Here https://poetryace.com/im-still-here
2	R. K. Narayan. Engine Trouble http://www.sbioaschooltrichy.org/work/Work/images/new/8e.pdf
3	Washington Irving. Rip Van Winkle https://www.gutenberg.org/files/60976/60976-h/60976-h.htm
4	Frank Stockton. The Lady or the Tigerhttps://www.gutenberg.org/ebooks/396

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
CO1	3	3	3	3
CO2	3	3	3	3
CO3	3	3	3	3
CO4	3	3	3	3
CO5	3	3	3	3
Weightage	15	15	15	15
Weighted percentage of Course Contribution toPos	3.0	3.0	3.0	3.0

SECOND YEAR - SEMESTER III

PAPER II –GENERAL ENGLISH-III

Subject Code	Category	L	T	P	S	Credits	Inst. Hours	Marks		
								CIA	External	Total
2332E	Part II	Y	Y	-	-	3	6	25	75	100

	Learning Objectives
LO1	To make them active listeners
LO2	To enhance the interpersonal relationship skills
LO3	To embolden them to cope with stress
LO4	To master grammar skills
LO5	To help them to use English effectively in a business environment

Unit No.	Unit Title & Text	No. of Periods for the Unit
Unit I	**ACTIVE LISTENING** **Short Story** 1.1 In a Grove – AkutagawaRyunosuke Translated from Japanese by Takashi Kojima 1.2 The Gift of the Magi – O' Henry **Prose** 1.3 Listening – Robin Sharma 1.4 Nobel Prize Acceptance Speech – WangariMaathai	20
Unit II	**INTERPERSONAL RELATIONSHIPS** **Prose** 2.1 Telephone Conversation – Wole Soyinka 2.2 Of Friendship – Francis Bacon **Song on (Motivational/ Narrative)** 2.3 Ulysses – Alfred Lord Tennyson 2.4 And Still I Rise – Maya Angelou	20
Unit III	**COPING WITH STRESS** **Poem** 3.1 Leisure – W.H. Davies 3.2 Anxiety Monster – RhonaMcFerran **Readers Theatre** 3.3 The Forty Fortunes: A Tale of Iran 3.4 Where there is a Will – Mahesh Dattani	20
Unit IV	**Grammar** 4.1 Phrasal Verbs & Idioms 4.2 Modals and Auxiliaries 4.3 Verb Phrases – Gerund, Participle, Infinitive	15
Unit V	**Composition/ Writing Skills** 5.1 Official Correspondence – Leave Letter , Letter of Application, Permission Letter 5.2 Drafting Invitations 5.3 Brochures for Programmes and Events	15

Course Outcomes		
Course Outcomes	On completion of this course, students will;	
CO1	Listen actively	PO1,PO7
CO2	Develop interpersonal relationship skills	PO1,PO2,PO10
CO3	Acquire self-confidence to cope with stress	PO4,PO6,PO9
CO4	Master grammar skills	PO4,PO5,PO6
CO5	Carry out business communication effectively	PO3,PO8

Text Books (Latest Editions)	
1	WangariMaathai – Nobel Lecture. Nobel Prize Outreach AB 2023. Jul 2023.
2	Mahesh Dattani, Where there is a Will. Penguin, 2013.
3	Martin Hewings, Advanced English Grammar, Cambridge University Press, 2000
4	EssentialEnglish Grammar by Raymond Murphy

Web Resources	
1	WangariMaathai – Nobel Lecture. Nobel Prize Outreach AB 2023. Mon. 17 Jul 2023. https://www.nobelprize.org/prizes/peace/2004/maathai/lecture/
2	Telephone Conversation - Wole Soyinka https://www.k-state.edu/english/westmank/spring_00/SOYINKA.html
3	Anxiety Monster- RhonaMcFerran- www.poetrysoup.com

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
CO1	3	3	3	3
CO2	3	3	3	3
CO3	3	3	3	3
CO4	3	3	3	3
CO5	3	3	3	3
Weightage	15	15	15	15
Weighted percentage of Course Contribution to Pos	3.0	3.0	3.0	3.0

SECOND YEAR - SEMESTER IV
PAPER II –GENERAL ENGLISH-IV

Subject Code	Category	L	T	P	S	Credits	Inst. Hours	Marks		
								CIA	External	Total
2342E	**Part II**	Y	Y	-	-	3	6	25	75	100

	Learning Objectives									
LO1	To help learners imbibe goal-setting attitude.									
LO2	To enable them to understand the value of integrity.									
LO3	To help them deal with emotions.									
LO4	To teach the learners to frame sentences using tenses.									
LO5	To enhance reporting skills.									

Unit No.	Unit Title & Text	No. of Periods for the Unit
Unit I	**GOAL SETTING (UNICEF)** **Life Story** 1.1 From Chinese Cinderella – Adeline Yen Mah 1.2 Why I Write - George Orwell **Short Essay** 1.3 On Personal Mastery – Robin Sharma 1.4 On the Love of Life – William Hazlitt	20
Unit II	**INTEGRITY** **Short Story** 2.1The Taxi Driver – K.S. Duggal 2.2 Kabuliwala - Rabindranath Tagore 2.3 A Retrieved Reformation – O Henry **Extract from a play** 2.4 The Quality of Mercy (Trial Scene from the Merchant of Venice - Shakespeare)	20
Unit III	**COPING WITH EMOTIONS** **Poem** 3.1 Pride – Dahlia Ravikovitch 3.2 Phenomenal Woman – Maya Angelou **Reader's Theatre** 3.3 The Giant's Wife A Tall Tale of Ireland – William Carleton 3.4 The Princess and the God : A Tale of Ancient India	20
Unit IV	**Language Competency Sentences** 4.1 Simple Sentences	15

	4.2 Compound Sentences 4.3 Complex Sentences **Direct and Indirect Speech**	
Unit V	**Report Writing** 5.1 Narrative Report 5.2 Newspaper Report **Drafting Speeches** 5.3 Welcome Address 5.4 Vote of Thanks	15

Course Outcomes

Course Outcomes	On completion of this course, students will	
CO1	Determine their goals	PO1,PO7
CO2	Identify the value of integrity.	PO1,PO2,PO10
CO3	Deal with emotions.	PO4,PO6,PO9
CO4	Frame grammatically correct sentences	PO4,PO5,PO6
CO5	Write cohesive reports.	PO3,PO8

Text Books (Latest Editions)

1	Oxford Practice Grammar , John Eastwood, Oxford University Press
2	Cambridge Grammar of English , Ronald Carter and Michael McCarthy
3.	George Orwell Essays, Penguin Classics

Web Resources

1	http:/www.gradesaver.com/George-orwell-essays/study/summary
2	O' Henry. A Retrieved Reformation. https://americanenglish.state.gov/files/ae/resource_files/a-retrieved-reformation.pdf
	Maya Angelou. Phenomenal Woman. https://www.poetryfoundation.org/poems/48985/phenomenal-woman
3	The Quality of Mercy, https://poemana1ysis.com
4	https://www'.oxfordscho1ar1yeditions.coin/disp1ay/10.1093/actrade/9780199235742.book.1/actrade-9780199235742-div1-106- William Hazilitt

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
CO1	3	3	3	3
CO2	3	3	3	3
CO3	3	3	3	3
CO4	3	3	3	3
CO5	3	3	3	3
Weightage	15	15	15	15
Weighted percentage of Course Contribution to Pos	3.0	3.0	3.0	3.0

Semester - III					
SEC-III	**ENTREPRENEURSHIP**		**T/P**	**C**	**H/ W**
			T	**2**	**2**
Objectives	➢ To enable the students to understand the concept of Entrepreneurship and to learn the professional behaviour about Entrepreneurship. ➢ To identify significant changes and trends which create new business opportunities? ➢ To analyse the institutional arrangement for potential business opportunities. ➢ To provide conceptual exposure on converting ideas to an women entrepreneurship				
Unit -I	Entrepreneur – Meaning – Importance – Definition – Types – Functions – Qualities of an Entrepreneur – Entrepreneurship as a career.				
Unit-II	Business Promotion – Product selection – Form of ownership – Plant location – land, building, water and power, raw material, machinery, power and other infrastructural facilities– Licensing, registration and local bye laws.				
Unit- III	Institutional arrangements for entrepreneurship development – DIC, SIDCO, NSIC, SISI – Institutional finance to entrepreneurs – TIIC, SIDBI, Commercial banks – Incentives to small scale industries.				
Unit -IV	Project report – Meaning and importance – Project report – Format of a report (as per requirements of financial institutions) – Project appraisal – Market feasibility – Technical feasibility – Financial feasibility and economic feasibility – Break even analysis.				
Unit -V	Entrepreneurship development in India – Women entrepreneurship in India – Sickness in small scale industries and their remedial measures.				
Reference and Textbooks: - Entrepreneurship and Management of Small business – Centre for Entrepreneurship Development, Madurai Joseph Paul, N. Ajit kumar and T.Mampilly. *Entrepreneurship development*. Himalayan Publishing House. Khan, M.A. *Entrepreneurship Development Programmes in India*. Kanishka Publishing House, Delhi Saravanavel, P. (1997). *Entrepreneurial Development. Ess Pee kay Publishing House, Chennai*. Vasant Desai. *Dynamics of Entrepreneur Development and Management*. Himalayan Publishing House.					
Outcomes	After studied, the student will be able to ➢ To understand the significance of entrepreneurship and entrepreneur qualities. ➢ To know about the developing ideas and techniques of business. ➢ To understand about the procedures of startup. ➢ To identify the institutional support provided to entrepreneurs. ➢ To analyse the women entrepreneurship development				

SEC	Small Business Management	T/P	C	H/W
		T	2	2
Objectives	➢ To understand the policy initiatives and infrastructural support for establishing a small scale enterprises ➢ To analyze the opportunities for starting a small enterprise.			
Unit-I	Small Scale enterprises–An Introduction and overview–Definition–Scope and importance – relative advantages of small scale enterprises vis - a – vis –Large andmedium scale industries – Efforts to development of SSE- Meaning and concept ofentrepreneurship, the history of entrepreneurship development, role of entrepreneurship in economic development, agencies in entrepreneurship management and future of entrepreneurship.			
Unit-II	Policy and institutional infrastructure for small enterprises – Development agencies for small enterprise–small enterprises growth and environmental factors influency– funding agencies and their role in Developing SSE.- Meaning of entrepreneur, the skills required to be an entrepreneur, the entrepreneurial decision process, and role models, mentors and support system.			
Unit-III	Establishing the small scale enterprises–opportunities scanning–Choice of enterprise–Market assessment for SSE–Choice of technology and selection of site– Financing then ew/small enterprise– Preparation of business plan–Ownership structure and organizational framework-Business ideas, methods of generating ideas, and opportunity recognition			
Unit-IV	Operating the small-scale enterprise – Financial management issues in SSE – Operation management issues in SSE – Marketing management issues in SSE- Importance of new venture financing, types of owner ship securities, venture capital, types of debt securities, Determining ideal debt-equity mix, and financial institutions and banks			
Unit-V	Performance appraisal and growth strategies – Management performance assessment and control–Growth and stabilization strategies for small enterprises – Managing family enterprises–Related Cases-Exit strategies for entrepreneurs, bankruptcy, and Succession and harvesting strategy			
Unit-VI	Dynamic Component for Continuous Internal Assessment only: Contemporary Developments Related to the Course during the Semester concerned.			

REFERENCES:

MathurS.P.(1979)*Economicsofsmall-scaleindustries.*

Siropolis.(1986)*EntrepreneurshipandsmallBusinessManagement*

VasantDesai.(1979)*Organizationandmanagementofsmallscaleindustries.*

Outcomes	➢ Thestudentshouldbeablefindoutasuitableideaforstartingasmallenterprise ➢ The student should be able to visualize the importance of small scale enterprises in economic development.

Semester - V					
Course code: **23BVE5**	**VALUE EDUCATION**		**T/P**	**C**	**H/ W**
			T	**2**	**2**
Objectives	➢ To impart humanism values among the student under various religious thoughts ➢ To make them awareness of ethics and civil rights ➢ To familiarities the students with basic features of extracurricular activities such NSS and NCC and relevance of Abdul Kalam and Mother Teresa efforts to teach values ➢ To impart skills by preparing project works such as writing poems and stories				
Unit -I	Definition – Need for Value Education – How Important Human Values are – Humanism and Humanistic Movement in the World and in India – Literature on the Teaching of Values Under Various Religions Like Hinduism, Buddhism, Christianity, Jainism, Islam, Etc. Agencies for Teaching Value Education in India – National Resource Centre for Value Education – NCERT– IITS and IGNOU.				
Unit-II	**Vedic Period – Influence** of Buddhism and Jainism – Hindu Dynasties – Islam Invasion – Moghul Invasion – British Rule – Culture Clash – Bhakti Cult – Social Reformers – Gandhi – Swami Vivekananda – Tagore – Their Role in Value Education.				
Unit- III	**Value Crisis – After Independence:** Independence – Democracy – Equality – Fundamental Duties – Fall of Standards in All Fields – Social, Economic, Political, Religious and Environmental – Corruption in Society. Politics Without Principle – Commerce Without Ethics – Education Without Character – Science Without Humanism – Wealth Without Work – Pleasure Without Conscience – Prayer Without Sacrifice – Steps Taken by The Governments – Central and State – To Remove Disparities on the Basis of Class, Creed, Gender.				
Unit -IV	**Value Education on College Campus:** Transition from School to College – Problems – Control – Free Atmosphere – Freedom Mistaken for License – Need for Value Education – Ways of Inculcating It – Teaching of Etiquettes – Extra-Curricular Activities – N.S.S., N.C.C., Club Activities – Relevance of Dr.A.P.J. Abdual Kalam's Efforts to Teach Values – Mother Teresa.				
Unit -V	**Project Work** 1. Collecting Details about Value Education from Newspapers, Journals and Magazines. 2. Writing Poems, Skits, Stories Centering on Value-Erosion in Society. 3. Presenting Personal Experience in Teaching Values. 4. Suggesting Solutions to Value – Based Problems on the Campus.				

Reference and Textbooks: -

Chakrabarti, M. (1997). *Value education: changing perspectives*. Kanishka Publishers.

Eknath Ranade (1991). *Swami Vivekananda's Rousing Call to Hindu Nation*. Centenary Publication

Karabi Kakoti, *Value Education – Need of the Hour*.

Radhakrishnan, S. (1968). *Religion and culture*. Orient Paperbacks, New Delhi

Saraswathi, T. S. (Ed.). (1999). *Culture, socialization and human development: Theory, research and applications in India.* SAGE Publications Pvt. Limited.

Satchidananda, M. K. (1991). *Ethics, education, Indian unity and culture.* Ajanta Publications, Delhi.

Venkataiah, N. (Ed.). (1998). *Value education*. APH Publishing, New Delhi.

Outcomes	After studied, the student will be able to ➢ Knowledge about Humanism and Humanistic Movement in the World and in India ➢ Understand the Social Reformers and Their Role in Value Education ➢ Explore the theories of Fundamental Duties, Ethics, Extra-Curricular Activities – N.S.S., N.C.C ➢ Know the concept of Value Education on College Campus, Project Work regarding Writing Poems, Skits, Stories Centering on Value-Erosion in Society

Semester - IV				
Course Code **23BES4**	**ENVIRONMENTAL STUDIES**	**T/P**	**C**	**H/ W**
		T	**2**	**2**
Objectives	➢ To understand the multidisciplinary nature of environmental studies such as forest, water, mineral and energy and land resources. ➢ To portray the eco system bio diversity and its conservation. ➢ To impart the knowledge of environmental pollution ➢ To know the importance of field work to study common plants, insects and birds and visit local areas to document environmental assets.			
Unit -I	**The Multidisciplinary Nature of Environmental Studies:** Definition, Scope and importance - Need for public awareness			
Unit-II	**Natural Resources:** Renewable and non-renewable resources A). **Forest Resources:** Use and Over-Exploitation, Deforestation, Case Studies, Timber Extraction, Mining, Dams and Their Effect on Forests and Tribal People. B). **Water Resources:** Use and Over-Utilization of Surface and Ground Water, Floods, Drought, Conflicts over Water, Dams- Benefits and Problems. C). **Mineral Resources:** Use and Exploitation, Experimental Effects of Extracting and Using Mineral Resources, Case Studies. D). **Food Resources:** World Food Problems, Changes Caused by Agriculture and Overgrazing, Effects of Modern Agriculture, Fertilizer-Pesticide Problems, Water Logging, Salinity, Case Studies. E). **Energy Resources:** Growing Energy Needs, Renewable and Non-Renewable Energy Sources, Use of Alternate Energy Resources, Case Studies. F). **Land Resources:** Land as a Resource, Land Degradation, Main Induced Landsides, Soil-Erosion and Desertification. ➢ Role of Individual in Conservation of Natural Resources ➢ Equitable Use of Resources for Sustainable Lifestyle			
Unit- III	**ECOSYSTEMS, BIO-DIVERSITY AND ITS CONSERVATION** **Ecosystems:** Concept of an Ecosystem, Structure and Function of an Ecosystem, Energy Flow in The Ecosystem, Food Chains, Food Webs and Ecological Pyramids. **Biodiversity and Its Conservation:** Introduction- Definition: Genetic, Species and Ecosystem Diversity**,** Bio-Geographical Classification of India**,** Value of Biodiversity: Consumptive Use, Productive Use, Social Ethical, Aesthetic and Option Values. Biodiversity at Global, National and Local Levels**,** India as a Mega-Diversity Nation**,** Hot Spots of Biodiversity**,** Threats to Biodiversity: Habitat Loss, Poaching of Wildlife, Man-Wildlife Conflicts**,** Endangered and Endemic Species of India**,** Conservation of Biodiversity: In-Situ And Ex-Situ Conservation of Biodiversity**.**			
Unit -IV	**Environmental Pollution:** Causes, Effects And Control Measures of: **A).**Air Pollution, **B).** Water Pollution, **C).** Soil Pollution, **D).** Marine Pollution, **E).** Noise Pollution, **F).** Thermal Pollution, **G).** Nuclear Hazards.			
Unit -V	**Field Work** ➢ Visit to a Local Area to Document Environmental Assets–River/ Forest/ Grassland/ Hill/ Mountain ➢ Visit to a Local Polluted Site- Urban/Rural/Industrial/Agricultural ➢ Study of Common Plants, Insects, Birds ➢ Study of Simple Ecosystem-Pond, River, Hill Slopes, etc.,			

Reference and Textbooks: -

Agarwal, K. C. (2001). *Environmental Biology*. Nidi Publication Ltd.

Bharucha, E. (2002). *The Biodiversity of India* (Vol. 1). Mapin Publishing Pvt Ltd, Ahamedabad, India.

Brunner, C. R. (1993). *Hazardous waste incineration*. Mcgraw Hill Inc.

Clark, R. B., Frid, C., & Attrill, M. (2001). *Marine pollution* (Vol. 5). Oxford: Oxford university press.

Cunningham, W. P., Cooper, T. H., Gorham, E., & Hepworth, M. T. (1998). *Environmental encyclopedia*.

De, A.K. (1990). *Environmental Chemistry*. Wiley Eastern Ltd.

Gleick, H.P.(1993). *Water In Crisis, Pacific Institute For Studies In Dev, Environment & Security*. Stockholm Env. Institute, Oxford University Press.

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Hawkins, R. E. *Encyclopedia of Indian Natural History.* Bombay Natural History Society, Bombay.

Heywood, V. H., & Watson, R. T. (1995). *Global biodiversity assessment* (Vol. 1140). Cambridge: Cambridge university press.

Jadhav, H. V., & Bhosale, V. M. (2006). *Environmental Protection and laws*. Himalaya Publishing House.

McKinney, M. L., & Schoch, R. M. (1996). *Environmental Science: Systems and Solutions* (St. Paul, MN).

Mhaskar, A. K. *Matter Hazardous*. Techno-Science Publications.

Miller, T. G. (1989). *Environmental Science: Working with the earth (2 nd).* Wadsworth Publicing Co.

Narain, S., Mahapatra, R., Das, S., Misra, A., Parrey, A. A., Pandey, K., & Banerjee, S. (2014). *Down to Earth*. Centre for Science and Environment.

Odum, E. P., & Barrett, G. W. (1971). *Fundamentals of ecology* (Vol. 3, p. 5). Philadelphia: Saunders.

Rao, M.N., & Datta, A.K. (1987). *Waste Water Treatment*. Oxford & Ibh Publ, Co.Pvt. Ltd.

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Townsend, C.R., Begon, M., & Harper, J.L. (2008). *Essentials of Ecology* (3rd edition). Oxford: Blackwell Publishing.

Trivedi, R. K. (2010). *Handbook of Environmental Laws, Rules, Guidelines, Compliances and Standards*. *Vol. I and II, Enviro Media*.

Wanger, K.D. (1998). *Environmental Management*. Saunders Co. Philadelphia, USA.

Outcomes	On successful completion of the subject, the students acquired knowledge about: ➢ Renewable and non-renewable resources. ➢ Species and Ecosystem Diversity**,** Bio-Geographical Classification of India**,** Value of Biodiversity: ➢ Causes, Effects and Control Measures of environmental pollution ➢ Field work knowledge of studying eco system pond, river, hill and common plants, insects and birds ➢ Documentation of environmental assets