CHOICE BASED CREDIT SYSTEM - LEARNING OUTCOMES-BASED CURRICULUM FRAMEWORK

M.Sc Computer Science

Those who have joined in the Academic year 2023-24 onwards

1. **Preamble**

ToDevelopthe PostGraduates in **Computer Science** withdeepknowledgeoftheoreticalComputerSciencesubjectswhocanbemployedinresearchanddevelopmentunitsofindustriesandacademicinstitutions.

2. *GeneralGraduateAttributes*

GA1:ApplyMathematicalKnowledge

Graduateswillbeabletoapply mathematics, andstatisticstothedesignanddevelopmentofsoftwaresystems.

GA2: DevelopSoftwaresbased onSoftware Engineering principles

Graduateswillbeabletodesignanddevelopcomputersoftwaresystems based on the acquiredknowledge in ProgrammingLanguages and based on Software Engineering.

GA3:DevelopResearchskills

Graduateswillbeabletoexhibittheresearchskillsinvariousareasandupdatetheirskillsbasedonrecentadvancesinresearchfield.

GA4:UnderstandingofProfession Ethics

Graduateswillexhibitanunderstandingofprofessionalethicsandtherolesofregulationsandguidelinesintheprofession.

GA5:Solvecomputerscienceproblems

Beequippedwitharangeoffundamentalprinciples of ComputerSciencethatwillprovide the basis for future learning and enablethemtoadapttotheconstantrapiddevelopmentofthefield.Beabletoapplymathematics,logic,andstatisticstothedesign,development,andanalysisofsoftwaresystems.

GA 6:To apply algorithmic principles

Toidentifythekeyintellectualthemesofthefieldinalgorithmicthinking,informationrepresentation,andcomputerprograms.GA7:

GA 7 :To acquire the latest technical skills

Toenablethestudentstoacquirethelatesttechnicalskillsandbuildtheircarrieronthebasisofcontinuouslearningandadaptability.

GA8:Leadership,initiativeandteamwork:

ToinculcatetheAbilitytoworkeffectivelyinateamandleadinmultidisciplinaryenvironment.

GA9:KindleCreativity

To demonstrate criticalthinking, imagination anintellectual agilityand strive to be innovative and experimental in advancing knowledgeandincreatingsolutions.

GA10:EnhancetheknowledgeinSpecializationarea:

Toenhancetheknowledgeintheirspecialistareaand

applyAnalyticalapproachtoidentifyandresolveproblems.

GA11:PersuadeIntellectualRigour

Anabilitytothinkclearlyand deeply with rigour when faced withnewknowledgeandargumentsanddemonstratetheability toapplyresearchresultstosolveproblems.

GA12:Communicationandsocialskills

ToimpartGoodcommunicationandsocialskillstowidentheabilityto listen to,as well as clearlyexpress, information back to others inavarietyofways:oral,written,andvisual-usingarangeoftechnologies.

3. **ProgrammeSpecificQualificationAttributes**

Mentiontheprogrammespecificqualificationattributesachievedthroughco ursesintheprogrammeintermsof

- **Knowledgeandunderstandinglevel(K1andK2)**
  - ➢ Rememberorrecognizeatermorabasicconcept
  - ➢ Selectanexplanationforastatementrelatedtothequestiontopic
  - ➢ Understandtheexistingproblems
- **Applicationlevel(K3)**
  - ➢ Beabletosolvetheproblemsusingcomputingtechniques.
- **Analyticallevel(K4)**
  - ➢ Be able to separate information related to a procedure or techniqueinto its constituent parts for better understanding and can distinguishbetweenfactsandinferences.
- **Evaluationcapabilitylevel(K5)**
  - ➢ Be able to make judgments based on criteria and standards. Detectsinconsistenciesorfallacieswithinaprocessorproduct,deter mineswhether a process or product has internal consistency and detects theeffectivenessofaprocedureasitisbeingimplemented.
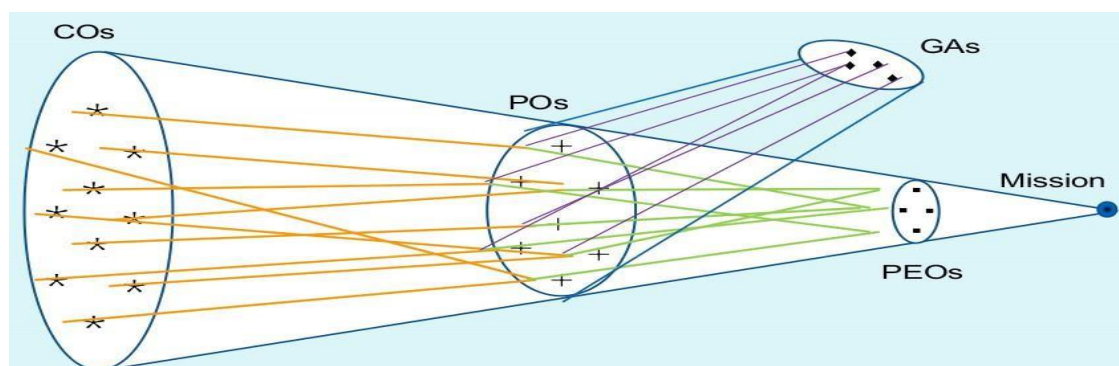- **Scientificorsynthesislevel(K6)**
  - ➢ Ascientificwaytoanalyzeandsolvetheproblems.

4. **Vision**

AchievingexcellenceinInformationTechnologyEnabledServicesth roughTeaching,Research,ExtensionandConsultancy.

Itmustbelinkedlikethis

MissionistheProgrammeSpecificObjectives,GAs–Graduateattributes(general)

5. **Programme Objectives and Outcomes**

SpeltthePEOs(ProgrammeEducationalObjectives),ProgrammeSpecificObjectives(PSOs)andProgrammeOutcomes(POs)

ProgrammeEducationalOutcomes(PEOs)forM.ScComputerScienceareasfollows

PEO1: Apply algorithmic, mathematical and scientific reasoning to a variety ofcomputationalproblems

PEO2: Implementsoftwaresystemsthatmeetspecifieddesignandperformancerequirements.

PEO3: Workeffectivelyinteamstodesignandimplementsolutionstocomputationalproblems

PEO4: Communicate effectively, both orally and in writing. Design, correctlyimplementanddocumentsolutionstosignificantcomputationalproblems

ProgrammeSpecificOutcomes(PSOs)forM.ScComputerScienceareasfollows:

PSO1: Anabilitytoapplyprofoundknowledgetoanalyzeanddesignsoftwareandsystemscontaininghardwareandsoftwarecomponentsof
varyingcomplexity.

PSO2: Anabilitytoapplymathematicalmodel,algorithmicprinciples,andcomputersciencetheoryinthedesignofreal-timeapplications

Programme Outcomes(POs)for M.ScComputer Science are as follows

PO1:ComputationalKnowledge

GainknowledgeinthetheoreticalfoundationsofComputerScience,ComputingFundamentalsandBasicMathematics.

PO2: Problem Analysis
Toanalyzeandidentifythecustomerrequirementsinmultidisciplinarydomains,createhighleveldesignandimplementrobustsoftwareapplicationsusinglatesttechnologicalskills.

PO3:DesignandDevelopment
Designanddevelopsolutionsforcomplexproblemsinvariousdomains.ServeastheProgrammersorthe
SoftwareEngineerswiththesoundknowledgeofpracticalandtheoreticalconceptsfordevelopingsoftware.

PO4:ResearchActivity
TounderstandthefundamentalsofresearchandInculcatetheabilitytoundertakeoriginalresearchatthecuttingedgeofcomputer science & its related areas. Produce researchers who can investigateproblems in different application domains and creatively develop, and evaluatecomputationalsolutions.

PO5:Softwaretoolusage

Toadaptandapplymodern computing skills andtoolstoresolveproblemswithsoftwaredevelopment tools, software systems,andmoderncomputingplatforms.

PO6:Professionalethics

TounderstandprofessionalethicsandCyberregulationsanddevelopyouth withsocialcommitments.

PO7: Personality development

To understand Management Principles andapply the principles to develop software as a team member and mange projectsefficientlyformultidisciplinaryenvironments.

PO8: Communication and Presentation Efficacy

Communicate effectivelywithcomputingsocietyinbothverbalandwrittenform.Improvec ommunicationandpresentationskills,especiallyinprovidingtechnicalsup port.

PO9: Social Responsibility

To access Social and Environmental issues forlocalandglobalneedsandgiverelevantsolutionsforthem.Gainedtheana lytical ability to analyze the literature and social issues to appreciate thestrengthandtosuggesttheimprovementsforbetterresults.

PO10: Entrepreneurship

Discover the opportunity for entrepreneurship andcreateandaddvalueforthebettermentofanindividualandsocietyatlarge.

PO11:Algorithmicprinciplesandtheory

Anabilitytoapplymathematicalfoundations,algorithmicprinciples,and Computer Science theory in themodelinganddesignofcomputationalsystemsinawaythatdemonstratesc omprehensionofthetradeoffsinvolvedindesignchoices.

PO12:Teamwork

Solve the problems (programming networking databaseandWebdesign)intheInformation Technology environment. Functioneffectivelyonteamsto accomplisha common goalanddemonstrateprofessionalbehavior.

CHOICE BASED CREDIT SYSTEM - LEARNING OUTCOMES-BASED CURRICULUM FRAMEWORK

M.Sc Computer Science

Part			Course	Code	Cr.	Hrs
			SEMESTER I			
A	CC – 1		Discrete Mathematics	232504101	4	4
	CC – 2		Linux and Shell Programming	232504102	4	4
	CC – 3		Python Programming	232504103	4	4
	EC – I T		Theory of Computation	232504104	2	4
	EC – I P		Linux and shell programming - Lab	232504105	1	3
	EC II – T		.Net technology	232504106	2	4
	EC II P		Python Programming Lab	232504107	1	2
B	SEC I		.Net Technology Lab	232504108	2	3
	AECC 1		Soft Skill Development Lab	232504109	2	2
	Total				**22**	**30**
			SEMESTER II			
A	CC – 4		Design and Analysis of algorithms	232504201	4	5
	CC – 5		Big Data Analytics	232504202	4	5
	CC – 6		Design and Analysis of Algorithms Lab	232504203	4	5
	EC – III		Big Data Analytics Lab	232504204	3	5
			Mini Project	232504205		
	EC - IV		Fundamentals of Human Rights	232504206	3	5
			Cryptography and Network Security	232504207		
B	SEC - II		Office Automation and ICT Tools Lab	232504208	2	3
	AECC II		Leadership and Personality Development	232504209	2	2
					22	**30**
			SEMESTER III			
A	CC 7		Advanced Java Programming	232504301	4	5
	CC 8		Web Technologies	232504302	4	5
	CC 9		Web Technology Lab	232504303	4	5
	EC – V		Advanced Java Programming – Lab	232504304	3	5
	Core		Advanced Machine Learning Lab	232504305	3	4
B	SEC III		Computer Networking	232504306	2	4
	AECC III		Data Visualization Techniques Lab	232504307	2	2
	*Internship		**Internship / Industrial Activity**		2	-
					24	**30**
			SEMESTER IV			
A	CC – 10		Core	232504401	4	5
	CC – 11		Core	232504402	4	5
	CC -12		Core	232504403	4	5
	CC - 13		Project Viva	232504404	3	4
	EC		Elective – VI	232504405	3	5
B	SEC		Professional Competency Skill Enhancement	232504406	2	4
	AECC – IV		Ability Enhancement Compulsory	232504407	2	2
C	EA		Extension Activity	232504408	1	-
	Total				**23**	**30**

* Internship will be carried out during the summer vacation of the first year and marks will be included in the Third Semester Marks Statement.

Title of the Course	Discrete Mathematics						
Category	Core	**Year**	I	**Credits**	4	**Course Code**	**232504101**
		Semester	I				
Instructional Hours per week		**Lecture**	**Tutorial**	**Lab Practice**	**Total**	**CIA**	**External**	**Total**
		4	-	--	4	25	75	100

Course Objective

- To know the concepts of relations and functions
- To distinguish among different normal forms and quantifiers
- To solve recurrence relations and permutations & combinations
- To know and solve matrices , rank of matrix & characteristic equations
- To study the graphs and its types

Unit-I

Relations- Binary relations-Operations on relations- properties of binary relations in a set – Equivalence relations— Representation of a relation by a matrix -Representation of a relation by a digraph – **Functions**-Definition and examples-Classification of functions-Composition of functions-Inverse function

Unit-II

Mathematical Logic-Logical connectives-**Well formed formulas** – Truth table of well formed formula –Algebra of proposition –Quine's method- **Normal forms of well formed formulas**-Disjunctive normal form-Principal Disjunctive normal form-Conjunctive normal form-Principal conjunctive normal form-**Rules of Inference for propositional calculus** – **Quantifiers**- Universal Quantifiers- Existential Quantifiers

Unit-III

Recurrence Relations- Formulation -solving recurrence Relation by Iteration- solving Recurrence Relations- Solving Linear Homogeneous Recurrence Relations of Order Two- Solving Linear Non homogeneous Recurrence Relations. **Permutations**-Cyclic permutation- Permutations with repetitions- permutations of sets with indistinguishable objects- **Combinations**- Combinations with repetition

Unit-IV

Matrices- special types of matrices-Determinants-Inverse of a square matrix-Cramer's rule for solving linear equations-Elementary operations-Rank of a matrix-solving a system of linear equations-characteristic roots and characteristic vectors-Cayley-Hamilton Theorem-problems

Unit-V

Graphs -Connected Graphs -Euler Graphs- Euler line-Hamiltonian circuits and paths –planar graphs – Complete graph-Bipartite graph-Hyper cube graph-Matrix   representation of graphs

Text book

UNIT: I, II, III & V

1. N.Chandrasekaran and M.Umaparvathi, Discrete mathematics, PHI   Learning Private Limited, New Delhi, 2015.

UNIT: IV

2. Dr. Arumugam S and Thangapandi Isaac A, Modern Algebra, Scitech Publications (India)Pvt.Lte.,2016.

Reference Book

1. Kimmo Eriksson &Hillevi Gavel, Discrete Mathematics & Discrete Models, Student litteratur AB, 2015.
2. Kenneth H. Rosen Discrete Mathematics and applications, Mc Graw Hill, 2012

Course Outcomes

On the successful completion of the course, students will be able

CO1	To understand the concepts of relations and functions distinguish among normal forms		
CO2	To analyze and evaluate the recurrence relations		
CO3	To distinguish among various normal forms and predicate calculus		
CO4	To solve and know various types of matrices		
CO5	To evaluate and solve various types of graphs		

K1- Remember, K2- Understand, K3- Apply, K4- Analyze, K5- Evaluate, K6- Create

Mapping with Programme Outcomes

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	S	S	S	-	S	-	-	-	M	-	-	-
CO2	S	S	S	-	S	-	-	-	M	-	-	-
CO3	S	S	S	-	S	-	-	-	M	S	S	S
CO4	S	S	S	-	S	-	-	-	M	-	-	-
CO5	S	S	S	-	S	-	-	-	M	S	S	S

S- Strong; M-Medium; L-Low

Title of the Course	Linux and Shell Programming						
Category	Core	**Year**	I	**Credits**	4	**Course Code**	**232504102**
		Semester	I				
Instructional Hours per week		**Lecture**	**Tutorial**	**Lab Practice**	**Total**	**CIA**	**External**	**Total**
		4	-	--	4	25	75	100

Course Objective

- To teach principles of operating system including File handling utilities, Basic Linux commands, Scripts and filters.
- To familiarize fundamentals of shell (bash), shell programming, pipes, Control structures, arithmetic in shell interrupt processing, functions, debugging shell scripts.
- To impart fundamentals of file concepts kernel support for file, File structure related system calls (file API's).
- To facilitate students in understanding Inter process communication, semaphore and shared memory.
- To explore real-time problem solution skills in Shell programming.

Unit-I

Basic bash Shell Commands: Interacting with the shell-Traversing the file system-Listing files and directories-Managing files and directories-Viewing file contents. **Basic Script Building:** Using multiple commands-Creating a script file-Displaying messages-Using variables-Redirecting input and output-Pipes-Performing math-Exiting the script. **Using Structured Commands:** Working with the if-then statement-Nesting ifs-Understanding the test command-Testing compound conditions-Using double brackets and parentheses-Looking at case.
(Book-1, Chapters: 3, 11, and 12)

Unit-II

More Structured Commands: Looping with for statement-Iterating with the until statement-Using the while statement-Combining loops-Redirecting loop output. **Handling User Input:** Passing parameters-Tracking parameters-Being shifty-Working with options-Standardizing options-Getting user input. **Script Control:** Handling signals-Running scripts in the background-Forbidding hang-ups -Controlling a Job-Modifying script priority-Automating script execution.
(Book-1, Chapters: 13, 14, and 16)

Unit-III

Creating Functions: Basic script functions-Returning a value-Using variables in functions-Array and variable functions-Function recursion-Creating a library-Using functions on the command line. **Writing Scripts for Graphical Desktops:** Creating text menus-Building text window widgets-Adding X Window graphics. **Introducing sed and gawk:** Learning about the sed Editor-Getting introduced to the gawk Editor-Exploring sed Editor basics.
(Book-1, Chapters: 17, 18, and 19)

Unit-IV

Regular Expressions: Defining regular expressions-Looking at the basics-Extending our patterns-Creating expressions. **Advanced sed:** Using multiline commands-Understanding the hold space-Negating a command-Changing the flow-Replacing via a pattern-Using sed in scripts-Creating sed utilities. **Advanced gawk:** Reexamining gawk-Using variables in gawk-Using structured commands-Formatting the printing-Working with functions.
(Book-1, Chapters: 20, 21, and 22)

Unit-V
Working with Alternative Shells: Understanding the dash shell-Programming in the dash shell-Introducing the zsh shell-Writing scripts for zsh. **Writing Simple Script Utilities:** Automating backups-Managing user accounts-Watching disk space. **Producing Scripts for Database, Web, and E-Mail:** Writing database shell scripts-Using the Internet from your scripts-Emailing reports from scripts. **Using Python as a Bash Scripting Alternative:** Technical requirements-Python Language-Hello World the Python way-Pythonic arguments-Supplying arguments-Counting arguments-Significant whitespace-Reading user input-Using Python to write to files-String manipulation.
(Book-1, Chapters: 23, 24, 25, and Book-2, Chapter: 14)
Text book:
1. Richard Blum, Christine Bresnahan, "Linux Command Line and Shell Scripting BIBLE", Wiley Publishing, 3rd Edition, 2015.**Chapters:** 3, 11 to14, 16 to 25.
2. Mokhtar Ebrahim, Andrew Mallett, "Mastering Linux Shell Scripting", Packt Publishing, 2nd Edition, 2018. **Chapter:** 14.

Reference Books:
1. ClifFlynt,SarathLakshman,ShantanuTushar, "Linux Shell Scripting Cookbook ", Packt Publishing, 3rd Edition, 2017.
2. Stephen G.Kochan, Patrick Wood, "Shell Programming in Unix, Linux, and OS X", Addison Wesley Professional, 4th Edition, 2016
3. Robert Love, "Linux System Programming", O'Reilly Media, Inc, 2013
4. W.R. Stevens, "Advanced Programming in the UNIX environment", 2nd Edition, Pearson Education, 2013
5. Graham Glass, King Ables, " UNIX for Programmers and Users", 3rd Edition, Pearson Education, 2003

Course Outcomes
        On the successful completion of the course, students will be able

CO1	To understand, apply and analyze the concepts and methodology of Linux shell programming	
CO2	To comprehend, impart and apply fundamentals of control structure and script controls	
CO3	To understand, analyses and evaluate the functions, graphical desktop interface and editors	
CO4	To collaborate, apply and review the concepts and methodology of regular expression and advanced gawk	
CO5	To comprehend, use and illustrate the advance concepts such as alternate shell script, data connectivity and bash scripting using python	

K1- Remember, K2- Understand, K3- Apply, K4- Analyze, K5- Evaluate, K6- Create

Mapping with Programme Outcomes

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	S	S	S	-	S	L	-	M	M	M	M	S
CO2	S	S	M	-	S	L	-	M	M	M	M	S
CO3	S	S	M	-	S	L	-	M	M	S	S	S
CO4	S	S	M	-	S	L	-	M	M	M	M	S
CO5	S	S	M	-	S	L	-	M	M	M	M	S

  S- Strong; M-Medium; L-Low

Title of the Course	Python Programming						
Category	Core	Year	I	Credits	4	Course Code	232504103
		Semester	I				
Instructional Hours per week		Lecture	Tutorial	Lab Practice	Total	CIA	External	Total
		4	-	--	4	25	75	100

Course Objectives:
- To acquire programming skills in core Python
- To learn Strings and function
- To develop object oriented skills in Python
- To comprehend various Python Packages
- To develop web applications using Django

Unit I

Introduction : Fundamental ideas of Computer Science **-** Strings, Assignment, and Comments - Numeric Data types and Character sets – Expressions – Loops and Selection Statements: Definite iteration: the for Loop - selection: if and if-else statements - Conditional iteration: the while Loop

Unit II

Strings and Text Files: Accessing Characters and substrings in strings - Data encryption-Strings and Number systems- String methods – Text - Lists and Dictionaries: Lists – Dictionaries – Design with Functions: A Quick review - Problem Solving with top-Down Design - Design with recursive Functions - Managing a Program's namespace - Higher-Order Functions

Unit III

Design with Classes: Getting inside Objects and Classes – Data-Modeling Examples – Building a New Data Structure – The Two – Dimensional Grid - Structuring Classes with Inheritance and Polymorphism   -   GraphicalUser Interfaces   -   The   Behavior   of   terminal-Based   programs and GUI-Based programs - Coding Simple GUI-Based programs - Windows and Window Components - Command Buttons and responding to events.

Unit IV

Working with Python Packages: NumPy Library-Ndarray – Basic Operations – Indexing, Slicing and Iteration – Array manipulation - Pandas –The Series – The DataFrame - The Index Objects – Data Vizualization with Matplotlib – The Matplotlib Architecture – pyplot – The Plotting Window – Adding Elements to the Chart – Line Charts – Bar Charts – Pie charts

Unit V

Django: Installing Django – Building an Application – Project Creation – Designing the Data Schema - Creating an administration site for models - Working with QuerySets and Managers – Retrieving Objects – Building List and Detail Views

Text Book:
1. K.A. Lambert, " Fundamentals of Python: first programs", Second Edition, Cengage Learning, 2018 **(Unit - I, II and III)**
2. Fabio Nelli, "Python Data Analytics: With Pandas, NumPy, and Matplotlib", Second Edition, Kindle Edition, 2018 **(Unit - IV)**
3. Antonio Mele, "Django 3 By Example", Third Edition, 2020
   (Unit - V)

Course Outcomes

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

CO1	Comprehend the programming skills in python and develop applications using conditional branches and loop	
CO2	Create python applications with strings and functions	
CO3	Understand and implement the Object Oriented Programming paradigm with the concept of objects and classes, Inheritance and polymorphism	
CO4	Evaluate the use of Python packages to perform numerical computations and data visualization	
CO5	Design interactive web applications using Django	

K1- Remember, K2- Understand, K3- Apply, K4- Analyze, K5 Evaluate, K6- Create

Mapping with Programme Outcomes

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	S	S	M	S	M	S	S	S	S	M	S	S
CO2	S	S	S	M	S	S	S	S	S	S	M	S
CO3	S	M	S	S	M	S	M	S	S	M	S	S
CO4	S	S	S	S	S	S	S	M	S	S	M	S
CO5	S	S	S	S	S	S	S	S	S	M	M	S

S- Strong; M-Medium; L-Low

Title of the Course	Theory of Computation						
Category	Elective I Theory	**Year**	I	**Credits**	2	**Course Code**	**232504104**
		Semester	I				
Instructional Hours per week		**Lecture**	**Tutorial**	**Lab Practice**	**Total**	**CIA**	**External**	**Total**
		4	-	--	4	25	75	100

COURSE OBJECTIVES:
- Introduce core concepts in Automata and Theory of Computation
- Identify different Formal language Classes and their Relationships
- Design Grammars and Recognizers for different formal languages
- Prove or disprove theorems in automata theory using their properties
- Determine the decidability and intractability of Computational problems

UNIT I
History of automata- grammar-Chomsky hierarchy-use of automata characteristics of automata-finite automata-graphical and tabular representation transactional system-DFA and NFA – conversion of NFA to DFA-Equivalence of DFA and NFA-Dead state-Finite automata with output-conversion of one machine to minimization of finite automata-Two way finite automata

UNIT II
Finite state machine-state equivalence and minimization of machine - incompletely specified machine-merger graph- merger table-finite memory and definite memory information lossless machine-inverse machine-minimal inverse machine-ardens theorem-construction of finite automata from regular expression

UNIT III
Equivalence of two finite automata- Equivalence of two regular expression- construction of regular grammar from an RE-constructing FA from regular grammar-Pumping lemma for regular expression--derivation and parse tree-Ambiguity in context free grammar-left recursion and left factoring-linear grammar-normal form – pumping lemma for CFL-Ogdens lemma for CFL

UNIT IV
Push down automata-acceptance PDA-DPDA and NPDA-Construction of PDA from CFG-construction of CFG equivalent to PDA-Graphical notation for PDA-Turing Machine-transactional representation of turing machine –non deterministic turing – conversion of regular expression to turing machine.

UNIT V
Variations of turing machine-turing machine as an integer function-Universal turing machine-linear bounded automata- undecidability- reducibility

TEXT BOOKS:
1. ShyamlenduKandar, "Introduction to automata theory, formal languages and Computation" First Edition, Pearson Education, 2013.

REFERENCE BOOK:
1. John E. Hopcroft, Rajeev Motwani, Jeffrey D.Ullman, "Introduction to Automata Theory, Languages and Computation", 3rd Edition, Pearson Education, 2011.

COURSE OUTCOMES
On the successful completion of the course, students will be able to

CO1	To understand the concepts and methodology of automata		
CO2	To analyze and construct automata, regular expressions and grammars		
CO3	To analyses and evaluate the push down automata and various Turing machines		

K1- Remember, K2- Understand, K3- Apply, K4- Analyze, K5- Evaluate, K6- Create

Title of the Course	Linux and Shell Programming - Lab						
Category	Elective I Practical	Year	I	Credits	1	Course Code	232504105
		Semester	I				
Instructional Hours per week		Lecture	Tutorial	Lab Practice	Total	CIA	External	Total
		-	-	3	3	25	75	100

Course Objective
- To enable the students to study and understand the efficiency of Linux shell script.
- To demonstrate the File Backup process.
- To develop and implement the shell script for GUI processing.
- To develop and implement the shell script for IPC and Networking.
- To demonstrate PostgreSQL.

List of Programs
1. Write a Shell Script program to calculate the number of days between two dates.
2. Write a Shell Script program to check systems on local network using control structures with user input.
3. Write a Shell Script program to check systems on local network using control structures with file input.
4. Write a Shell Script program to demonstrate the script control commands.
5. Write a Shell Script program to demonstrate the Shell script function.
6. Write a Shell Script program to demonstrate the Regular Expressions.
7. Write a Shell Script program to demonstrate the sed and awk Commands.
8. Write a Shell Script program to demonstrate the File Backup process through creating a daily archive location.
9. Write a Shell Script program to create a following GUI tools.
   a) Creating text menus
   b) Building text window widgets
10. Write a Shell Script program to demonstrate to connect a PostgreSQL database and performing CRUD operations.

Course Outcomes
On the successful completion of the course, students will be able to

CO1	To understand, apply and analyze the concepts and methodology of Linux shell programming	
CO2	To comprehend, impart and apply fundamentals of control structure and script controls	
CO3	To understand, analyses and evaluate the functions, graphical desktop interface and editors	
CO4	To collaborate, apply and review the concepts and methodology of regular expression and advanced gawk	
CO5	To comprehend, use and analyze the advance concepts such as alternate shell script, dy and bash scripting using PostgreSQL	

K1- Remember, K2- Understand, K3- Apply, K4- Analyze, K5- Evaluate, K6- Create
Mapping with Programme Outcomes

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	S	S	S	-	S	-	-	-	M	-	-	-
CO2	S	S	S	-	S	-	-	-	M	-	-	-
CO3	S	S	S	-	S	-	-	-	M	S	S	S
CO4	S	S	S	-	S	-	-	-	M	-	-	-
CO5	S	S	S	-	S	-	-	-	M	S	S	S

S- Strong; M-Medium; L-Low

Title of the Course			.NET TECHNOLOGY						
Category	EC II Theory	**Year**	I	**Credits**	2	**Course Code**		232504106	
		Semester	I						
Instructional Hours per week		**Lecture**	**Tutorial**	**Lab Practice**	**Total**	**CIA**	**External**		**Total**
		4	-	--	4	25	75		100

- ✎ To gain full power of windows applications and high performance web applications.
- ✎ To deploy windows and web applications.

I	Introduction to Visual Basic .NET: Creating a Windows Application – Creating Web Application – Creating a Console Application – New in VB .NET – The .NET Framework and the Common Language Runtime – Building VB .NET Applications – The VB IDE.	
II	The VB .NET Language: Constants – Enumerations – Variables – Data Types – Type Conversion – Arrays – Strings – Operators – Control Statements – Procedures – Functions – Properties – Scope – Exception Handling.	
III	Windows Forms: Form Properties – MsgBox – InputBox – Multiple Forms – MDI Applications – Dialog Boxes – Mouse Events – Keyboard Events. Controls: Text Boxes – Rich Text Boxes – Labels – Link Labels – Buttons – Checkboxes – Radio Buttons – Panels – Group Boxes.	
IV	Other Controls: List Boxes – Checked List Boxes – Combo Boxes – Picture Boxes – Scroll Bars – Splitters – Track Bars – Pickers – Notify Icons – Tool Tips – Timers – Menus – Built- In Dialog Boxes – Printing.	
V	Advanced Controls: Image Lists – Treeviews – List Views – Toolbars – Status Bars – Progress Bars – Tab Controls. Object-Oriented Programming: Classes – Objects – Structures – Modules – Constructors – Data Members – Methods – Properties – Events – Overloading – Class Libraries – Namespaces – Destructors – Inheritance – Interfaces – Shadowing – Polymorphism.	

Text Book
1. Visual Basic .NET Programming Black Book, Steven Holzner (DreamTech Press, New Delhi 2005 Edition)   CHAPTERS: (Relevant Topics Only)   UNIT I: 1, 2 ;   UNIT II: 3 ,4   UNIT III: 5, 6   UNIT III: 7, 8, 9   UNIT V: 10, 11, 12
Reference
1. Programming Visual Basic .NET, Dave Grundgeiger (2003, O'Reilly, - Jesse Liberty, New Delhi: Second Edition)

Course Outcome:

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

CO1	Creating a Windows Application and Building VB .NET Applications	
CO2	Creating VB .NET Application with Strings and Functions	
CO3	Use of Windows Forms and Form Properties.	
CO4	Understand and implement the VB .NET Controls and Notify Icons.	
CO5	Understand and implement the Object Oriented Programming paradigm with the concept of objects and classes, Inheritance and polymorphism	

K1- Remember, K2- Understand, K3- Apply, K4- Analyze, K5- Evaluate, K6- Create

Mapping with Programme Outcomes

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	S	S	M	S	M	S	S	S	S	M	S	S
CO2	S	S	S	M	S	S	S	S	S	S	M	S
CO3	S	M	S	S	M	S	M	S	S	M	S	S
CO4	S	S	S	S	S	S	S	M	S	S	M	S
CO5	S	S	S	S	S	S	S	S	S	M	M	S

S- Strong; M-Medium; L-Low

Title of the Course	Python Programming Lab						
Category	EC – II Practical	**Year**	I	**Credits**	1	**Course Code**	**232503107**
		Semester	I				
Instructional Hours per week		**Lecture**	**Tutorial**	**Lab Practice**	**Total**	**CIA**	**External**	**Total**
		-	-	2	2	25	75	100

Course Objectives:

This course enables the students:
- To master the fundamentals of writing python scripts
- To create program using elementary data items
- To implement Python programs with conditionals and loops
- To use functions for structuring Python programs
- To develop web programming with Django

Implement the following in Python:

2. Program using elementary data items, lists, dictionaries and tuples
3. Program using conditional branches, loops
4. Program using functions
5. Program using classes and objects
6. Program using inheritance
7. Program using polymorphism
8. Program using Numpy
9. Program using Pandas
10. Program using Matplotlib
11. Program for creating dynamic and interactive web pages using forms

Course Outcome:

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

CO1	Comprehend the programming skills in python and write scripts	
CO2	Create python applications with elementary data items, lists, dictionaries and tuples	
CO3	Implement the Object Oriented Programming concepts such as objects and classes, Inheritance and polymorphism	
CO4	Assess the use of Python packages to perform numerical computations and perform data visualization	
CO5	Create interactive web applications using Django	

K1- Remember, K2- Understand, K3- Apply, K4- Analyze, K5- Evaluate, K6- Create

Mapping with Programme Outcomes

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	S	S	M	S	S	S	S	S	S	M	S	S
CO2	S	S	S	S	S	S	S	S	S	S	M	S
CO3	S	S	S	S	S	S	M	S	S	M	L	S
CO4	S	S	S	S	S	S	S	M	S	S	S	S
CO5	S	S	S	S	L	S	M	S	S	M	M	S

S- Strong; M-Medium; L-Low

Title of the Course		.NET TECHNOLOGY LAB						
Category	SEC I	**Year**	I	**Credits**	2	**Course Code**		**232504108**
		Semester	I					
Instructional Hours per week		**Lecture**	**Tutorial**	**Lab Practice**	**Total**	**CIA**	**External**	**Total**
		--	-	3	3	25	75	100

Objective :
- ✐ The objective of this course is to provide a comprehensive overview and understanding of network management and practically teaches the technical know-how of networking concepts. The fundamental concepts and principles in computer networks and protocol design are studied.

VB.NET PROGRAMMING
1. Program using structure and enum
2. Program using classes, methods, and properties and read only property
3. Program using constructors, overload constructors and class events.
4. Program using exception handling.
5. Functions to perform various string operation.
6. Program using .net built –in collection classes namely array list, bit array, hash table, queue, sorted list, stack.
7. Program using inheritance, constructors in inheritance.
8. Programming using overriding, abstract base classes, shared members and interface.
9. Program using win form control.
10. Develop a package for student data processing
11. Develop a package for employee data processing.
12. Design software for ticket reservation.
REFERENCE:
1. Steven holzher, Dreamtech pren, VB .NET Programming Black Book, New
Delhi, 2005.

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

CO1	Comprehend the programming skills in Linux and Shell programming	
CO2	Create Linux applications with Constructors and constructor overloading	
CO3	Implement the Inheritance concepts and various string operations	
CO4	Assess the use of Linux packages to perform numerical computations	
CO5	Create interactive web applications using Shell Programming Code	

K1- Remember, K2- Understand, K3- Apply, K4- Analyze, K5- Evaluate, K6- Create

   Mapping with Programme Outcomes

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	S	S	M	S	S	S	S	S	S	M	S	S
CO2	S	S	S	S	S	S	S	S	S	S	M	S
CO3	S	S	S	S	S	S	M	S	S	M	L	S
CO4	S	S	S	S	S	S	S	M	S	S	S	S
CO5	S	S	S	S	L	S	M	S	S	M	S	S

S- Strong; M-Medium; L-Low

Title of the Course	Soft Skill Development Lab						
Category	AECC I	**Year**	I	**Credits**	2	**Course Code**	**232504109**
		Semester	I				
Instructional Hours per week		**Lecture**	**Tutorial**	**Lab Practice**	**Total**	**CIA**	**External**	**Total**
		-	-	2	2	25	75	100

Course Objective

This course enables the students:

● To enable students to gain basic communication skills in professional and social contexts effectively.
● To acquire useful words and apply them in situational context.
● To develop listening and reading skills through comprehension passages
● To enrich the leadership qualities and interpersonal communication
● To enhance essential characteristics in writing

Exercises

1. Characteristics of Technical Writing
2. Development of Employability Skills
3. Vocabulary Development
4. Sentence Completion
5. Error Spotting
6. Interpretation of Verbal Analogy
7. Interpretation of Reading (Comprehension -Conception)
8. Interpretation of Reading (Comprehension -Reasoning)
9. Practice for writing E-mails/Technical Blogs/Forums
10. PPT Preparation / Demonstration of Technical Presentation
11. Preparation of Resume
12. Preparation for Job Interviews / Mock Interview Section
13. Group Discussion Skills
14. Developing Listening Skill(Comprehension)
15. Practice for Short Speeches / Situational Conversation
16. English through Mass Media
17. Essential Grammar
18. Communicating and collaborating with peer members
19. Team Empowerment
20. Persuasive Communication

Text Books

1. Uma Narula, "Development Communication: Theory and Practice", Revised Edition, Har-Aanad Publication, 2019.
2. Annette Capel and Wendy Sharp, "Cambridge English: Objective First", Fourth Edition, Cambridge University Press, 2013.
3. Emma Sue-Prince, "The Advantage: The 7 Soft Skills You Need to Stay One Step Ahead", First Edition, FT Press, 2013.
4. Guy Brook-Hart, "Cambridge English: Business Benchmark",Second Edition, Cambridge University Press, 2014.
5. Norman Lewis, "How to Read Better & Faster", Binny Publishing House, New Delhi, 1978.

Reference Books

1. Michael McCarthy and Felicity O'Dell, "English Vocabulary in Use:100 Units of Vocabulary Reference and Practice", Cambridge University Press,1996.

Murphy, Raymond, "Intermediate English Grammar", Second Edition,

Title of the Course	Design and Analysis of Algorithms						
Category	Core	Year	I	Credits	4	Course Code	232504201
		Semester	II				
Instructional Hours per week		Lecture	Tutorial	Lab Practice	Total	CIA	External	Total
		5	-	--	5	25	75	100

Course Objectives:

- Apply the algorithms and design techniques to solve problems
- Analyze the complexities of various problems in different domains.
- Analyze the performance of various algorithms.

Unit-I

Introduction – Notion of Algorithm - Fundamentals of algorithmic problem solving – Important problem types – Fundamentals of the analysis of algorithm efficiency – analysis frame work – Asymptotic Notations and Basic Efficiency Classes-Mathematical analysis of non-recursive Algorithms – Non-recursive solution to the Matrix Multiplication - Mathematical analysis of recursive algorithms – Recursive solution to the Tower of Hanoi Puzzle.

Unit-II

Divide and conquer Technique – Multiplication of large integers – Strassen's matrixmultiplication – Closest pair and Convex Hull Problems - Greedy method – Prim's algorithm – Kruskal's algorithm – Dijkstra's algorithm.

Unit-III

Dynamic Programming - Computing a binomial coefficient – Warshall's and Floyd' Algorithm – Application of Warshall's Algorithm to the digraph – Flyd's Algorithm for the all pairs shortest paths Problem - The Knapsack problem and Memory function.

Unit-IV

Backtracking – N-Queens problem – Hamiltonian circuit problem – Subset sum problem – Branch and bound – Assignment problem – Knapsack problem – Traveling salesman problem.

Unit-V

P, NP and NP-complete problems – Approximation algorithms for NP-hard problems – Traveling salesman problem – Knapsack problem.

Text Book:

1. Anany Levitin "Introduction to the Design and Analysis of Algorithms" Pearson Education 2011. (Chapters 1.1-1.3, 2.1, 2.2, 2.3, 2.4, 4.5, 4.6, 8.2, 8.4, 9.1-9.3, 11.3, 12.1,12.2, 12.3)

Reference Books:

1. Thomas H.Cormen, Charles E.Leiserson, Ronald L.Rivest, "Introduction to algorithms", Prentice Hall 1990.
2. S.K. Basu, "Design methods and Analysis of Algorithms", Prentice Hall, 2005.

Course Outcomes

On the successful completion of the course, students will be able

CO1	To understand and apply knowledge of computing and mathematics to find the algorithm efficiency.	
CO2	To analyze a problem and identify the computing requirements appropriate for its solution.	
CO3	To create, implement, and evaluate a Dynamic Programming algorithm to meet desired needs.	
CO4	To create, implement, and evaluate a Backtracking and Knapsack to meet desired needs.	
CO5	To evaluate the algorithmic principles and efficiency of NP and NP-Complete problems – Approximation algorithms for NP-hard problems – Travelling salesman problem – Knapsack problem.	

K1- Remember, K2- Understand, K3- Apply, K4- Analyze, K5- Evaluate, K6- Create

Mapping with Programme Outcomes

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	S	S	S	-	S	L	-	M	M	M	M	S
CO2	S	S	M	-	S	L	-	M	M	M	M	S
CO3	S	S	M	-	S	L	-	M	M	S	S	S
CO4	S	S	M	-	S	L	-	M	M	M	M	S
CO5	S	S	M	-	S	L	-	M	M	M	M	S

S- Strong; M-Medium; L-Low

Title of the Course	Big Data Analytics						
Category	Core	**Year**	I	**Credits**	4		**232504202**

		Semester	II			Course Code		
Instructional Hours per week		Lecture	Tutorial	Lab Practice	Total	CIA	External	Total
		5	-	--	5	25	75	100

Course Objectives
- To introduce big data tools & Information Standard formats.
- To understand the basic concepts of big data.
- To learn Hadoop, HDFS and MapReduceconcepts.
- To teach the importance of NoSQL.
- To explore the big data tools such as Hive, HBase and Pig.

UNIT I
Big Data and Analytics: Classification of Digital Data: Structured Data- Semi Structured Data and Unstructured Data.
Introduction to Big Data: Characteristics – Evolution – Definition - Challenges with Big Data - Other Characteristics of Data - Big Data - Traditional Business Intelligence versus Big Data - Data Warehouse and Hadoop.
Environment Big Data Analytics: Classification of Analytics – Challenges - Big Data Analytics important - Data Science - Data Scientist - Terminologies used in Big Data Environments – Basically Available Soft State Eventual Consistency - Top Analytics Tools

UNIT II
Technology Landscape: NoSQL, Comparison of SQL and NoSQL, Hadoop -RDBMS Versus Hadoop - Distributed Computing Challenges – Hadoop Overview - Hadoop Distributed File System - Processing Data with Hadoop - Managing Resources and Applications with Hadoop YARN - Interacting with Hadoop Ecosystem

UNIT III
Mongodb and MapreduceProgramming: MongoDB: Mongo DB - Terms used in RDBMS and Mongo DB - Data Types - MongoDB Query Language.
MapReduce: Mapper – Reducer – Combiner – Partitioner – Searching – Sorting – Compression

UNIT IV
Hive: Introduction – Architecture - Data Types - File Formats - Hive Query Language Statements – Partitions – Bucketing – Views - Sub- Query – Joins – Aggregations - Group by and Having – RCFile - Implementation - Hive User Defined Function - Serialization and Deserialization.

UNIT V
Pig: Introduction - Anatomy – Features – Philosophy - Use Case for Pig - Pig Latin Overview - Pig Primitive Data Types - Running Pig - Execution Modes of Pig - HDFS Commands - Relational Operators - Eval Function - Complex Data Types - Piggy Bank - User-Defined Functions - Parameter Substitution – Diagnostic Operator - Word Count Example using Pig - Pig at Yahoo! - Pig Versus Hive

Text Book:
1. Seema Acharya, Subhashini Chellappan, "Big Data and Analytics", WileyPublications, First Edition, 2015

Reference Book:
1. Judith Huruwitz, Alan Nugent, Fern Halper, Marcia Kaufman, "Big data for dummies", John Wiley & Sons, Inc. (2013)
2. Tom White, "Hadoop The Definitive Guide", O'Reilly Publications, Fourth Edition, 2015
3. Dirk Deroos, Paul C.Zikopoulos, Roman B.Melnky, Bruce Brown, Rafael Coss, "Hadoop For Dummies", Wiley Publications, 2014
4. Robert D.Schneider, "Hadoop For Dummies", John Wiley & Sons, Inc. (2012)
5. Paul Zikopoulos, "Understanding Big Data: Analytics for Enterprise Class Hadoop and Streaming Data, McGraw Hill, 2012 Chuck Lam, "Hadoop In Action", Dreamtech Publications, 2010

Course Outcomes
On the successful completion of the course, students will be able to

CO1	To understand, illustrate and evaluate the concepts and techniques of Data Science, Big Data Analytics and its tools	
CO2	To collaborate, apply and review the computing for big data in Hadoop, and NoSQL environment.	
CO3	To comprehend, implement and review the concepts of data science and big data analytics projects using MapReduce, and MongoDB	
CO4	To understand, use and anlayse the concepts of big data analytics projects using HIVE database.	
CO5	To illustrate, develop and review the concepts of PIG database in Hadoop environment.	

K1- Remember, K2- Understand, K3- Apply, K4- Analyze, K5- Evaluate, K6- Create

Mapping with Programme Outcomes

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	S	-	-	-	-	L	-	-	-	-	-	-
CO2	S	-	M	-	M	L	-	-	-	-	-	-
CO3	S	-	S	-	S	L	-	-	-	S	S	S
CO4	S	-	S	-	S	L	-	-	-	S	S	S
CO5	S	-	S	-	S	L	-	-	-	S	S	S

S- Strong; M-Medium; L-Low

Title of the Course	Design and Analysis of Algorithms Lab							

Category	Core	Year	I	Credits	4	Course Code	232504203	
		Semester	II					

Instructional Hours per week	Lecture	Tutorial	Lab Practice	Total	CIA	External	Total
	5	-	--	5	25	75	100

Implement the following problems using Python Programming

1. Compute the transitive closure of any directed graph using Warshall's Algorithm.

2. Knapsack problem using backtracking

3. 0/1 knapsack problem using Dynamic programming

4. Apply the divide and conquer technique implement Strassen's matrix Multiplication Algorithm

5. Find minimum cost spanning Tree of a given undirected graph using Kruskal's Algorithm.

6. Find minimum cost spanning Tree of a given undirected graph using Prim's Algorithm.

7. All-pairs Shortest Paths algorithms

8. 8 Queen's problem using backtracking

9. DIjkstra's Algorithm using greedy technique

10. Sum of subset problem using backtracking

Title of the Course	BIG DATA ANALYTICS LAB					
Category	EC III	Year	I	Credits	3	Course Code	235604204
		Semester	II				

Instructional Hours per week	Lecture	Tutorial	Lab Practice	Total	CIA	External	Total
	-	-	5	5	25	75	100

Course Objectives
- To teach the fundamental techniques for handling the big data tools.
- To familiarize the tools required to manage big data.
- To analyse big data using Hadoop, MapReduce, Hive, and Pig
- To teach the fundamentalprinciples in achieving big data analytics with scalability and streaming capability
- To enable students to have skills that will help them to solve complex.

Implement the following problems
1. Implement File System Shell Commands for HDFS in Hadoop Environment
2. Write a Mapreduce program using single reduce function for finding Maximum and Minimum Number
3. Write a Mapreduce program using multiple reduce function for Word Count in an given Text document
4. Implement the following using Pig Latin Input and Output Operations Relational Operations
5. Implement the following using Pig Latin User Defined Functions Advanced Relational Operations
6. Write a Word Count program using Pig Latin Script
7. Write a program to find a maximum temperature using Pig Latin Script
8. Implement the following using Hive commands Handling the Database Creating and Manipulating table
9. Implement Simple Queries for database using Mongo
10. Implement Simple Queries for collections using Mongo

Course Outcomes
On the successful completion of the course, students will be able to

CO1	Understand and develop conceptually how Big Data is stored and implement it using different tools	K1-K6
CO2	Comprehend and implement programs for data storage in HDFS and table manipulation using Big Data tools in Hadoop environment	K1-K6
CO3	Understand and Critically analyse existing Big Data datasets and implementations the solutions for it using MongoDB	K1- K6
CO4	Understand and examine existing Big Data datasets and implementations the solutions using HIVE database	K1- K6
CO5	Comprehend and review existing datasets and implementations the solutions to handle it using PIG	K1- K6

K1- Remember, K2- Understand, K3- Apply , K4- Analyze, K5- Evaluate, K6- Create
Mapping with Programme Outcomes

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	S	S	M		M	S	-	-	-	-	-	-
CO2	S	M	S	S	S	M	-	-	-	-	-	-
CO3	S	S	S	S	S	S	-	-	-	-	-	-
CO4	S	M	S	S	S	M	-	-	-	-	-	-
CO5	S	S	S	S	S	S	-	-	-	-	-	-

S- Strong; M-Medium; L-Low

Title of the Course	Mini Project						
Category	Core	**Year**	I	**Credits**	3	**Course Code**	**232504205**
		Semester	II				
Instructional Hours per week		**Lecture**	**Tutorial**	**Lab Practice**	**Total**	**CIA**	**External**	**Total**
		5	-	--	5	25	75	100

The students are expected to collect the necessary data from neighboring industries during holidays and apply the concepts studied in the Semester I and Semester II to develop the project.

    i. Introduction
   ii. Data Collection
  iii. System development
  iv. Implementation
   v. Conclusion

Title of the Course	Fundamentals of Human Rights						
Category	Core	**Year**	I	Credits	3	**Course Code**	232504206
		Semester	II				
Instructional Hours per week		Lecture	Tutorial	Lab Practice	Total	CIA	External	Total
		5	-	--	5	25	75	100

Unit I: Introduction: Meaning and Definitions of Human Rights – Characteristics and Importance of Human Rights – Evolution of Human Rights – Formation, Structure and Functions of the UNO - Universal Declaration of Human Rights – International Covenants – Violations of Human Rights in the Contemporary Era.

Unit II: Human Rights in India: Development of Human Rights in India – Constituent Assembly and Indian Constitution – Fundamental Rights and its Classification – Directive Principles of State Policy – Fundamental Duties.

Unit III: Rights of Marginalized and other Disadvantaged People: Rights of Women – Rights of Children – Rights of Differently Abled – Rights of Elderly - Rights of Scheduled Castes – Rights of Scheduled Tribes – Rights of Minorities – – Rights of Prisoners – Rights of Persons Living with HIVAIDS – Rights of LGBT.

Unit IV: Human Rights Movements: Peasant Movements (Tebhaga and Telangana) – Scheduled Caste Movements (Mahar and Ad-Dharmi) – Scheduled Tribes Movements (Santhal and Munda) – Environmental Movements (Chipko and Narmada BachaoAndolan) – Social Reform Movements (Vaikom and Self Respect).

Unit V: Redressal Mechanisms: Protection of Human Rights Act, 1993 (Amendment 2019) – Structure and Functions of National and State Human Rights Commissions – National Commission for SCs – National Commission for STs – National Commission for Women – National Commission for Minorities – Characteristics and Objectives of Human Rights Education.

References

1. SudarshanamGankidi, Human Rights in India: Prospective and Retrospective, Rawat Publications, Jaipur, 2019.
2. SatvinderJuss, Human Rights in India, Routledge, New Delhi, 2020.
3. Namita Gupta, Social Justice and Human Rights in India, Rawat Publications, Jaipur, 2021.
4. Mark Frezo, The Sociology of Human Rights, John Willy & Sons, U.K. 2014.
5. Chiranjivi J. Nirmal, Human Rights in India: Historical, Social and Political Perspectives, Oxford University Press, New York, 2000.
6. Dr. S. Mehartaj Begum, Human Rights in India: Issues and perspectives, APH Publishing Corporation, New Delhi, 2010.
7. Asha Kiran, The History of Human Rights, Mangalam Publications, Delhi, 2011.
8. Bani Borgohain, Human Rights, Kanishka Publishers & Distributors, New Delhi-2, 2007. Jayant Chudhary, A Textbook of Human Rights, Wisdom Press, New Delhi, 2011.

Title of the Course	Cryptography and Network Security						
Category	EC - IV	Year	I	Credits	3	Course Code	232504207
		Semester	II				
Instructional Hours per week		Lecture	Tutorial	Lab Practice	Total	CIA	External	Total
		5	-	--	5	25	75	100

Objectives:
- ✍ To familiarize classical encryption techniques and advanced encryption standards
- ✍ To explore the working principles and utilities of various cryptographic algorithms including secret key cryptography, hashes and message digests, and public key algorithms
- ✍ To recognize different encryption and decryption techniques to solve problems related to confidentiality and authentication
- ✍ To develop the ability to use existing cryptographic utilities to build programs for secure communication.
- ✍ To learn the need of digital signatures to secure the document with key management

Unit-I   **[9 Hrs]**

Overview: Computer Security Concepts – The OSI Security Architecture – Security Attacks – Security Services – Security Mechanisms –A Model for Network Security – Classical Encryption Techniques: Symmetric Cipher Model – Substitution Techniques – Transposition Techniques – Steganography.

Unit-II   **[9 Hrs]**

Block Ciphers and the Data Encryption Standard: Traditional Block Cipher Structure –The Data Encryption Standard – The DES Example – The Strength of DES – Block Cipher Design Principles.

Unit-III   **[9 Hrs]**

Advanced Encryption Standard: Finite Field Arithmetic– AES Structure – AES Transformation Functions – AES Key Expansion –Block Cipher Operation: Multiple Encryption and Triple DES – Stream Ciphers – RC4 – Public-Key Cryptography and RSA: Principles of Public-Key Cryptosystems – The RSA Algorithm

Unit-IV   **[9 Hrs]**

Cryptographic Hash Functions: Applications of Cryptographic Hash Functions – Two Simple Hash Functions – Requirements and Security – Hash Functions Based on Cipher Block Chaining – Secure Hash Algorithm (SHA).

Unit-V   **[9 Hrs]**

Digital Signatures – Elgamal Digital Signature Scheme – Schnorr Digital Signature Scheme – NIST Digital Signature Algorithm – Elliptic Curve Digital Signature Algorithm.

Text Books
1. William Stallings, "Cryptography and Network Security – Principles and Practices", Pearson Education / PHI, 7th Edition.
2. Behrouz A Forouzan, Debdeep Mukhopadhyay, "Cryptography And Network Security", McGraw Hill Education, 3rd Edition.

Reference Books

1. Bernard Menezes, "Network Security and Cryptography", Cengage,1st Edition, 2010.
2. William Stallings, "Cryptography and Network Security", Pearson Education India, Sixth Edition, 2016.
3. V.K. Jain, "Cryptography and Network Security", Khanna Book Publishing, New Delhi, 2016.
4. C.K. Shyamala, N. Harini, Dr. T. R. Padmanabhan, "Cryptography and Security", Wiley India Pvt.Ltd.,2011

Course Outcomes :

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

CO1:	Comprehend and analyze the security concepts to apply and evaluate the encryption techniques in various models	K1-K6
CO2:	Understand and examine the various data encryption standards and number theory. Illustrate and evaluate the various techniques in different applications	K1-K6
CO3:	Grasp the knowledge of AES techniques and apply to evaluate the performance with different key types	K1-K6
CO4:	Comprehend and analyse the basics of hash function and MAC that helps to develop the encryption models in various application	K1-K6
CO5:	Understand and illustrate the need of digital signature to examine the method of providing good security to the document. And also learn the concept of key management	K1-K6

K1- Remember, K2- Understand, K3- Apply , K4- Analyze, K5- evaluate and K6- Create

Mapping with Programme Outcomes:

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	M	S	-	L	M	S	M	M	-	S	-	-
CO2	M	S	-	M	M	L	M	S	-	M	-	-
CO3	S	S	-	M	S	M	S	M	-	S	-	-
CO4	S	M	L	S	M	L	S	M	-	M	-	-
CO5	M	S	M	L	S	L	M	S	-	S	-	-

S – Strong, M – Medium, L – Low

Title of the Course	**OFFICE AUTOMATION AND ICT TOOLS LAB**						
PART							
Category	SEC II	**Year**	I	**Credits**	2	**Course Code**	**232504208**
		Semester	II				
Instructional Hours per week		**Lecture**	**Tutorial**	**Lab Practice**	**Total**	**CIA**	**External**	**Total**
		-	-	3	3	25	75	100

Learning Objectives
To familiarize the students with various software approaches and techniques Offi+*-ce automation and ICT tools.

Course Outcomes: On Successful completion of this course, the students will be able to:

CO1 : **[K2]** Demonstrate and execute the meaningful office automation using MS Office.

CO2 : **[K3]** Demonstrate an understanding of the ICT tools.

CO3 : **[K4]** Apply ICT tools in developing real time office work.

CO4 : **[K5]** Assess the complex ICT tools in MS Office.

CO5 : **[K6]** Create simple applications that make use of MS Office.

Exercises:

MS-WORD

1. Text Manipulations and Text Formatting
2. Usage of Numbering, Bullets Tools and Headers
3. Usage of Spell Check and Find and Replace
4. Picture Insertion and Alignment
5. Creation of Documents Using Templates
6. Creation of Templates
7. Mail Merge Concept
8. Copying Text and Picture from Excel
9. Creation of Tables, Formatting Tables
10. Splitting the Screen and Opening Multiple Document
11. Inserting Symbols in Documents

MS-EXCEL

1. Creation of Worksheet and Entering Information
2. Aligning , Editing Data in Cell
3. Excel Function (Date , Time, Statistical, Mathematical, Financial Functions)
   Changing of Column Width and Row Height (Column and Range of Column)
   Moving, copying, Inserting and Deleting Rows and Columns
4. Formatting Numbers and Other Numeric Formats
5. Drawing Borders around Cells
6. Creation of Charts
7. Raising Moving Changing Chart Type
8. Controlling the Appearance of a Chart

MS-POWER POINT

1. Working with slides Creating, saving, closing presentation
2. Changing slide layout
3. Working fonts and bullets
4. Inserting Clipart
5. Working with Clipart
6. Applying Transition and animation effects
7. Add audio file to the slide.
8. Run a Slide Show

Reference Books:

1. **Microsoft** Office 2003: The Complete Reference by Jennifer Ackerman Kettell, Guy Hart-Davis and Curt Simmons ; New Delhi **Tata McGraw-Hill Publishing** Company Ltd.

2.Office Automation A Complete Guide - 2020 Edition, Gerardus Blokdyk**,** 5STARCooks, **2021**

Web References:

1. https://www.youtube.com/watch?v=DzTCFsdxMP4

2. https://support.microsoft.com/en-us/office

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

Title of the Course		**Leadership and Personality Development**						
Category	AECC II	**Year**	I	**Credits**	2	**Course Code**		**232504209**
		Semester	I					
Instructional Hours per week		**Lecture**	**Tutorial**	**Lab Practice**	**Total**	**CIA**	**External**	**Total**
		2	-	-	2	25	75	100

Course Objective

This course enables the students:
- ✍ To enhance students' interpersonal skills
- ✍ To improve students' writing skills
- ✍ To inculcate positive attitude in students
- ✍ To enrich the vocabulary of students by employing various teaching techniques
- ✍ To enhance employability skills in students

Unit-1 Writing Skills

Basics of Writing-Writing Paragraphs-Writing Research Articles-Report Writing-Writing a CV.

Unit-2 Public speaking / Communication

The power of Public Speaking-Developing Confidence-Planning-Preparation-Successful and effective delivery of speech- Inter-Personal Communication-Relationships-Leadership-Team building.

Unit-3 Grammar and Projecting a Positive Social Image

Basics of grammar- (Parts of speech, tense form, articles, etc.)-Identifying Errors-Grooming-Body Language-Eye Contact-Social Etiquette-Manners in conversations

Unit-4 Attitude and Motivation

Importance of possessing the right Attitude-Factors affecting Attitudes-Positive and negative Attitudes-Internal and external Motives-Importance of self-Motivation-Factors leading to de-Motivation-Goal setting and Prioritization-Effective Planning-Time Management-Discipline in problem solving.

Unit-5 Interviews and Personality Development

Interviewing in the 21st Century-Developing an Interview Strategy -Taking Care of the Details- Practicing for the Interview-During the Interview-Stress Interviews- Traditional Interviews - Positive self-image and negative self-Image-Problems of Maladjustment-Building self-esteem and confidence.

Reference Books
1. Winning at Interviews(second Edition)- Edgar Thrope and showick Thorpe, Pearson, New Delhi 2009.
2. Inspired to write-Jean withrow, Gay Brookers and Martha Cumings, Cambridge University Press, New York, 2004.
3. How to build the a better vocabulary – Maxwell Numberg and Morris Rosenblum, Warner Books, New York,1989.

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

CO1	To improve the students writing skills	**K1- K6**
CO2	To enhance the students interpersonal skills	**K1- K6**
CO3	To inculcate Positive attitude and employability in students	**K1- K6**
CO4	To enrich the vocabulary of the students by employing various techniques.	**K1- K6**
CO5	To guide the students to tackle the Interviews	**K1- K6**

K1- Remember, K2- Understand, K3- Apply, K4- Analyze, K5- Evaluate, K6- Create

Mapping with Programme Outcomes

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	S	S	M	S	S	S	S	S	S	M	S	S
CO2	S	S	S	S	S	S	S	S	S	S	M	S
CO3	S	S	S	S	S	S	M	S	S	M	L	S
CO4	S	S	S	S	S	S	S	M	S	S	S	S
CO5	S	S	S	S	L	S	M	S	S	M	M	S

4. **S- Strong; M-Medium; L-Low**