AG & S.G SIDDHARTHA DEGREE COLLEGE OF ARTS & SCIENCE, VUYYURU-521165

(An Autonomous College in the Jurisdiction of Krishna University)

Accredited at the level 'A' by the **NAAC**

Sponsors: Siddhartha Academy of General & Technical Education

DEPARTMENT OF COMPUTER SCIENCE

Minutes of the meeting of Board of Studies in Computer Science for PG (M.Sc.)

Date: 25th November 2021

A.G & S.G SIDDHARTHA DEGREE COLLEGE OF ARTS & SCIENCE
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DEPARTMENT OF COMPUTER SCIENCE

Minutes of the meeting of Board of Studies in Computer Science for PG held on 25th November 2021 in the Department of Computer Science.

Members Present		
Name of the Member	**Role**	**Signature**
Sri. T.Naga Prasada Rao, I/C HOD,Dept of Computer Science, A.G & S.G Siddhartha Degree College of Arts & Science, Vuyyuru-521165. Mobile: 9866803938, E-Mail: t.nagaprasadarao@gmail.com	Chairman	
Dr. K. Madhavi, Associate Professor, Dept of Computer Science, JNTUA. College of Engineering, Anantapur. Mobile: 9440206501 E-Mail: kasamadhavi@yahoo.com	University Nominee, Krishna University	
Dr. R. Satya Prasad, Professor, Department of Computer Science, Acharya Nagarjuna University, Nagarjuna Nagar-522508. Mobile: 9848487478 E-Mail: profrsp@gmail.com	Subject Expert	
Dr. T. S. Ravi Kiran, H.O.D & Assistant Professor, Dept of Computer Science, P.B. Siddhartha Degree College of Arts & Science - Vijayawada -520002. Mobile: 9441176980 E-Mail: kirantsr1 @gmail.com, tsravikiran@pbsiddhartha.ac.in	Special Invitee	
Mr. U. Sairam, C.E.O, Codegnan I.T Solutions OPC PVT LTD., Vijayawada520002 Mobile: 9959555952 E-Mail: uppugundlasairam@gmail.com	Industrialist	
Mr. Korada Sri Venkata Siva Sai Kumar, Software Developer, GGS Information Services India Pvt., Ltd. Mobile: 8686541443 E-Mail: svkorada@gmail.com	Alumni Representative	
Mrs. T. Keerthi, Assistant Professor, Dept. of Computer Science, A.G & S.G Siddhartha Degree College of Arts & Science,Vuyyuru-521165. Mobile: 9959558485 E-Mail: keerthitatineni16@gmail.com	Member	
Mr. K.Srikanth, Assistant Professor, Dept. of Computer Science, A.G & S.G Siddhartha Degree College of Arts & Science, Vuyyuru-521165. Mobile: 9182188521 E-Mail: srikanth.agsgs@gmail.com	Member	
Mrs. V. Munni, Assistant Professor, Dept. of Computer Science, A.G & S.G Siddhartha Degree College of Arts & Science, Vuyyuru-521165. Mobile: 8099205522 E-Mail: munni.j2ee@gmail.com	Member	
Mr. V. Naga Malleswararao, Assistant Professor, Dept. of Computer Science, A.G & S.G Siddhartha Degree College of Arts & Science , Vuyyuru-521165. Mobile: 9505582600, E-Mail: nagamalliv14@gmail.com	Member	

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BOS Meeting – P.G Department of Computer Science-25/11/2021, 10.00 AM, through online Mode (Google Meet) A.G& S.G Siddhartha Degree College of Arts & Science.

Syllabus approval letter through Mail

1. **Associate Professor Dr. K. Madhavi,**

Dear Sir/Madam,

I Approve the Structure, Syllabi and Model Question Papers for the First & Third Semester of M.Sc Computer Science , which were discussed in the Bos Meeting held on 25/11/2021.

Dr K. Madhavi,
Associate Professor,
Dept. of CSE,
JNTUA College of Engineering, Ananthapuramu
Mobile: 9440206501
E-Mail: kasamadhavi@yahoo.com

2. **Professor Dr. R. Satya Prasad,**

Dear Sir/Madam,

I Approved minutes of BOS of all resolutions 25th November 2021

Dr. R. Satya Prasad,
Professor,
Department of Computer Science,
Acharya Nagarjuna University,
Nagarjuna Nagar-522508.
Mobile: 9848487478
E-Mail: profrsp@gmail.com

3. **Dr. T. S. Ravi Kiran, Assistant Professor,**

Dear Sir
I Approved Minutes of BOS

Dr. T. S. Ravi Kiran,
Assistant Professor
Dept of Computer Science,
P.B. Siddhartha Degree College of Arts & Science
Vijayawada -520002.
Mobile: 9441176980
E-Mail: kirantsr1 @gmail.com,
tsravikiran@pbsiddhartha.ac.in

- To discuss and approve the Structure, Syllabi and Model Question Papers of First Semester of M.Sc.(Computer Science) for the batch of students admitted from the academic year 2021-2022 and onwards.

- To discuss and approve the Structure, Syllabi and Model Question Papers of Third Semester of M.Sc.(Computer Science) for the batch of students admitted from the academic year 2021-2022 and onwards.

- To discuss and approve the Structure, Syllabi and Model Question Papers of Open Electives "Visual Analytics for Executes" and "Web Programming".

- To discuss and approve the Structure, Syllabi and Model Question Paper of Add on Course "PHP with My SQL Certification (21CS3A1)" for M.Sc.(Computer Science) Programme.

RECOMMENDATIONS FOR M.Sc.(COMPUTER SCIENCE) PROGRAMME

- Resolved and recommended to adopt the Structure, Syllabi and Model Question Papers of First Semester of M.Sc.(Computer Science) Programme inline with the guidelines of OBE following the Bloom's Taxonomy for the batch of students admitted from the academic year 2021-2022 and onwards. Refer Appendix-I for First Semester Structure, Syllabi and Model Question Papers as per the new regulations recommended by the Krishna University with effect from 2021-2022(R20).

- Resolved and recommended to adopt the Structure, Syllabi and Model Question Papers of Third Semester of M.Sc.(Computer Science) Programme inline with the guidelines of OBE following the Bloom's Taxonomy for the batch of students admitted from the academic year 2020-2021 and onwards. Refer Appendix-II for Third Semester Structure, Syllabi and Model Question Papers as per the new regulations recommended by the Krishna University with effect from 2020-2021(R20).

RECOMMENDATIONS FOR OPEN ELECTIVES

- Resolved and recommended to adopt the Syllabi and Model Question Papers of open electives "Visual Analytics for Executives" and "Web Programming". Refer Appendix-III for Syllabi and Model Question Papers.

RECOMMENDATIONS FOR ADD ON COURSE

- It is resolved and recommended that grades for Add on Course "PHP with My SQL Certification" (20CS3A1) are awarded as per the rule applicable to any course part of M.Sc.(Computer Science) Programme. Refer Appendix-IV.

Program Educational Objectives & Program Specific Objectives

Program Educational Objectives for M.Sc.(Computer Science) Programme

PEO1. Technical Expertise and Knowledge in Multiple Domains: Ability to develop an understanding of modern computing concepts and architectures from a design and performance perspective of various domains.

PE02. Assessment from System Level Perspective: Able to analyse and appreciate the structure of computer systems and the processes involved in their construction at various levels of detail and abstraction.

PEO3. Critical Thinking, Business Analytics & Problem Solving and Innovation: An ability to apply knowledge of mathematics and computer science practices to build Innovative Public & Private Sector Applications involving complex computing problem solving and in research.

PEO4. Professional Ethics & Social Responsibility: Ability to apply and commit to professional ethics following cyber regulations in a global economic environment. Create and design innovative applications to solve complex problems using established practices for the betterment of the society.

PEO5. Apposite to Industry: Gain exposure to multiple programming languages, tools, paradigms, and technologies as well as the fundamental underlying principles throughout their education there by making them the right choice for industry positions.

PEO6. Effective Communication & Leadership: Ability to communicate effectively and present technical & project management information using audio visual tools as well as in oral and written reports. Rise up to the need and be able to lead teams of individuals.

PEO7. Life-long Learning and Research: Understand the importance of, and possess pre-requisite skill set to undertake life-long independent learning and research in the context of contemporary technological advancements.

Program Specific Objectives for M.Sc.(Computer Science) Programme

PSO1. To make the students industry ready as far as possible to enhance their employability in the industries.

PSO2. Create an ambience of education through faculty training, self learning, sound academic practices and research endeavors.

Applicable for the batch of students admitted during the Academic Year 2021-2022

S.No.	Course Code	Title of the Course	L	T	P	Credits	CIA Marks	SEE Marks	SEE Duration	Total Marks
	M.Sc.(Computer Science)					SEMESTER I				
1	21CS1T1	Problem Solving Using Python Programming	4			4	30	70	3 Hours	100
2	21CS1T2	Computer Organization	4			4	30	70	3 Hours	100
3	21CS1T3	Software Engineering	4			4	30	70	3 Hours	100
4	21CS1T4	Database Management Systems	4			4	30	70	3 Hours	100
5	21CS1T5	Theory of Computation	4			4	30	70	3 Hours	100
6	21CS1L1	Problem Solving Using Python Programming Lab			8	4	30	70	3 Hours	100
7	21CS1L2	DBMS Lab			8	4	30	70	3 Hours	100
8	21CS1S1	Seminar	2			1	50	Nil	Nil	50
		Total	38			29	260	490		750

CIA=Continuous Internal Assessment   SEE=Semester End Examinations

Applicable for the batch of students admitted during the Academic Year 2021-2022

S.No.	Course Code	Title of the Course	L	T	P	Credits	CIA Marks	SEE Marks	SEE Duration	Total Marks
	M.Sc.(Computer Science)					SEMESTER III				
1	21CS3T1	Cryptography & Network Security	4			4	30	70	3 Hours	100
2	21CS3T2	Design & Analysis of Algorithms	4			4	30	70	3 Hours	100
3	21CS3T3	Web Technologies	4			4	30	70	3 Hours	100
4	21CS3T4	Data Mining Techniques	4			4	30	70	3 Hours	100
5		Open Elective-II (Student has to select one open elective from the elective courses provided)	4			4	30	70	3 Hours	100
6	21CS3L1	Web Technologies Lab			8	4	30	70	3 Hours	100
7	21CS3L2	Data Mining Lab			8	4	30	70	3 Hours	100
		Total	36			28	210	490		700

CIA=Continuous Internal Assessment   SEE=Semester End Examinations

A.G & S.G Siddhartha Degree College of Arts & Science, Vuyyuru – 521165.
(An Autonomous College in the jurisdiction of Krishna University)
M.Sc., (Computer Science) Programme - I Semester

Course	PROBLEM SOLVING USING PYTHON PROGRAMMING		
Course Code	21CS1T1	Course Delivery Method	Class Room / Blended Mode
Credits	4	CIA Marks	30
No. of Lecture Hours / Week	4	Semester End Exam Marks	70
Total Number of Lecture Hours	60	Total Marks	100
Year of Introduction:2020-21	Year of Offering:2021-22	Year of Revision:2021-22	Percentage of Revision: 0%

Course Outcomes: On successful completion of this course, the students:

1. Understand basics of Python Programming. (CO1)
2. Gain knowledge on Decision Control Statements and Functions & Modules. (CO2)
3. Be familiar with Python Strings and Data Structures. (CO3)
4. Have knowledge on Classes & Objects. (CO4)
5. Apply Inheritance, Error and Exception Handling and Operator Overloading. (CO5)

Unit	Learning Units	Lecture Hours
I	**Basics of Python Programming:** Features of Python, History of Python, The Future of Python, Writing and Executing First Python Program, Literal Constants, Variables and Identifiers, Data Types, Input Operation, Comments, Reserved Words, Indentation, Operators and Expressions, Expressions in Python, Operations on Strings, Other Data Types, Type Conversion.	14
II	**Decision Control Statements:** Conditional Branching Statements, Basic Loop Structures, Nested Loops, The Break Statement, The Continue Statement, The Pass Statement. The Else Statement used with Loops. **Functions and Modules:** Function Definition, Function Call, Variable Scope and Lifetime, The Return Statement, More on Defining Functions, Recursive Functions, Modules, Packages in Python, Standard Library Modules.	14
III	**Python Strings Revisited:** Concatenating, Appending and Multiplying Strings, String Formatting Operator, Built in String Methods and Functions, Comparing Strings, Regular Expressions. **Data Structures:** Sequence, Lists, Functional Programming, Tuple, Sets, Dictionaries.	10
IV	**Classes and Objects:** Classes and Objects, Class Method and self Argument, Class Variables and Object Variables, Public and Private Data Members, Private Methods, Calling a Class Method from Another Class Method, Built-in Class Attributes, Class Methods, Static Methods.	10
V	**Inheritance:** Inheriting Classes in Python, Types of Inheritance, Abstract Classes and Interfaces. **Error and Exception Handling:** Introduction to Errors and Exceptions, Handling Exceptions, Raising Exceptions, Built-in and User defined Exceptions **Operator Overloading:** Concept of Operator Overloading, Advantage of Operator Overloading, Implementing Operator Overloading.	12

Prescribed Text Book			
	Author	Title	Publisher
1	Reema Thareja	Python Programming Using Problem Solving Approach	Oxford University Press
Reference Text Book			
1	Wesley Chun	Core Python Programming	Prentice Hall

A.G & S.G Siddhartha Degree College of Arts & Science, Vuyyuru – 521165.
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M.Sc., (Computer Science) Programme - I Semester
Course Code: 21CS1T1   Title: PROBLEM SOLVING USING PYTHON PROGRAMMING
(w.e.f admitted batch 2021-22)

Time: 3 Hours   **Max. Marks: 70**
Answer ALL questions   **(10×2 = 20 Marks)**

1. a) Define Comments and Operators. (BTL1)
   b) Define Indentation. (BTL1)
   c) What is Dangling else Problem? (BTL1)
   d) What is a Package? (BTL1)
   e) What is a Slice? (BTL1)
   f) Define Immutable. (BTL1)
   g) What is Class Variable and Instance Variable? (BTL1)
   h) What is Namespace? (BTL1)
   i) Differentiate Error and Exception? (BTL3)
   j) What is Membership Operator? (BTL1)

Answer Five Questions Choosing One Question from Each Unit.
All Questions Carry Equal Marks.   **(5×10 = 50 Marks)**
UNIT – I
2. A) Explain the features of Python Programming Language. (BTL2)
                                (or)
   B) Explain Different Types of Operators in Python. (BTL2)

UNIT – II
3. A) Discuss Basic Loop Structures in Python with illustrations. (BTL6)
                                (or)
   B) Explain Modules in Python with examples. (BTL2)

UNIT – III
4. A) State built-in String Methods and Functions in Python. (BTL1)
                                (or)
   B) Explain Tuple Data Structure in Python with examples. (BTL2)

UNIT – IV
5.   A) What are Classes and Objects? Write a program in Python to illustrate an instance
            variable. (BTL1)
                                (or)
   B) Explain Class Method and Static Method with example. (BTL2)

UNIT – V
6. A) Explain Different Types of Inheritance in Python with suitable examples. (BTL2)
                                (or)
   B) Explain any three Built-in Exceptions with relevant examples. (BTL2)

A.G & S.G Siddhartha Degree College of Arts & Science, Vuyyuru – 521165.
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M.Sc., (Computer Science) Programme - I Semester

Course	COMPUTER ORGANIZATION		
Course Code	21CS1T2	Course Delivery Method	Class Room / Blended Mode
Credits	4	CIA Marks	30
No. of Lecture Hours / Week	4	Semester End Exam Marks	70
Total Number of Lecture Hours	60	Total Marks	100
Year of Introduction:2020-21	Year of Offering:2021-22	Year of Revision:2021-22	Percentage of Revision: 0%

Course Outcomes:

On successful completion of this course, the students:

1. Understand Digital Logic Circuits, Digital Components and Data Representation. (CO1)
2. Know Register Transfer and Micro Operations and Basic Computer Organization and Design. (CO2)
3. Be familiar with Micro Programmed Control and Central Processing Unit. (CO3)
4. Have knowledge on Computer Arithmetic. (CO4)
5. Understand Input-Output Organization & Memory Organization. (CO5)

Unit	Learning Units	Lecture Hours
I	**Digital Logic Circuits:** Digital Computers, Logic Gates, Boolean Algebra, Map Simplification, Combinational Circuits, Flip-Flops, Sequential Circuits.**Digital Components:** Integrated Circuits, Decoders, Multiplexers, Registers, Shift Registers, Binary Counters, Memory Unit.**Data Representation:** Data Types, Complements, Fixed-Point Representation, Floating-Point Representation, Other Binary Codes, Error Detection Codes.	14
II	**Register Transfer and Micro Operations:** Register Transfer Language, Register Transfer, Bus & Memory Transfers, Arithmetic Micro Operations, Logic Micro Operations, Shift Micro Operations, Arithmetic Logic Shift Unit.**Basic Computer Organization and Design:** Instruction Codes, Computer Registers, Computer Instructions, Timing & Control, Instruction Cycle, Memory-Reference Instructions, Input-Output Interrupt.	14
III	**Micro Programmed Control:** Control Memory, Address Sequencing, Micro Program Example, Design of Control Unit.**Central Processing Unit:** General Register Organization, Stack Organization, Instruction Formats, Addressing Modes, Data Transfer and Manipulation, Program Control.	14
IV	**Computer Arithmetic:** Introduction, Addition and Subtraction, Multiplication Algorithm, Floating Point Arithmetic Operations, Decimal Arithmetic Unit, Decimal Arithmetic Operations.	08
V	**Input-Output Organization:** Peripheral Devices, Input-Output Interface, Asynchronous Data Transfer, Modes of Transfer, Priority Interrupt.**Memory Organization:** Memory Hierarchy, Main Memory, Auxiliary Memory, Associative Memory, Cache Memory.	10

Prescribed Text Book

	Author	Title	Publisher
1	M.Morris Mano	Computer System Architecture	3rd Edition, Pearson Education (2008).

Reference Text Books

	Author	Title	Publisher
1	V. Rajaraman, T. Radha Krishnan	Computer Organization and Architecture	PHI
2	Behrooz Parhami	Computer Architecture	Oxford (2007)
3	ISRD group	Computer Organization	Ace series, TMH (2007)
4	William Stallings	Computer Organization and Architecture – Designing for Performance	Pearson Education (2005)
5	P.Chakraborty	Computer Architecture and Organization	Jaico Books (2008)

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M.Sc., (Computer Science) Programme - I Semester
Course Code: 21CS1T2   Title: COMPUTER ORGANIZATION
(w.e.f admitted batch 2021-22)

Time: 3 Hours   **Max. Marks: 70**
Answer ALL questions   **(10×2 = 20 Marks)**

1. a) State any two Logic Gates with Truth Tables. (BTL1)
    b) Find the Binary Number (?)$_2$ to Hexadecimal Number (1C)$_{16}$ (BTL1)
    c) What is Register Transfer? (BTL1)
    d) What is Accumulator ? (BTL1)
    e) What is Address Sequencing ? (BTL1)
    f) Give details of Stack Organization. (BTL1)
    g) What is BCD Adder ? (BTL1)
    h) Perform Binary Multiplication for the decimal numbers 23 and 19. (BTL1)
    i) What is the difference between Isolated and Memory Mapped I/O? (BTL1)
    j) What is Priority Interrupt ? (BTL1)

Answer Five Questions Choosing One Question from Each Unit.
All Questions Carry Equal Marks.   **(5×10 = 50 Marks)**

UNIT – I

2. A) What is Flip flop? Explain different types of Flip flops in detail. (BTL1)
                          (or)
    B) Explain the Fixed Point Representation with an example.   (BTL2)

UNIT – II

3. A) Explain Logic Micro Operations in detail. (BTL2)
                          (or)
    B) What is Instruction Cycle? Explain various phases of Instruction Cycle. (BTL1)

UNIT – III

4. A) Describe the design of Control Unit. (BTL2)
                          (or)
    B) Explain various Addressing Modes. (BTL2)

UNIT – IV

5. A) What is BCD Added ? Explain in detail. (BTL1)
                          (or)
     B) Explain Booth's Multiplication Algorithm with example. (BTL2)

UNIT – V

6. A) Explain different Modes of Data Transfers. (BTL2)
                          (or)
    B) What is Cache Memory? Discuss various Mapping Procedures of Cache Memory. (BTL1)

A.G & S.G Siddhartha Degree College of Arts & Science, Vuyyuru – 521165.
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M.Sc., (Computer Science) Programme - I Semester

Course	SOFTWARE ENGINEERING		
Course Code	21CS1T3	Course Delivery Method	Class Room / Blended Mode
Credits	4	CIA Marks	30
No. of Lecture Hours / Week	4	Semester End Exam Marks	70
Total Number of Lecture Hours	60	Total Marks	100
Year of Introduction:2021-22	Year of Offering:2021-22	Year of Revision:2021-22	Percentage of Revision: 0%

Course Outcomes: On successful completion of this course, the students:

1. Understand various Software Engineering Methods, Practices, Process Models and Agile Development Strategies. (CO1)
2. Illustrate Core Principles, Requirements & Modelling Concepts. (CO2)
3. Identify different Software Testing Approaches and various aspects of Software Quality Assurance. (CO3)
4. Classify various Process & Project Management Concepts. (CO4)
5. Estimate Software Projects & apply Formal Methods Modelling. (CO5)

Unit	Learning Units	Lecture Hours
I	**Software and Software Engineering:** The Nature of Software: Defining Software, Software Application Domains, Legacy Software, The Unique Nature of WebApps, Software Engineering, The Software Process, Software Engineering Practices: The Essence of Practice, General Principles, Software Myths. **Process Models:** A Generic Process Model: Defining a Framework Activity, Identifying a Task Set, Process Patterns, Process Assessment and Improvement, Prescriptive Process Models:The Waterfall Model, Incremental Process Models, Evolutionary Process Models, Concurrent Models, A Final Word on Evolutionary Processes, Specialized Process Models: Component-Based Development, The Formal Methods Model, Aspect-Oriented Software Development, The Unified Process:A Brief History, Phases of the Unified Process, Personal and Team Process Models: Personal Software Process (PSP), Team Software Process (TSP).**Agile Development**: What Is Agility, Agility and the Cost of Change, What Is an Agile Process: Agility Principles, The Politics of Agile Development, Human Factors, Extreme Programming (XP): XP Values, The XP Process, Industrial XP, The XP Debate, Other Agile Process Models: Adaptive Software Development (ASD), Scrum, Dynamic Systems Development Method (DSDM), Crystal, Feature Driven Development (FDD), Lean Software Development (LSD), Agile Modeling (AM), Agile Unified Process (AUP).	12
II	**Principles that Guide Practice: Core Principles:** Principles That Guide Process, Principles That Guide Practice**,** Principles That Guide Each Framework Activity: Communication Principles, Planning Principles, Modeling Principles, Construction Principles, Deployment Principles.**Requirements Modeling: Scenarios, Information, and Analysis Classes:** Requirements Analysis: Overall Objectives and Philosophy, Analysis Rules of Thumb, Domain Analysis, Requirements Modeling Approaches, Scenario-Based Modeling: Creating a Preliminary Use Case, Refining a Preliminary Use Case, Writing a Formal Use Case, UML Models That Supplement the Use Case: Developing an Activity Diagram, Swimlane Diagrams. **Data Modeling Concepts:** Data Objects, Data Attributes, Relationships, Class-Based Modeling: Identifying Analysis Classes, Specifying Attributes, Defining Operations, Class-Responsibility-Collaborator (CRC) Modeling, Associations and Dependencies, Analysis Packages.	12

III	**Software Quality Assurance:** Background Issues, Elements of Software Quality Assurance, SQA Tasks, Goals, and Metrics: SQA Tasks, Goals, Attributes, and Metrics, Formal Approaches to SQA, Statistical Software Quality Assurance: A Generic Example, Six Sigma for Software Engineering, Software Reliability: Measures of Reliability and Availability, Software Safety, The ISO 9000 Quality Standards, The SQA Plan. **Software Testing Strategies:** A Strategic Approach to Software Testing:Verification and Validation, Organizing for Software Testing, Software Testing Strategy-The Big Picture, Criteria for Completion of Testing, Strategic Issues, Test Strategies for Conventional Software: Unit Testing, Integration Testing, Test Strategies for Object-Oriented Software: Unit Testing in the OO Context, Integration Testing in the OO Context, Test Strategies for WebApps, Validation Testing: Validation-Test Criteria, Configuration Review, Alpha and Beta Testing, System Testing: Recovery Testing, Security Testing, Stress Testing, Performance Testing, Deployment Testing, The Art of Debugging:The Debugging Process, Psychological Considerations, Debugging Strategies, Correcting the Error **Testing Conventional Applications:** Software Testing Fundamentals, Internal and External Views of Testing, White-Box Testing, Basis Path Testing: Flow Graph Notation, Independent Program Paths, Deriving Test Cases, Graph Matrices, Control Structure Testing: Condition Testing, Data Flow Testing, Loop Testing, Black-Box Testing: Graph-Based Testing Methods, Equivalence Partitioning, Boundary Value Analysis, Orthogonal Array Testing,	12
IV	**Project Management Concepts:** The Management Spectrum: The People, The Product, The Process, The Project, People: The Stakeholders, Team Leaders, The Software Team, Agile Teams, Coordination and Communication Issues, The Product:Software Scope, Problem Decomposition, The Process: Melding the Product and the Process, Process Decomposition,The Project, The W5HH Principles. **Process and Project Metrics:** Metrics in the Process and Project Domains:Process Metrics and Software Process Improvement, Project Metrics, Software Measurement: Size-Oriented Metrics, Function-Oriented Metrics, Reconciling LOC and FP Metrics, Object-Oriented Metrics, Use-Case–Oriented Metrics, WebApp Project Metrics, Metrics for Software Quality: Measuring Quality, Defect Removal Efficiency	12
V	**Formal Modeling And Verification:** The Cleanroom Strategy, Functional Specification: Black-Box Specification, State-Box Specification, Clear-Box Specification, Cleanroom Design: Design Refinement, Design Verification, Cleanroom Testing: Statistical Use Testing, Certification, Formal Methods Concepts, Applying Mathematical Notation for Formal Specification, Formal Specification Languages: Object Constraint Language (OCL), The Z Specification Language. **Estimation for Software Projects:** Resources: Human Resources, Reusable Software Resources, Environmental Resources, Software Project Estimation, Decomposition Techniques: Software Sizing, Problem-Based Estimation, An Example of LOC-Based Estimation, An Example of FP-Based Estimation, Empirical Estimation Models: The Structure of Estimation Models, The COCOMO II Model, The Software Equation, Estimation for Object-Oriented Projects.	12

Prescribed Text Book

	Author	Title	Publisher
1	Roger S Pressman	Software Engineering - A Practitioner's Approach	Seventh Edition, McGraw - Hill, A Business Unit of The McGraw-Hill Companies, Inc.,

Reference books

1	Sommerville	Software engineering	7th edition, Pearson
2	S.A.Kelkar	Software Engineering - A Concise Study	PHI.
3	Waman S.Jawadekar	Software Engineering	TMH.

A.G & S.G Siddhartha Degree College of Arts & Science, Vuyyuru – 521165.
(An Autonomous College in the jurisdiction of Krishna University)
M.Sc., (Computer Science) Programme - I Semester
Course Code: 21CS1T3   Title: SOFTWARE ENGINEERING
(w.e.f admitted batch 2021-22)

Time: 3 Hours   **Max. Marks: 70**
Answer ALL questions   **(10×2 = 20 Marks)**

1. a) Define Software Engineering. (BTL1)
   b) What is PSP & TSP? (BTL2)
   c) Write any two key features of Class-Responsibility-Collaborator (CRC) Modeling. (BTL1)
   d) State any two Deployment Principles. (BTL1)
   e) What is Software Reliability? (BTL1)
   f) Describe the Arts of Debugging. (BTL2)
   g) What are the aspects to be considered while testing Object Oriented Software? (BTL1)
   h) Write any two W5HH Principles. (BTL1)
   i) State various Resources while estimating the Software Projects. (BTL1)
   j) What is State Box? (BTL1)

Answer Five Questions Choosing One Question from Each Unit.
All Questions Carry Equal Marks.   **(5×10 = 50 Marks)**
UNIT – I

2. A) What is Myth? State various myths of Software Myths. (BTL1)
                              (or)
   B) Describe any two Prescriptive Process Models. (BTL2)
UNIT – II

3. A) State (i) Communication and (ii) Planning Principles. (BTL1)
                              (or)
   B) Describe Scenario-Based Modeling in detail. (BTL2)

UNIT – III
4. A) Discuss the testing strategies to test Conventional Software. (BTL2)
                              (or)
   B) What is White Box Testing? Explain in detail. (BTL1)

UNIT – IV

5. A) Discuss the Management Spectrum in detail. (BTL6)
                              (or)
   B) Explain (i) Size-Oriented Metrics and (ii) Function-Oriented Metrics in detail. (BTL2)

UNIT – V

6. A) Explain Functional Specification of Cleanroom Strategy. (BTL2)
                              (or)
   B) Describe (i) The COCOMO II Model and (ii) The Software Equation of Empirical
      Estimation Models. (BTL2)

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M.Sc., (Computer Science) Programme - I Semester

Course	DATABASE MANAGEMENT SYSTEMS		
Course Code	21CS1T4	Course Delivery Method	Class Room / Blended Mode
Credits	4	CIA Marks	30
No. of Lecture Hours / Week	4	Semester End Exam Marks	70
Total Number of Lecture Hours	60	Total Marks	100
Year of Introduction:2020-21	Year of Offering:2021-22	Year of Revision:2021-22	Percentage of Revision: 0%

Course Outcomes:

On successful completion of this course, the students:

1. Understands the Concepts & Architecture of Databases. (CO1)
2. Able to apply simple and complex SQL Queries & Relational Algebra & Relational Calculus operations. (CO2)
3. Gain knowledge on ER, EER Schemas & Normalization. (CO3)
4. Understands Disk Storage Organization, Hashing & Indexing. (CO4)
5. Be aware of Transaction Processing, Concurrency Control and Distributed Databases. (CO5)

Unit	Learning Units	Lecture Hours
I	**Databases and Database Users:** Introduction, An Example, Characteristics of the Database Approach, Actors on the Scene, Workers behind the Scene, Advantage of Using the DBMS Approach. **Database System Concepts and Architecture:** Data Models, Schemas, and Instances, Three-Schema Architecture and Data Independence, Database Languages and Interfaces, The Database System Environment, Centralized and Client/Server Architectures for DBMSs. **The Relational Data Model and Relational Database Constraints:** Relational Model Concepts, Relational Model Constraints and Relational Database Schemas, Update Operations, Transactions, and Dealing with Constraint Violations.	12
II	**Basic SQL:** SQL Data Definition and Data Types, Specifying Constraints in SQL, Basic Retrieval Queries in SQL, INSERT, DELETE, and UPDATE Statements in SQL. **More SQL:** More Complex SQL Retrieval Queries, Views (Virtual Tables) in SQL, Schema Change Statements in SQL. **The Relational Algebra and Relational Calculus:** Unary Relational Operations: SELECT and PROJECT, Relational Algebra Operations from Set Theory, Binary Relational Operations: JOIN and DIVISION, Additional Relational Operations, Examples of Queries in Relational Algebra, The Tuple Relational Calculus, The Domain Relational Calculus.	10
III	**Data Modeling Using the Entity-Relationship (ER) Model:** Using High-Level Conceptual Data Models for Database Design, Entity Types, Entity Sets, Attributes, Keys, Relationship Types, Relationship Sets, Roles, Structural Constraints, Weak Entity Types, ER Diagrams, Naming Conventions,DesignIssues. **The Enhanced Entity-Relationship (EER) Model:** Subclasses, Super classes, Inheritance, Specialization and Generalization, Constraints and Characteristics of Specialization and Generalization Hierarchies, Modeling of UNION Types Using	14

	Categories, A Sample UNIVERSITY EER Schema, Design Choices, Formal Definitions. **Functional Dependencies:** Introduction, Basic Definitions, Trivial and Non-Trivial Dependencies, Closure of set of Dependencies, Closure of set of Attributes, Irreducible sets of dependencies. **Further Normalization 1NF, 2NF, 3NF, BCNF:** Introduction, Nonloss decomposition and functional dependencies, 1st, 2nd and 3rd normal forms, Boyce-Codd Normal Form. Multivalued Dependency and Fourth Normal Form, Join Dependencies and Fifth Normal.	
IV	**Disk Storage, Basic File Structures and Hashing:** Secondary Storage Devices, Buffering of Blocks, Placing File Records on Disk, Operations on Files, Files of Unordered Records (Heap Files), Files of Ordered Records (Sorted Files), Hashing Techniques, Parallelizing Disk Access Using RAID Technology. **Indexing Structures for Files:** Types of Single-Level Ordered Indexes, Multilevel Indexes, Dynamic Multilevel Indexes Using B-Trees and B^+-Trees.	10
V	**Introduction to Transaction Processing Concepts and Theory:** Introduction to Transaction Processing, Transaction and System Concepts, Desirable Properties of Transactions, Characterizing Schedules Based on Recoverability, Characterizing Schedules Based on Serializability, Transaction Support in SQL. **Concurrency Control Techniques**: Two-Phase Locking Techniques for Concurrency Control, Concurrency Control Based on Timestamp Ordering, Multiversion Concurrency Control Techniques, Validation (Optimistic) Concurrency Control Techniques, Granularity of Data Items and Multiple Granularity Locking, Using Locks for Concurrency Control in Indexes. **Distributed Databases:** Distributed Database Concepts, Types of Distributed Database Systems, Distributed Database Architectures, Data Fragmentation, Replication and Allocation Techniques for Distributed Database Design.	14

Prescribed Text Book			
	Author	Title	Publisher
1	Ramez Elmasri, Shamkant B. Navathe	Fundamentals of Database Systems.	Pearson Education, Seventh Edition, 2017
2	C.J. Date, A.Kannan, S.Swamynathan	An Introduction to Database Systems	VII Edition Pearson Education (2006).

Reference Text Books			
	Author	Title	Publisher
1	Peter Rob, Carlos Coronel	Database Systems - Design, Implementation and Management	Eigth Edition, Thomson (2008)
2	Raman A Mata - Toledo, Panline K. Cushman	Database Management Systems	Schaum's Outlines, TMH (2007)
3	Steven Feuerstein	Oracle PL/SQL - Programming	10th Anniversary Edition, OREILLY (2008)

A.G & S.G Siddhartha Degree College of Arts & Science, Vuyyuru – 521165.
(An Autonomous College in the jurisdiction of Krishna University)
M.Sc., (Computer Science) Programme - I Semester
Course Code: 21CS1T4   Title: DATABASE MANAGEMENT SYSTEMS
(w.e.f admitted batch 2021-22)

Time: 3 Hours   **Max. Marks: 70**
Answer ALL questions   **(10×2 = 20 Marks)**

1. a) What is Data Independence? (BTL1)
    b) What is Primary Key? (BTL1)
    c) Write example for Update Command. (BTL1)
    d) What is Join Condition? Explain with example. (BTL1)
    e) What is Weak Entity? (BTL1)
    f) What is First Normal Form. (BTL1)
    g) What is Heap File. (BTL1)
    h) Write advantage of using Multilevel Indexes? (BTL1)
    i) Write Properties of Transaction. (BTL1)
    j) What is Data Fragmentation? (BTL1)

Answer Five Questions Choosing One Question from Each Unit.
All Questions Carry Equal Marks.   **(5×10 = 50 Marks)**
UNIT – I
2. A) What is DBMS? Explain advantage of DBMS. (BTL1)
                           (or)
    B) Explain Three Schema Architecture of DBMS with neat diagram.   (BTL2)

UNIT – II
3. A) What is Constraint? Explain various Constraints of the Relational Model. (BTL1)
                           (or)
    B) Describe SELECT & PROJECT Operations of Relational Algebra. (BTL2)

UNIT – III
4. A) What is Generalization? Explain with example. (BTL1)
                           (or)
    B) What is BCNF? Explain with example. (BTL1)

UNIT – IV
5. A) What is Hashing? Describe Internal & External Hashing Techniques.
                           (or)
    B) What is B-Tree? Construct B-Tree for the values 10, 20, 30, 40, 50, 60, 70, 80,
       90 of order 3.

UNIT – V
6. A) Explain Concurrency Control Based on Timestamp Ordering. (BTL2)
                           (or)
    B) Explain Distributed Database Concepts in detail. (BTL2)

A.G & S.G Siddhartha Degree College of Arts & Science, Vuyyuru – 521165.
(An Autonomous College in the jurisdiction of Krishna University)
M.Sc., (Computer Science) Programme - I Semester

Course	THEORY OF COMPUTATION		
Course Code	21CS1T5	Course Delivery Method	Class Room / Blended Mode
Credits	4	CIA Marks	30
No. of Lecture Hours / Week	4	Semester End Exam Marks	70
Total Number of Lecture Hours	60	Total Marks	100
Year of Introduction:2020-21	Year of Offering:2021-22	Year of Revision:2021-22	Percentage of Revision: 0%

Course Outcomes:

On successful completion of this course, the students:

1. Understand Fundamentals of Automata and Finite Automata. (CO1)
2. Able to apply Regular Languages. (CO2)
3. Gain knowledge on Grammar Formalism and Context Free Grammars. (CO3)
4. Design Pushdown Automata. (CO4)
5. Understand Turing Machine and Computability Theory. (CO5)

Unit	Learning Units	Lecture Hours
I	**Fundamentals:** Strings, Alphabet, Language, Operations, Finite Automaton Model, Acceptance of Strings and Languages, FA, Transition Diagrams and Language Recognizers. **Finite Automata:** Deterministic Finite Automaton, Non Deterministic Finite Automaton (Simple Problems), Differences between NFA and DFA, NFA with ε Transitions- Significance of NFA with Epsilon , Acceptance of Language, Conversions and Equivalence-Conversion from NFA with ε to NFA without ε, NFA to DFA Conversion, NFA with ε to DFA, Minimization of FSM, Equivalence between two FSMs, Equivalence of Moore and Mealy Machines.	14
II	**Regular Languages:** Regular Sets, Regular Expressions, Identity Rules for Regular Expression, Conversion of Finite Automata (DFA) to Regular Expressions - using State Elimination Method and Arden's Theorem, Conversion of Regular Expression to ε-NFA, Pumping Lemma of Regular Languages (Sets) (Proofs Not Required).	10
III	**Grammar Formalism:** Regular Grammars - Right Linear and Left Linear Grammars, Inter Conversion- Conversion of a Regular Grammar for a given Finite Automata, Construct FA from Regular Grammar, Context Free Grammar, Derivation Trees, Sentential Forms, Right most and Leftmost Derivation of Strings. **Context Free Grammars:** Ambiguity in Context Free Grammars. Minimization of Context Free Grammars. Chomsky Normal Form, Greibach Normal Form, Pumping Lemma for Context Free Languages, Enumeration Properties of CFL (Proofs Not Required), Simple Problems	14
IV	**Push Down Automata:** Definition, Model, Design of PDA, Acceptance by Final State and Acceptance by Empty Stack, Inter Conversion - Construct PDA Equivalent to a given CFL, Construct CFL Equivalent to a given PDA (Proofs Not Required).	08
V	**Turing Machine:** Definition, Model, Design of TM, Recursively Enumerable Languages and its Properties and Recursive Languages, Types of Turning Machines: Simple Problems. **Computability Theory:** Chomsky Hierarchy of Languages: Regular Grammars, Unrestricted Grammars, Context Sensitive Languages, Decidability of Problems: Properties of Recursive and Recursively Enumerable Languages, Universal Turing Machine, Undecidability of Posts Correspondence Problem, Definition of NP Complete and NP Hard Problems.	14

Prescribed Text Book

	Author	Title	Publisher
1	Hopcroft H.E. and Ullman	Introduction to Automata Theory Languages and Computation	J. D. Pearson Education

Reference Text Books

	Author	Title	Publisher
1	John C Martin	Introduction to languages and the Theory of Computation	TMH
2	A.A Putumbekar	Formal Languages and Automata Theory	Technical Publications
3	Lewis H.P. & Papadimitriou C.H	Elements of Theory of Computation	Pearson PHI
4	Mishra and Chandrashekaran	Theory of Computer Science and Automata Languages and Computation	2nd edition, PHI.
5	Daniel I.A. Cohen	Introduction to Computer Theory	John Wiley

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(An Autonomous College in the jurisdiction of Krishna University)
M.Sc., (Computer Science) Programme - I Semester
Course Code: 21CS1T5   Title: THEORY OF COMPUTATION
(w.e.f admitted batch 2021-22)

Time: 3 Hours   **Max. Marks: 70**
Answer ALL questions   **(10×2 = 20 Marks)**

1.
   a) Define Alphabet. (BTL1)
   b) Find ε-closure of all states for the given Transition Diagram. (BTL1)
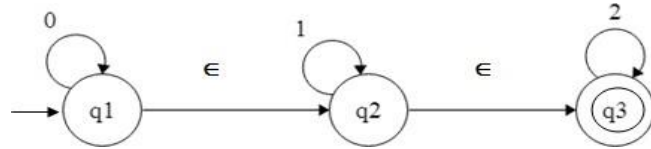
   c)   Define   Regular Expression and Regular Set

   with example (BTL1)
   d)   Write Regular Expression which denotes a language L over the set ∑={0} having even length of
   string.
   e) Define Parse Tree with example. (BTL1)
   f) Show that the grammar is ambiguous (BTL2)
       S ➔ a | sA || bSS || SSb || SbS |
   g) Give the formal definition of Push Down Automata. (BTL1)
   h) Define Deterministic PDA. (BTL1)
   i) What are Recursively Enumerable Languages?   (BTL1)
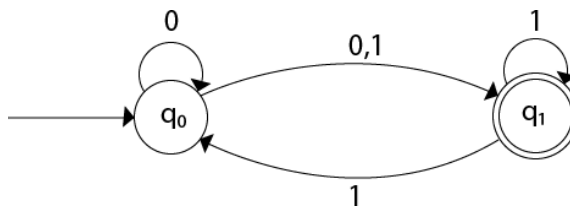   j) Define Turing Machine. (BTL1)

Answer Five Questions Choosing One Question from Each Unit.
All Questions Carry Equal Marks.   **(5×10 = 50 Marks)**
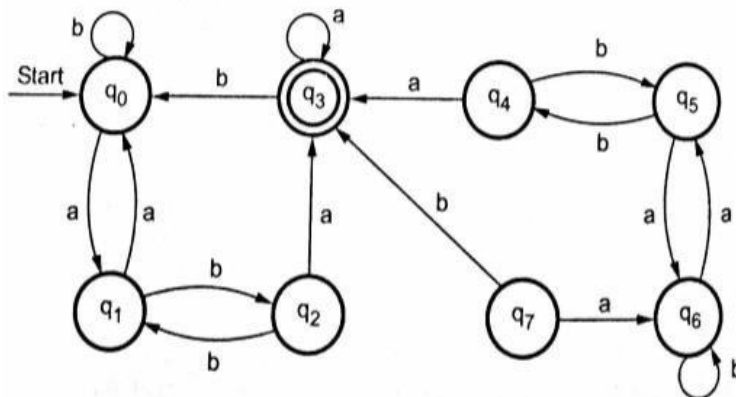
UNIT – I
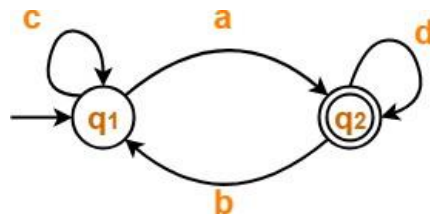
2. A) Convert the given NFA to DFA. (BTL3)

(or)

 B) Construct the minimum DFA for the following Transition Diagram. (BTL3)

UNIT – II

3. A) Construct epsilon NFA for Regular Expression 1+00+010* (BTL3)

(or)

B) Find Regular Expression for the following DFA using State Elimination Method. (BTL1)

UNIT – III

4. A) Drive the string "aabbabba" for Leftmost Derivation and Rightmost Derivation
using a CFG given by (BTL5)

$S \rightarrow aB \mid bA$

$A \rightarrow a \mid aS \mid$

$AB \rightarrow b \mid bS \mid$

aB

(or)

B) For the following grammar, construct CNF   (BTL3)

$S \rightarrow ABC \mid BbB$

$A \rightarrow aA \mid BaC$

$B \rightarrow bBb \mid a \mid D$

$C \rightarrow CA \mid AC$

$D \rightarrow \varepsilon$

i) Eliminate ε-productions.

ii) Eliminate any unit productions in the resulting grammar.

iii) Eliminate any useless symbols in the resulting grammar.

.UNIT – IV

5. A) Convert the following Context Free Grammar to Push Down Automata (BTL3)

$S \rightarrow AA \mid a$

$A \rightarrow SA \mid b$

(or)

B) The PDA is as given below (BTL3)

$A = (\{q_0, q_1\}, \{0,1\}, \{S,A\}, \delta, q_0, S, \emptyset)$

Where δ is as given below

$\delta (q_0, 1, S) = \{(q_0, AS)\}$

$\delta (q_0, \varepsilon, S) = \{(q_0, \varepsilon)\}$

$\delta (q_0, 1, A) = \{(q_0, AA) \}$

$\delta (q_0, 0, A) = \{(q_1, A) \}$

$\delta (q_0, 1, A) = \{(q_1, \varepsilon)\}$

$\delta (q_0, 0, S) = \{(q_0, S)\}$

Construct the CFG equivalent to this PDA.

UNIT – V

6. A) Design a Turing Machine for the Language $L=\{a^n b^n c^n | n >= 1\}$ (BTL6)

(or)

B) Define PCP and also find the correspondence system as given below

$A = (1,0,010,11)$ and $B = (10,10,01,1)$ the input set is $\sum=\{0,1\}$ find the solution. (BTL1)

Course	PROBLEM SOLVING USING PYTHON PROGRAMMING LAB		
Course Code	21CS1L1	Course Delivery Method	Class Room / Blended Mode
Credits	4	CIA Marks	30
No. of Lecture Hours / Week	8	Semester End Exam Marks	70
Total Number of Lecture Hours	90	Total Marks	100
Year of Introduction :2020-21	Year of Offering:2021-22	Year of Revision:2021-22	Percentage of Revision: 0%

Course Outcomes:

On successful completion of this course, the students:
1. Understand basics of Python Programming. (CO1)
2. Gain knowledge on Decision Control Statements and Functions & Modules. (CO2)
3. Be familiar with Python Strings and Data Structures. (CO3)
4. Apply Inheritance, Error and Exception Handling and Operator Overloading. (CO4)
5. Able to connect Database and perform Database Access. (CO5)

1. Write a python program to enter a number and display its hex and octal equivalent and its square root.

2. WAP to read and print values of variables of different data types.

3. WAP a. To calculate area of a triangle using herons formula.

    b. To calculate the distance between two points.

    c. To calculate the area of the circle.

4. WAP to perform addition, subtraction, multiplication, division, integer division, and modulo division on two integer numbers.

5. WAP to calculate the total amount of money in the piggybank, given the coins of Rs10,Rs 5, Rs 2 and Rs1.

6. WAP to calculate the bill amount for an item given its quantity sold, value, discount and tax.

7. WAP to calculate a students result based on two examinations,1sports event and 3 activities conducted. The weightage of activities=30 percent, sports=20 percent and examination=50 percent.

8. WAP to convert a floating point number into the corresponding integer.

9. A company decides to give bonus to all its employees on diwali. 5% bonus on salary is given to the male workers and 10% bonus on salary to the female workers.WAP to enter the salary of the employee and gender of the employee gets an extra2% bonus on salary .Calculate the bonus that has to be given to the employee and display the salary that the employee will get.

10. WAP to calculate tax given the following conditions:

    If income is less than 1,50.000 then no tax

    If taxable income is 1,50,001 – 300,000 then charge 20% tax

    If taxable income is above 5,00,001 then charge 30% tax

       MIN1 = 150001

MAX1= 300000

RATE1 = 0.10

MIN2 = 300001

MAX2=500000

RATE2=0.20

MIN3=500001

RATE3=0.30

11. WAP to calculate the roots of quadratic equation.

12. WAP to make a simple calculator.

13. WAP to print the calendar of any given year.

14. WAP to calculate simple interest .suppose the customer is a senior citizen. He is being offered 12% interest for all customers the ROI is 10% using functions.

15. WAP to display the date and time using the time module.

16. Write a python program to perform inheritance.

17. Write a Python program to perform exception handling.

18. WAP to demonstrate slice operation on string objects.

19. a. WAP to calculate fib(n) using a dictionary.

   b. to create a dictionary cubes of odd numbers in the range 1 to 10.

20. WAP to parse an emailed to print from which email server it was sent and when.

21. WAP to perform operations on stack.

22. WAP to perform read and write operations in files.

23. WAP that accepts filename as an input from an user open a file count a number of times a character appears in the file.

24. Write a program on modules.

25. Write a program to perform image operations.

26. Write a GUI for an expression calculator using tk.

27. Write a program to print text from the audio file. (Speech to Text and using speech_recognization library).

28. Write a program to connect database and create a table using SQLite.

29. Write a program to perform insertion and selection operation using SQLite.

Course	DBMS LAB		
Course Code	21CS1L2	Course Delivery Method	Class Room / Blended
Credits	4	CIA Marks	30
No. of Lecture Hours / Week	8	Semester End Exam Marks	70
Total Number of Lecture Hours	90	Total Marks	100
Year of Introduction :2020-21	Year of Offering:2021-22	Year of Revision:2021-22	Percentage of Revision: 0%

Course Outcomes:

1. Create Database using DDL Commands. (CO1)
2. Retrieve Data from database using DML for a given situation. (CO2)
3. Familiarize with a Query Language through basic SQL Queries. (CO3)
4. Experiment Nested Query, Joins, Integrity Constraints and Views in database. (CO4)
5. Demonstrate Trigger, Function and Procedure using PL/SQL. (CO5)

CYCLE-I

Aim: Marketing Company wishes to computerize their operations by using following tables.

Table Name: Client- Master		Description: Used to store client information	
Column Name	Data Type	Size	Attribute
CLIENT_ NO	Varchar2	6	Primary key and first letter must start
NAME	Varchar2	20	Not null
ADDRESS 1	Varchar2	30	
ADDRESS S	Varchar2	30	
CITY	Varchar2	15	
PINCODE	Varchar2	8	
STATE	Varchar2	15	
BAL_DUE	Number	10,2	

Table Name: Product_ Master		Description: Used to store product information	
Column Name	Data Type	Size	Attribute
PRODUCT _NO	Varchar2	6	Primary key and first letter must start
DESCRIPTION	Varchar2	15	Not null
PROFIT _PERCENT	Number	4,2	Not null
UNIT _MEASUE	Varchar2	10	
QTY_ ON_ HAND	Number	8	
REORDER_ LVL	Number	8	
SELL _PRICE	Number	8, 2	Not null, cannot be 0
COST _PRICE	Number	8,2	Not null, cannot be 0

Table Name: Salesman_Master			
Description: Used to store salesman information working for the company.			
Column Name	Data Type	Size	Attribute
SALESMAN_ NO	Varchar2	6	Primary key and first letter must start with 'S'
SALESMAN _NAME	Varchar2	20	Not null
ADDRESS1	Varchar2	30	
ADDRESS2	Varchar2	30	
CITY	Varchar2	20	
PINCODE	Number	8	

STATE	Vachar2	20	
SAL_AMT	Number	8,2	Not null, cannot be 0
TGT_TO_GET	Number	6,2	Not null, cannot be 0
YTD _SALES	Number	6,2	Not null
REMARKS	Varchar2	20	

Table Name: Sales_Order
Description: Used to store client's orders

Column Name	Data Type	Size	Attribute
ORDER_ NO	Varchar2	6	Primary key and first letter must start with
CLIENT _NO	Varchar2	6	Foreign Key
ORDER _DATE	Date		
DELY _ADDRESS	Varchar2	25	
SALESMAN_ NO	Varchar2	6	Foreign Key
DELY _TYPE	Char	1	Delivery: part(p)/ full(f) and default 'F'
BILL_ YN	Char	1	
DELY_ DATE	Date		Can't be less than order date
ORDER _STATUS	Varchar2	10	Values ("In Process", " Fulfilled",

Table Name: Sales_Order_Details
Description: Used to store client's order with details of each product ordered.

Column Name	Data Type	Size	Attribute
ORDER _NO	Varchar2	6	Primary key references SALES_ORDER
PRODUCT_ NO	Varchar2	6	Foreign Key references
QTY_ ORDERED	Number	8	
QTY_ DISP	Number	8	
PRODUCT _RATE	Number	10,2	Foreign Key

Solve the following queries by using above tables.
1. Retrieve the list of names, city and the state of all the clients.
2. List all the clients who are located in 'Mumbai' or 'Bangalore'.
3. List the various products available from the product_master table.
4. Find the names of sales man who have a salary equal to Rs.3000.
5. List the names of all clients having 'a' as the second letter in their names.
6. List all clients whose Bal due is greater than value 1000.
7. List the clients who stay in a city whose first letter is 'M'.
8. List all information from sales-order table for orders placed in the month of July.
9. List the products whose selling price is greater than 1000 and less than or equal to 3000.
10. Find the products whose selling price is greater than 1000 and also find the new selling price as original selling price 0.50.
11. Find the products in the sorted order of their description.
12. Find the products with description as '540HDD' and 'Pen drive'.
13. Count the total number of orders.
14. Print the description and total qty sold for each product.
15. Calculate the average qty sold for each client that has a maximum order value of 15,000.
16. Find all the products whose quantity on hand is less than reorder level.
17. List the order number and day on which clients placed their order.
18. Find out the products and their quantities that will have to deliver in the current month.
19. Find the names of clients who have placed orders worth of 10000 or more.
20. Find the client names who have placed orders before the month of June,2018.

CYCLE-II

Aim: A manufacturing company deals with various parts and various suppliers supply these parts. It consists of three tables to record its entire information. Those are as follows.

Supplier (Supplier_No, Sname, City, status)
Part(Part_no, pname, color, weight, city, cost)
Shipment (supplier_No, Part_no, city)
JX(project_no, project_name, city)
SPJX (Supplier_no, part_no, project_no, city)

Solve the following queries by using above tables.
1. Get supplier numbers and status for suppliers in Chennai with status > 20.
2. Get project names for projects supplied by supplier S.
3. Get colors of parts supplied by supplier S_1.
4. Get part numbers for parts supplied to any project in Mumbai.
5. Find the id's of suppliers who supply a red or pink parts.
6. Find the pnames of parts supplied by London supplier and by no one else.
7. Get the names of the parts supplied by the supplier 'Mart' and 'Miller'.
8. Get supplier names for suppliers who do not supply part P_2.
9. Get all pairs of supplier numbers such that the suppliers concerned are "colocated".
10. Get suppliers names for the suppliers who supply at least one red part.

CYCLE-III

Aim: An enterprise wishes to maintain a database to automate its operations. Enterprise divided into a certain departments and each department consists of employees. The following two tables describes the automation schemas.

Emp(Empno, Ename, Job, Mgr, Hiredate, Sal, Comm, Deptno)
Dept(Deptno, Dname, Loc)

Solve the following queries by using above tables.
1. List the details of employees who have joined before the end of September' 81.
2. List the name of the employee and designation of the employee, who does not report to anybody.
3. List the name, salary and PF amount of all the employees (PF is calculated as 10% of salary)
4. List the names of employees who are more than 2 years old in the organization.
5. Determine the number of employees, who are taking commission.
6. Update the employee salary by 20% , whose experience is greater than 12 years.
7. Determine the department does not contain any employees.
8. Create a view, which contains employee name and their manager names working in sales department.
9. Determine the employees, whose total salary is like the minimum salary of any department.
10. List the department numbers and number of employees in each department.
11. Determine the employees, whose total salary is like the minimum salary of any department.
12. List average salary for all departments employing more than five people.
13. Determine the names of employees, who take highest salary in their departments.
14. Determine the names of employees, who earn more than their managers.
15. Display ename, dname, even if no employee belongs to that department (use outer join).

CYCLE-IV

An Airline system would like to keep track their information by using the following relations.
FLIGHTS(fl_no: integer, from: string, to: string, distance: integer, price: integer)
AIRCRAFT(aid: integer, aname: string, cruising_range: integer)

CERTIFIED(eid: integer, aid: integer)
Employees(eid: integer, ename: string, salary: real)

Note that the employees relation describes pilots and other kinds of employees as well; every pilot is certified for aircraft and only pilots are certified to fly. Resolve the following queries.

a) Find the names of pilots whose salary is less than the price of the cheapest route from Newyork to Chicago.
b) For each pilot who is certified for more than 2 aircraft, find the eid's and the maximum cruising range of the aircraft that he or she certified for.
c) For all aircraft with cruising range over 1,500 miles, find the name of the aircraft and the average salary of all pilots certified for this aircraft.
d) Find the aid's of all aircraft than can be used from chicaga to LosAngels.
e) Find the name of the pilots certified from some Boeing aircraft.
f) Print the enames of pilots who can operate planes with cruising range greater than 3,500 miles, but are not certified by Boeing aircraft.
g) Find the eid's of employees who are certified for exactly 2 aircrafts.
h) Find the total amount paid to employees as salaries.
i) Find the aid's of all than can be used on non-stop flights from Chennai to Dubai.
j) Find the eid's of employee who make second highest salary.

PL/SQL PROGRAMS

1. Write a PL/SQL program to check the given number is strong or not.
2. Write a PL/SQL program to check the given string is palindrome or not.
3. Write a PL/SQL program to swap two numbers without using third variable.
4. Writ a PL/SQL program to generate multiplication tables for 2, 4, 6.
5. Write a PL/SQL program to check the given number is Amstrong or not.
6. Write a PL/SQL code to find the factorial of any number.
7. Write a PL/SQL program to display sum of even numbers and sum of odd numbers in the given range.
8. Write a PL/SQL program to check the given number is palindrome or not.
9. The HRD manager has decide to raise the employee salary by 15% write a PL/SQL block to accept the employee number and update the salary of that employee. Display appropriate message based on the existence of the record in Emp table.
10. Write a PL/SQL program to display to 10 rows in Emp table based on their job and salary.
11. Write a PL/SQL program to raise the employee salary by 10% for department number 30 people and also maintain the raised details in the raise table.
12. Write a procedure to update the salary of Employee, who are not getting commission by 10%.
13. Write a PL/SQL procedure to prepare an electricity bill by using following table.

Table used: Elect

Name	Null?	Type
MNNO	NOT NULL	NUMBER(3)
CNAME		VARCHAR2(20)
CUR_READ		NUMBER(5)
PREV_READ		NUMBER(5)
NO_ UNITS		NUMBER(5)
AMOUNT		NUMBER(8,2)
SER_ TAX		NUMBER(8,2)
NET_AMT		NUMBER(9,2)

14. Write a PL/SQL program to prepare an telephone bill by using following table and print the monthly bills for each customer.

Table used: Phone		
Name	Null?	Type
TEL_NO	NOT NULL	NUMBER(6)
CNAME		VARCHAR2(20)
CITY		VARCHAR2(10)
PR_READ		NUMBER(5)
CUR_READ		NUMBER(5)
NET_AMT		NUMBER(5)
TOT-AMT		NUMBER(8,2)

15. Write a PL/SQL program to raise the employee salary by 10 %, who are completed ther 25 years of service and store the details at appropriate tables (Define the Retair_ Emp_Table) .

16. Write a PL/SQL program to evaluate the grade of a student with following
    conditions: For pass: all marks > 40
    For I class: Total % > 59
    For II Class: Total % between >40 and < 60
    For III class: total % = 40
    And also maintain the details in abstract table.

1. Table Std		
Name	Null?	Type
NO	NOT NULL	NUMBER
NAME		VARCHAR2(10)
INTNO		NUMBER
CLASS	NOT NULL	VARCHAR2(10)
M1		NUMBER
M2		NUMBER
M3		NUMBER
M4		NUMBER
M5		NUMBER

2. Table Abstract		
Name	Null?	Type
STDNO		NUMBER
STDNAME		VARCHAR2(10)
CLASS		VARCHAR2(10)
MONTH		VARCHAR2(10)
INTNO (INTEGER NUMBER)		NUMBER
TOT		NUMBER
GRADE		VARCHAR2(10)
PERCENT		NUMBER
DAT_ENTER		DATE

M.Sc., (Computer Science) Programme - II Semester

COURSE	COURSE CODE	L	T	P	C	Year
COMPUTER NETWORKS	CS2T1	4	-	-	4	2020-21

Course Outcomes:
1. Understand the fundamental concepts of computer networks and identify various networks based on scale and technology.
2. Illustrate and summarize Ethernet, Mobile and Wireless Networks.
3. Interpret network routing concepts, apply in designing Local area networks.
4. Functionality of internet transport protocols.
5. Understand the e-mail, DNS and role of content delivery networks with network security.

UNIT I

Introduction: Uses of Computer Networks: Business Application, Home Applications, Mobile Users, Social Issues, **Network Hardware:** Local Area Networks, Metropolitan Area Networks, Wide Area Networks, Wireless Networks, Home Networks, Internet Works, **Network Software:** Protocol Hierarchies, Design Issues for the Layers, Connection Oriented and Connectionless Services, Service Primitives, The Relationship of Services to Protocols. **Reference Models:** The OSI Reference Model, The TCP/IP Reference Model, A Comparison of OSI and TCP/IP Reference Model, A Critique of the OSI Model and Protocols, A Critique of the TCP/IP reference model, **Example Networks:** The Internet, The Third Generation Mobile Phone Networks, Wireless LANs, RFID and Sensor Networks.
Physical Layer: Guided Transmission Media: Magnetic Media, Twisted Pair, Coaxial Cable, power lines, Fiber Optics.

UNIT II

Data Link Layer: Data Link Layer Design Issues: Services Provided to the Network Layer, Framing, Error Control, Flow Control, **Error Correcting Codes**, **Error Detecting Codes**, **Elementary Data Link Protocols**: An Utopian Simplex Protocol, A Simplex Stop and Wait Protocol, A Simplex Protocol for a Noisy Channel, **Sliding Window Protocols:** A One Bit Sliding Window Protocol, A Protocol Using Go Back N, A Protocol using Selective Repeat
The Medium Access Control Sub Layer: Ethernet: Ethernet Cabling, Manchester Encoding, The Ethernet MAC sub layer Protocol, The Binary Exponential Backoff Algorithm, Ethernet. Performance , Switched Ethernet , Fast Ethernet , Gigabit Ethernet, 10-bit Gigabit Ethernet **Wireless Lans:** The 802.11 Protocol Stack, The 802.11 Physical Layer, The 802.11 MAC Sub Layer Protocol, The 802.11 Frame Structure, **Bluetooth:** Bluetooth Architecture, Bluetooth Applications, The Bluetooth Protocol Stack, The Bluetooth Radio Layer, The Bluetooth Link Layers, The Bluetooth Frame Structure, **Data Link Layer Switching:** Uses of Bridges, Learning Bridges, Spanning Tree Bridges, Remote Bridges, Repeaters, Hubs, Bridges, Switches, Routers and

Gateways, Virtual LANs.

The Network Layer: Network Layer Design Issues: Store and Forward Packet Switching, Services provided to the Transport Layer, Implementation of Connectionless Services, Implementation of Connection Oriented Services, Comparison of Virtual Circuit and Datagram Subnets. **Routing Algorithms:** The Optimality Principle, Shortest Path Routing, Flooding, Distance Vector Routing, Link

State Routing, Hierarchical Routing, Broadcast Routing, Multicast Routing. **Internet Working:** How Networks Differ, How Networks can be Connected, Concatenated Virtual Circuits, Connectionless Internetworking, Tunneling, Internetwork Routing, Packet Fragmentation. **The Network Layer in the Internet:** The IPVersion 4 Protocol, IP address, Internet Control Protocols, OSPF, The Internet Gateway Routing Protocol, BGP, The Exterior Gateway Routing Protocol.

UNIT IV

The Transport Layer: The Transport Service: Services provided to the Upper Layers, Transport Services Primitives, Berkeley Sockets. **Elements of Transport Protocols**: Addressing, Connection Establishment, Connection Release, Flow Control and Buffering, Multiplexing. **The Internet Transport Protocols:** Introduction to UDP: Remote Procedure Call, The Real Time Transport Protocol. **The Internet Transport Protocols:** TCP Introduction to TCP, The TCP Service Model, The TCP Protocol, The TCP Segment Header, TCP Connection Establishment, TCP Connection Release, Modeling TCP Connection Management, TCP Sliding Window TCP Congestion Control, TCP Timer Management, Future of TCP.

UNIT V

The Application Layer: DNS: The Domain Name System: The DNS Name Space, Resource Records, Name Servers. **Electronic Mail**: Architecture and Services, The User Agent, Message Formats, Message Transfer, Final Delivery. **The World Wide Web**: Architecture Overview, Static Web Pages, Dynamic Web Pages and Web Applications, HTTP-The Hyper Text Transfer Protocol. **Streaming Audio and Video**: Digital Audio, Digital Video, Streaming Stored Media, Streaming Live Media, Real Time Conferencing. **Network Security:** Introduction to Cryptography, Public Key Algorithms - RSA.

Prescribed Text Book			
	Author	Title	Publisher
1	Andrew S. Tanenbaum	Computer Networks	Fifth Edition, Pearson Chapters: 1.1 to 1.5, 2.2, 3.1 to 3.4, 4.3, 4.4, 4.6, 4.8 5.1, 5.2.1 to 5.2.8, 5.5, 5.6.1 to 5.6.4,5.6.6,5.6.7 6.1.1 to 6.1.3, 6.2.1 to 6.2.5, 6.4, 6.5, 7.1 ,7.2, 7.3.1 to 7.3.4, 7.4.1 to 7.4.5 ,8.1.1,8.3.1

Reference Text Books			
	Author	Title	Publisher
1	Behrouz A Forouzan Firouz Mosharaff	Computer Networks - A TopDown Approach	McGrawhill Education(India) Special Indian Edition
2	James F.Kurose, Keith W. Ross	Computer Networking - A Top-Down Approach	6e, Pearson
3	Larry Peterson and Bruce Davie	Computer Networks - A System Approach	5e, Elsevier India

M.Sc., (Computer Science) Programme - II Semester

COURSE	COURSE CODE	L	T	P	C	Year
OPERATIONS RESEARCH	CS2T2	4	-	-	4	2020-21

Course Outcomes:
1. Understand the meaning, scope and role of computers in operations research, formulate the liner programming problems using graphical method, simplex method and artificial variable techniques.
2. Examine transportation problems and drive their optimum solution.
3. Inspect assignment problems and drive their optimum solution.
4. How game theorists think and approach a strategic problem.
5. Apply the concepts of PERT and CPM for decision making and optimally managing projects.

UNIT I

Linear programming: Nature, Meaning and Scope of Operations Research, Role of Computers in OR, Introduction and Formulation of LP problems, Linear Programming: Graphical Solution for Two Variable Problem, Simplex Method, Artificial Variable Technique: Big M and Two-Phase Methods

UNIT II

Transportation Problem: L. P Formulation of the Transportation Problem, Tabular Representation, Initial Basic Feasible Solution (I.B.F.S.) to Transportation Problem: North West Corner, Least Cost, Vogel's Approximation Methods, The Optimality Test, Transportation Algorithm, MODI (Modified Distribution Method), Some Exceptional Cases: Unbalanced, Prohibited, Maximization Transportation Problems, Time minimization Transportation problem, Simple Problems.

UNIT III

Assignment Problem: Mathematical formulation of the problem, Hungarian method for Assignment problem, Special cases in Assignment problems: Unbalanced, Prohibited, Maximization, Travelling Salesman Problem, A Typical Assignment Problem, Simple Problems.

UNIT IV

Game Theory: Introduction, Pure Strategy, Mixed Strategy, Two Person Zero Sum Game, Minimax-Maximin Criteria, Solution of Games with Saddle Point, Solution of Game without Saddle Point, Principle of Dominance, Solution of game Without Saddle Point, Graphical Method for $2{\times}N$ and $M{\times}2$ Games, Solution of Game without Saddle Point - Simplex Method,

Simple Problems.

Project Management: Introduction, Rules for Network Construction, Network Diagram Representation, Critical Path Analysis-Forward Pass Calculation, Backward Pass Calculation; Float and Slack Times, Project Evaluation and Review Technique(PERT), Simple Problems.

Prescribed Text Book			
	Author	Title	Publisher
1	KantiSwarup, P.K.Gupta, Man Mohan	Operations Research	15th Edition, 2010, Sultan Chand & Sons, New Delhi.

Prescribed Text Books			
	Author	Title	Publisher
1	S.D.Sharma, HimanshuSharma	Operations Research Theory, Methods and Applications	Improved and Enlarged Edition, Kedar NathRamNath & Co., Meerut.
2	Dr. R. K. Gupta	Krishna's Operations Research	27thEdition,2010, Krishna Prakashan Media (P) Ltd., Meerut
3	J.K.Sharma	Operations Research: Theory and Applications	5th Edition, 2013, Macmillan.
4	Hamdy	Operations Research: An Introduction	A.Taha, 9th edition ,2010, Prentic Hall.

M.Sc., (Computer Science) Programme - II Semester

COURSE	COURSE CODE	L	T	P	C	Year
THEORY OF COMPUTATION	CS2T3	3	1	-	4	2020-21

Course Outcomes:
1. *Design Finite Automata for Regular Languages.*
2. *Construct the Regular Expressions and Design their Finite Automata.*
3. *Design Context Free grammars for Context Free Languages.*
4. *Design Push Down Automata for Context Free Languages.*
5. *Design Turing Machines for Recursively Enumerable Languages.*

UNIT I

Fundamentals, Introduction to Finite Automata:

Finite Automaton Model, Acceptance of Strings and Languages, Deterministic Finite Automata, Non-Deterministic Finite Automata, Transition Diagrams, NFA with E-Transitions, Acceptance of Languages, Conversions and Equivalence: Equivalence between NFA with and without E-Transitions, NFA to DFA Conversion, Minimization of FSM, Equivalence between two FSM's Finite Automata with Output-Moore and Mealy Machines.

UNIT II

Regular Languages:
Regular Sets, Regular Expressions, Identity Rules, Constructing Finite Automata for a given Regular Expression, Conversion of Finite Automata to Regular Expressions, Pumping Lemma of Regular Sets, Closure Properties of Regular Sets.

UNIT III

Grammar Formalism:
Regular Grammars-Right Linear and Left Linear Grammars, Context Free Grammar, Derivation Trees, Right most and Leftmost Derivation of Strings, Ambiguity in Context Free Grammars, Minimization of Context Free Grammars, Chomsky Normal Form, Greiback Normal Form, Pumping Lemma for Context Free Languages, Enumeration Properties of CFL.

UNIT IV

Push Down Automata:
Push Down Automata (Definition and Model), Acceptance of CFL, Acceptance by Final State and Acceptance by Empty Stack and its Equivalence, Equivalence of CFL and PDA, Interco Version.

UNIT V

Turing Machine:
Turing Machine (Definition and Model), Design of Turing Machine, Computable Functions, Techniques of Turing Machine Construction.

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Undesirability:
Properties of Recursively Enumerable Languages, Universal Turing Machines (Without any Reference to Undesirable Problems), Undesirability of Post Correspondence Problem.
The Chomsky Hierarchy: Regular Grammars, Unrestricted Grammars, Context Sensitive Languages.

Prescribed Text Book			
	Author	Title	
1	Hopcroft H.E. and Ullman J.D.	Introduction to Automata Theory Languages and Compilation	Pearson

Reference books			
	Author	Title	Publisher
1	A A .Puntambekar	Formal Languages & Automata Theory	Technical
2	John C Martin	Introduction to languages and the Theory of Computation	TMH

M.Sc., (Computer Science) Programme - II Semester

COURSE	COURSE CODE	L	T	P	C	Year
SOFTWARE ENGINEERING	CS2T4	4	-	-	4	2020-21

Course Outcomes:
1. Understand various software engineering methods, practices, process models and agile development strategies.
2. Illustrate core principles, requirements & modelling concepts.
3. Identify different software testing approaches and various aspects of software quality assurance.
4. Classify various process & project management concepts.
5. Estimate software projects, & performs formal methods modelling.

UNIT I

Software and Software Engineering: The Nature of Software: Defining Software, Software Application Domains, Legacy Software, The Unique Nature of WebApps, Software Engineering, The Software Process, Software Engineering Practices: The Essence of Practice, General Principles, Software Myths.

Process Models: A Generic Process Model: Defining a Framework Activity, Identifying a Task Set, Process Patterns, Process Assessment and Improvement, Prescriptive Process Models:The Waterfall Model, Incremental Process Models, Evolutionary Process Models, Concurrent Models, A Final Word on Evolutionary Processes, Specialized Process Models: Component-Based Development, The Formal Methods Model, Aspect-Oriented Software Development, The Unified Process:A Brief History, Phases of the Unified Process, Personal and Team Process Models: Personal Software Process (PSP), Team Software Process (TSP).

Agile Development: What Is Agility, Agility and the Cost of Change, What Is an Agile Process: Agility Principles, The Politics of Agile Development, Human Factors, Extreme Programming (XP): XP Values, The XP Process, Industrial XP, The XP Debate, Other Agile Process Models: Adaptive Software Development (ASD), Scrum, Dynamic Systems Development Method (DSDM), Crystal, Feature Driven Development (FDD), Lean Software Development (LSD), Agile Modeling (AM), Agile Unified Process (AUP).

UNIT II

Principles that Guide Practice: Core Principles: Principles That Guide Process, Principles That Guide Practice**,** Principles That Guide Each Framework Activity: Communication Principles, Planning Principles, Modeling Principles, Construction Principles, Deployment Principles.

Requirements Modeling: Scenarios, Information, and Analysis Classes: Requirements Analysis: Overall Objectives and Philosophy, Analysis Rules of Thumb, Domain Analysis, Requirements Modeling Approaches, Scenario-Based Modeling: Creating a Preliminary Use Case, Refining a Preliminary Use Case, Writing a Formal Use Case, UML Models That Supplement the Use Case: Developing an Activity Diagram, Swimlane Diagrams.

Data Modeling Concepts: Data Objects, Data Attributes, Relationships, Class-Based Modeling: Identifying Analysis Classes, Specifying Attributes, Defining Operations, Class-Responsibility- Collaborator (CRC) Modeling, Associations and Dependencies, Analysis Packages.

Software Quality Assurance: Background Issues, Elements of Software Quality Assurance, SQA Tasks, Goals, and Metrics: SQA Tasks, Goals, Attributes, and Metrics, Formal Approaches to SQA, Statistical Software Quality Assurance: A Generic Example, Six Sigma for Software Engineering, Software Reliability: Measures of Reliability and Availability, Software Safety, The ISO 9000 Quality Standards, The SQA Plan.

Software Testing Strategies: A Strategic Approach to Software Testing:Verification and Validation, Organizing for Software Testing, Software Testing Strategy-The Big Picture, Criteria for Completion of Testing, Strategic Issues, Test Strategies for Conventional Software: Unit Testing, Integration Testing, Test Strategies for Object-Oriented Software: Unit Testing in the OO Context, Integration Testing in the OO Context, Test Strategies for WebApps, Validation Testing: Validation-Test Criteria, Configuration Review, Alpha and Beta Testing, System Testing: Recovery Testing, Security Testing, Stress Testing, Performance Testing, Deployment Testing, The Art of Debugging:The Debugging Process, Psychological Considerations, Debugging Strategies, Correcting the Error

Testing Conventional Applications: Software Testing Fundamentals, Internal and External Views of Testing, White-Box Testing, Basis Path Testing: Flow Graph Notation, Independent Program Paths, Deriving Test Cases, Graph Matrices, Control Structure Testing: Condition Testing, Data Flow Testing, Loop Testing, Black-Box Testing: Graph-Based Testing Methods, Equivalence Partitioning, Boundary Value Analysis, Orthogonal Array Testing,

Project Management Concepts: The Management Spectrum: The People, The Product, The Process, The Project, People: The Stakeholders, Team Leaders, The Software Team, Agile Teams, Coordination and Communication Issues, The Product:Software Scope, Problem Decomposition, The Process: Melding the Product and the Process, Process Decomposition,The Project, The W5HH Principles.

Process and Project Metrics: Metrics in the Process and Project Domains:Process Metrics and Software Process Improvement, Project Metrics, Software Measurement: Size-Oriented Metrics, Function-Oriented Metrics, Reconciling LOC and FP Metrics, Object-Oriented Metrics, Use-Case– Oriented Metrics, WebApp Project Metrics, Metrics for Software Quality: Measuring Quality, Defect Removal Efficiency.

Formal Modeling And Verification: The Cleanroom Strategy, Functional Specification: Black-Box Specification, State-Box Specification, Clear-Box Specification, Cleanroom Design: Design Refinement, Design Verification, Cleanroom Testing: Statistical Use Testing, Certification, Formal Methods Concepts, Applying Mathematical Notation for Formal Specification, Formal Specification Languages: Object Constraint Language (OCL), The Z Specification Language.

Estimation for Software Projects: Resources: Human Resources, Reusable Software

Resources, Environmental Resources, Software Project Estimation, Decomposition Techniques: Software Sizing, Problem-Based Estimation, An Example of LOC-Based Estimation, An Example of FP-Based Estimation, Empirical Estimation Models: The Structure of Estimation Models, The COCOMO II Model, The Software Equation, Estimation for Object-Oriented Projects.

Prescribed Text Book			
	Author	Title	Publisher
1	Roger S Pressman	Software Engineering-A Practitioner's Approach	Seventh Edition, McGraw-Hill, a business unit of The McGraw-Hill Companies, Inc., 2010

Reference books			
	Author	Title	Publisher
1	Sommerville	Software engineering	7th edition, Pearson education
2	S.A.Kelkar	Software Engineering - A Concise Study	PHI.
3	Waman S.Jawadekar	Software Engineering	TMH.
4	AH Behforooz and Frederick J.Hudson	Software Engineering Fundamentals	Oxford (2008)

M.Sc., (Computer Science) Programme - II Semester

COURSE	COURSE CODE	L	T	P	C	Year
OPERATING SYSTEMS	CS2T5	4	-	-	4	2020-21

Course Outcomes:
1. Understand the basic concepts of operating system, its functions and services.
2. Applying concepts of threads, process synchronization & CUP scheduling.
3. Understand deadlock, main memory & virtual memory.
4. Explain mass storage structure, file system interface & file system implementation.
5. Understanding on protection & security.

UNIT I

Introduction: What Operating Systems Do, Computer System Organization, Computer System Architecture, Operating System Structure, Operating System Operations, Process Management, Memory Management, Storage Management, Protection and Security, Kernel Data Structures, Computing Environments, Open Source Operating Systems.

Operating-System Structures: Operating System Services, User and Operating System Interface, System Calls, Types of System Calls, System Programs, Operating System Design and Implementation, Operating System Structure.

Processes: Process Concept, Process Scheduling, Operations on Processes, Inter Process Communication, Communication in Client-Server Systems.

UNIT II

Threads: Overview, Multicore Programming, Multithreading Models, Thread Libraries, Implicit Threading, Threading Issues.

Process Synchronization: Background, The Critical Section Problem, Peterson's Solution, Synchronization Hardware, Mutex Locks, Semaphores, Classic Problems of Synchronization, Monitors.

CPU Scheduling: Basic Concepts, Scheduling Criteria, Scheduling Algorithms, Thread Scheduling, Multiple Processor Scheduling.

UNIT III

Deadlocks: System Model, Deadlock Characterization, Methods for Handling Deadlocks, Deadlock Prevention, Deadlock Avoidance, Deadlock Detection, Recovery from Deadlock.

Main Memory: Swapping, Contiguous Memory Allocation, Segmentation, Paging, Structure of the Page Table, Intel 32 and 64-bit Architectures.

Virtual Memory: Background, Demand Paging, Copy-on-Write, Page Replacement, Allocation of Frames, Thrashing.

Mass Storage Structure: Overview of Mass Storage Structure, Disk Structure, Disk Attachment, Disk Scheduling, Swap Space Management, RAID Structure.

File System Interface: File Concept, Access Methods, Directory and Disk Structure, File System Mounting, Protection.

File System Implementation: File System Structure, File System Implementation, Directory Implementation, Allocation Methods, Free Space Management, Efficiency and Performance, Recovery.

UNIT V

I/O Systems: Hardware, Application I/O Interface, Kernel I/O Subsystem, Transforming I/O Requests to Hardware Operations, STREAMS, Performance.

Protection: Goals of Protection, Principles of Protection, Domain of Protection, Access Matrix, Implementation of the Access Matrix.

Security: The Security Problem, Program Threats, System and Network Threats, Cryptography as a Security Tool, User Authentication, Firewalling to Protect Systems and Networks.

Prescribed Text Book			
	Author	Title	Publisher
1	Abraham Silberschatz, Peter Baer Galvin, Greg Gagne	Operating System Concepts	Ninth Edition, Wiley, 9th Edition, 2015

Reference Text Books			
	Author	Title	Publisher
1	William Stallings	Operating Systems-Internals and Design Principles	Fifth Edition, Pearson Education (2007)
2	Achyut S Godbole	Operating Systems	Second Edition, TMH (2007).
3	Flynn/McHoes	Operating Systems	Cengage Learning (2008).
4	Deitel & Deitel	Operating Systems	Third Edition, Pearson Education (2008)

M.Sc., (Computer Science) Programme - II Semester

COURSE	COURSE CODE	L	T	P	C	Year
PROBLEM SOLVING USING PYTHON PROGRAMMING LAB	CS2L1	-	-	6	3	2020-21

1) a) Running instructions in interactive interpreter and a python script.
   b) Write a program to purposefully raise indentation error and correct it.
   c) Write a program to perform arithmetic operations that take two numbers as command line arguments in a single line.

2) a) Write a program to compute distance between two points taking input from the user (Pythagorean Theorem).
   b) Write a Python program to convert temperatures to and from Celsius, Fahrenheit. [Formula: c/5 = f-32/9 [where c = temperature in Celsius and f = temperature in Fheit]

3) a) Write a program for checking whether the given number is an even number or not.
   b) Using a for loop, write a program that prints out the decimal equivalents of 1/2, 1/3, 1/4, . . . ,1/10.
   c)Write a program using a while loop that asks the user for a number, and prints a countdown from that number to zero.

4) a) Find the sum of all the primes below 100.
   b) Each new term in the Fibonacci sequence is generated by adding the previous two terms. By starting with 1 and 2, the first 10 terms will be:
      1, 2, 3, 5, 8, 13, 21, 34, 55, 89...By considering the terms in the fibonacci sequence whose values do not exceed 100, find the sum of the even-valued terms.

5) a) Write a program to count the numbers of characters in the string and store them in a List data structure.
   b) Write a program to calculate number of days between two sample dates.

6) a) Write a Python script to print a dictionary where the keys are numbers between 1 and 15 (both included) and the values are square of keys.
   b) Write a program to generate the Matrix having R rows and C columns such that all numbers are in increasing order starting from 1 in Row-wise manner.

7) Write a program to perform Liner Search.

8) Write a program to perform Binary Search.

9) Write a program to perform Bubble sort.

10) Write a program to perform Insertion sort.

11) a) Find mean, median, mode for the given set of numbers in a list.
    b) Write a program to print this list L after removing the duplicate values with original order preserved.
12) a) Write a function unique to find all the unique elements of a list.
    b) Write a function reverse to reverse a list.
    c) Write function to compute GCD, LCM of two numbers.

13) Write a program to print each line of a file in reverse order and type of a file.

14) Write a program to compute the number of characters, words and lines in a file.

15) a) Write a program that defines a matrix and prints.
    b) Write a program to perform addition of two square matrices.

16) Write a program to perform multiplication of two square matrices.
17) a) Write a script that imports requests and fetch content from the page. Eg. (Wiki)
    b) Write a simple script that serves a simple HTTP Response and a simple HTML Page.

18) a) Write a program to find sequence of one uppercase letter followed by lower case letters.
    b) Write a program that matches a string that has an 'a' followed by anything and ending in 'b'.

19) a) Write a program that matches a word at the end of the string with optional punctuation.
    b) Write a program to remove leading zeros from IP address.
20) a) Write a Python class to convert Roman numeral to an Integer.
    b) Write a Python class to reverse a string word by word.
21) Write a Python class with class variables and instance variable and illustration of the self variable.

22) Write a Python class with default constructor or non-parameterized constructor.
23) Write a Python program to perform Inheritance.

24) Write a Python program to perform Exception handling.

25) Write a program on modules.

26) Write a program to perform Image operations.

27) Write a GUI for an expression calculator using tk.

28) Write a program to print text from the audio file(Speech to Text).

29) Write a program to connect database and create a table using SQLite.

30) Write a program to perform insertion and selection operation using SQLite.

31) Write a program to perform updation and deletion operation using SQLite.

32) Write a program to create a sample form using GUI and perform crud operations using SQLite.

A.G & S.G Siddhartha Degree College of Arts & Science, Vuyyuru - 521165. (An Autonomous College in the jurisdiction of Krishna University)
M.Sc., (Computer Science) Programme - II Semester

COURSE	COURSE CODE	L	T	P	C	Year
COMPUTER NETWORKS & OPERATING SYSTEMS LAB	CS2L2	-	-	6	3	2020-21

Course Outcomes:
1. Practice Unix Shell Scripting and AWK Programming
2. Demonstrate Operating System Scheduling Algorithms
3. Prepare Patch Cards and Implement Network Monitoring Tools.
4. Implement Network Programming to obtain IP address, Machine Name and Communication etc.
5. Design various networks with CISCO Packet Tracer and implement Network Algorithms.

LAB LIST
PART A
Shell Scripting

Introduction to basic UNIX commands.
1. Write a shell script to accept the name of the file from standard input and perform the following tests on whether the file exists, if exists test file permissions whether file is executable, readable, writable,both read & writable.
2. Write a script that will ask user, fullname (first, middle, last name) greet user by first name. Ask users DOB and calculate user's age.
3. Write a shell script which will display fibonacci series up to a given number of arguments.
4. Write a shell script to accept student number, name, marks in 5 subjects. Find total, average and grade. Display the result of student and store in a file called stu.dat
Rules: if avg >=90 grade A+,80-89 grade B+,70-79 grade B, 69-69 grade C+, 51-50 grade C, 41-49 grade D else grade F
5. Write a shell script to accept empno, empname, and basic. Find DA, HRA, TA, PF using following rules. Display empno, empname, basic, DA, HRA, PF, TA, GROSS SAL and NETSAL. Also store details in a file called emp.dat. Rules: DA is 18% of basic if basic > 5000 otherwise 550 DA is 35% of basic, PF is 12% of basic + DA, TA is 10% of basic.
6. Write a shell script to display reverse numbers from given arguments

AWK scripting

7. Write awk script for the following
a. To print the numbers of even lines in a file.
b. To print the numbers of Odd lines in a file.
c. To delete empty lines in a file.
d. To Display lines having more than 60 characters.
e. To display the lines which match the multiple patterns.
f. To display the lines which do not match the patterns.
g. To display the lines or records 5-9 both inclusive.

8. Write awk script for the following
a. To display the lines between two patterns (both inclusive).

b. To display the specified line 5 or record in a file.
c. List out the files which are created in March.
d. Print the total size occupied by the files in your directory.

e. Print the all lines by changing in to upper case.

f. Print line where fields have multiple field separators.

9. Write an awk program to display employee's pay bill (data file may be comma separated file containing (eno,name,basic) calculate DA,HRA,TA,PF(basic+da)

PART B

10. Scheduling algorithms

a) Write program to implement FCFS scheduling algorithm.

b) Write program to implement Round Robin scheduling algorithm.

c) Write program to implement SJF scheduling algorithm.

PART C

11. a.Study different type of Guided media. Coaxial, UTP & OFC.

   b.Prepare straight and cross wire cable and test it.

12. Study network devices in detail (repeater, hub, switch, router, gateway).

13. Study of IP address (IPV4 - classification, Sub netting, super netting, IPV6).

14. Connect the computers in a local area Network.

15. Study basic network commands (ping, finger, ftp, traceroute, nslookup, pathping, telnet, arp).

PART D (Implementing Python /Java)

16. Program to fetch the IP address of a system.

17. Program to obtain the information about the (a) Host (b) Port (c) protocol.

18. Write a program to accept the Website name and return its IP address.

19. Write a program to implement echoclient and echoserver.

20. Write a program to implement TCP client-server program.

21. Write a program to use Simple Mail Transfer Protocol.

22. Write a program to use the Domain Name System using UDP.

23. Implementation of sliding window protocol.

24. Find the subnet mask and Network address for the given IP address.

PART E - Using Cisco packet tracer 6.5 (freely available) (BTL4)

25. Configure a network using a server with five nodes using packet tracer.

26. Configure a network using a DHCP server with five nodes using packet tracer.

27. Configure a network using two DHCP servers with nodes using packet tracer.

28. Configure a network using three DHCP servers with nodes using packet tracer.

29. Configure a network with DHCP servers with wired and wireless nodes using cisco packet tracer.

30. Exhibit spanning tree algorithms

A.G & S.G Siddhartha Degree College of Arts & Science, Vuyyuru – 521165.
(An Autonomous College in the jurisdiction of Krishna University)
M.Sc., (Computer Science) Programme - III Semester

Course	CRYPTOGRAPHY A& NETWORK SECURITY		
Course Code	20CS3T1	Course Delivery Method	Class Room / Blended Mode
Credits	4	CIA Marks	30
No. of Lecture Hours / Week	4	Semester End Exam Marks	70
Total Number of Lecture Hours	60	Total Marks	100
Year of Introduction : 2018	Year of Offering: 2021	Year of Revision: 2021	Percentage of Revision: 10

Course Objective: To understand and gain knowledge on Computer & Network Security, Number Theory, Classical Encryption Techniques, Advanced Encryption Standard and Random Bit Generation and Stream Ciphers, Number Theory, Public Key Cryptography and RSA, Other Public-Key Crypto Systems and Message Authentication Codes, Digital Signatures, Key Management and Distribution and User Authentication, Transport Level Security, Electronic Mail Security and IP Security and Intruders and Firewalls.

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

CO1 : Understand Computer & Network Security Concepts, Classical Encryption Techniques and Advanced Encryption Standard.

CO2 : Gain knowledge on Number Theory, Public Key Cryptography and RSA, Other Public-Key Crypto Systems and Message Authentication Codes.

CO3 : Know Digital Signatures, Key Management and Distribution and User Authentication.

CO4 : Understand Transport Level Security, Electronic Mail Security and IP Security.

CO5 : Gain knowledge about Intruders and Firewalls.

Syllabus

Unit	Learning Units	Lecture Hours
I	**Computer & Network Security Concepts:** 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, Rotor Machines, Steganography **Advanced Encryption Standard:** Block cipher principles, the strength of DES, Differential and linear cryptanalysis, Block cipher design principles. **Confidentiality using symmetric Encryption:** Placement of encryption function Traffic Confidentiality, key distribution, random number generator	12
II	**Public key cryptography and RSA:** Principles of public key crypto systems, The RSA algorithm **Key Management:** Other public key cryptosystems: key management, diffie-Hellman key exchange. **Message authentication and hash functions:** Authentication requirements, Authentication functions, message authentication codes, Hash functions, security of hash functions and MACs	12
III	**Digital Signatures and Authentication protocols:** Digital Signatures, Authentication protocols, Digital signatures standard. **Authentication Applications:** Kerberos, X.509 authentication service	12
IV	**Email Security:** Pretty good privacy, S/MIME	12

50

	IP Security: IP security overview, IP security architecture, Authentication header, Encapsulating security payload, combining security associations, key management. **Web security**: Web Security considerations, secure socket layer and transport layer security, secure electronic transaction.		
V	**Intruders:** Intruders, Intrusion Detection, Password Management. Malicious Software: Viruses and related threads, virus counter measures , Distributed denial of service attacks **Firewalls:** The Need for Firewalls, Firewall Characteristics and Access Policy, Types of Firewalls.		12

Prescribed Text Book			
	Author	Title	Publisher
1	William Stallings	Cryptography and Network Security	Pearson, Seventh Edition, 2017

Reference Text Book			
	Author	Title	Publisher
1	William Stallings	Cryptography and Network Security	Pearson, Sixth Edition, 2014
2	William Stallings	Network Security Essentials-Applications and Standards	Pearson Education (2007), Third Edition.
3	Chris McNab	Network Security Assessment	OReilly (2007), 2nd Edition
4	Jon Erickson	Hacking-The Art of Exploitation	Press (2006),SPD
5	Neal Krawety	Introduction to Network Security	Thomson (2007).
6	Ankit Fadia	Network Security-AHackers Perspective	Macmillan (2008)
7	Behrouz A Forouzan, Debdeep Mukhopadhyay	Cryptography and Network Security	MCGraw-Hill, Indian Special Edition, Third Edition, 2015

Course has focus on : Employability

Websites of Interest :
1. https://www.pearsonhighered.com/assets/hip/us/hip_us_pearsonhighere d/preface/0132775069.pdf
2. http://faculty.mu.edu.sa/public/uploads/1360993259.0858Cryptography%20and%20Network%20Security %20Principles%20and%20Practice,%205th %20Edition.pd

Co-curricular Activities : Programming Contests, Hackathons & Quiz.

A.G & S.G Siddhartha Degree College of Arts & Science, Vuyyuru – 521165.
(An Autonomous College in the jurisdiction of Krishna University)
M.Sc., (Computer Science) Programme - III Semester
Course Code: 21CS3T1   Title: CRYPTOGRAPHY & NETWORK SECURITY
(w.e.f admitted batch 2021-22)

Time: 3 Hours   **Max. Marks: 70**
Answer ALL questions   **(10×2 = 20 Marks)**

1) a) What is Caesar Cipher?
    b) What is Steganography?
    c) What is Key management?
    d) What is Hash functions?
    e) What is the Digital signatures?
    f) What is Kerberos?
    g) State any two Protocols of Transport Layer Security.
    h) What is Pretty Good Privacy?
    i) What is Firewall?
    j) State any two Intrusion Detection Techniques.

Answer Five Questions Choosing One Question from Each Unit.
All Questions Carry Equal Marks.   (5×10 = 50 Marks)
UNIT- I
2) a) Explain various Security Attacks and Security Services.   10 Marks
(or)
    b) Explain AES Encryption and Decryption Process. 10 Marks

UNIT- II
3) a) Illustrate Diffie-Hellman Key Exchange. 10 Marks
(or)
   b) Explain about hash functions and MAC.   10 Marks
UNIT-III
4) a) Explain Digital Signature in detail . 10 Marks
(or)
    b) Explain about X.509 authentication service (BTL5) 10 Marks

UNIT-IV
5) a) Explain Confidentiality and Authentication in S/MIME. 10 Marks
(or)
    b) Illustrate Overview of IP Security. 10 Marks

UNIT-V
6) a) Discuss what are the problems that may intruder create and explain how to overcome those problem?
    10 Marks
(or)
   b) Discuss Various Types of Firewalls. 10 Marks

Course	DESIGN & ANALYSIS OF ALGORITHMS		
Course Code	20CS3T2	Course Delivery Method	Class Room / Blended Mode
Credits	4	CIA Marks	30
No. of Lecture Hours / Week	4	Semester End Exam Marks	70
Total Number of Lecture Hours	60	Total Marks	100
Year of Introduction :2018	Year of Offering:2021	Year of Revision:2006	Percentage of Revision:10%

Course Objective: The objective of this course is to develop proficiency in Problem Solving and Programming, To Perform Analysis of various Algorithms in regard to Time and Space Complexity, Gain good understanding of Applications of Data Structures, To develop a base for Advanced Study in Computer Science, To apply Design Techniques to solve different types of problems as per their Complexity and Develop ability to segregate NP-Hard and NP-Complete problems.

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

CO1 : Understand Basic Ideas about Analysis of Algorithms and the Concept of Data Structures.

CO2 : Know Divide and Conquer ,Greedy Methods and Solving Various Problems by applying them.

CO3 : Apply Dynamic Programming Method and Basic Traversal and Search Techniques to solve various Problems.

CO4 : Understand Backtracking and Branch and Bound Techniques to Design Algorithms.

CO5 : Categorize NP-Hard and NP-Complete Problems.

Syllabus

Unit	Learning Units	Lecture Hours
I	**Introduction:** What is Algorithm, Algorithm Specification Pseudo code Conventions, Recursive Algorithms, Performance Analysis: Space Complexity Time Complexity, Asymptotic Notation, Performance Measurement, Randomized Algorithms: Basics of Probability Theory, Randomized Algorithms Identifying the Repeated Element, Primality Testing: Advantages and Disadvantages. **Elementary Data Structures:** Stacks and Queues, Trees: Terminology, Binary Trees, Dictionaries: Binary Search Trees, Priority Queues, Heaps , Heapsort , Sets and Disjoint Set Union: Introduction-Union and Find Operations, Graphs: Introduction, Definitions, Graph Representations.	10
II	**Divide-and-Conquer:** General Method, Defective Chess Board, Binary Search, Finding Maximum and Minimum, Merge Sort, Quick Sort, Selection Problem, Strassen's Matrix Multiplication, Convex Hull: Some Geometric Primitives, The Quick Hull Algorithm, Graham's Scan, An O(nlogn) Divide and Conquer Algorithm. **The Greedy Method:** The General Method, Container Loading, Knapsack Problem, Tree Vertex Splitting, Job Sequencing with Deadlines, Minimum Cost Spanning Trees: Prim's Algorithm, Kruskal's Algorithm, Optimal Storage on Tapes, Optimal Merge Patterns, Single Source Shortest Paths.	14

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III	**Dynamic Programming:** The General Method, Multi Stage Graphs, All Pairs Shortest Paths, Single Source Shortest Paths, Optimal Binary Search Trees, String Editing -0/1 Knapsack, Reliability Design, The Traveling Sales Person Problem, Flow Shop Scheduling. **Basic Traversal and Search Techniques:** Techniques for Binary Trees, Techniques for Graphs: Breadth First Search and Traversal-Depth First Search, Connected Components and Spanning Trees, Bi-Connected Components and DFS.	17
IV	**Backtracking:** The General Method, The 8-Queens Problem, Sum of Subsets, Graph Coloring, Hamiltonian Cycles, Knapsack Problem. **Branch and Bound :** The Method: Least Cost Search, The 15 Puzzle Control Abstractions for LC Search, Bounding, FIFO Branch and Bound , LC Branch and Bound, 0/1 Knapsack Problem, LC Branch and Bound Solution, FIFO Branch and Bound Solution, Traveling Sales person.	11
V	**NP-Hard and NP-Complete Problems:** Basic Concepts: Non Deterministic Algorithms, The Classes NP Hard and NP Complex, Cook's Theorem, NP Hard Graph Problems, Clique Decision Problem, Node Cover Decision Problem Chromatic Number Decision Problem, Directed Hamiltonian Cycle, Traveling Sales Person Decision Problem, AND/OR Graph Decision Problem, NP-Hard Scheduling Problems, Scheduling Identical Processors, Flow Shop Scheduling, Job Scheduling.	8

Prescribed Text Book			
S.No	Author	Title	Publisher
1	Sartaj Sahni	Fundamentals of Computer Algorithms	Second Edition, Universities Press (2008)

Reference Text Books			
S.No.	Author	Title	Publisher
1	Anany Levitin	Introduction to the Design & Analysis of	Second Edition, Pearson
2	I.Chandra Mohan	Design and Analysis of Algorithms	PHI
3	Prabhakar Gupta, Vineet Agrawal	Design and Analysis of Algorithms	PHI
4	Parag Himanshu, Dave	Design and Analysis of Algorithms	Pearson Education (2008)

Course Focus: Foundation **/ S**kill Development.

Reference Websites :
1. https://epgp.inflibnet.ac.in/Home
2. https://ocw.mit.edu/courses/electrical-engineering-and-computer-science/6-046j-design-and-analysis-of-algorithms-spring-2015/lecture-notes/
3. https://www.cukashmir.ac.in/cukashmir/User_Files/imagefile/DIT/StudyMaterial/DAA/DAA_UNIT-I_6th-Sem_StudyMaterial.pdf

A.G & S.G Siddhartha Degree College of Arts & Science, Vuyyuru – 521165.
(An Autonomous College in the jurisdiction of Krishna University)
M.Sc.(Computer Science) Programme - III Semester
Course Code: 21CS3T2   Title: DESIGN AND ANALYSIS OF ALGORITHMS
(w.e.f admitted batch 2021-22)

Time: 3 Hours   **Max. Marks: 70**
Answer ALL questions   **(10×2 = 20 Marks)**

1. a) Define Algorithm.
    b) What is a priority queue?
    c) Define Convex Hull.
    d) What is tree vertex splitting?
    e) What is String Editing ?
    f) Differentiate DFS and BFS.
    g)What is Graph colouring?
    h) What is LC and FIFO Branch and Bound?
    i) Compare NP hard and NP complete classes.
    j) What is flow shop scheduling in NP Hard Scheduling problems?

Answer Five Questions Choosing One Question from Each Unit.
All Questions Carry Equal Marks.   **(5×10 = 50 Marks)**

UNIT – I

2. A) Explain Asymptotic Notations regarding time and space complexities of an algorithm.
                                        (or)
    B) Explain in detail about Heap Sort Technique with an example.

UNIT – II

3. A) What is Divide and Conquer approach? Apply it on Quick Sort with an example.
                                        (or)
    B) What is Greedy method? Explain Kruskal's Algorithm to find minimum cost spanning tree with an example.

UNIT – III

4. A) Explain the application of Dynamic Programming on Travelling Salesman Problem.
                                        (or)
    B) Explain the procedure to obtain Optimal Binary Search Tree by applying Dynamic Programming approach.

UNIT – IV

5.   A) What is 0/1-Knapsack Problem ? Solve it using Branch and Bound technique.
                                        (or)
     B) Explain the Sum of Subsets Problem. How can it be solved using Back Tracking Technique?

UNIT – V

6.   A) Write Cook's theorem. Briefly explain Cook's theorem.
                                        (or)
     B) Discuss various NP Hard Graph Problems.

Course	WEB TECHNOLOGIES		
Course Code	20CS3T3	Course Delivery Method	Class Room / Blended Mode
Credits	4	CIA Marks	30
No. of Lecture Hours / Week	4	Semester End Exam Marks	70
Total Number of Lecture Hours	60	Total Marks	100
Year of Introduction :2018	Year of Offering:2021	Year of Revision:2021	Percentage of Revision:10

Course Objective:

Understand the principles of creating an effective web page, including an in-depth consideration of information architecture. Become familiar with graphic design principles that relate to web design and learn how to implement theories into practice. Develop skills in analyzing the usability of a web site. Understand how to plan and conduct user research related to web usability. Learn the language of the web: HTML and CSS. Develop basic programming skills using Javascript and jQuery. Be able to embed social media content into web pages.

Course Outcomes:

CO1: Build functional Web Applications HTML.

CO2: Understand the concept of JAVA SCRIPTS

CO3: Understand the concept of DOM and CSS selectors .

CO4: : Create Dynamic Web Pages where in Client Interaction is facilitated using Advanced Server Technology like JSP.

CO5: Understand how to create web pages using PHP and identify the difference between the HTML, PHP. Integrate Offline Data Storage, Background Processes and APIs using Database Connectivity

Syllabus

Unit	Learning Units	Lecture Hours
I	**Introduction:** Evolution of Internet and World Wide Web, Web Basics, Multitier Application Architecture, Client-Side Scripting versus Server-Side Scripting, Object Technology **HTML5**: Introduction, Editing HTML5, First HTML5 Example, W3C HTML5 Validation Service, Headings, Linking, Images, Special Characters and Horizontal Rules, Lists, Tables, Forms, Internal Linking, meta Elements, HTML5 Form input Types, input and datalist Elements and autocomplete Attribute, Page-Structure Elements.	10

II	**CSS:** Introduction, Inline Styles, Embedded Style Sheets, Conflicting Styles, Linking External Style, Positioning Elements, Backgrounds, Element Dimensions, Box Model and Text Flow, Media Types, Building a CSS Drop-Down Menu, User Style Sheets, Text Shadows, Rounded Corners, Color, Box Shadows, Image Borders, Animation-Selectors. **JavaScript:** Introduction to Scripting, Control Statements I, Control Statements II, Functions, Arrays, Objects, Document Object Model, Event Handling.		14
III	**JQuery Basics:** String, Numbers, Boolean, Objects, Arrays, Functions, Arguments, Scope, Built-in Functions. jQuery-Selectors: CSS Element Selector, CSS Element ID Selector, CSS Element Class Selector, CSS Universal Selector, Multiple Elements E, F, G Selector, Callback Functions. jQuery-DOM Attributes: Get Attribute Value, Set Attribute Value. jQuery – DOM Traversing : Find Elements by index, Filtering out Elements, Locating Descendent Elements, JQuery DOM Traversing Methods.		17
IV	**JQuery CSS Methods:** Apply CSS Properties, Apply Multiple CSS Properties, Setting Element Width & Height, JQuery CSS Methods. jQuery – DOM Manipulation Methods: Content Manipulation, DOM Element Replacement, Removing DOM Elements, Inserting DOM elements, DOM Manipulation Methods. jQuery – Event Handling: Binding event handlers, Removing event handlers, Event Types, The Event Object, The Event Attributes. jQuery – Effects: JQuery Effect Methods, jQuery Hide and Show, jQuery Toggle, jQuery Slide – slideDown, SlideUP, SlideToggle, jQuery Fade- fadeIn – fadeout, faceTo, jQuery Custom Animations.		11
V	**Databases:** SQL, MYSQL. **PHP:** Introduction, Simple PHP Program, Converting Between Data Types, Arithmetic Operators, Initializing and Manipulating Arrays, String Comparisons, String Processing with Regular Expressions, Form Processing and Business Logic, Reading from a Database, Using Cookies, Dynamic Content.		8

Text Books			
	Author	Title	Publisher
1	Harvey M.Deitel and Paul J.Deitel	Internet and World Wide Web How To Program, 5e	Prentice Hall; 4th edition
2	Robert W Sebesta	Programming with World Wide Web	Pearson Education; 4th edition.
3	Jon Duckett	JavaScript & jQuery	Wiley

Reference Books			
	Author	Title	Publisher
1	Chris Bates	Web Programming Building Internet Application, Second Edition	Wiley (2007)
2	Uttam Kumar Roy	Web Technologies	Oxford University Press

Websites of Interest:
1. https://www.w3schools.com/html/default.asp
2. https:www.udemy.com/course/wix-master-course-make-a-website-in-1-day-with-wix

Course Focus: Foundation **/ E**mployability / **S**kill Development.

A.G & S.G Siddhartha Degree College of Arts & Science, Vuyyuru – 521165.
(An Autonomous College in the jurisdiction of Krishna University)
M.Sc., (Computer Science) Programme - III Semester
Course Code: 21CS3T3   Title: WEB TECHNOLOGIES
(w.e.f admitted batch 2021-22)

Time: 3 Hours   **Max. Marks: 70**
Answer ALL questions   **(10×2 = 20 Marks)**
1. a) What is WWW?
    b) Explain Meta Elements.
    c) Explain embedded style sheet with an example.
    d) What is Event Handling?
    e) List out built in functions in jQuery.
    f) Define Array. How to declare arrays in jQuery?
    g) How to set element width and height in JQuery?
    h) Explain Arithmetic operations in PHP.
    i) What are DDL Statements?
    j) Define cookies.

Answer Five Questions Choosing One Question from Each Unit.

All Questions Carry Equal Marks.   **(5×10 = 50 Marks)**
UNIT – I

2. A) How do you add Tables and Images to HTML page?
                              (or)
    B) Distinguish Client side scripting versus Server side scripting.

UNIT – II

3. A) Write short notes on user style sheets.
                              (or)
    B) Explain control statements in java script with example.

UNIT – III

4. A) What are jQuery Selector? Give some examples.
                              (or)
    B) Explain jQuery DOM attributes with an example.

UNIT – IV

5. A) Explain jQuery CSS methods with an example
                              (or)
    B) What are the effect methods used in jQuery?

UNIT – V

6. A) Differentiate between SQL and MYSQL databases
                              (or)
    B) How to read data from a database in PHP? Explain with an example.

A.G & S.G Siddhartha Degree College of Arts & Science, Vuyyuru – 521165.
(An Autonomous College in the jurisdiction of Krishna University)
M.Sc., (Computer Science) Programme - III Semester

Course	DATA MINING TECHNIQUES		
Course Code	20CS3T4	Course Delivery Method	Class Room / Blended Mode
Credits	4	CIA Marks	30
No. of Lecture Hours / Week	4	Semester End Exam Marks	70
Total Number of Lecture Hours	60	Total Marks	100
Year of Introduction :2018	Year of Offering:2021	Year of Revision:2020	Percentage of Revision:10%

Course Objective:

To understand and gain knowledge on Basic Concepts, Applications, Techniques of Data Mining, Data Warehouse Architecture and its Components, Schemas, Different OLAP Operations, Characterize The Kinds of Patterns that can be discovered by Association Rule Mining, Data Classification and Prediction Techniques, Identify the Similarities among the data Using Clustering Algorithms and Outlier Analysis.

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

CO1: Understand the Basics of Data Mining and Data Pre-Processing Techniques.

CO2: Aware of constructing the Data Warehouse, OLAP and relevant Data Model Concepts.

CO3: Understand the Frequent Itemset Mining Methods and Different Levels in Association Rules.

CO4: Understand the Basic Concepts in Classification and Advanced Classification Methods by implementing Various Algorithms.

CO5: Find the similarities among the data using Clustering Algorithms and Outlier Analysis.

Syllabus

Unit	Learning Units	Lecture Hours
I	**Warehouse:** What is it, Who need it, and Why? Things to consider, Managing the Data Warehouse, Getting ready for your project, Picking a target and moving forward, Project management benefits, The Scope statement, Work breakdown structure, Project estimating, Scope creep & tracking project's progress.	12
II	**Data Warehouse Design Methodology:** The preferred Architecture, Alternate warehouse architectures, Data Marts and Star Schema Design, Fundamentals of ETL Architecture, Partitioning Data.	12
III	**Data Mining:** Introduction, Data mining on What kind of data, Data mining functionalities classification of Data mining systems, Major issues in Data mining. **Mining Association rules in large databases:** Association rule mining, Mining	12

	single-Dimensional Boolean association rules from Transactional databases, Mining multi-Dimensional Association rules from relational Databases and Data Warehouses.	
IV	**Classification and Prediction:** Introduction to classification by decision tree induction, Bayesian Classification, Other classification methods, classification by back propagation, Prediction, classifier accuracy.	12
V	**Cluster Analysis :** Introduction, types of data in cluster analysis, a categorization of major clustering methods, partitioning methods, hierarchical methods. Density based methods: DBSCAN, Grid-based method: STING, Model based clustering method : Statistical Approach.	12

Text Books:

	Author	Title	Publisher
1	Michael Corey, Michael Abbey, Ian Abramson, Ben Taub	Oracle 8i Data Warehousing	TMH(Unit- I & II)
2	Jiawei Han MichelineKamber	Data mining & Techniques	Morgan Kaufmann Publishers(Unit-III to V)

Reference Books:

1	S.N.Sivanandam, S.Sumathi	Data Mining-Concepts, Tasks and Techniques	Thomson(2006)
2	Ralph Kimball	The Data Warehousing Toolkit	Wiley
3	Margaret H.Dunham	Data Mining-Introduction and Advanced Topics	Pearson Education
4	D.Hand, H.Mannila and P.Smyth	Principles of Data Mining	PHI(2001)

Websites of Interest:
1. www- db.standford.edu /`ullman/mining/mining.html : Data mining lecture notes.
2. ocw.mit.edu/ocwweb/slon-School-of-management/15-062Data-Mining Spring2003/course

Course Focus: Foundation **/ E**mployability / **S**kill Development.

A.G & S.G Siddhartha Degree College of Arts & Science, Vuyyuru – 521165.
(An Autonomous College in the jurisdiction of Krishna University)
M.Sc., (Computer Science) Programme - III Semester
Course Code: 21CS3T4   Title: DATA MINING TECHNIQUES
(w.e.f admitted batch 2021-22)

Time: 3 Hours   **Max. Marks: 70**
Answer ALL questions   **(10×2 = 20 Marks)**
1. Define Data Warehouse.

2.what is Data Mart.

3.What is snowflake scheme?

4.Define partitioning data.

5.Define Data Mining.

6.Define Classification and Prediction.

7.What are the major issues in Data mining.

8.Define Linear Regression.

9.Define Outlier Analysis.

10.what is clustering?

Answer Five Questions Choosing One Question from Each Unit.

All Questions Carry Equal Marks.   **(5×10 = 50 Marks)**
Unit-1
11 a) Discuss about Data Warehouse on user's perspective and developer's perspective .

(or)

  b) Explain about the Work Breakdown structure.

Unit-2
12 a) Explain about Data Warehouse Architecture.

(or)

  b) Discuss about the ETL design in detail.

Unit-3
13 a) Explain about data mining functionalities.

(or)

  b) Explain about the FP Growth algorithm with example.

Unit-4
14 a) Briefly discuss about classification by back propagation.

(or)

  b) Briefly discuss about Bayesian Classification.

Unit-5
15 a) Explain about the partitioning clustering .

(or)

  b). Discuss about DBSCAN & STING

Course	WEB TECHNOLOGIES LAB		
Course Code	20CS3L1	Course Delivery Method	Class Room / Blended Mode
Credits	4	CIA Marks	30
No. of Lecture Hours / Week	8	Semester End Exam Marks	70
Total Number of Lecture Hours	90	Total Marks	100
Year of Introduction :2018	Year of Offering:2021	Year of Revision:2021	Percentage of Revision: 10%

Course Objective: Able to build functional Web Applications using HTML, Able to use JavaScript and DHTML for Web Designing, Able to code using XML and PHP for Integrating with Web Pages, Create Dynamic Web Pages where in client interaction is facilitated using advanced server technology like JSP and Web Pages with Database Connectivity using PHP.

Course Outcomes: On successful completion of the course student will be able to:

CO1: Build functional Web Applications HTML.

CO2: Incorporates Multimedia Capabilities and Web Page Designs using Cascading Style Sheets.

CO3: Code Client Server Interaction Programs using Java Based Server Technology named Servlets.

CO4: Create Dynamic Web Pages where in Client Interaction is facilitated using Advanced Server Technology like JSP.

CO5: Integrate Offline Data Storage, Background Processes and APIs using Database Connectivity and ASP.

Course Details

HTML:
1. Develop HTML code to provide intra document linking.

2. Develop HTML code to provide inter document linking.

3. Develop a program to implement the three types of lists.

4. Create a HTML page using frames.

5. Develop a program to embed college picture into your web page and develop a short note on your college using paragraph tag.

6. Illustrate a suitable example; depict how we can align text using a table tag as follows.

II M.C.A	Pass percenetage=95%
	Fail percentage=5%
III M.C.A	Pass percenetage=97%
	Fail percentage=3%

7. Develop a program to create the time table as follows:

	1	2	3		4	5	6
MON	<------WEB LAB------>			B	SE	WEB	PPL
TUE	UML	CRY	SE	R	<-------VB LAB------->		
WED	WEB	SE	UML	E	CRY	PPL	
THU	CRY	WEB	PPL	A	<------WEB LAB------>		
FRI	<-------VB LAB------->			K	PPL	WEB	UML
SAT	SE	CRY	UML		<------SEMINARS------>		

8. Create a Registration form that interacts with the user. Collect login name, password, date of birth,sex, address, qualification and display a "Thank you for registering" message when the user submits the form.

Java Script:

9. Develop a script to compare two strings using String object.

10. Develop a script to generate random numbers within 1 to 10 and display the numbers in a table.

11. Develop a Java Script to update the information into the array, in the "onClick" event of the button "Update".

12. Create a web page for a shopping mall that allows the user to tick off his purchases and obtain the bill with the total being added up simultaneously.

13. Develop a script to find the duplicate elements of an array.
14. Develop a script which generates a different greeting each time the script is executed.
15. Develop a JavaScript to check the number is Armstrong number or not by getting the number from textbox and the result is displayed in a alert dialog box.
16. Develop a java script code that accepts user name and   password from user, Check their correctness and display appropriate   alert messages.

DHTML:
17. Create an inline style sheet. Illustrate the use of an embedded style sheet.

18. Create an external style sheet to illustrate the "Font" elements.

19. Develop a program to switch on and off light using onClick event.

20. Illustrate different types of filters (at least six) on a sample text.

21. Develop a program to illustrate tabular data control for data binding.

XML:
22. Create a small XML file designed to contain information about student performance on a module. Each student has a name, a roll number, a subject mark and an exam mark.
23. Create a internal DTD file.
24. Create an external DTD file.
25. Create a XSLT style sheet to display the student data as an HTML table.

PHP:
26. Illustrate PHP declarations and expressions to find factorial of a given number using.
27. Develop a PHP program that interacts with the user .Collect first name last name and date of birth and displays that information back to the user.
28. Develop a PHP program to connect MySQL Database.

JSP:
29. Develop a program to implement JSP directives.
30. Develop a JSP program for session tracking.

	Author	Title	Publisher
Prescribed Textbook			
1	N.P.Gopalan, J.Akilandeswari	Web Technologies-A Developer's Perspective	PHI(2008)
2	Harvey M. Deitel and Paul 1. Deitel	Internet and World Wide Web How To Program, 5e	Prentice Hall; 4th edition

Course Focus: Employability

Websites of Interest:

1. https://www.w3schools.com
2. https://www.edx.org/learn/web-development
3. https://www.codecademy.com/learn/paths/web-development

A.G & S.G Siddhartha Degree College of Arts & Science, Vuyyuru – 521165.
(An Autonomous College in the jurisdiction of Krishna University)
M.Sc., (Computer Science) Programme - III Semester

Course	DATA MINING LAB		
Course Code	20CS3L2	Course Delivery Method	Class Room / Blended Mode
Credits	4	CIA Marks	30
No. of Lecture Hours / Week	8	Semester End Exam Marks	70
Total Number of Lecture Hours	90	Total Marks	100
Year of Introduction : 2018	Year of Offering : 2021	Year of Revision : 2020	Percentage of Revision: 10%

Course Objective:

The main objective of this lab is to impart the knowledge on How to implement Data Mining Algorithms using Various Tools and How to characterize the kinds of Patterns that can be discovered by Association Rule Mining, Classification, Clustering, Identifying Outliers and Emphasize Hands-on Experience working with all Real Time Data Sets.

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

CO1: Understand the Various Kinds of Tools.

CO2: Apply Mining Techniques for Realistic Data.

CO3: Understand the Basic Concepts in R and Weka.

CO4: Understand how to import and export CSV Files and Package installation in R.

CO5: Develop and visualization of Data Mining Algorithms in R.

Using R Programming:

1. How to import data into R from text and excel files using read.table() and read.csv functions. .
2. Create Association Rules using Aprior Algorithm in R.
3. Construct Multilayer Perceptron or Neural Network using R.
4. Apply Time Series Analysis using R.
5. Apply Time Series Forecasting using R.
6. Apply Time Series Decomposition using R.
7. Create K-Means Clustering Algorithm using R.
8. Construct Decision Tree in R using package party.
9. Create Hierarchical Clustering using R.
10. Crate Hierarchical Clustering with Euclidean Distance using R
11. Examine K-Medoids clustering using R.
12. Detecting and Removing outliers using R.
13. Construct Density Based Clustering using R.
14. Illustrate Linear Regression using R.
15. Illustrate Multiple Regression using R.
16. Illustrate Logistic Regression using R.
17. Construct Outlier Detection by Clustering using R.
18. Detecting and Removing Missing values in R.
19. Create different kinds of Charts using Sample Data Sets in R.
20. Create Word Cloud using R.

Websites of Interest :

1. https://www.rdocumentation.org/packages/stats/versions/3.6.2
2. http://www.r-bloggers.com/

Course Focus: Foundation **/ E**mployability / **S**kill Development.

OPEN ELECTIVES OFFERD BY COMPUTER SCIENCE DEPARTMET

A.G & S.G Siddhartha Degree College of Arts & Science, Vuyyuru – 521165.
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M.Sc., (Computer Science) Programme - III Semester

Course	VISUAL ANALYTICS FOR EXECUTIVES		
Course Code	21CS3OEL1	Course Delivery Method	Face-to-face/Blended Mode
Course Category	Open elective	Lecture-Tutorial-	2-0-4
Credits	4	CIA Marks	30
No. of Lecture Hours / Week	6	Semester End Exam Marks	70
Total Number of Lecture Hours	60	Total Marks	100
Year of Introduction : 2021	Year of Offering: 2021	Year of Revision:2021	Percentage of Revision: Nil

Course Objectives : This Course focuses to know the Importance of Visualization in the world of Data Analytics and Prediction, To handle Data Sources in Tableau, To get familiarized about creating visualization using different Types of Charts, To gain knowledge about using Maps in Tableau, To gain knowledge about Analysis, To design Interactive Dash Boards.

Course Outcomes : At the end of this course, students should be able to:
CO1 : Able to know the importance of Visualization and connect Different Data Sources in Tableau.
CO2 : Able to create Charts in Tableau.
CO3 : Able to implement Aggregate Functions, Calculated Fields, Table Calculations and Level of Detail Calculations.
CO4 : Able to implement Maps and Advance Analytic.
CO5 : Able to create Interactive Dash Boards.

Syllabus		
Unit	**Learning Units**	**Lecture Hours**
I	**Introduction and Getting Started with Tableau:** The Advantages of a Modern Analytics Platform, The Tableau Application Suite, Installing Tableau Desktop Data Preparation, The Sample Dataset, The Tableau Workspace, Working With Measures and Dimensions. Working With Marks, Saving, Opening, And Sharing Your Workbooks. **Adding Data Sources in Tableau:** Setting up a Data Connector, Selecting Data Tables, Joins, Unions, Data Extracts and Live Connections, Editing The Model's Metadata, Data Types, Adding Hierarchies, Calculated Fields and Table, Calculations, Data Collection.	12
II	**Creating Data Visualizations:** Chart Types, Ready, Set, Show Me, Bar Charts, Legends, Filters and Hierarchies,, Line Charts, Highlight Tables, Heatmaps, Bullet Charts, Cumulative Sums With Waterfall Charts, Reflection, The Anatomy of A Tableau Visualization.	12
III	**Aggregate Functions, Calculated Fields, and Parameters:** Aggregate Functions, Calculated Fields, Aggregations in Calculated Fields, Text Operators, Date Fields, Logical	12

	Functions In Calculated Fields, Parameters, Searching Text Fields. **Table Calculations and Level of Detail Calculations:** Different Types of Calculations, Quick Table Calculations, Customized Table Calculations, Level of Detail Expressions.	
IV	**Maps:** Symbol Maps, Filled Maps, Density Maps, Map Layers, Maps With Pie Charts, Viz in Tooltip. **Reflection:** The Anatomy of a Tableau Map, Alternative Map Services, Mapbox Maps, Spatial Data. **Advanced Analytics**: Trends, Forecasts, Clusters and Other Statistical Tools, Overview of The Tableau Analytics Pane, Constant, Average, Reference Lines, Trend Lines, Forecasts, Cluster Analysis.	12
V	**Interactive Dashboards:** Preliminary Considerations, Creating a New Dashboard, The Dashboard Pane, Placing Charts on the Dashboard, Dashboard Titles, Navigation Buttons, Dashboard Actions.	12

Course has focus on : Employability

Websites of Interest :

1. Visual Analytics in Tableau | https://www.youtube.com/watch?v=gEKQ3kigJsM
2. Tableau Training for Beginners | Edureka https://www.youtube.com/watch?v=aHaOIvR00So
3. Tableau Training for Beginners | Simplilearn https://www.youtube.com/watch?v=Wh4sCCZjOwo
4. Tableau Full Course| https://youtu.be/KA0QHWm0nWo

Co-curricular Activities : Programming Contests, workshops & Quiz.

Lab List:

1. Tableau installation.

2. Tableau Introduction /Exploring Tableau.

3. Creating New Workbooks Opening Existing Workbooks in Tableau

4. Data Collection from various sources web/text/csv/JSON

5. Implementing joins and Unions

6. Creating Bar Chart.

7. Creating Pie Chart.

8. Creating Dual Axis Chart.

9. Creating Shared Axis.

10. Creating Cross Tab.

11. Creating Word Cloud.

12. Creating Scatter Plot.

13. Creating Bubble Chart.

14. Implementing Data Blending.

15. Implementing Word Cloud.

16. Implementing Aggregate Functions, Calculated Fields.

17. Implementing Table Calculations and Level of Detail Calculations.

18. Creating Maps.

19. Implementing Trend lines and analytics in Tableau.

20. Creating a Dash Board.

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M.Sc., (Computer Science) Programme – III Semester
Course Code: 21CS3OEL1   **Title: Visual Analytics for Executives**
(w.e.f admitted batch 2021-22)

Time: 3 Hours   **Max. Marks: 70**

Part A   (Theory)

(5×4 = 20 Marks)

Answer All Questions

1. What is Dimension and Measure?

2. Explain Joining Tables with Tableau with example.

3. Explain the role of Table Data Extract.

4. How to Replace Tableau's Standard Maps?

5. What is Cluster Analysis?

Part B (Practical)

(2×25 = 50 Marks)

Answer all Questions

1. a. Creating word clouds using Tableau.

   b. Create a dual axis chart using Tableau.

2. Creating a Simple Dash Board using Tableau.

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M.Sc., (Computer Science) Programme - III Semester

Course	WEB PROGRAMMING		
Course Code	21CS3OEL2	Course Delivery Method	Class Room / Blended Mode
Credits	4	CIA Marks	30
No. of Lecture Hours / Week	4	Semester End Exam Marks	70
Total Number of Lecture Hours	60	Total Marks	100
Year of Introduction :2018	Year of Offering:2021	Year of Revision:2021	Percentage of Revision: 10%

Course Objective: To provide knowledge on Web Architecture, Web Services, Client Side and Server Side Scripting Technologies, To focus on the development of Web Based Information Systems and Web Services, To provide skills to design Interactive and Dynamic Web Sites.

Course Outcomes: On successful completion of the course student will be able to:

CO1: Understand the Web Architecture and Web Services.
CO2: Design Interactive Web Pages using HTML and Style Sheets.
CO3: Design Interactive Web Pages using Forms and Tables.
CO4: Study about CSS and XML.
CO5: Create a Website using Wix Platform.

Syllabus

Unit	Learning Units	Lecture Hours
I	**Introduction:** What is Internet, History of Internet, Internet Services and Accessibility, Uses of the Internet, Protocols, Web Concepts: The Client/Server Model, Retrieving Data from the Web, How the Web Works?, Web Browsers, Searching information on the Web, Internet Standards. **Internet Protocols:** Internet Protocols, Host Names, Internet Applications And Application Protocols, Email Protocols**.** **World Wide Web:** Basics of WWW and Browsing, URL, Types of Browsers, Features of Browsers.	12
II	**Introduction to HTML:** HTML Document Structure, Creating Headings on Webpage. **Working with Links:** Creating Hyper Link, Setting The Hyper Link Colors, Linking Different Sections of Web Page. **Working with images:** Inserting an Image, Displaying alternate Text for an Image, Adding a Border, Aligning an Image, Using Image as Links, Image Maps. **Working with tables**: Creating a Table, Specifying Caption to a Table, Adding a Table Heading and Border, Aligning a Table and Cell Content, Setting The Width of a Table And Table Columns.	12
III	**Forms:** Creating Forms, Named Input Fields, The <INPUT> Tag, Multiple Lines Text Windows, Drop Down and List Boxes, Text, Text Area, Password, Button, Submit, Reset, Radio, Checkbox, Select Option, Labeling Input Fields, Grouping Related Fields, Disabled and Read Only Fields. **Frames:** Introduction to Frames, Frames Document, The <FRAMESET> Tag, Nesting <FRAMESET> Tag, Placing Content in Frames with the <FRAME> Tag, Targeting Named Frames.	12

IV	**CSS:** Introduction to Style Sheets, Inline Styles, External Style Sheets, Internal Style Sheets, Style Classes, Multiple Styles. **XML:** Introduction, HTML vs. XML, Syntax of XML Document, XML Attributes, Use of Elements vs. Use of Attributes, XML Validation, Well Formed XML Documents, Valid XML Documents, XML DTD: Internal DTD, External DTD, The Buildings Blocks of XML Documents.	12
V	**Make a Website with Wix:** Planning your Wix Website Design, Planning your Website Pages Working, Planning your Website Pictures, Videos and Logos, Wix Signup and Selecting a Premade or Blank Template. **Building Your Wix Website**: Getting to know Wix platform, Getting to know Wix editor, Designing the Header, Footer and Menu, Background for Pages and Sections, Adding Text, Adding Photos, Adding Videos, Adding Icons, Shapes and Boxes, Adding Links, Adding Forms, Adding a Wix Store, Adding a Lightbox.	12

Prescribed Textbook			
	Author	Title	Publisher
1	N.P.Gopalan, J.Akilandeswari	Web Technologies-A Developer's Perspective	PHI(2008)

Reference Text Book			
	Author	Title	Publisher
1	Harvey M. Deitel and Paul 1. Deitel	Internet and World Wide Web How To Program, 5e	Prentice Hall; 4th edition
2	Thomas Powell	Web Design The Complete Reference	TMH Tata McGraw Hill

Course Focus: Employability

Websites of Interest:
3. https://www.w3schools.com/html/default.asp
4. https:www.udemy.com/course/wix-master-course-make-a-website-in-1-day-with-wix

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Course Code: 21CS3OEL2   Title: Web Programming

(w.e.f admitted batch 2021-22)

Time: 3 Hours   Max. Marks: 70
Answer ALL questions   (10×2 = 20 Marks)

1. a. What is Web Browser? Explain it?
    b. What is the Functionality of HTTP?
    c. Compare Tag and Attributes with example.
    d. Describe how you will Embed Images in Web document.
    e. Why do we use <frameset>?
    f. Write tag for Drop Down.
    g. Develop an Inline Style Sheet with suitable example.
    h. What is the Syntax of XML?
    i. How to Plan a Website Design?
    j. Explain adding a photo in Wix Platform.

Answer Five Questions Choosing One Question from Each Unit.
All Questions Carry Equal Marks.   (5×10 = 50 Marks)

Unit I

2) a) Explain various Services Offered by Internet and the Types Of Internet Connections.

(or)

   b) Explain about Internet Protocols.

Unit II

3) a) What is the structure of HTML Document? Explain with example.

(or)

   b) How to Create A Table in HTML with various Attributes?

Unit III

4) a) Discuss Frame Set and Frame Attributes by writing Program.

(or)

   b) Develop a Form with Various Tags with suitable example.

Unit IV

5) a) What are Types of CSS? Explain with example.

(or)

   b) What are Well Formed and Valid XML Documents?

Unit V

6) a) Explain Planning of Wix Website Pages Working, Website Pictures, Videos and Logos.

(or)

   b) Explain creating a Website using Wix Platform.

APPENDIX - IV
ADD ON COURSE

Applicable for the batch of students applicable during the Academic Year 2021-2022

M.Sc.(Computer Science)

S.No.	Course Code	Title of the Course	Instructional Hours per Semester			Credits	Evaluation			Total Marks
			L	T	P		CIA Marks	SEE		
								Marks	Duration	
1	21CS3A1	PHP with My SQL Certification			45	4	Nil	Nil	3 Hours	Nil

CIA=Continuous Internal Assessment	SEE=Semester End Examinations