B.Sc.,

COMPUTER SCIENCE & INFORMATION TECHNOLOGY

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SYLLABUS

FROM THE ACADEMIC YEAR

2024– 2025

1. Introduction

B.Sc. Computer Science & 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 within and outside India. Quality education in general and higher education in particular deserves high priority to enable the young and future generation of students to acquire skill, training and knowledge in order to enhance their thinking, creativity, comprehension and application abilities and prepare them to compete, succeed and excel globally. Learning Outcomes-based Curriculum Framework (LOCF) makes it student-centric, interactive and outcome-oriented with well-defined aims, objectives and goals to achieve. LOCF also aims at ensuring uniform education standard and content delivery across the state which will help the students to ensure similar quality of education irrespective of the institute and location.

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

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

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

LEARNING OUTCOMES-BASED CURRICULUM FRAMEWORK GUIDELINES BASED REGULATIONS FOR UNDER GRADUATE PROGRAMME	
Programme:	**B.Sc., Computer Science & Information Technology**
Programme Code:	
Duration:	**3 years [UG]**
Programme Outcomes:	**PO1: Disciplinary knowledge:** Capable of demonstrating comprehensive knowledge and understanding of one or more disciplines that form a part of an undergraduate Programme of study **PO2: Communication Skills:** Ability to express thoughts and ideas effectively; Communicate with others using appropriate media; confidently share one's views; 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; analyse and evaluate evidence, arguments, claims, beliefs on the basis of empirical evidence; identify relevant assumptions or implications; formulate coherent arguments; critically evaluate practices, policies and theories by following scientific approach to knowledge development. **PO4: Problem solving:** Capacity to extrapolate from what one

	has learned and apply their competencies to solve different kinds of non-familiar problems and apply to real life situations. **PO5: Analytical reasoning**: Ability to evaluate the reliability and relevance of evidence; identify logical flaws and holes in the arguments of others; analyze and synthesize data; 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, synthesising and articulating; Ability to recognise cause-and-effect relationships, define problems, formulate and test hypotheses, analyse, interpret and draw conclusions from data, establish hypotheses, predict cause-and-effect relationships; ability to plan, execute and report the results of an experiment or investigation **PO7: Cooperation/Team work:** Ability to work effectively and respectfully with diverse teams; facilitate cooperative or coordinated effort on the part of a group, and act together as a group or a team in the interests of a common cause and work efficiently as a member of a team **PO8: Scientific reasoning**: Ability to analyse, interpret and draw conclusions from quantitative/qualitative data; 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 appropriate software for analysis of data. **PO 11 Self-directed learning**: Ability to work independently, identify appropriate resources required for a project, and manage a project through to completion. **PO 12 Multicultural competence:** Possess knowledge of the values and beliefs of multiple cultures and a global perspective; and capability to effectively engage in a multicultural society and interact respectfully with diverse groups. **PO 13: Moral and ethical awareness/reasoning**: Ability to embrace moral/ethical values in conducting one's life, formulate a position/argument about an ethical issue from multiple perspectives, and use ethical practices in all work. Capable of demonstrating the ability to identify ethical issues, avoid unethical behaviour such as fabrication, falsification or misrepresentation of data or committing plagiarism, not adhering to intellectual property rights; appreciating environmental and

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	sustainability issues; and adopting objective, unbiased and truthful actions in all aspects of work. **PO 14: Leadership readiness/qualities:** Capability for mapping out the tasks of a team or an organization, and setting direction, formulating an inspiring vision, building a team who can help achieve the vision, motivating and inspiring team members to engage with that vision, and using management skills to guide people to the right destination, in a smooth and efficient way. **PO 15: Lifelong learning:** Ability to acquire knowledge and skills, including learning "how to learn", through self-paced and self-directed learning aimed at personal development, meeting economic, social and cultural objectives, and adapting to changing trades and demands of work place through knowledge/skill development/reskilling.
Programme Specific Outcomes:	**PSO1**: To enable students to apply basic microeconomic, macroeconomic and monetary concepts and theories in real life and decision making. **PSO 2**: To sensitize students to various economic issues related to Development, Growth, International Economics, Sustainable Development and Environment. **PSO 3**: To familiarize students to the concepts and theories related to Finance, Investments and Modern Marketing. **PSO 4**: Evaluate various social and economic problems in the society and develop answer to the problems as global citizens. **PSO 5:** Enhance skills of analytical and critical thinking to analyze effectiveness of economic policies.

	PO 1	PO2	PO3	PO4	PO5	PO6	PO7	PO8
PSO 1	S	S	L	S	S	S	M	S
PSO 2	S	S	S	S	S	L	S	S
PSO3	M	S	M	S	M	S	L	S
PSO 4	S	S	S	S	S	S	S	S
PSO 5	L	S	S	S	S	S	S	M

S – Strong, M- Medium, L- Low

Highlights of the Revamped Curriculum:

- Student-centric, meeting the demands of industry & society, incorporating industrial components, hands-on training, skill enhancement modules, industrial project, project with viva-voce, exposure to entrepreneurial skills, training for competitive

examinations, sustaining the quality of the core components and incorporating application oriented content wherever required.

- The Core subjects include latest developments in education and scientific front, practical training, devising mathematical models and algorithms for providing solutions to real life situations. The curriculum also facilitates peer learning with advanced mathematical topics in the final semester, catering to the needs of stakeholders with research aptitude.
- The General Studies and Mathematics based problem solving skills are included as mandatory components in the 'Training for Competitive Examinations' course at the final semester, a first of its kind.
- The curriculum is designed so as to strengthen the Industry-Academia interface and provide more job opportunities for the students.
- Project with viva-voce component enables application of conceptual knowledge to practical situations. The innovative provisions of the industrial training, project and internships will give students an edge over the counterparts in the job market.
- State-of Art techniques from the streams of multi-disciplinary, cross disciplinary and inter disciplinary nature are incorporated as Elective courses, covering conventional topics to the latest.

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ValueadditionsintheRevampedCurriculum:

Semester	NewlyintroducedComponents	Outcome/ Benefits
I	**FoundationCourse** To ease the transition of learningfrom higher secondary to highereducation,providinganoverviewofthepedagogyoflearningLiteratureandanalysingtheworldthroughtheliterarylens givesrisetoanewperspective.	➢ Instill confidence ➢ Createinterestforthesubject
I,II,III,IV	**SkillEnhancementpapers**(Discipline centric /Generic/Entrepreneurial)	➢ Industry readygraduates ➢ Skilledhumanresource ➢ Equippedwithessentialskillsto be employable
		➢ Trainingonlanguageandcommunication skills enable to gain knowledgeand exposureinthecompetitiveworld.
		➢ Discipline centric skillwillimprovethetechnical know-how ofsolvingreallife problems.
III,IV,V& VI	Electivepapers	➢ Strengthening thedomainknowledge ➢ Introducingthe stakeholders totheStateof Arttechniquesfromthestreamsofmulti-disciplinary,crossdisciplinaryand interdisciplinarynature ➢ Exposuretoindustry-mouldsstudentsintosolutionproviders ➢ Self-learning is enhanced ➢ Developingaresearchframework and presenting their independent andIntellectual ideaseffectively.
ExtraCredits: ForAdvancedLearners/Honorsdegree		➢ Tocatertotheneedsofpeerlearners/ research aspirants
SkillsacquiredfromtheCourses		Knowledge, Problem Solving, Analytical ability,ProfessionalCompetency,ProfessionalCommunicationandTransferrable Skill

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Choice Based Credit System (CBCS), Learning Outcomes Based Curriculum Framework (LOCF) Guideline Based Credit and Hours Distribution System for all UG courses including Lab Hours

*** Part III components will be separately taken into account for CGPA calculation and classification for the under graduateprogramme and the other components. IV, V have to be completed during the duration of the programme as per the norms, to be eligible to obtain the UG degree.**

MethodsofEvaluation		
InternalEvaluation	ContinuousInternalAssessmentTest	25 Marks
	Assignments	
	Seminars	
	AttendanceandClassParticipation	
ExternalEvaluation	EndSemesterExamination	75 Marks
	Total	100 Marks
MethodsofAssessment		
Recall(K1)	Simpledefinitions,MCQ,Recallsteps,Conceptdefinitions	
Understand/Comprehend(K2)	MCQ,True/False,Shortessays,Conceptexplanations,ShortsummaryorOverview	
Application (K3)	Suggestidea/conceptwithexamples,Suggestformulae, Solveproblems,Observe,Explain	
Analyze(K4)	Problem-solvingquestions,Finishaprocedureinmanysteps,Differentiate	
	betweenvariousideas,Mapknowledge	
Evaluate(K5)	Longer essay/Evaluationessay,Critiqueorjustifywithprosandcons	
Create(K6)	Checkknowledgeinspecificoroffbeatsituations,Discussion,DebatingorPresentations	

Eligibility for Admission to B.Sc., Computer Science & Information Technology:

Candidates who have studied Mathematics in HSC areeligible for this programme (item no. 11 of G.O. (D) No. 147, Higher Education (G1) Department dated 05.05.2023)

B.Sc Computer Science & Information Technology

2024-2025

First Year Semester-I

Part	List of Courses	Credit	Hours per week (L/T/P)
Part-I	Language – Tamil	3	6
Part-II	English	3	6
Part III	Core 1: Object Oriented Programming using C++	5	5
	Core Practical: C++ Programming Lab	4	5
	Elective Course 1 Numerical Methods/ Discrete Mathematics	3	4
Part-IV	SEC-1 Multimedia Lab	2	2
	Foundation Course: Fundamentals of Information Technology	2	2
	Total	22	30

Semester-II

Part	List of Courses	Credit	Hours per week
Part-I	Language – Tamil	3	6
Part-II	English	3	4
Part-III	Core 2: JAVA PROGRAMMING	4	5
	Core Practical: Java Programming	4	5
	Elective Course 2 Optimization Techniques / Trends in Computing	3	4
Part-IV	SEC 2: PHP Scripting Lab	2	2
	SEC 3:Quantitative Aptitude	2	2
	Naan Muthalvan – Language Proficiency for Employability	2	2
	Total	23	30

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Semester-III

Part	List of Courses	Credit	No. of Hours
Part-1	Language – Tamil	3	6
Part-2	English	3	6
Part-3	Core Course- Data Structures and Algorithms	4	4
	Core Practical: Data Structures and Algorithms Lab	3	4
	Elective :Computational Intelligence/Computer Networks	3	4
Part-4	SEC 4: Practical: Web Application & Development Laboratory	2	2
	SEC 5 - Naan Mudhalvan	2	2
	E.V.S	2	2
		22	30

Semester-IV

Part	List of Courses	Credit	No. of Hours
Part-1	Language – Tamil	3	6
Part-2	English	3	6
Part 3	Core Course - Python Programming	4	4
	Core Practical: - Python Programming Laboratory	3	4
	Elective-Image Processing/ Cloud Computing	3	4
Part-4	SEC 6 Practical: Android Applications Development Lab	2	2
	SEC 7 Naan Muthalvan	2	2
	Value Education	2	2
		22	30

Semester-V

Part	List of Courses	Credit	No. of Hours
Part 3	Core Course 5 1 Software Engineering	4	5
	Core Course 5 2 Machine Learning	4	5
	Core Course 5 3 Database Management Systems	4	5
	Core Practical: Machine Learning Laboratory	4	5
	Mini Project	4	4
	Elective 5 1 Human Computer Interaction/Data Mining and Data Warehousing	3	4
Part-4	Naan Muthalvan	2	2
	Internship/ Industrial Visit / Field Visit	2	-
		27	30

Semester-VI

Part	List of Courses	Credit	No. of Hours
Part-3	Core Course 6 1 R Programming	4	5
	Core Course 6 2 Simulation & Modeling	4	5
	Core Practical: R ProgrammingLaboratory	4	4
	Project	4	6
	Elective 6.1 Robotics and its Applications/ Pattern Recognition	3	4
	Elective 6.2 Cyber Security/ Fuzzy Logic	3	4
Part-4	Extension Activity	1	-
	Naan Muthalvan	2	2
		25	30

Internship: The students should submit certificate of attendance from the industry along with report for external evaluation.

Industrial visit/Field visit/Knowledge Updation Activity: A report should be submitted for external evaluation.

Internship/ Industrial visit/Field visit/Research Knowledge Updation Activity: Internal – 50 Marks, External – 50 Marks

Project/ Mini Project: Individual or Group of Maximum Three members Project report should be submitted for external evaluation. Internal – 50 Marks, External – 50 Marks

Students who couldn't appear for Naan Muthalvan Course in a particular semester or who have failed in Naan Muthalvan Course should write the following Self-Study papers (External – 100 marks)

Semester	Title of the Paper
II	Soft Skills for Employability
III	Digital Skills for Employability – Office Fundamentals
IV	Web Designing
V	Internet Basics
VI	C Programming

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CC1; Core Course 1: OBJECT ORIENTED PROGRAMMING USING C++

Subject Code	L	T	P	S	Credits	Inst. Hours	Marks		
							CIA	External	Total
	5	0	0	I	5	5	25	75	100

Learning Objectives		
LO1	To inculcate knowledge on Object-oriented concepts and programming using C++.	
LO2	Demonstrate the use of various OOPs concepts with the help of programs	
Unit	**Contents**	**No. of Hours**
I	OOP Paradigm – Concepts of OOP – Benefits of OOP - Object Oriented Languages – Applications of OOP – OOP Design: Using UML as a Design Tool Beginning with C++	**15**
II	Tokens, Expressions and Control Structures - Functions in C++ : Function Prototyping – Call by Reference - Return by Reference – Inline Function – Default Arguments – Const Arguments – Recursion – Function Overloading – Classes and Objects	**15**
III	Constructors and Destructors: Constructors – Parameterized Constructors – Multiple Constructors – Constructor with default Arguments – Copy Constructors – Dynamic Constructor – Destructors – Operator Overloading and Type Conversions: Operator Overloading – Overloading Unary Operators – Overloading Binary operators – Rules for Operator Overloading – Type Conversions	**15**
IV	Inheritance: Introduction – Types of Inheritance – Virtual Base Classes – Abstract Classes – Pointers - Virtual Function - Polymorphism	15
V	Templates: Class Templates – Function Templates – Overloading of template Function – Exception Handling	15
TOTAL		75

CO	Course Outcomes
CO1	Outline the C++ programming fundamentals and the concepts of object-oriented programming like object and class, Encapsulation, inheritance and polymorphism.
CO2	Classify the control structures, types of constructors, inheritance and different type conversion mechanisms.
CO3	Analyze the importance of object oriented programming features like polymorphism, reusability, generic programming, data abstraction and the usage of exception handling.
CO4	Determine the use of object oriented features such as classes, inheritance and templates to develop C++ programs for complex problems.
CO5	Create a program in C++ by implementing the concepts of object-oriented programming.

Textbooks

- E. Balaguruswamy, (2013), "Object Oriented Programming using C++", 6th Edition, Tata McGraw Hill.

Reference Books

1	Bjarne Stroustrup, “The C++ Programming Language”, Fourth Edition, Pearson Education.
2	Hilbert Schildt, (2009), “C++ - The Complete Reference”, 4th Edition, Tata McGrawHill
NOTE: Latest Edition of Textbooks May be Used	
Web Resources	
1.	http:/fahad.cprogramming.blogspot.com/p/c-simple-examples.html
2.	http://www.sitesbay.com/cpp/cpp-polymorphism

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 ofcoursecontributedtoeachPSO	15	14	11	15	15	10

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CC2-1: Core Practical 1 :C++ Programming Lab

Subject Code	L	T	P	S	Credits	Inst. Hours	Marks		
							CIA	External	Total
	0	0	3	I	3	3	25	75	100

Learning Objectives	
LO1	To inculcate knowledge on Object-oriented concepts and programming using C++.
LO2	Demonstrate the use of various OOPs concepts with the help of programs

List of Exercises

Exercises:

1. Working with Classes and Objects
2. Using Constructors and Destructors
3. Using Function Overloading
4. Using Operator Overloading
5. Using Type Conversions
6. Using Inheritance
7. Using Polymorphism
8. Using Console I/O
9. Using Templates
10. Using Exceptions

TOTAL 75

CO	Course Outcomes
CO1	Understand the fundamentals of C++ programming structure
CO2	Identify the basic features of OOPS such as classes, objects, polymorphism, inheritance
CO3	Analyze the concept of inheritance with the understanding of early and late binding, usage of exception handling, constructors, destructors, generic programming and type conversions
CO4	Determine the use of various data structures such as stacks, queues and lists to solve various problems in C++ by incorporating OOPS concepts.
CO5	Develop a program in C++ with the concepts of object oriented programming to solve real-v problems.

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 ofcoursecontributedtoeachPSO	15	14	11	15	15	10

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Elective Course: EC1 A: NUMERICAL METHODS

L	T	P	C
4	0	0	3

COURSE OBJECTIVE:

1. To introduce the concept of solving equations using different methods
2. To understand the use of Assignment and Transportation problems

Unit I:

Curve Fitting: Introduction, Method of Least squares, Curve Fitting, Fitting a Straight Line

Unit II:

Solution of Algebraic and Transcendental Equations: Bisection method, Regula Falsi method, Newton Raphson Method

Unit III:

Solution of Simultaneous Linear Equations: Solution of Simultaneous Linear Equations: Gauss Elimination method, Gauss-Jordan method, Gauss Seidel Method, Jacobi's method

Unit IV:

Numerical Differentiation & Integration: Differentiation: Using Newton's Forward Difference, Newton's Backward Difference, Newton's Divided Difference (First Order Differentiation only)

Integration: Using Trapezoidal rule, Simpson's 1/3 & Simpson's 3/8 rules

Unit V:

Solution of Ordinary Differential Equations: Runge-Kutta 2nd Order and4th Order methods, Predictor-Corrector Methods: Milne and Adam's methods.

COURSE OUTCOME:

On successful completion of the course, the learners will be able to

1. Obtain numerical solutions of algebraic and transcendental equations
2. Solve system of linear equations numerically using direct and iterative methods
3. Solve ordinary differential equations
4. Compute integration using Simpson's & Trapezoidal Rule
5. Apply numerical methods in real life problems

CO - PO - PSO Mapping

NUMERICAL METHODS											
CO	PO					PSO					COGNITIVE LEVEL
	1	2	3	4	5	1	2	3	4	5	
CO 1	S	S	S	M	S	S	S	M	S	S	K – 2
CO 2	S	S	M	S	S	S	S	S	S	S	K – 6
CO 3	S	S	M	S	S	S	S	S	S	S	K – 4
CO 4	S	S	M	S	S	S	S	S	S	S	K – 6
CO 5	S	S	M	S	S	S	S	S	S	S	K – 6

Strongly Correlated – S, Moderately Correlated – M, Weekly Correlated - L

TEXT BOOKS

1. B.S. Grewal, "Numerical Methods in Engineering & Science", Khanna Publishers, Fifth Edition, April 1999.

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2. M.K. Venkataraman, “Numerical Methods in Science & Engineering”, National Publishing Co., 2005'

Elective Course: EC1 B: Discrete Mathematics

Subject Code	Subject Name	Category	L	T	P	S	Credits	Marks		
								CIA	External	Total
	DISCRETE MATHEMATICS	Elective	4	-	-	I	3	25	75	100

COURSE OUTCOMES

On Successful completion of the course, the student will be able to

- **CO1: To recall basic concepts for clear understanding of mathematical principles**
- **CO2: To explain practical problems.**
- **CO3: To construct matrices using discrete mathematics**
- **CO4: To analyze techniques to draw graph using mathematics**
- **CO5: To design graphs using the representations**

Unit – I: RELATIONS 12 Hours

Introduction to Relations – Binary relation – Classification of Relations – Composition of Relations – Inverse of Relation – Closure operation on Relations – Matrix representation of Relation - digraphs.

Unit – II: FUNCTIONS 12 Hours

Introduction to Functions – Addition and Multiplication of Functions - Classifications of Functions – Composition of Function – Inverse Function.

Unit – III: MATHEMATICAL LOGIC 12 Hours

Introduction – Statement (Propositions) – Laws of Formal Logic –Basic Set of Logical operators/operations - Propositions and Truth Tables – Algebra Propositions - Tautologies and Contradictions – Logical Equivalence – Logical Implication – Normal Forms.

Unit – IV: MATRIX ALGEBRA 12 Hours

Introduction – Definition of a Matrix - Types of Matrices – Operations on Matrices – Related Matrices – Transpose of a Matrix – Symmetric and Skew-symmetric Matrices – Complex Matrix

– Conjugate of a Matrix – Determinant of a Matrix – Typical Square Matrices – Adjoint and Inverse of a Matrix – Singular and Non-singular Matrices – Adjoint of a Square Matrix – Properties of Adjoint of a Matrix – Properties of Inverse of a Matrix.

Unit – V: GRAPH 12 Hours

Introduction – Graph and Basic Terminologies – Types of Graphs – Sub Graph and Isomorphic Graph – Operations on Graphs – Representation of Graph.

Text Book:

DISCRETE MATHEMATICS, Swapan Kumar Chakraborty and Bikash Kanti Sarkar, OXFORD University Press.

Reference Books:

1. DISCRETE MATHEMATICS, Third Edition, Seymour Lipschutz and Marc Lars Lipson, Tata McGraw Hill Education Private Limited.

2. Discrete Mathematical Structures with Applications to Computer Science by J.P.Tremblay, R.Manohar TMH edition

3. https://www.tutorialspoint.com › discrete_mathematics

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

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

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SEC1: Multimedia Lab

Subject Code	L	T	P	S	Credits	Inst. Hours	Marks		
							CIA	External	Total
	0	0	2	I	2	2	25	75	100

Learning Objectives		
LO1	Understands the basics of multimedia	
LO2	Acquire knowledge of image editing and animation techniques.	
LO3	Apply multimedia concepts to real world projects	
Unit	**Contents**	**No. of Hours**
I	GIMP's Tools- Taking Advantage of Paths - Working with Layers and masks - Using Channels **Exercises:** 1. Enlarge a Logo using path 2. Create an ink drawing using path 3. Replace Background of image using Channels	**6**
II	Manipulating Images: Transforming Images - Using The Image Tools - Adjusting Colors - Working with Text - Painting in Gimp: Creating new brushes - Enhancing Photos - Exploring Filters and Effects. Exercises: 1. Design Front Cover for a Book. 2. Create a customized logo 3. Use clone tool to remove text from an image 4. Remove Red eye using Filter.	**6**
III	Using GIMP animation package - Managing the Frames of Image Sequence with GAP - Morphing - onion skinning - Creating a Storyboard. **Exercises:** 1. Morphing - Create smooth transitions from one image to another. 2. Create a Story board for your project	**6**
IV	Flash: Introduction - Creating and Editing Objects - Color and Text. Animations: Frame- by- frame animation-Motion Tweening- Motion Guides 1. Creating Frame-by-frame Animation 2. Create a Motion Tween for Graphic and Text Object 3. Create a Motion guide Layer	**6**
V	Shape Tweening - Masking - Interactivity: Adding Script to Buttons - Testing and Publishing. **Exercises:** 1. Create a Shape Tween for Graphic Object 2. Create a Mask Layer	**6**

	3. Adding buttons with Action Script	
TOTAL		**30**
CO	Course Outcomes	
CO1	Demonstrate understanding and use of multimedia fundamentals	
CO2	Implement appropriate techniques required for editing images and designing animated system	
CO3	Solve various design and implementation issues materialize on the development of multimedia systems	
CO4	Assess different Photo Editing, Video Editing and animation tools and select the appropriate tool based on the requirements	
CO5	Design and develop Multimedia Projects	
Textbooks		
➢	1. Jason Van Gumster& Robert Shimonski (2010), "GIMP Bible", Wiley, 2nd edition. 2. Chris Gover, 2010, "Flash CS5: The missing Manual", 1st Edition, O" Reilly India.	
Reference Books		
1	Juan Manuel Ferreyra (2011), "GIMP 2.6 Cookbook", PACK publishing Ltd.	
2	Robert Reinhard (2003), "Macromedia Flash MX Bible", Wiley Dreamtech India Pvt Ltd.	
NOTE: Latest Edition of Textbooks May be Used		
Web Resources		
1.	https://www.youtube.com/watch?v=T8NIK3RdoIc (Unit IV: Gimp Video Editing)	
2.	https://www.youtube.com/watch?v=Jz9WrbELGYA	

	PO 1	**PO 2**	**PO 3**	**PO 4**	**PO 5**	**PO 6**	**PO 7**	**PO 8**
CO 1	M	S	M	M	M	M	M	L
CO 2	S	M	S	M	M	M	M	M
CO 3	M	S	S	S	M	L	L	M
CO 4	M	L	M	L	M	L	M	M
CO 5	M	L	M	M	S	S	M	S

Foundation Course FC1

Subject Code	Subject Name	Category	L	T	P	S	Credits	Marks		
								CIA	External	Total
	FUNDAMENTALS OF INFORMATION TECHNOLOGY	FC	2	-	-	I	2	25	75	100

Learning Objectives	
LO1	Understand basic concepts and terminology of information technology.
LO2	Have a basic understanding of personal computers and their operation
LO3	Be able to identify data storage and its usage
LO4	Get great knowledge of software and its functionalities
LO5	Understand about operating system and their uses

UNIT	Contents	No. Of. Hours
I	**Introduction to Computers:** Introduction, Definition, .Characteristics of computer, Evolution of Computer, Block Diagram Of a computer, Generations of Computer, Classification Of Computers, Applications of Computer, Capabilities and limitations of computer	**6**
II	**Basic Computer Organization:** Role of I/O devices in a computer system. Input Units: Keyboard, Terminals and its types. Pointing Devices, Scanners and its types, Voice Recognition Systems, Vision Input System, Touch Screen, Output Units: Monitors and its types. Printers: Impact Printers and its types. Non Impact Printers and its types, Plotters, types of plotters, Sound cards, Speakers.	**6**
III	**Storage Fundamentals:** Primary Vs Secondary Storage, Data storage & retrieval methods. Primary Storage: RAM ROM, PROM, EPROM, EEPROM. Secondary Storage: Magnetic Tapes, Magnetic Disks. Cartridge tape, hard disks, Floppy disks Optical Disks, Compact Disks, Zip Drive, Flash Drives	**6**
IV	**Software:** Software and its needs,Types of S/W. System Software: Operating System, Utility Programs Programming Language: Machine Language, Assembly Language, High Level Language their advantages & disadvantages. Application S/W and its types: Word Processing, Spread Sheets Presentation, Graphics, DBMS	**6**
V	**Operating System:** Functions, Measuring System Performance, Assemblers, Compilers and Interpreters.Batch Processing, Multiprogramming, Multi Tasking, Multiprocessing, Time Sharing, DOS, Windows, Unix/Linux.	**6**
	TOTAL HOURS	**30**

Course Outcomes	**Programme**

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		Outcomes
CO	On completion of this course, students will	
CO1	Learn the basics of computer, Construct the structure of the required things in computer, learn how to use it.	PO1, PO2, PO3, PO4, PO5, PO6
CO2	Develop organizational structure using for the devices present currently under input or output unit.	PO1, PO2, PO3, PO4, PO5, PO6
CO3	Concept of storing data in computer using two header namely RAM and ROM with different types of ROM with advancement in storage basis.	PO1, PO2, PO3, PO4, PO5, PO6
CO4	Work with different software, Write program in the software and applications of software.	PO1, PO2, PO3, PO4, PO5, PO6
CO5	Usage of Operating system in information technology which really acts as a interpreter between software and hardware.	PO1, PO2, PO3, PO4, PO5, PO6
Textbooks		
1	Anoop Mathew, S. Kavitha Murugeshan (2009), " Fundamental of Information Technology", Majestic Books.	
2	Alexis Leon, Mathews Leon," Fundamental of Information Technology", 2nd Edition.	
3	S. K Bansal, "Fundamental of Information Technology".	
Reference Books		
1.	Bhardwaj Sushil Puneet Kumar, "Fundamental of Information Technology"	
2.	GG WILKINSON, "Fundamentals of Information Technology", Wiley-Blackwell	
3.	A Ravichandran , "Fundamentals of Information Technology", Khanna Book Publishing	
Web Resources		
1.	https://testbook.com/learn/computer-fundamentals	
2.	https://www.tutorialsmate.com/2020/04/computer-fundamentals-tutorial.html	
3.	https://www.javatpoint.com/computer-fundamentals-tutorial	
4.	https://www.tutorialspoint.com/computer_fundamentals/index.htm	
5.	https://www.nios.ac.in/media/documents/sec229new/Lesson1.pdf	

Mapping with Programme Outcomes:

CO/PSO	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	3	3	3
CO 3	3	3	3	3	3	3
CO 4	3	3	3	3	2	3
CO 5	3	3	2	3	3	2

Weightage of course contributed to each PSO	15	15	14	15	14	14

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

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SEMESTER II

JAVAPROGRAMMING

Subject Code	L	T	P	S	Credits	Inst. Hours	Marks		
							CIA	External	Total
	5	0	0	II	4	5	25	75	100

Learning Objectives	
LO1	Toprovideknowledgeonfundamentalsofobject-orientedprogramming
LO2	Tohavetheability to use theSDKenvironment tocreate, debugandrun servlet programs

Prerequisites: Basic knowledge about programming concepts

Unit	Contents	No. of Hours
I	FundamentalsofObject-OrientedProgramming:Introduction–ObjectOrientedParadigm–ConceptsofObject–OrientedProgramming–BenefitsofOOP–Evolution:JavaHistory-JavaFeatures-DiffersfromCandC++-OverviewofJavaLanguage:JavaProgram-Structure–Tokens–JavaStatements–JavaVirtualMachine–CommandLineArguments	15
II	Constants,VariablesandDataTypes–OperatorsandExpressions–Decisionmaking andBranching–Looping– Arrays - Strings – Collection Interfaces and classes	15
III	Classes objects and methods: Introduction – Defining a class – Method Declaration –Constructors - Method Overloading – Static Members – Nesting of methods – Inheritance –Overriding– Final variables andmethods– Abstract methodsand classes	15
IV	MultipleInheritance:DefiningInterfaces–ExtendingInterfaces–ImplementingInterfaces – Packages: Creating Packages – Accessing Packages – Using a Package – ManagingErrorsandExceptions- MultithreadedProgramming	15
V	Layout Managers -JDBC – Java Servlet: - Servlet Environment Role – Servlet API –ServletLifeCycle –ServletContext–HTTPSupport–HTMLtoServlet Communication	15
	TOTAL	75

CO	Course Outcomes
CO1	Outline the basic terminologies of OOP, programminglanguage techniques,JDBCandInternetprogrammingconcepts

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CO2	Solve problems using bsic constructs, mechanisms, techniquesandtechnologies ofJava
CO3	Analyseandexplainthebehaviorofsimpleprogramsinvolvingdifferenttechniquessuchas Inheritance, Packages,Interfaces,ExceptionHandlingandThreadandtechnologiessuchasJDBCandServlets
CO4	Assessvariousproblem-solvingstrategiesinvolvedinJavatodevelopa high-level application.
CO5	DesignGUIbasedJDBCapplicationsandabletodevelopServletsusingsuitableOOP concepts and techniques
Textbooks	
	E Balagurusamy(2010), "ProgrammingwithJava", TataMcGrawHill EditionIndia PrivateLtd, 4th Edition
	C Xavier,"JavaProgramming – A Practical Approach", Tata McGrawHill Edition Private Ltd
Reference Books	
	P.Naughton andH.Schildt(1999), "Java2 TheComplete Reference", TMH, 3rdEdition
	Jaison Hunder&WilliamCrawford(2002),"JavaServlet Programming",O'Reilly
	Jim Keogh (2002), "J2EE: TheComplete Reference", Tata McGraw HillEdition.
NOTE: Latest Edition of Textbooks May be Used	
Web Resources	
	http://javabeginnerstutorial.com/core-java/
	http://www.tutorialspoint.com/java/
	http://beginnersbook.com/java-tutorial-for-beginners-with-examples/
	http://www.homeandlearn.co.uk/java/java.html
	http://www.journaldev.com/1877/servlet-tutorial-java(UnitV:ServletAPI)

Mapping with Programme Outcomes:

CO/PSO	PSO 1	PSO 2	PSO 3	PSO 4	PSO 5	PSO 6
CO1	3	2	2	2	2	2
CO2	2	3	2	2	2	2
CO3	2	3	3	3	2	2
CO4	2	3	2	2	2	2
CO5	3	3	2	2	2	2
Weightage ofcoursecontributedto eachPSO	12	14	11	11	10	10

Core Practical

Subject Code	Subject Name	Category	L	T	P	S	Credits	Inst. Hours	Marks		
									CIA	External	Total
CC2 -1	**Java Programming Practical**	Core	-	-	3	II	3	3	25	75	100

Learning Objectives	
LO1	To provide fundamental knowledge of object-oriented programming.
LO2	To equip the student with programming knowledge in Core Java from the basics up.
LO3	To enable the students to know about Event Handling .
LO4	To enable the students to use String Concepts.
LO5	To equip the student with programming knowledge in to create GUI using AWT controls.

EXCERCISE	**Details**
1	Write a Java program that prompts the user for an integer and then prints out all the prime numbers up to that Integer
2	Write a Java program to multiply two given matrices.
3	Write a Java program that displays the number of characters, lines and words in a text
4	Generate random numbers between two given limits using Random class and print messages according to the range of the value generated.
5	Write a program to do String Manipulation using CharacterArray and perform the following string operations: a. String length b. Finding a character at a particular position c. Concatenating two strings
6	Write a program to perform the following string operations using String class: a. String Concatenation b. Search a substring c. To extract substring from given string
7	Write a program to perform string operations using String Buffer class: a. Length of a string b. Reverse a string c. Delete a substring from the given string
8	Write a java program that implements a multi-thread application that has three threads. First thread generates random integer every 1 second and if the value is even, second thread computes the square of the

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

Course Outcomes		**Programme Outcome**
CO	On completion of this course, students will	
1	Understand the basic Object-oriented concepts.Implement the basic constructs of Core Java.	PO1
2	Implement inheritance, packages, interfaces and exception handling of Core Java.	PO1, PO2
3	Implement multi-threading and I/O Streams of Core Java	PO4, PO6
4	Implement AWT and Event handling.	PO4, PO5, PO6
5	Use Swing to create GUI.	PO3, PO6

Text Book

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1	Herbert Schildt, The Complete Reference, Tata McGraw Hill, New Delhi, 7th Edition
2.	Gary Cornell, *Core Java 2 Volume I – Fundamentals,* Addison Wesley, 1999.
Reference Books	
1.	Head First Java, O'Rielly Publications,
2.	Y. Daniel Liang, *Introduction to Java Programming*, 7th Edition, Pearson Education India, 2010.
Web Resources	
1.	https://www.w3schools.com/java/
2.	http://java.sun.com
3.	http://www.afu.com/javafaq.html

Mapping with Programme Outcomes:

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

S-Strong M-Medium L-Low

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	L	T	P	C
EC2: Elective Course 2 A OPTIMIZATION TECHNIQUES	**4**	**0**	**0**	**3**

Course objectives:

1. To apply various optimization techniques for decision making.
2. To introduce the use of variables for formulating complex mathematical models in management, science and industrial applications

Course Outcome:

On successful completion of the course, the learners will be able to CO1. Formulate and solve Linear Programming Problems.

CO2. Analyze the usage of Sequencing Problems.

CO3. Evaluate Queueing Models.

CO4. Apply PERT and CPM techniques to find the optimal solution.

UNIT I **12 hours**

INTRODUCTION-LINEAR PROGRAMMING PROBLEM

The Nature and Meaning of OR – Management – Applications of OR – Modeling in OR – General methods for solving OR models – Scope of OR.

Linear Programming Problem: Formulation of LP problems – Graphical solution of LP problems – General formulation of LPP – Slack and Surplus variables – Standard form of LPP – Some important forms of LPP – Simplex Method I.

UNIT II **12 hours**

ASSIGNMENT PROBLEMS

Assignment Problem: Mathematical formulation–Hungarian method– Unbalanced assignment problem – Various types

UNIT III **12 hours**

TRANSPORTATION PROBLEMS

Transportation Model: Mathematical formulation – Matrix form–Methods for finding Initial Basic Feasible solution and Optimal solution – Degeneracy in Transportation Problems – Unbalanced Transportation Problem.

UNIT IV **12 hours**

SEQUENCING PROBLEMS AND QUEUING MODELS

Sequencing Problems: Assumptions – Solutions to Sequencing Problems: Processing n jobs through 2 machines – Processing n jobs through 3 machines – Processing n jobs on m machines.

Queuing Models: Queuing System – Transient and Steady States– Kendal's Notation for representing Queuing Models – Various Models in Queuing System – Birth and Death Model.

UNIT V **12 hours**

PERT AND CPM TECHNIQUES

PERT and CPM Techniques: Basic Steps – Network Diagram representation– Rules for drawing Network Diagram – Labeling Fulkerson's I–

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J Rule – Time Estimates and Critical Path in Network Analysis – Examples on optimum duration and minimum duration cost – PERT.

CO-PO –PSO Mapping

OPTIMIZATION TECHNIQUES											
CO	PO					PSO					COGNITIVE LEVEL
	1	2	3	4	5	1	2	3	4	5	
CO1	S	S	S	M	S	S	S	M	S	S	K-2
CO2	S	S	M	S	S	S	S	S	S	S	K-1
CO3	S	S	M	S	S	S	S	S	S	S	K-3
CO4	S	S	M	S	S	S	S	S	S	S	K-5
CO5	S	S	M	S	S	S	S	S	S	S	K– 6

Strongly Correlated–S, Moderately Correlated–M, Weekly Correlated-L

TEXT BOOK

S.D.Sharma, "Operations Research", Tenth Edition,Pearson,2017.

REFERENCE BOOKS

1. Hamdy A Taha,"Operations Research", Ninth Edition,2016.
2. V.Sundaresan, K.S.Ganapathy Subramanian, K.Ganesan, "Resource Management Techniques", Ninth Edition, A. R.Publications, 2015.

3. **EC2: Elective Course 2 B**

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Subject Code	Subject Name	Category	L	T	P	S	Credits	Inst. Hours	Marks		
									CIA	External	Total
	Trends in Computing	Elective	4	Y	-	-	3	4	25	75	100

Course Objective	
C1	Learning current trends in various computer science and information technology fields.
C2	Learning various fields of Cloud computing, Green computing ,the Edge and Fog computing technology.
C3	To learn about Architecture and Application design of Cloud, Edge & fog computing.
C4	To know computingandtoimprove security services of computing technologies.
C5	To learn the various Case Studies in Cloud, Edge & fog Computing.

UNIT	Details	No. of Hours
I	**Era of Cloud Computing**: Introduction – Components of Cloud Computing – Cloud Types: Private, Public and Hybrid clouds – Limitations of the Cloud - **Virtualization**: Structure and Mechanisms.	12
II	**Cloud computing Services**: Software as a Service(SaaS) – Platform as a Service(PaaS)- Infrastructure as a Service(IaaS)-Database as a Service(DBaaS)- Recent Trends in cloud computing and Standards- **Data Security in Cloud** – Risks and Challenges with Cloud Data-Security as a Service.	12
III	**Edge Computing:** Edge Computing and Its Essentials: Introduction- Edge Computing Architecture- Advantages and Limitations of Edge ComputingSystems- Edge Computing Interfaces and Devices - Edge Analytics: Edge Data Analytics – Potential of Edge Analytics – Architecture of Edge Analytics – Case study	12
IV	**Edge Data storage Security:** Edge-Based Attack Detection and Prevention-Edge Computing Use Cases and Case Studies: Edge Computing High- Potential Use Cases. **Introductiontogreen computing**–Calculatingcarbonfootprint-**Choosing Green PC path:**A green make over – Buying green computer- ChoosingEarthFriendlyperipherals	12
V	Fog Computing: Introduction to Fog computing – Architecture - Characteristics - Fog Computing Services – Fog Resource Estimation and Its Challenges-Fog computing on 5G networks – Fog computing Use cases and Case studies.	12

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	Total	60
Course Outcomes		**Programme Outcome**
CO	On completion of this course, students will	
1	Outline the concepts, applications, benefits and limitations of various computing paradigms.	PO1
2	Classify the computing technologies based on its architecture and infrastructure and identify its strategies.	PO1, PO2
3	Examinevariouscloudservices, Securitythreatexposurewithinacloudcomputing infrastructure.	PO4, PO6
4	Asses the problems and solutions involved in various stages of different computing environments.	PO4, PO5, PO6
5	Discuss the importance of cloud, edge and Fog technology and implement innovative ideas and practices for regulating green IT.	PO3
Text Book		
1	Kailas Jayaswal,JagannathKallakurchi,DonaldJ.Houde,Dr.Devan Shah " Cloud Computing –Black Book" Edition :2020 (UNIT I & II : CHAPTER 1,2,3,9,11)	
2	K. Anitha Kumari G. Sudha Sadasivam D. Dharani M. Niranjanamurthy, "EDGE COMPUTING Fundamentals, Advances and Applications", First Edition 2022, CRC Press. (UNIT III & IV : CHAPTER 1, 2 , 3, 4,5,6)	
3	Woody Leonhard and Katherine Murray (2009) ,Green Home Computing forDummies,WilleyPublishingInc. (UNIT IV : CHAPTER 2 ,5,6,7)	
4	Evangelos Markakis, George Mastorakis, Constandinos X.Mavromoutakis and Evangelos pallis "Cloud and Fog computing in 5G mobile Networks" ,First edition 2017. (UNIT V: CHAPTER 2)	
Reference Books		
1.	RajKumarBuyya,ChristianVecchiola,S.ThamaraiSelvi,(2013),MasteringCloudComputing,McGraw Hill Education.	
2.	MichaelMiller,(2009), CloudComputing,PearsonEducation.	
3.	Shijun Liu Bedir Tekinerdogan Mikio Aoyama Liang-Jie Zhang" Edge Computing – EDGE " 2018.	
4.	FlavioBonomi, Rodolfo Milito, Jiang Zhu, SateeshAddepalli, ―Fog Computing and Its Role in the Internet of Things‖, MCC'12, August 17, 2012, Helsinki, Finland. Copyright 2012.	
5	Amir M. Rahmani · Pasi Liljeberg Jürgo-Sören Preden "Fog Computing in the Internet of Things"Springer,2018. (UNIT V: PART/CHAPTER (1.4,2.5)	

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Web Resources	
1.	https://static.googleusercontent.com/media/www.google.com/en//green/pdfs/google-green- computing.pdf(CaseStudy)
2.	http://whatiscloud.com/basic_concepts_and_terminology/cloud
3.	http://www.computerweekly.com/guides/Using-green-computing-for-improving-energy- efficiency

4.
5. **Mapping with Programme Outcomes:**

	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8
CO 1	S							
CO 2	S	S						
CO 3				S		S		
CO 4				S	S	S		
CO 5			S					S

6. **S-Strong M-Medium L-Low**

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SEC2: PHP SCRIPTING LAB

Subject Code	L	T	P	S	Credits	Inst. Hours	Marks		
							CIA	External	Total
	0	0	2	II	2	2	25	75	100

Learning Objectives	
LO1	Toenablethestudentstounderstand,analyzeandbuilddynamicwebpagesusingPHP and jQuerywith MySql database

	Contents	No. of Hours
	IntroductiontoPHP:EmbeddingPHP in Web Pages Exercises: 1. Workingwith Forms.	5
	Exercises: 2. StringManipulations 3. Functions 4. Sorting	10
	Exercises: 5. Classes andObjects 6. CookiesandSessions 7. Graphics	10
	Working with MySQL Database: Select data from a single table – Select data from multiple tables- Performing DML operations Exercises: 8. Working with multiple tables	5
	TOTAL	30

CO	Course Outcomes
CO1	Demonstratesimple programsusingPHP
CO2	Applythe interfacesetup,styles&themesforthegiven application
CO3	Analyzetheproblemandaddnecessaryuserinterfacecomponents, multimedia componentsand webdatasourceintothe application
CO4	Evaluatethe resultsbyimplementingthe correcttechniques onthe webform
CO5	Constructwebapplicationswith thefacilitatedcomponentsin PHP

Textbooks	
➢	Kevin Tatroe, Peter MacIntyre, RasmusLerdorf, " Programming PHP",O'Reilly Publications,Third Edition
➢	Joel Murach, Ray Harris (2010), "PHP and MySQL", Shroff Publishers & Distributors
➢	CesarOtero, RobLorsen (2012), "Professional jQuery", John WileySons &Inc

Reference Books

1.	W.Jason Gilmore(2010), "BeginningPHP&MySql",Apress
2.	LarryUllman (2008), "PHP6 and MySQL5", Pearson Education
3.	John Coggeshall(2006), "PHP5",Pearson Education
4.	MichaleC.Glass(2004),"BeginningPHP,Apache, MySQLWebDevelopment",Wiley DreamTechPress
5.	Robin Nixon (2013),"LearningPHP,MySQL, JavaScript &CSS", O'Reilly, 2nd Edition
NOTE: Latest Edition of Textbooks May be Used	
Web Resources	
1.	http://www.w3schools.com/jquery/
2.	http://www.ccc.commnet.edu/faculty/sfreeman/cst%20250/jQueryNotes.pdf
3.	http://www.w3schools.com/php/
4.	http://www.tutorialspoint.com/php/
5.	http://www.tutorialspoint.com/mysql/

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	2	2	3
CO3	3	2	3	2	2	3
CO4	3	2	2	2	2	3
CO5	3	2	2	3	2	2
Weightage ofcoursecontributedtoeachPSO	15	11	11	12	11	13

SEC 3: Skill Enhancement Course

Subject Code	Subject Name	Category	L	T	P	S	Credits	Inst. Hours	Marks		
									CIA	External	Total
	Quantitative Aptitude	Specific Elective	Y	2	-	II	2	2	25	75	100

Course Objective	
C1	To understand the basic concepts of numbers
C2	Understand and apply the concept of percentage, profit & loss
C3	To study the basic concepts of time and work, interests
C4	To learn the concepts of permutation, probability, discounts
C5	To study about the concepts of data representation, graphs

UNIT	**Details**	**No. of Hours**	**Course Objective**
I	Numbers-HCF and LCM of numbers-Decimal fractions-Simplification- Square root and cube roots - Average-problems on Numbers.	6	CO1
II	Problems on Ages - Surds and Indices - percentage - profits and loss - ratio and proportion-partnership-Chain rule.	6	CO2
III	Time and work - pipes and cisterns - Time and Distance - problems on trains -Boats and streams - simple interest - compound interest - Logarithms - Area-Volume and surface area -races and Games of skill.	6	CO3
IV	Permutation and combination-probability-True Discount-Bankers Discount – Height and Distances-Odd man out & Series.	6	CO4
V	Calendar - Clocks - stocks and shares - Data representation - Tabulation – Bar Graphs-Pie charts-Line graphs.	6	CO5
	Total	**60**	

Course Outcomes		**Programme Outcome**
CO	On completion of this course, students will	
1	understand the concepts, application and the problems of numbers	PO1
2	To have basic knowledge and understanding about percentage, profit & loss related processing	PO1, PO2

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3	To understand the concepts of time and work	PO4, PO6
4	Speaks about the concepts of probability, discount	PO4, PO5, PO6
5	Understanding the concept of problem solving involved in stocks & shares, graphs	PO3
Text Book		
1	"Quantitative Aptitude", R.S.AGGARWAL, S. Chand & Company Ltd.,	
Web Resources		
1.	https://www.javatpoint.com/aptitude/quantitative	
2.	https://www.toppr.com/guides/quantitative-aptitude/	

Mapping with Programme Outcomes:

	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8
CO 1	S							
CO 2	M	S						
CO 3				S		S		
CO 4				S	S	M		
CO 5			S					S

S-Strong M-Medium L-Low

MSU

SECOND YEAR –SEMESTER- III

Subject Code	Subject Name	Category	L	T	P	S	Credits	Marks		
								CIA	External	Total
	DATA STRUCTURES AND ALGORITHMS	Core	4	-	-	III	4	25	75	100

Learning Objectives	
LO1	Understand the meaning asymptotic time complexity analysis and various data structures
LO2	To enhancing the problem solving skills and thinking skills
LO3	To write efficient algorithms and Programs
LO4	To make the students learn best practices in C++ programming
LO5	To understand how to handle the files in Data Structure

UNIT	Contents	No. Of. Hours
I	**Arrays and ordered Lists** Abstract data types – asymptotic notations – complexity analysis- Linked lists: Singly linked list – doubly linked lists - Circular linked list, General lists- stacks – Queues	**12**
II	**Trees** Trees – Binary Trees – Binary Tree Traversal – Binary Tree Representations – Binary Search Trees - threaded Binary Trees - Application of trees (Sets).	**12**
III	**Searching and Sorting** Sorting – Bubble Sort, Insertion Sort, Quick Sort, Merge Sort, Selection Sort. Searching – Linear search, Binary search	**12**
IV	**Greedy Method** Greedy Method: Knapsack problem– Job Sequencing with deadlines. **Graphs**Representation of Graphs – Graph implementation – graph Traversals - Minimum Cost Spanning Trees – Shortest Path Problems	**12**
V	**Backtracking**– 8-Queen"s –Graph Colouring – Hamiltonian Cycles – Branch and Bound: Travelling Sales Person Problem	**12**
	TOTAL HOURS	**60**

Course Outcomes		Programme Outcomes
CO	On completion of this course, students will	
CO1	To understand the asymptotic notations and analysis of time and space complexity To understand the concepts of Linked List, Stack and Queue.	PO1, PO2, PO3, PO4, PO5, PO6
CO2	To understand the Concepts of Trees and Graphs Perform traversal operations on Trees and Graphs. To enable the applications of Trees and Graphs.	PO1, PO2, PO3, PO4, PO5, PO6
CO3	To apply searching and sorting techniques	PO1, PO2, PO3, PO4, PO5, PO6

CO4	To understand the concepts of Greedy Method To apply searching techniques.	PO1, PO2, PO3, PO4, PO5, PO6
CO5	Usage of File handlings in python, Concept of reading and writing files, Do programs using files.	PO1, PO2, PO3, PO4, PO5, PO6
Textbooks		
1	Seymour Lipshutz(2011),Schaum‟s Outlines - Data Structures with C, Tata McGraw Hill publications.	
2	Ellis Horowitz and SartajSahni (2010), Fundamentals of Computer Algorithms, Galgotia Publications Pvt., Ltd.	
3	Dr. K. Nagesware Rao, Dr. Shaik Akbar, ImmadiMurali Krishna, Problem Solving and Python Programming(2018)	
Reference Books		
1.	Gregory L.Heileman(1996), Data Structures, Algorithms and Object-Oriented Programming, McGraw Hill International Edition, Singapore.	
2.	A.V.Aho, J.D. Ullman, J.E.Hopcraft(2000). Data Structures and Algorithms, Addison Wesley Publication.	
3.	Ellis Horowitz and SartajSahni, Sanguthevar Rajasekaran (2010), Fundamentals of Computer Algorithms, Galgotia Publications Pvt.Ltd.	
Web Resources		
1.	https://www.tutorialspoint.com/data_structures_algorithms/index.htm	
2.	https://www.programiz.com/dsa	
3.	https://www.geeksforgeeks.org/learn-data-structures-and-algorithms-dsa-tutorial/	

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

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

Subject Code	Subject Name	Category	L	T	P	S	Credits	Marks		
								CIA	External	Total
	DATASTRUCTURES AND ALGORITHMS LAB	**Practical**	-	-	4	III	3	25	75	100

Objectives

To predict the performance of different algorithms in order to guide design decisions, provide theoretical estimation for the required resources of an algorithm to solve a specific computational problem

LIST OF PROGRAMS	**Required Hour**
1. Perform stack operations 2. Perform queue operations 3. Perform binary tree traversal operations 4. Search an element in an array using linear search 5. Search an element in an array using binary search 6. Sort the given set of elements using Merge Sort. 7. Sort the given set of elements using Quick sort. 8. Search the Kth smallest element using Selection Sort 9. Sort the given set of elements using Insertion sort. 10. Find the Optimal solution for the given Knapsack Problem using Greedy Method. 11. Find all possible solution for an N Queen problem using backtracking method 12. Find all possible Hamiltonian Cycle for the given graph using backtracking method	**75**

Course Outcomes

CO	On completion of this course, students will
CO1	To understand the concepts of Linked List, Stack and Queue.
CO2	Concepts of Trees and Graphs. Perform traversal operations on Trees and Graphs. To enable the applications of Trees and Graphs.
CO3	To apply searching and sorting techniques
CO4	To determine the concepts of Greedy Method To apply searching techniques.
CO5	Usage of File handlings in python, Concept of reading and writing files, Do programs using files.

Learning Resources:

- **Recommended Texts**

1. Ellis Horowitz , Sartaj Sahni, Susan Anderson Freed, Second Edition , "Fundamentals of Data in C", Universities Press

2. E. Horowitz, S. Sahni and S. Rajasekaran, Second Edition ,"Fundamentals of Computer Algorithms" Universities Press

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- **Reference Books**

1.Seymour Lipschutz ,"Data Structures with C", First Edition, Schaum's outline series in computers, Tata McGraw Hill.

2.R.Krishnamoorthy,G.Indirani Kumaravel, Data Structures using C, Tata McGrawHill – 2008.

3.A.K.Sharma, Data Structures using C , Pearson Education India,2011.

4. G. Brassard and P. Bratley, "Fundamentals of Algorithms", PHI, New Delhi, 1997.

5. A.V. Aho, J.E. Hopcroft, J.D. Ullmann,, "The design and analysis of Computer Algorithms", Addison Wesley, Boston, 1974

6, Thomas H. Cormen, C.E. Leiserson, R L.Rivest and C. Stein, Introduction to Algorithms, Third edition, MIT Press, 2009

7.Sanjoy Dasgupta, C.Papadimitriou and U.Vazirani , Algorithms , Tata McGraw-Hill, 2008.

Course Outcomes	
CO	On completion of this course, students will
CO1	Implement data structures using C
CO2	Implement various types of linked lists and their applications
CO3	Implement Tree Traversals
CO4	Implement various algorithms in C
CO5	Implement different sorting and searching algorithms

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

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

Subject Code	Subject Name	Category	L	T	P	S	Credits	Inst.	Marks		
									CIA	External	Total
	Computational Intelligence	Elective	4	-	-	-	3	4	25	75	100

Course Objective	
C1	To identify and understand the basics of AI and its search.
C2	To study about the Fuzzy logic systems.
C3	Understand and apply the concepts of Neural Network and its functions.
C4	Understand the concepts of Artifical Neural Network
C5	To study about the Genetic Algorithm.

UNIT	Details	No. of Hours
I	**Introduction to AI**: Problem formulation – AI Applications – Problems – State Space and Search – Production Systems – Breadth First and Depth First – Travelling Salesman Problem – Heuristic search techniques: Generate and Test – Types of Hill Climbing.	12
II	**Fuzzy Logic Systems:** Notion of fuzziness – Operations on fuzzy sets – T-norms and other aggregation operators – Basics of Approximate Reasoning – Compositional Rule of Inference – Fuzzy Rule Based Systems – Schemes of Fuzzification – Inferencing – Defuzzification – Fuzzy Clustering – fuzzy rule-based classifier.	12
III	**Neural Networks:** Learning rules and various activation functions, Single layer Perception Back Propagation networks, Architecture of Backpropagation(BP) Networks, Back propagation Learning -Neural Network,Introduction to Associative Memory, Adaptive Resonance theory and Self Organizing Map,	12
IV	**Artificial Neural Networks:** Fundamental Concepts – Basic Models of Artificial Neural Networks – Important Terminologies of ANNs – McCulloch-Pitts Neuron – Linear Separability – Hebb Network.	12
V	**Genetic Algorithm:** Introduction – Biological Background – Genetic Algorithm Vs Traditional Algorithm – Basic Terminologies in Genetic Algorithm – Simple GA – General Genetic Algorithm – Operators in Genetic Algorithm	12
	Total	**60**

Course Outcomes		**Programme Outcomes**
CO	On completion of this course, students will	
1	Describe the fundamentals of artificial intelligence concepts and searching techniques.	PO1
2	Develop the fuzzy logic sets and membership function and defuzzification techniques.	PO1, PO2

3	Understand the concepts of Neural Network and analyze and apply the learning techniques	PO4, PO6
4	Understand the artificial neural networks and its applications.	PO4, PO5, PO6
5	Understand the concept of Genetic Algorithm and Analyze the optimization problems using GAs.	PO3, PO8
Text Book		
1	S.N. Sivanandam and S.N. Deepa, "Principles of Soft Computing", 2nd Edition, Wiley India Pvt. Ltd.	
2	Stuart Russell and Peter Norvig, "Artificial Intelligence - A Modern Approach", 2nd Edition, Pearson Education in Asia.	
3	S. Rajasekaran, G. A. Vijayalakshmi, "Neural Networks, Fuzzy Logic and Genetic Algorithms: Synthesis & Applications", PHI.	
Reference Books		
1.	F. Martin, Mc neill, and Ellen Thro, "Fuzzy Logic: A Practical approach", AP Professional, 2000. Chin Teng Lin, C. S. George Lee," Neuro-Fuzzy Systems", PHI	
2.	Chin Teng Lin, C. S. George Lee," Neuro-Fuzzy Systems", PHI.	
Web Resources		
1.	https://www.javatpoint.com/artificial-intelligence-tutorial	
2.	https://www.w3schools.com/ai/	

Mapping with Programme Outcomes:

	PO 1	**PO 2**	**PO 3**	**PO 4**	**PO 5**	**PO 6**	**PO 7**	**PO 8**
CO 1	S							
CO 2	M	S						
CO 3				S		S		
CO 4				S	S	M		
CO 5			S					S

S-Strong M-Medium L-Low

Subject Code	Subject Name	Category	L	T	P	S	Credits	Inst. Hours	Marks		
									CIA	External	Total
CC13	**Computer Networks**	Elective	4	-	-	-	3	4	25	75	100

Course Objective	
LO1	To learn the basic concepts of Data communication and Computer network
LO2	To learn about wireless Transmission
LO3	To learn about networking and data link layer.
LO4	To study about Network communication.
LO5	To learn the concept of Transport layer

UNIT	**Contents**	**No. of Hours**
I	Introduction – Network Hardware – Software – Reference Models – OSI and TCP/IP Models – Example Networks: Internet, ATM, Ethernet and Wireless LANs - Physical Layer – Theoretical Basis for Data Communication - Guided Transmission Media	12
II	Wireless Transmission - Communication Satellites – Telephone System: Structure, Local Loop, Trunks and Multiplexing and Switching. Data Link Layer: Design Issues – Error Detection and Correction.	12
III	Elementary Data Link Protocols - Sliding Window Protocols – Data Link Layer in the Internet - Medium Access Layer – Channel Allocation Problem – Multiple Access Protocols – Bluetooth.	12
IV	Network Layer - Design Issues - Routing Algorithms - Congestion Control Algorithms – IP Protocol – IP Addresses – Internet Control Protocols.	12
V	Transport Layer - Services - Connection Management - Addressing, Establishing and Releasing a Connection – Simple Transport Protocol – Internet Transporet Protocols (ITP) - Network Security: Cryptography	12
	Total	**60**

Course Outcomes		**Programme Outcome**
CO	On completion of this course, students will	
CO1	To Understand the basics of Computer Network architecture, OSI and TCP/IP reference models	PO1
CO2	To gain knowledge on Telephone systems using	PO1, PO2

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	wireless network	
CO3	To understand the concept of MAC	PO4, PO6
CO4	To analyze the characteristics of Routing and Congestion control algorithms	PO4, PO5, PO6
CO5	To understand network security and define various protocols such as FTP, HTTP, Telnet, DNS	PO3, PO4
Text Book		
1	A. S. Tanenbaum, "Computer Networks", 4th Edition, Prentice-Hall of India, 2008.	
Reference Books		
1.	B. A. Forouzan, "Data Communications and Networking", Tata McGraw Hill, 4th Edition, 2017	
2.	F. Halsall, "Data Communications, Computer Networks and Open Systems", Pearson Education, 2008	
3.	D. Bertsekas and R. Gallagher, "Data Networks", 2nd Edition, PHI, 2008.	
4.	Lamarca, "Communication Networks", Tata McGraw- Hill, 2002	
Web Resources		
1.	https://en.wikipedia.org/wiki/Computer_network	
2.	https://citationsy.com/styles/computer-networks	

Mapping with Programme Outcomes:

CO/PSO	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6
CO1	**3**	**3**	**2**	**3**	**2**	**3**
CO2	**3**	**2**	**2**	**2**	**2**	**2**
CO3	**3**	**2**	**3**	**3**	**2**	**3**
CO4	**3**	**2**	**2**	**2**	**2**	**2**
CO5	**3**	**2**	**2**	**2**	**2**	**3**
Weightage of course contributed to each PSO	**15**	**11**	**11**	**12**	**10**	**13**

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

CourseCode	**Web Application & Development Lab**		**Credits 2**
LectureHours:(L) perweek	**TutorialHours: (T)perweek**	**LabPractice 2 Hours: (P)perweek**	**Total:(L+T+P) perweek 2**
CourseCategory:	**Year&Semester:**	**AdmissionYear:**	
LearningObjectives: To develop an ability to design and implement static and dynamic website &Choose best technologies for solving web client/server problems			

CourseOutcomes:(forstudents:Toknowwhattheyaregoingtolearn)

CO1: Study and Implement Webpages using Basic and Advanced HTML

CO2: Differentiate between functionalities of Basic CSS and Advanced CSS

CO3: Implement basic JavaScript.

CO4: Program basic functions in JavaScript and XHTML

Units	Contents
I	1. Write a JavaScript to design a simple calculator to perform the following operations: sum, product, difference and quotient. 2. Write a JavaScript that calculates the squares and cubes of the numbers from 0 to 10 and outputs HTML text that displays the resulting values in an HTML table format. 3. Write a JavaScript code that displays text "TEXT-GROWING" with increasing font size in the interval of 100ms in RED COLOR, when the font size reaches 50pt it displays "TEXT-SHRINKING" in BLUE color. Then the font size decreases to 5pt. 4. Develop and demonstrate a HTML5 file that includes JavaScript script that uses functions for the following problems: a. Parameter: A string b. Output: The position in the string of the left-most vowel c. Parameter: A number d. Output: The number with its digits in the reverse order 5. Design an XML document to store information about a student in an engineering college affiliated to VTU. The information must include USN, Name, and Name of the College, Branch, Year of Joining, and email id. Make up sample data for 3 students. Create a CSS style sheet and use it to display the document. 6. Change a Content of webpage using AJAX. Perform Different Operations using JQUERY Selectors. 7. Create a XHTML form with Name, Address Line 1, Address Line 2, and E-mail text fields. On submitting, store the values in MySQL table. Retrieve and display the data based on Name.

SECOND YEAR –SEMESTER- IV

Subject Code	Subject Name	Category	L	T	P	S	Credits	Marks		
								CIA	External	Total
	PYTHON PROGRAMMING	CCI	5	-	-	I	5	25	75	100

Learning Objectives	
LO1	To make students understand the concepts of Python programming.
LO2	To apply the OOPs concept in PYTHON programming.
LO3	To impart knowledge on demand and supply concepts
LO4	To make the students learn best practices in PYTHON programming
LO5	To know the costs and profit maximization

UNIT	Contents	No. of Hours
I	**Basics of Python Programming:** History of Python-Features of Python-Literal-Constants-Variables - Identifiers–Keywords-Built-in Data Types-Output Statements – Input Statements-Comments – Indentation- Operators-Expressions-Type conversions. **Python Arrays:** Defining and Processing Arrays – Array methods.	15
II	**Control Statements:** Selection/Conditional Branching statements: if, if-else, nested if and if-elif-else statements. Iterative Statements: while loop, for loop, else suite in loop and nested loops. **Jump Statements:** break, continue and pass statements**.**	15
III	**Functions:** Function Definition – Function Call – Variable Scope and its Lifetime-Return Statement. **Function Arguments**: Required Arguments, Keyword Arguments, Default Arguments and Variable Length Arguments-Recursion. **Python Strings:** String operations- Immutable Strings - Built-in String Methods and Functions - String Comparison. **Modules**: import statement- The Python module – dir() function – Modules and Namespace – Defining our own modules.	15
IV	**Lists:** Creating a list -Access values in List-Updating values in Lists-Nested lists -Basic list operations-List Methods. Tuples: Creating, Accessing, Updating and Deleting Elements in a tuple – Nested tuples– Difference between lists and tuples. **Dictionaries:** Creating, Accessing, Updating and Deleting Elements in a Dictionary – Dictionary Functions and Methods - Difference between Lists and Dictionaries.	15
V	**Python File Handling:** Types of files in Python - Opening and Closing files-Reading and Writing files: write() and writelines() methods- append() method – read() and readlines() methods – with keyword – Splitting words – File methods - File Positions- Renaming and deleting files.	15

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	TOTAL HOURS	**75**

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

Textbooks

1	Reema Thareja, "Python Programming using problem solving approach", First Edition, 2017, Oxford University Press.
2	Dr. R. Nageswara Rao, "Core Python Programming", First Edition, 2017, Dream tech Publishers.

Reference Books

1.	VamsiKurama, "Python Programming: A Modern Approach", Pearson Education.
2.	Mark Lutz, "Learning Python", Orielly.
3.	Adam Stewarts, "Python Programming", Online.
4.	Fabio Nelli, "Python Data Analytics", APress.
5.	Kenneth A. Lambert, "Fundamentals of Python – First Programs", CENGAGE Publication.

Web Resources

1.	https://www.programiz.com/python-programming
2.	https://www.guru99.com/python-tutorials.html
3.	https://www.w3schools.com/python/python_intro.asp
4.	https://www.geeksforgeeks.org/python-programming-language/
5.	https://en.wikipedia.org/wiki/Python_(programming_language)

Mapping with Programme Outcomes:

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

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

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Subject Code	Subject Name	Category	L	T	P	S	Credits	Marks		
								CIA	External	Total
	PYTHON LAB	**Practical**	-	-	4	4	3	50	50	100

Course Objectives:

1. Be able to design and program Python applications.
2. Be able to create loops and decision statements in Python.
3. Be able to work with functions and pass arguments in Python.
4. Be able to build and package Python modules for reusability.
5. Be able to read and write files in Python.

LAB EXERCISES	Required Hours
1. Program using variables, constants, I/O statements in Python. 2. Program using Operators in Python. 3. Program using Conditional Statements. 4. Program using Loops. 5. Program using Jump Statements. 6. Program using Functions. 7. Program using Recursion. 8. Program using Arrays. 9. Program using Strings. 10. Program using Modules. 11. Program using Lists. 12. Program using Tuples. 13. Program using Dictionaries. 14. Program for File Handling	**60**

Course Outcomes

On completion of this course, students will

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

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Mapping with Programme Outcomes:

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

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

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CourseCode	Image Processing		Credits 3
LectureHours:(L) perweek 4	TutorialHours: (T)perweek	LabPractice Hours: (P)perweek	Total:(L+T+P) perweek 4
CourseCategory:	Year&Semester: II & IV	AdmissionYear:	
Pre-requisite			

LearningObjectives:(forteachers:whattheyhavetodointheclass/lab/field)

- To become familiar with digital image fundamentals
- To get exposed to simple image enhancement techniques in Spatial and Frequency domain.
- To learn concepts of degradation function and restoration techniques.
- To study the image segmentation and representation techniques.
- To become familiar with image compression and recognition methods

Units	Contents	RequiredHours
I	DIGITAL IMAGE FUNDAMENTALS: Steps in Digital Image Processing – Components – Elements of Visual Perception – Image Sensing and Acquisition – Image Sampling and Quantization – Relationships between pixels - Color image fundamentals - RGB, HSI models, Two-dimensional mathematical preliminaries, 2D transforms - DFT, DCT.	12
II	IMAGE ENHANCEMENT: Spatial Domain: Gray level transformations – Histogram processing – Basics of Spatial Filtering– Smoothing and Sharpening Spatial Filtering, Frequency Domain: Introduction to Fourier Transform– Smoothing and Sharpening frequency domain filters – Ideal, Butterworth and Gaussian filters	12
III	IMAGE RESTORATION: Image Restoration - degradation model, Properties, Noise models – Mean Filters – Order Statistics – Adaptive filters – Band reject Filters – Band pass Filters – Notch Filters – Optimum Notch Filtering – Inverse Filtering – Wiener filtering	12
IV	IMAGE SEGMENTATION: Edge detection, Edge linking via Hough transform – Thresholding - Region based segmentation – Region growing – Region splitting and merging – Morphological processing- erosion and dilation, Segmentation by morphological watersheds – basic concepts – Dam construction – Watershed segmentation algorithm.	12
V	IMAGE COMPRESSION AND RECOGNITION: Need for	12

	data compression, Huffman, Run Length Encoding, Shift codes, Arithmetic coding, JPEG standard, MPEG. Boundary representation, Boundary description, Fourier Descriptor, Regional Descriptors – Topological feature, Texture - Patterns and Pattern classes - Recognition based on matching.	

LearningResources:

- **RecommendedTexts**
- **ReferenceBooks**
- **Webresources**

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CourseCode:	Cloud Computing		Credits: 3
LectureHours:(L) perweek 4	TutorialHours: (T)perweek	LabPractice Hours: (P)perweek	Total:(L+T+P) perweek: 4
CourseCategory:Elective	Year&Semester: II Year IV Semester	AdmissionYear:	

LearningObjectives:(forteachers:whattheyhavetodointheclass/lab/field)

- To impart fundamental concepts of Cloud Computing.
- To impart a working knowledge of the various cloud service types and their uses and pitfalls.
- To enable the students to know the common features and differences in the service offerings of the three major Cloud Computing service providers, namely Amazon, Microsoft and Google.
- To provide know-how of the various aspects of application design, benchmarking and security on the Cloud.

CourseOutcomes:(forstudents:Toknowwhattheyaregoingtolearn)

CO1: To understand the concepts and technologies involved in Cloud Computing.

CO2: To understand the concepts of various cloud services and their implementation in the Amazon, Microsoft and Google cloud computing platforms.

CO3: To understand the aspects of application design for the Cloud.

CO4: To understand the concepts involved in benchmarking and security on the Cloud.

CO5: To understand the way in which the cloud is used in various domains.

Units	Contents	RequiredHours
I	**Introduction to Cloud Computing:**Définition of Cloud Computing – Characteristics of Cloud Computing – Cloud Models – Cloud Service Examples – Cloud-based Services and Applications. **Cloud Concepts and Technologies:**Virtualization – Load balancing – Scalability and Elasticity – Deployment – Replication – Monitoring – Software Defined Networking – Network FunctionVirtualization – MapReduce – Identity and Access Management	12
II	**Cloud Services** **ComputeServices:** Amazon Elastic Computer Cloud - Google Compute Engine - Windows Azure Virtual Machines. **Storage Services:** Amazon Simple Storage Service - Google Cloud Storage - Windows Azure Storage **DatabaseServices:** Amazon Relational Data Store - Amazon Dynamo DB - Google Cloud SQL - Google Cloud Data Store - Windows Azure SQL Database - Windows Azure Table Service	12

	Application Services: Application Runtimes and Frameworks - Queuing Services - Email Services - Notifiction Services - Media Services **Content Delivery Services:** Amazon CloudFront - Windows Azure Content Delivery Network **Analytics Services:** Amazon Elastic MapReduce - Google MapReduce Service - Google BigQuery - Windows Azure HDInsight **Deployment and Management Services:** Amazon ElasticBeanstack - Amazon CloudFormation **Identity and Access Management Services:** Amazon Identiy and Access Management - Windows Azure Active Directory **Open Source Private Cloud Software:**CloudStack – Eucalyptus - OpenStack	
III	**Cloud Application Design:** Introduction – Design Consideration for Cloud Applications – Scalability – Reliability and Availability – Security – Maintenance and Upgradation – Performance – Reference Architectures for Cloud Applications – Cloud Application Design Methodologies: Service Oriented Architecture (SOA), Cloud Component Model, IaaS, PaaS and SaaS Services for Cloud Applications, Model View Controller (MVC), RESTful Web Services – Data Storage Approaches: RelationalApproach (SQL), Non-RelationalApproach (NoSQL).	**17**
IV	**Cloud Application Benchmarking and Tuning:**Introduction to Benchmarking – Steps in Benchmarking – WorkloadCharacteristics – Application Performance Metrics – Design Consideration for Benchmarking Methodology – Benchmarking Tools and Types of Tests – DeploymentPrototyping.	**12**
V	**Cloud Security:**Introduction – CSA Cloud Security Architecture – Authentication (SSO) – Authorization – Identity and Access Management – Data Security : Securing data at rest, securing data in motion – Key Management – Auditing. Case Studies : Cloud Computing for Healthcare – Cloud Computing for Energy Systems - Cloud Computing for Transportation Systems	**12**

LearningResources:

- **RecommendedTexts**
  1. Arshdeep Bahga, Vijay Madisetti, *Cloud Computing – A Hands On Approach*, Universities Press (India) Pvt. Ltd., 2018.
- **ReferenceBooks**
  1. Anthony T Velte, Toby J Velte, Robert Elsenpeter, *Cloud Computing: A Practical Approach*, Tata McGraw-Hill, 2013.
  2. Barrie Sosinsky, *Cloud Computing Bible*, Wiley India Pvt. Ltd., 2013.
  3. David Crookes, *Cloud Computing in Easy Steps*, Tata McGraw Hill, 2012.
  4. Dr. Kumar Saurabh, *Cloud Computing*, Wiley India, Second Edition 2012.

Webresources: Web resources from NDL Library, E-content from open-source libraries

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Android Application Development Laboratory

List of Exercises

1. **Create "hello world" application to display "hello world" in the middle of the screen in the emulator as well as android phone**
2. **Create an android app to display various android lifecycle phases**
3. **Create an android app with first activity having edit text and send button. On click of send button, use explicit intent to send the text within edit text to a second activity and displayed within text view**
4. **Create an android app with first activity having edit text and send button. On click of send button, use implicit intent that uses send action, and let user select app from app chooser and navigate to that application.**
5. **Create a calculator app that performs addition, subtraction, division and multiplication operation on numbers.**

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Third Year Semester V

CourseCode: CC9	Software Engineering		Credits: 4
LectureHours:(L) perweek: 5	TutorialHours: (T)perweek	LabPractice Hours: (P)perweek	Total:(L+T+P) perweek: 5
CourseCategory:CC9	Year&Semester: III Year V Semester	AdmissionYear:	

LearningObjectives:(forteachers:whattheyhavetodointheclass/lab/field)

- To understand the software engineering concepts and to create a system model in real life applications

CourseOutcomes:(forstudents:Toknowwhattheyaregoingtolearn)

CO1: Gain basic knowledge of analysis and design of systems

CO2: Ability to apply software engineering principles and techniques

CO3: Model a reliable and cost-effective software system

CO4: Ability to design an effective model of the system

CO5: Perform Testing at various levels and produce an efficient system.

Units	Contents	RequiredHours
I	Introduction: The software engineering discipline, programs vs. software products, why study software engineering, emergence of software engineering, Notable changes in software development practices, computer systems engineering. Software Life Cycle Models: Why use a life cycle model, Classical waterfall model, iterative waterfall model, prototyping model, evolutionary model, spiral model, comparison of different life cycle models.	15
II	**Requirements Analysis and Specification:** Requirements gathering and analysis, Software requirements specification (SRS) **Software Design**: Good software design, cohesion and coupling, neat arrangement, software design approaches, object- oriented vs function-oriented design	15
III	Function-Oriented Software Design: Overview of SA/SD methodology, structured analysis, data flow diagrams (DFD's), structured design, detailed design.	15

	User-Interface design: Characteristics of a good interface; basic concepts; types of user interfaces; component based GUI development, a user interface methodology.	
IV	Coding and Testing: Coding; code review; testing; testing in the large vs testing in the small; unit testing; black-box testing; white-box testing; debugging; program analysis tools; integration testing; system testing; some general issues associated with testing. Software Reliability and Quality Management: Software reliability; statistical testing; software quality; software quality management system; SEI capability maturity model; personal software process.	**15**
V	Computer Aided Software Engineering: CASE and its scope; CASE environment; CASE support in software life cycle; other characteristics of CASE tools; towards second generation CASE tool; architecture of a CASE environment. Software Maintenance: Characteristic of software maintenance; software reverse engineering; software maintenance process models; estimation of maintenance cost;	**15**

LearningResources:

- **RecommendedTexts**
  1. Rajib Mall, Fundamentals of Software Engineering, Fifth Edition, Prentice-Hall of India, 2018
- **ReferenceBooks**
  1. Richard Fairley, Software Engineering Concepts, Tata McGraw-Hill publishing company Ltd, Edition 1997.
  2. Roger S. Pressman, Software Engineering, Seventh Edition, McGraw-Hill.
  3. James A. Senn, Analysis & Design of InformationSystems, Second Edition, McGraw-Hill International Editions.

Webresources: Web resources from NDL Library, E-content from open-source libraries

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MACHINELEARNING

Subject Code	L	T	P	S	Credits	Inst. Hours	Marks		
							CIA	External	Total
	5	0	0	V	4	5	25	75	100

Learning Objectives		
LO1	To comprehend the raw data and to design the same with the appropriate machine learning algorithms for a meaningful representation of data..	
Unit	**Contents**	**No. of Hours**
I	**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.	**15**
II	**Parametric Methods:** Maximum Likelihood Estimation – Evaluating an Estimator: Bias and Variance – The Bayes' Estimator – Parametric Classification – Regression – Tuning Model Complexity: Bias/Variance Dilemma – Model Selection Procedures. **Nonparametric Methods:** Nonparametric Density Estimation – Generalization to Multivariate Data – Nonparametric Classification – Condensed Nearest Neighbor – Distance-Based Classification – Outlier Detection – Nonparametric Regression: Smoothing Models	**15**
III	**Linear Discrimination** – Generalizing the Linear Model – Geometry of the Linear Discriminant – Pairwise Separation – Gradient Descent – Logistic Discrimination – Discrimination by Regression – Learning to Rank. **Multilayer Perceptrons:** The Perceptron – Training a Perceptron – Learning Boolean Functions – Multilayer Perceptrons – MLP as a Universal Approximator – Backpropagation Algorithm	**15**
IV	**Combining Multiple Learners:** Generating Diverse Learners – Model Combination Schemes – Voting – Bagging – Boosting – Stacked Generalization – Fine-Tuning an Ensemble – Cascading Reinforcement Learning: Elements of Reinforcement Learning – Model-Based Learning – Temporal Difference Learning – Generalization – Partially Observable States	**15**
V	**Machine Learning with Python**: Data Pre-processing, Analysis & Visualization - Training Data and Test Data – Techniques – Algorithms: List of Common Machine Learning Algorithms- Decision Tree Algorithm- Naïve Bayes Algorithm - K-Means-Random Forest- Dimensionality Reduction Algorithm- Boosting Algorithms – Applications: Social Media-	**15**

	Refinement of Search Engine Results- Product Recommendations-Detection of Online frauds.	
TOTAL		**75**
CO	**Course Outcomes**	
CO1	Outline the importance of machine learning in terms of designing intelligent machines	
CO2	Identify suitable machine learning techniques for the real time 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		
➢	Ethem Alpaydın, "Introduction to Machine Learning" Third Edition, MIT, 2014. (Unit I – Unit IV)https://www.tutorialspoint.com/machine_learning_with_python/machine_learning_with_python_tutorial.pdf (**Unit V:** Machine learning with python tutorial)	
Reference Books		
	1. Bertt Lantz, "Machine Learning with R," Packt Publishing, 2013	
	2. Jason Bell, "Machine Learning: Hands-On for Developers and Technical Professionals," Wiley Publication, 2015.	
Web Resources		
	1. https://www.expertsystem.com/machine-learning-definition/	
	2. https://searchenterpriseai.techtarget.com/definition/machine-learning-ML	

MSU

Subject Code	Subject Name	Category	L	T	P	S	Credits	Inst. Hours	Marks		
									CIA	External	Total
CC10	**Database Management System**	Core	5	-	-	-	4	5	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

UNIT	Contents	No. of Hours
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	15
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	15

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.	15
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	15
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.	15
	Total	**75**

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	

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Machinelearninglab

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OnSuccessfulcompletionofthecourse,thestudentwillbeableto

CO1:Applytheconceptsandpracticalknowledgeinanalysis,designandDevelopmentofcomputingsystems

CO2:Tomakeuseofapplicationstomultidisciplinaryproblems.CO3:

Todiscusstheknowledgeaboutvariousalgorithms

CO4:TointerprettheknowledgeaboutvariousdatasetsCO5:Developdataframesin MachineLeaning

Exercises

1. Findthe standarddeviationforspeedofa carsusingnumpy
2. Findthepercentileofamarksofstudents
3. DrawthehistogramforNormalDistribution
4. DrawthescatterPlot
5. PolynomialRegression
6. Drawthedecisiontree.
7. CreateTableand insertvaluesusingPythonMySQL
8. Constructthequeryforretrievingrelevantinformationfromthetable PythonMySQL
9. Deletetherecordsfromthetable.
10. Updatethevaluesfromthetable.

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LOCFMAPPING

Coursecodeandtitle:MachinelearningLAB											
CO/PO	PO					PSO					
	1	2	3	4	5	1	2	3	4	5	% of co‘s
CO1	3	2	3	2	2	2	3	3	3	2	2.5
CO2	3	3	2	2	2	3	3	3	2	2	2.5
CO3	2	3	3	2	2	2	3	3	2	2	2.4
CO4	2	2	2	3	3	2	2	3	3	3	2.5
CO5	2	2	3	3	3	2	2	3	3	3	2.6
AverageofCO‘s=2.5(high)											

Stronglycorrelated -3Moderatelycorrelated-2weaklycorrelated-1Nocorrelati

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CourseCode	Mini Project		Credits:4
LectureHours:(L) perweek	TutorialHours: (T)perweek	LabPractice Hours: 4	Total:(L+T+P) perweek:4
CourseCategory:	Year&Semester:	AdmissionYear:	

Units	Contents	RequiredHours
	Students (Individual or maximum three in a group) will take a specific problem with a front-end and back-end (involving Database Management Systems) for the Mini Project and solve it and submit a report. Further each student will participate in regular project review with group project guide / Faculty.	
ExtendedProfessionalComponent(is apartof Internalcomponent only,	Questionsrelatedtotheabovetopics,fromvariouscompetitiveexaminationsUPSC/TRB/NET/UGC–CSIR/GATE/TNPSC/otherstobesolved(Tobediscussedduringthe Tutorialhour) Notto be included in the ExternalExaminationquestion paper	
Skillsacquired	Knowledge,ProblemSolving,Analyticalability,ProfessionalCompetency,ProfessionalCommunicationandTransferrable Skill	

MAPPING TABLE

CO/PSO	PSO 1	PSO 2	PSO 3	PSO 4	PSO 5	PSO 6
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
WeightageofcoursecontributedtoeachPSO	13	12	13	13	13	13

CourseCode	Human – Computer Interaction		Credits 3
LectureHours:(L) perweek 4	TutorialHours: (T)perweek	LabPractice Hours: (P)perweek	Total:(L+T+P) perweek4
CourseCategory: Elective	Year&Semester: III & V	AdmissionYear:	
Pre-requisite			

LearningObjectives:(forteachers:whattheyhavetodointheclass/lab/field)

- To learn the foundations of Human Computer Interaction.
- To become familiar with the design technologies for individuals and persons with disabilities.
- To be aware of mobile HCI.
- To learn the guidelines for user interface

CourseOutcomes:(forstudents:Toknowwhattheyaregoingtolearn)

CO1: Design effective dialog for HCI

CO2: Design effective HCI for individuals and persons with disabilities

CO3:designing multimedia/ ecommerce/ e-learning Web sites

CO4: Assess the importance of user feedback.

Units	Contents	RequiredHours
I	**FOUNDATIONS OF HCI :**The Human: I/O channels – Memory - Reasoning and problem solving; The Computer: Devices – Memory – processing and networks;- Interaction: Models – frameworks – Ergonomics – styles – elements – interactivity- Paradigms	12
II	. **DESIGN & SOFTWARE PROCESS:**Interactive Design:: Basics – process – scenarios - Navigation: screen design Iteration and prototyping- HCI in software process: - Software life cycle – usability engineering – Prototyping in practice – design rationale. Design rules: principles, standards, guidelines, rules. Evaluation Techniques – Universal Design	12
III	**MODELS AND THEORIES:** HCI Models : Cognitive models:- Socio-Organizational issues and stakeholder requirements - Communication and collaboration models- Hypertext, Multimedia and WWW.	12
IV	**Mobile HCI:** Mobile Ecosystem: Platforms, Application	12

	frameworks -Types of Mobile Applications: Widgets, Applications, Games Mobile Information Architecture, Mobile 2.0 - Mobile Design: Elements of Mobile Design, Tools.	
V	**WEB INTERFACE DESIGN: –** Designing Web Interfaces – Drag & Drop, Direct Selection, Contextual Tools, Overlays, Inlays and Virtual Pages, Process Flow -	**12**

LearningResources:

- **RecommendedTexts**
  1. Alan Dix, Janet Finlay, Gregory Abowd, Russell Beale, ”Human -Computer Interaction ”, III Edition, Pearson Education, 2004 (UNIT I, II & III)
  2. . Brian Fling, —”Mobile Design and Development”, I Edition, O‘Reilly Media Inc., 2009 (UNIT – IV)
  3. . Bill Scott and Theresa Neil, —Designing Web Interfaces , First Edition, O‘Reilly, 2009. (UNIT-V)

- **ReferenceBooks**

  1. Shneiderman, “Designing the User Interface: Strategies for Effective Human-Computer Interaction”, V Edition, Pearson Education

- **Webresources**

CourseCode: EC-6	Data Mining and Data Warehousing		Credits:3
LectureHours:(L) perweek: 4	TutorialHours: (T)perweek	LabPractice Hours: (P)perweek	Total:(L+T+P) perweek: 4
CourseCategory:EC-6	Year&Semester:III& V	AdmissionYear:	

LearningObjectives:(forteachers:whattheyhavetodointheclass/lab/field)

- To provide the knowledge on DataMining and Warehousing concepts and techniques.
- Tostudythebasicconceptsofclusteranalysis
- Tostudyasetoftypicalclusteringmethodologies,algorithms,andapplicati ons

CourseOutcomes:(forstudents:Toknowwhattheyaregoingtolearn)

CO1: To understand the basic concepts and the functionality of the various data mining and data warehousing component

CO2: To know the concepts of Data mining system architectures

CO3: To analyse the principles of association rules

CO4: To get analytical idea on Classification and prediction methods.

CO5: To Gain knowledge on Cluster analysis and its methods.

Recap:(notforexamination)Motivation/previouslecture/relevantportionsrequiredforthe course)[Thisisdoneduring2Tutorialhours)

Units	Contents	RequiredHours
I	Introduction: Data mining – Functionalities – Classification – Introduction to Data Warehousing – Data Preprocessing: Preprocessing the Data – Data cleaning – Data Integration and Transformation – Data Reduction	12
II	Data Mining, Primitives, Languages and System Architecture: Data Mining – Primitives – Data Mining Query Language, Architecture of Data mining Systems. Concept Description, Characterization and Comparison: Concept Description, Data Generalization and Summarization,	12

	Analytical Characterization, Mining Class Comparison – Statistical Measures	
III	Mining Association Rules: Basic Concepts – Single Dimensional Boolean Association Rules From Transaction Databases, Multilevel Association Rules from transaction databases – Multi dimension Association Rules from Relational Database and Data Warehouses	**12**
IV	Classification and Prediction: Introduction – Issues – Decision Tree Induction – Bayesian Classification – Classification of Back Propagation. Classification based on Concepts from Association Rule Mining – Other Methods. Prediction – Introduction – Classifier Accuracy.	**12**
V	Cluster Analysis: Introduction – Types of Data in Cluster Analysis, Petitioning Methods – Hierarchical Methods-Density Based Methods – GRID Based Method – Model based Clustering Method	**12**

LearningResources:

- **RecommendedTexts**

  1. Han and M. Kamber, "Data Mining Concepts and Techniques", 2001, Harcourt India Pvt. Ltd, New Delhi.

- **ReferenceBooks**

1. K.P. Soman, Shyam Diwakar, V. Ajay "Insight into Data Mining Theory and Practice ", Prentice Hall of India Pvt. Ltd, New Delhi
2. Parteek Bhatia, 'Data Mining and Data Warehousing: Principles and Practical Techniques',
   Cambridge University Press, 2019

Webresources: Web resources from NDL Library, E-content from open-source libraries

Semester VI

CourseCode	R Programming		Credits 4
LectureHours:(L) perweek 5	TutorialHours: (T)perweek	LabPractice Hours: (P)perweek	Total:(L+T+P) perweek 5
CourseCategory:	Year&Semester:	AdmissionYear:	
Pre-requisite			

LearningObjectives:(forteachers:whattheyhavetodointheclass/lab/field)

- To understand and able to use basic programming concepts
- To automate data analysis, working collaboratively and openly on code
- To know how to generate dynamic documents

CourseOutcomes:(forstudents:Toknowwhattheyaregoingtolearn)

CO1: To understand the problem solving approaches

CO2: To learn the basic programming constructs in R Programming

CO3: To learn the basic programming constructs in R Programming

CO4: To use R Programming data structures - lists, tuples, dictionaries.

CO5: To do input/output with files in R Programming.

Units	Contents	RequiredHours
I	INTRODUCTION -Overview of R, R data types and objects, reading and writing data, sub setting R Objects, Essentials of the R Language, Installing R, Running R, Packages in R, Calculations, Complex numbers in R, Rounding, Arithmetic, Modulo and integer quotients, Variable names and assignment, Operators, Integers, Factors, Logical operations	15
II	CONTROL STRUCTURES AND VECTORS -Control structures, functions, scoping rules, dates and times, Introduction to Functions, preview of Some Important R Data Structures, Vectors, Character Strings, Matrices, Lists, Data Frames,	15

	Classes Vectors: Generating sequences, Vectors and subscripts, Extracting elements of a vector using subscripts, Working with logical subscripts, Scalars, Vectors, Arrays, and Matrices, Adding and Deleting Vector Elements, Obtaining the Length of a Vector, Matrices and Arrays as Vectors Vector Arithmetic and Logical Operations, Vector Indexing, Common Vector Operations	
III	LISTS- Lists: Creating Lists, General List Operations, List Indexing Adding and Deleting List Elements, Getting the Size of a List, Extended Example: Text Concordance Accessing List Components and Values Applying Functions to Lists, Data Frames, Creating Data Frames, Accessing Data Frames, Other Matrix-Like Operations	**15**
IV	FACTORS AND TABLES - Factors and Levels, Common Functions Used with Factors, Working with Tables, Matrix/Array-Like Operations on Tables , Extracting a Sub table, Finding the Largest Cells in a Table, Math Functions, Calculating a Probability, Cumulative Sums and Products, Minima and Maxima, Calculus, Functions for Statistical Distributions R PROGRAMMING	**15**
V	OBJECT-ORIENTED PROGRAMMING S Classes, S Generic Functions, Writing S Classes, Using Inheritance, S Classes, Writing S Classes, Implementing a Generic Function on an S Class, visualization, Simulation, code profiling, Statistical Analysis with R, data manipulation	**15**

LearningResources:

- **RecommendedTexts**
  1. Roger D. Peng," R Programming for Data Science ", 2012
  2. Norman Matloff,"The Art of R Programming- A Tour of Statistical Software Design", 2011
- **ReferenceBooks**

1. Garrett Grolemund, Hadley Wickham,"Hands-On Programming with R: Write Your Own Functions and Simulations" , 1st Edition, 2014

2. Venables ,W.N.,andRipley,"S programming", Springer, 2000.

- **Webresources**

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CourseCode	Simulation and Modeling		Credits 4
LectureHours:(L) perweek 5	TutorialHours: (T)perweek	LabPractice Hours: (P)perweek	Total:(L+T+P) perweek 5
CourseCategory:	Year&Semester:	AdmissionYear:	
Pre-requisite			

LearningObjectives:(forteachers:whattheyhavetodointheclass/lab/field)

In this course, modeling and simulation (M&S) methodologies considering the theoretical aspects. A wide range of Modeling and Simulation concepts that will lead you to develop your own M&S applications. Students learn the methodologies and tools for simulation and modeling of a real time problem/ mathematical model.

CourseOutcomes:(forstudents:Toknowwhattheyaregoingtolearn)

CO1: Introduction To Modeling & Simulation, Input Data Analysis and Modeling.

CO2: Random Variate and Number Generation. Analysis of Simulations and methods.

CO3: Comparing Systems via Simulation

CO4: Entity Body Modeling, Visualization, Animation.

CO5: Algorithms and Sensor Modeling.

Recap:(notforexamination)Motivation/previouslecture/relevantportionsrequiredforthe course)[Thisisdoneduring2Tutorialhours)

Units	Contents	RequiredHours
I	Introduction To Modeling & Simulation – What is Modeling and Simulation? – Complexity Types – Model Types – Simulation Types – M&S Terms and Definitions Input Data Analysis – Simulation Input Modeling – Input Data Collection - Data Collection Problems - – Input Modeling Strategy - Histograms -Probability Distributions - Selecting a Probability Distribution.	15
II	Random Variate Generation – Random Numbers – Random Number Generators – General principles – Inverse Transform Method –Acceptance Rejection Method – Composition Method –Relocate and Rescale Method - Specific distributions-Output Data Analysis – Introduction - Types of Simulation With Respect to Output Analysis - Stochastic Process and Sample Path - Sampling and Systematic Errors - Mean, Standard Deviation and Confidence Interval - Analysis of Finite-Horizon Simulations - Single Run - Independent Replications - Sequential	15

	Estimation – Analysis of Steady-State Simulations - Removal of Initialization Bias (Warm-up Interval) - Replication-Deletion Approach - Batch-Means Method .	
III	Comparing Systems via Simulation – Introduction – Comparison Problems - Comparing Two Systems - Screening Problems - Selecting the Best - Comparison with a Standard - Comparison with a Fixed Performance Discrete Event Simulations – Introduction - Next-Event Time Advance - Arithmetic and Logical Relationships - Discrete-Event Modeling Approaches – Event-Scheduling Approach – Process Interaction Approach	**15**
IV	Entity Modeling – Entity Body Modeling – Entity Body Visualization – Entity Body Animation – Entity Interaction Modeling – Building Modeling Distributed Simulation – High Level Architecture (HLA) – Federation Development and Execution Process (FEDEP) – SISO RPR FOM Behavior Modeling – General AI Algorithms - Decision Trees - Neural Networks - Finite State Machines - Logic Programming - Production Systems – Path Planning - Off-Line Path Planning - Incremental Path Planning - Real-Time Path Planning – Script Programming -Script Parsing - Script Execution.	**15**
V	Optimization Algorithms – Genetic Algorithms – Simulated Annealing Examples: Sensor Systems Modeling – Human Eye Modeling – Optical Sensor Modeling – Radar Modeling.	**15**

LearningResources:

- **RecommendedTexts**

1. Jerry Banks, "Handbook of Simulation: Principles, Methodology, Advances, Applications, and Practice", John Wiley & Sons, Inc., 1998.

2. George S. Fishman, "Discrete-Event Simulation: Modeling, Programming and Analysis", Springer-Verlag New York, Inc., 2001.

- **ReferenceBooks**

1. Andrew F. Seila, Vlatko Ceric, Pandu Tadikamalla, "Applied Simulation Modeling", Thomson Learning Inc., 2003.

- **Webresources**

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CourseCode	R Programming Laboratory		Credits 4
LectureHours:(L) perweek	TutorialHours: (T)perweek	LabPractice 4 Hours: (P)perweek	Total:(L+T+P) perweek
CourseCategory:	Year&Semester:	AdmissionYear:	
Pre-requisite			

LearningObjectives:(forteachers:whattheyhavetodointheclass/lab/field)

- Acquire programming skills in core R Programming
- Acquire Object-oriented programming skills in R Programming.
- Develop the skill of designing graphical-user interfaces (GUI) in R Programming
- Acquire R Programming skills to move into specific branches

CourseOutcomes:(forstudents:Toknowwhattheyaregoingtolearn)

CO1: To understand the problem solving approaches

CO2: To learn the basic programming constructs in R Programming

CO3: To practice various computing strategies for R Programming -based solutions to real world problems

CO4: To use R Programming data structures - lists, tuples, dictionaries.

CO5: To do input/output with files in R Programming

LIST OF EXERCISES:

1. Program to convert the given temperature from Fahrenheit to Celsius and vice versa depending upon user's choice.
2. Program, to find the area of rectangle, square, circle and triangle by accepting suitable input parameters from user.
3. Write a program to find list of even numbers from 1 to n using R-Loops.
4. Create a function to print squares of numbers in sequence.
5. Write a program to join columns and rows in a data frame using cbind() and rbind() in R.
6. Implement different String Manipulation functions in R.
7. Implement different data structures in R (Vectors, Lists, Data Frames)
8. Write a program to read a csv file and analyze the data in the file in R.
9. Create pie chart and bar chart using R.
10. Create a data set and do statistical analysis on the data using R.
11. Program to find factorial of the given number using recursive function
12. Write R program to count the number of even and odd numbers from array of N numbers

CourseCode	**Project**		**Credits:4**
LectureHours:(L) Perweek	**TutorialHours: (T)perweek**	**LabPractice Hours: 6**	**Total:(L+T+P) perweek:6**
CourseCategory:	**Year&Semester:**	**AdmissionYear:**	

Units	Contents	RequiredHours
	Students (Individual or maximum three in a group) will take a specific problem for the Project and solve it using any one of latest tool and submit a report. Further each student will participate in regular project review with group project guide / Faculty.	
ExtendedProfessionalComponent(is apartof Internalcomponent only,	Questionsrelatedtotheabovetopics,fromvariouscompetitiveexaminationsUPSC/TRB/NET/UGC–CSIR/GATE/TNPSC/otherstobesolved(TobediscussedduringtheTutorialhour) Notto be included inthe ExternalExaminationquestion paper	
Skillsacquired	Knowledge,ProblemSolving,Analyticalability,ProfessionalCompetency,ProfessionalCommunicationandTransferrable Skill	

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CourseCode	Robotics and Its Applications		Credits 3
LectureHours:(L) perweek 4	TutorialHours: (T)perweek	LabPractice Hours: (P)perweek	Total:(L+T+P) perweek 4
CourseCategory:	Year&Semester:	AdmissionYear:	

LearningObjectives:

- To make the students familiar with the various drive systems of robots, sensors and their applications in robots
- To introduce the parts of robots, basic working concepts and types of robots

CourseOutcomes:(forstudents:Toknowwhattheyaregoingtolearn)

CO1:Describe the different physical forms of robot architectures

CO2: Kinematically model simple manipulator and mobile robots

CO3:Mathematically describe a kinematic robot system.

CO4: Analyze manipulation and navigation problems using knowledge of coordinate frames, kinematics, optimization, control, and uncertainty.

CO5:Program robotics algorithms related to kinematics, control, optimization, and uncertainty.

Units	Contents	RequiredHours
I	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.	12
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	12

	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	
III	Localization:Self-localizations and mapping - Challenges in localizations – IR based localizations – vision based localizations – Ultrasonic based localizations - GPS localization systems.	12
IV	Path Planning :Introduction, path planning-overview-road map path planning-cell decomposition path planningpotential field path 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	12
V	Application : Ariel robots-collision avoidance robots for agriculture-mining-exploration-underwater-civilian- and military applications-nuclear applications-space applications-Industrial robots-artificial intelligence in robots-application of robots in material handling-continuous arc welding-spot welding-spray painting-assembly operation-cleaning-etc.	12

ExtendedProfessionalComponent(is apartof Internalcomponent only,	**Questionsrelatedtotheabovetopics,fromvariouscompetitiveexaminationsUPSC/TRB/NET/UGC–CSIR/GATE/TNPSC/otherstobesolved(TobediscusseduringtheTutorialhour)** **Notto be included inthe ExternalExaminationquestion paper**	
Skillsacquired	**Knowledge,ProblemSolving,Analyticalability,ProfessionalCompetency,ProfessionalCommunicationandTransferrable Skill**	

LearningResources:

- **RecommendedTexts**
  1. **RicharedD.Klafter. Thomas Achmielewski and MickaelNegin, Robotic Engineering and Integrated Approach, Prentice Hall India-Newdelhi-2001**
  2. **SaeedB.Nikku, Introduction to robotics, analysis, control and applications, Wiley-India, 2 nd edition 2011**
- **ReferenceBooks**
  1. Industrial robotic technology-programming and application by M.P.Groover et.al, McGrawhill2008
  2. Robotics technology and flexible automation by S.R.Deb, THH-2009
- **Webresources**

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Subject Code	Subject Name	Category	L	T	P	S	Credits	Inst. Hours	Marks		
									CIA	External	Total
	Pattern Recognition	Specific Elective	Y	-	-	-	2	2	75	25	100

Course Objective	
CO1	To learn the fundamentals of Pattern Recognition techniques
CO2	To learn the various Statistical Pattern recognition techniques
CO3	To learn the linear discriminant functions and unsupervised learning and clustering
CO4	To learn the various Syntactical Pattern recognition techniques
CO5	To learn the Neural Pattern recognition techniques

UNIT	Details	No. of Hours	Course Objective
I	PATTERN RECOGNITION OVERVIEW: Pattern recognition, Classification and Description-Patterns and feature Extraction with Examples-Training and Learning in PR systems-Pattern recognition Approaches	6	CO1
II	STATISTICAL PATTERN RECOGNITION: Introduction to statistical Pattern Recognition-supervised Learning using Parametric and Non-Parametric Approaches.	6	CO2
III	LINEAR DISCRIMINANT FUNCTIONS AND UNSUPERVISED LEARNING AND CLUSTERING: Introduction-Discrete and binary Classification Problems-Techniques to directly Obtain linear Classifiers - Formulation of Unsupervised Learning Problems-Clustering for unsupervised learning and classification	6	CO3
IV	SYNTACTIC PATTERN RECOGNITION: Overview of Syntactic Pattern Recognition-Syntactic recognition via parsing and other grammars–Graphical Approaches to syntactic pattern recognition-Learning via grammatical inference.	6	CO4
V	NEURAL PATTERN RECOGNITION: Introduction to Neural Networks-Feedforward Networks and training	6	CO5

	by Back Propagation-Content Addressable Memory Approaches and Unsupervised Learning in Neural PR		
	Total		

Course Outcomes		**Programme Outcomes**
CO	On completion of this course, students will	
1	understand the concepts, importance, application and the process of developing Pattern recognition over view	PO1
2	to have basic knowledge and understanding about parametric and non-parametric related concepts.	PO1, PO2
3	To understand the framework of frames and bit images to animations	PO4, PO6
4	Speaks about the multimedia projects and stages of requirement in phases of project.	PO4, PO5, PO6
5	Understanding the concept of cost involved in multimedia planning, designing, and producing	PO3, PO8

Text Book	
1	Robert Schalkoff, "Pattern Recognition: Statistical Structural and Neural Approaches", John wiley& sons.
2	Duda R.O., P.E.Hart& D.G Stork, " Pattern Classification", 2nd Edition, J.Wiley.
3	Duda R.O.& Hart P.E., "Pattern Classification and Scene Analysis", J.wiley.
4	Bishop C.M., "Neural Networks for Pattern Recognition", Oxford University Press.
Reference Books	
1.	1. Earl Gose, Richard johnsonbaugh, Steve Jost, "Pattern Recognition and Image Analysis", Prentice Hall of India, Pvt Ltd, New Delhi.
Web Resources	
1.	https://www.geeksforgeeks.org/pattern-recognition-introduction/
2.	https://www.mygreatlearning.com/blog/pattern-recognition-machine-learning/

Mapping with Programme Outcomes:

	PO 1	**PO 2**	**PO 3**	**PO 4**	**PO 5**	**PO 6**	**PO 7**	**PO 8**
CO 1	S							

CO 2	M	S						
CO 3				S		S		
CO 4				S	S	M		
CO 5			S					S

S-Strong M-Medium L-Low

MSU

CourseCode:	Cyber Security		Credits: 3
LectureHours:(L) perweek:4	TutorialHours: (T)perweek	LabPractice Hours: (P)perweek	Total:(L+T+P) perweek: 4
CourseCategory:Elective	Year&Semester:III&VI	AdmissionYear:	

LearningObjectives:

- Understand various block cipher and stream cipher models
- Describe the principles of public key cryptosystems, hash functions and digital signature
- To get a firm knowledge on Cyber Security Essentials

CourseOutcomes:(forstudents:Toknowwhattheyaregoingtolearn)

CO1: Implement basic security algorithms required by any computing system

CO2: Analyze the vulnerabilities in computing system and to design a security solution

CO3: Analyze the possible security attacks in complex real time systems and their effective countermeasures

CO4: Differentiate various governing bodies of cyber laws

CO5: Impart various privacy policies for an organization

Units	Contents	RequiredHours
I	**Introduction to Security:** Data Encryption Standard-Block cipher principles-block cipher modes of operation-Advanced Encryption Standard (AES)-Triple DES-Blowfish-RC5 algorithm.	12
II	**Public Key Cryptography and Hash Algorithms**Principles of public key cryptosystems-The RSA algorithm-Key management - Diffie Hellman Key exchange- Hash functions-Hash Algorithms (MD5, Secure Hash Algorithm	12
III	**Fundamentals of Cyber Security:** How Hackers Cover Their Tracks- Fraud Techniques- Threat Infrastructure-Techniques to Gain a Foothold (Shellcode, SQL Injection,	12

	Malicious PDF Files)- Misdirection, Reconnaissance, and Disruption Methods.	
IV	**Planning for Cyber Security:** Privacy Concepts -Privacy Principles and Policies -Authentication and Privacy - Data Mining - Privacy on the Web - Email Security	**12**
V	**Cyber Security Management:** Security Planning - Business Continuity Planning - Handling Incidents - Risk Analysis - Dealing with Disaster – Legal Issues – Protecting programs and Data – Information and the law – Rights of Employees and Employers - Emerging Technologies - The Internet of Things - Cyber Warfare.	**12**

LearningResources:

- **RecommendedTexts**

. 1. William Stallings, "Cryptography and Network Security", Pearson Education, 6th Edition,2013.

2. Charles P. Pfleeger Shari Lawrence Pfleeger Jonathan Margulies, Security in Computing, 5th Edition , Pearson Education , 2015.

- **ReferenceBooks**

1. Graham, J. Howard, R., Olson, R., Cyber Security Essentials, CRC Press, 2011.

2. George K.Kostopoulous, Cyber Space and Cyber Security, CRC Press, 2013.

Webresources: Web resources from NDL Library, E-content from open-source libraries

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CourseCode	Fuzzy Logic		Credits
LectureHours:(L) perweek	TutorialHours: (T)perweek	LabPractice Hours: (P)perweek	Total:(L+T+P) perweek
CourseCategory:	Year&Semester:	AdmissionYear:	
Pre-requisite			

LearningObjectives:(forteachers:whattheyhavetodointheclass/lab/field)
The objective of this course is to teach the fundamentals of fuzzy sets, relations and the various fuzzification and defuzzification methods.

CourseOutcomes:(forstudents:Toknowwhattheyaregoingtolearn)

CO1: Understand the basics of Fuzzy sets, operation and properties.

CO2: Apply Cartesian product and composition on Fuzzy relations and usethe tolerance and Equivalence relations

CO3: Analyze various fuzzification methods and features of membership Functions.

CO4: Evaluate defuzzification methods for real time applications.

CO5: Design an application using Fuzzy logic and its Relations.

Recap:(notforexamination)Motivation/previouslecture/relevantportionsrequiredforthe course)[Thisisdoneduring2Tutorialhours)

Units	Contents	RequiredHours
I	Introduction to Fuzzy Logic- Fuzzy Sets- Fuzzy Set Operations, Properties of Fuzzy Sets, Classical and Fuzzy Relations: Introduction-Cartesian Product of Relation-Classical Relations-Cardinality of Crisp Relation.	12
II	Operations on Crisp Relation-Properties of Crisp Relations-Composition Fuzzy Relations, Cardinality of Fuzzy Relations-Operations on Fuzzy Relations-Properties of Fuzzy Relations-Fuzzy Cartesian Product and Composition-Tolerance and Equivalence Relations,Crisp Relation.	12
III	Membership Functions: Introduction, Features of Membership Function, Classification of Fuzzy Sets,	12

	Fuzzification, Membership Value Assignments, Intuition, Inference, Rank Ordering.	
IV	Defuzzification: Introduction, Lambda Cuts for Fuzzy Sets, Lambda Cuts for Fuzzy Relations, Defuzzification Methods, Fuzzy Rule-Based System: Introduction, Formation of Rules, Decomposition of Rules, Aggregation of Fuzzy Rules, Properties of Set of Rules.	**12**
V	Applications of Fuzzy Logic: Fuzzy Logic in Automotive Applications, Fuzzy Antilock Brake System-Antilock-Braking System and Vehicle Speed-Estimation Using Fuzzy Logic.	**12**

LearningResources:

- **RecommendedTexts**

  1. S. N. Sivanandam, S. Sumathi and S. N. Deepa-Introduction to Fuzzy Logic using MATLAB, Springer-Verlag Berlin Heidelberg 2007

- **ReferenceBooks**

  1. Guanrong Chen and Trung Tat Pham- Introduction to Fuzzy Sets, Fuzzy Logic and Fuzzy Control Systems
  2. Timothy J Ross , Fuzzy Logic with Engineering Applications

- **Webresources**

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Students who couldn't appear for Naan Muthalvan Course in a particular semester or who have failed in Naan Muthalvan Course should write the following papers (External – 100 marks)

Semester	Title of the Paper
II	Soft Skills for Employability
III	Digital Skills for Employability – Office Fundamentals
IV	Web Design using HTML
V	Internet Basics
VI	C Programming

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Soft Skills for Employability

Unit-I: The Verbs -. Sentence Structure

Unit-II: Comprehension - Spotting Errors

Unit-III: Letter Writing – Formal - Curriculum Vitae

Unit-IV: Report Writing - Job Interview

Unit-V: Functional Communication - Group Discussion

Texts Prescribed:

T.M. Farhathullah&D.S.Kesava Rao: Strengthen Your English for competitive Examinations. Emerald Publishers, Chennai

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Digital Skills for Employability – Office Fundamentals

Unit I:

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

Unit II:

Spreadsheets : Excel–opening, entering text and data, formatting, navigating; Formulas–entering, handling and copying; Charts–creating, formatting and printing

Unit III:

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.

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 driven applications in query language (MS–Access).

Unit V:

Microsoft Access –Creating Tables — Creating database - Creating a Table – Working onTables – Saving the Table – Defining primary Key – Closing the Table – Closing the Databasewindow

Text Book:

1. Jennifer Ackerman Kettel, Guy Hat-Davis, Curt Simmons, “Microsoft 2003”, Tata McGrawHill.
2. VIKAS GUPTA, “Comdex Computer Course Kit (XP Edition)”, Dreametech press, New Delhi.

References:

1. Stephen L. Nelson, “The Complete Reference office 2000” Tata McGraw – Hill Publishing Company limited, New Delhi.
2. N.Krishnan, “Window and MS Office 2000 with Database Concepts” Scitech publications (India) Pvt Ltd., Chennai

https://www.udemy.com/course/office-automation-certificate-course/
https://www.javatpoint.com/automation-tools

Web Design using HTML

Unit I: Introduction to HTML: Designing a Home page – History of HTML – HTML generations – HTML tags

Unit II:HTML Documents-Anchor tag –Hyper links –Sample HTML documents -Designing a web page

Unit III: Head and Body section: Header Section –Title-Prologue-Links-Colorful web page –Comments lines Designing the body: Heading printing

Unit IV: Aligning the headings-Horizontal rule- paragraph-Tab settings-Image and pictures-Embedding PNG format Images.

Unit V: Ordered and unordered lists: List-Unordered lists- headings in a list – ordered lists- Nested lists.

Text Book:
World Wide Web Design with HTML, C. Xavier, TMH, 2001

Reference Book:
1. Internet & World Wide Web, H.M.Deital, P.J.Deital&A.B.Goldberg, Pearson Education
2. Fundamentals of information technology, Mathew's lenon and Alxis leon, Vijay Nicole private limited, Chennai.

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Internet Basics

Unit I

The Internet: Introduction – From Computers to the Internet - Advantages of the
Internet – Major Internet Services – Hardware and Software for the Internet -
– TCP/IP - The Protocols of the Internet.World Wide Web: Architecture of the World Wide Web –Types of websites – Uniform Resource Locator – Domain Name System – Web Pages andWeb Links – Visiting Web Pages — Searching the Web – Google& Chrome Search Engines.

Unit II

Types of Internet Accounts – Selecting Internet Service Providers –Electronic Mail: Advantages of E-mails – E-mail addresses – Mail transfer protocols – Working of E-mail system.

Hosting and Promoting Websites: Structure of Websites – Web Development tools – Hosting Websites –Getting a Domain /name – Visitor Analysis and Statistics – Website Promoting methods.

Unit III

Electronic Commerce: E-Business and E-Commerce – Types of business in the internet– M-Commerce - Marketing Strategies on the Web – Making Payments in Virtual Stores –Shopping in Virtual Stores –Cookies and E-Commerce – Major issues of E-commerce andM-Commerce

Unit IV

Blogs and Social Networking: Blogs – Uses of Blogs – Blogs System Components –Steps for Blogging – Building a Blog site – Social Networking – Etiquette in networkingsites.

Unit V

Internet Security: Importance of Internet Security – Internet Threats – Identity theftand Cybersquatting – Hacking – Spamming and Spoofing – Phishing and Pharming – Denialof Service – spyware – Viruses and worms- Security solutions – Firewalls and IntrusionPrevention Systems –Internet Security Precautions- The Information Technology Act.

Text Book:

The Internet A User's Guide Second Edition by K.L. James – PHI Learning Private LimitedReference Books:

1. Internet, World Wide Web, How to program, 4th Edition, Paul Deital, Harvey M Deitel,Pearson
2. Learning Internet & Email, 4th Revised Rdition, Ramesh Bangia, Khanna Book PublishingCo Pvt Ltd.
3. Internet & Ecommerce, C. Nellai Kannan, NELS Publications.

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Programming in C

Objective: To obtain knowledge about the structure of the programming language C and to develop the program writing and logical thinking skill.

Unit – I: INTRODUCTION C Declarations:- Character Set – C tokens – Keywords and Identifiers – Identifiers – Constants – Variables – Data types – Declaration of Variables –Assigning Values to Variables
Operators and Expressions:- Introduction – Arithmetic Operators – Relational Operators – Logical Operators – Assignment Operators – Increment and Decrement Operators – Conditional Operator – Bitwise Operators – Special Operators
Input and Output Operations:-getchar( ) – putchar( ) – scanf( ) – printf( ).

Unit – II: CONTROL STRUCTURES Decision Making and Branching:- Decision Making with IF Statement – Simple IF statement – The IF…Else Statement – Nesting of IF…Else Statements – The ELSE IF ladder – The Switch Statement – The ?: Operator – The GOTO statement.

Unit – III: Decision Making and Looping:- The WHILE Statement – The DO Statement – The FOR statement.
ARRAYS One-dimensional arrays – Declaration of One-dimensional arrays – Initialization of One dimensional arrays - Two-dimensional arrays – Initialization of Two-dimensional arrays

Unit – IV: Character Arrays and Strings:- Declaring and Initializing String Variables – Reading Strings from Terminal – Writing Strings to Screen – String Handling Functions.

Unit V: FUNCTIONS User-Definedfunctions:- Need for User-defined functions – Definition of functions – Return Values and their Types – Function Calls – Function Declaration
The Scope, Visibility and lifetime of a variables. Structures and Unions:-

Text Book :
Programming in ANSI C – 6 th Edition by E Balagurusamy – Tata McGraw Hill Publishing Company Limited.

Reference Books:
1. Computer System and Programming in C by Manish Varhney, Naha Singh – CBS Publishers and Distributors Pvt Ltd.

2. Introduction to Computer Science, ITL Education Solutions Limited, Second Edition, Pearson Education
3. Computer Basics and C Programming by V. Rajaraman – PHI Learning Private Limited 4. Programming with C, Third Edition, Byron S Gottfried, Tata McGraw Hill Education Private Limited.

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