MOTHER TERESA WOMEN'S UNIVERSITY

KODAIKANAL – 624 101

DEPARTMENT OF COMPUTER SCIENCE

M.Sc. Information Technology (IT)

Curriculum Framework, Syllabus and Regulations

(Based on TANSCHE Syllabus under Choice Based Credit System -CBCS)

(For the candidates to be admitted from the Academic Year 2023-24)

MOTHER TERESA WOMEN'S IUNIVERSITY, KODAIKANAL.

M.Sc. Information Technology

TANSCHE REGULATIONS ON LEARNING OUTCOMES-BASED CURRICULUM FRAMEWORK FOR POSTGRADUATE EDUCATION

Duration - 2 years for PG

Programme Outcomes (Pos) :

PO1: Problem Solving Skill: Apply knowledge of Management theories and Human Resource practices to solve business problems through research in Global context.

PO2: Decision Making Skill: Foster analytical and critical thinking abilities for data-based decision-making.

PO3: Ethical Value: Ability to incorporate quality, ethical and legal value-based perspectives to all organizational activities.

PO4: Communication Skill: Ability to develop communication, managerial and interpersonal skills.

PO5: Individual and Team Leadership Skill: Capability to lead themselves and the team to achieve organizational goals.

PO6: Employability Skill: Inculcate contemporary business practices to enhance employability skills in the competitive environment.

PO7: Entrepreneurial Skill: Equip with skills and competencies to become an entrepreneur.

PO8: Contribution to Society: Succeed in career endeavors and contribute significantly to society.

PO 9 Multicultural competence: Possess knowledge of the values and beliefs of multiple cultures and a global perspective.

PO 10: Moral and ethical awareness/reasoning

Ability to embrace moral/ethical values in conducting one's life.

Programme Specific Outcomes (PSOs)

PSO1 – Placement: To prepare the students who will demonstrate respectful engagement with others' ideas, behaviours, beliefs and apply diverse frames of reference to decisions and actions.

PSO 2 – Entrepreneur: To create effective entrepreneurs by enhancing their critical thinking, problem solving, decision making and leadership skill that will facilitate startups and high potential organizations.

PSO3 – Research and Development: Design and implement HR systems and practices grounded in research that comply with employment laws, leading the organization towards growth and development.

PSO4 – Contribution to Business World: To produce employable, ethical and innovative professionals to sustain in the dynamic business world.

PSO 5 – Contribution to the Society: To contribute to the development of the society by collaborating with stakeholders for mutual benefit.

Syllabus and Framework for PG Programme in Information Technology

M.Sc., Information Technology

SEMESTER – I

(I Year)

	Course Code	Course Title	Credit	Hours per week(L/T/P)
Part A	P23ITT11	CC1 - Python Programming	5	7
	P23ITP12	CC2 - Python Programming – Practical	5	7
	P23ITT13	CC3 - Web Development using Word Press– Practical	4	6
	P23ITE11	Elective I (Discipline Specific) (One from Group A) Data Structures	3	5(4 L+ 1T)
	P23ITG11	Elective II (Generic) - Women Empowerment	3	5(4L + 1T)
Total			20	30
Semester-II			Credit	Hours per week(L/T/P)
Part A	P23ITT24	CC4 – Database Systems	4	6
	P23ITP25	CC5 – RDBMS Lab	5	6
	P23ITP26	CC6 - Open Source Technologies -Practical	4	6
	P23ITE22	Elective III (Discipline Specific)(One from Group C) Networks and Security	3	4
	P23ITG22	Elective-IV (Generic) (One from Group D) Cyber Security	3	4
Part B	P23ITS21	Skill Enhancement Course -SEC 1 (One from Group G) – Documentation using LATEX / other packages	2	3
Total			22	30

Elective Courses

Courses are grouped (Group A to Group F) so as to include topics focussed on IT Oriented (ITC) courses for flexibility of choice by the stakeholders / institutions.

Semester I	
Elective I	**Elective II**
Group A: 1. Data Structures 2. Compiler Design 3. Natural Language Processing	**Group B:** 1. Operating Systems 2.Digital Computer Architecture 3. Human Computer Interaction
Semester II	
Elective III	**Elective IV**
Group C:	**Group D :**

1. Biometric Techniques 2. Digital Watermarking and Steganography 3. Digital Image Processing	1. Software Engineering 2. Object oriented analysis and design 3. Software Project Management
Semester III	
Elective V	**Elective VI**
Group E: 1. Research Methodology 2. Internet of Things 3. Trends in Computing	**Group F:** 1. IntelligentSystems 2. Introduction to Robotics 3. Virtual and Augmented Reality

Skill Enhancement Courses

Skill Enhancement Courses are chosen so as to keep in pace with the latest developments in the academic / industrial front and provides flexibility of choice by the stakeholders / institutions.

Group G (Skill Enhancement Courses) SEC:

- Multimedia Tools Lab
- Documentation using LATEX / other packages
- Office Automation and ICT Tools
- React JS – Practical
- Web Design
- Animation in Flash

Ability Enhancement Courses

- Soft Skill courses

Extra Disciplinary Courses for other Departments (not for Information Technology students)

Students from other Departments may also choose any one of the following as Extra Disciplinary Course.

ED-I: E-Commerce and Content Management Systems
ED-II: Computer Fundamentals
ED-III: Image Editing and Animation
ED-IV: Game Theory and Strategy
ED-V: Introduction to Data Analysis

Testing Pattern (25+75)

Internal Assessment

Theory Course: For theory courses there shall be three tests conducted by the faculty concerned and the average of the best two can be taken as the Continuous Internal Assessment (CIA) for a maximum of 25 marks. The duration of each test shall be one / one and a half hour.

Computer Laboratory Courses: For Computer Laboratory oriented Courses, there shall be two tests in Theory part and two tests in Laboratory part. Choose one best from Theory part and other best from the two Laboratory part. The average of the best two can be treated as the CIA for a maximum of 25 marks. The duration of each test shall be one / one and a half hour.

There is no improvement for CIA of both theory and laboratory, and, also for University End Semester Examination.

Written Examination: Theory Paper (Bloom's Taxonomy based)

Question paper Model

Intended Learning Skills	**Maximum 75 Marks** **Passing Minimum: 50%** **Duration : Three Hours**
	Part –A (**10x 2 = 20 Marks**) Answer ALL Questions **Each Question carries 2 marks**
Memory Recall / Example/ Counter Example / Knowledge about the Concepts/ Understanding	Two questions from each UNIT
	Question 1 to Question 10
	Part – B (5 x 5 = 25 Marks) **Answer ALL Questions** **Each questions carries 5 Marks**
Descriptions/ Application (problems)	**Either-or Type** Both parts of each question from the same UNIT
	Question 11(a) or 11(b) To **Question 15(a) or 15(b)**
	Part-C (3x 10 = 30 Marks) **Answer any THREE questions** **Each question carries 10 Marks**
Analysis /Synthesis / Evaluation	There shall be FIVE questions covering all the five units
	Question 16 to Question 20

Syllabus for the Courses of M.Sc. Information Technology

Semester - I

<table>
<tr><td colspan="2">Title of the Course</td><td colspan="6">PYTHON PROGRAMMING</td></tr>
<tr><td colspan="2">Paper Number</td><td colspan="6">CORE I</td></tr>
<tr><td rowspan="2">Category</td><td rowspan="2">Core</td><td>Year</td><td>I</td><td rowspan="2">Credits</td><td rowspan="2">4</td><td rowspan="2">Course Code</td><td rowspan="2">P23ITT11</td></tr>
<tr><td>Semester</td><td>I</td></tr>
<tr><td colspan="2" rowspan="2">Instructional Hours per week</td><td>Lecture</td><td colspan="2">Tutorial</td><td>Lab Practice</td><td colspan="2">Total</td></tr>
<tr><td>4</td><td colspan="2">1</td><td>-</td><td colspan="2">5</td></tr>
<tr><td colspan="2">Pre-requisite</td><td colspan="6">Basic understanding on object oriented programming concepts</td></tr>
<tr><td colspan="2">Objectives of the Course</td><td colspan="6">To acquire programming skills in core Python and to develop databaseapplicationsin Python</td></tr>
<tr><td colspan="2">Course Outline</td><td colspan="6">UNIT-I : Core Python: Introduction -Python Basics: Comments - Statements and syntax - variableAssignment - Identifiers - Python objects : Built-in-types - Internal types - Standard Typeoperators - Standard type Built-in-functions. Numbers : Introduction to Numbers - Integers -Floatingpointnumbers-Complexnumbers-Operators-Built-inandfactoryfunctions–ConditionalsandLoops -Sequences: Strings,Lists andTuples</td></tr>
<tr><td colspan="2" rowspan="4"></td><td colspan="6">UNIT-II :
Mappingandsettypes.-
Functionsandfunctionalprogramming:Introduction-Callingfunctions-Creatingfunctions- passing functions-Formalarguments- Variable-LengthArguments-Functional Programming- VariableScope – Recursion</td></tr>
<tr><td colspan="6">UNIT-III : Modules: Modules and Files – namespaces - Importing Modules - Features - Built-in functions.ObjectOrientedProgramming:Introduction-ObjectOrientedProgramming–EncapsulationInheritance–Polymorphism-ErrorsandExceptions:Introduction – ExceptionsinPython.</td></tr>
<tr><td colspan="6">UNIT-IV : GUI Programming:Introduction – Using Widgets: Core widgets- Generic widget properties –Labels–Buttons–RadioButtons–CheckButtons–Text–Entry–ListBoxes–Menus–Frame– Scroll Bars – Scale</td></tr>
<tr><td colspan="6">UNIT-V:
DatabaseProgramming:ConnectingtoadatabaseusingMongoDB-CreatingTables-INSERT-UPDATE-DELETE-READoperations.</td></tr>
</table>

Extended Professional Component (is a part of internal component only, Not to be included in the External Examination question paper)	Questions related to the above topics, from various competitive examinations UPSC / TRB / NET / UGC – CSIR / GATE / TNPSC / others to be solved (To be discussed during the Tutorial hour)
Skills acquired from this course	Knowledge, Problem Solving, Analytical ability, Professional Competency, Professional Communication and Transferrable Skill
Recommended Text	1. Wesley J. Chun, (2007), "Core Python Programming", Pearson Education, Second Edition –(UnitI, II, III). 2. Charles Dierbach,(2015),"Introduction to Computer Science Using Python – A Computational Problem-Solving Focus", Wiley India Edition- (UnitIII- Object Oriented Programming) **3.** Martin C Brown, (2018), "The Complete Reference Python", McGraw Hill Education (India)Private Limited– (UnitIV)
Reference Books	1. MarkLutz, (2013), "Learning Python Powerful Object Oriented Programming", OreillyMedia, 5 th Edition. 2. Timothy A.Budd,(2011), "ExploringPython", Tata McGraw Hill Education Private Limited, First Edition. 3. AllenDowney, Jeffrey Elkner, ChrisMeyers, (2012), "How to think like a computer scientist: learning with Python"
Website and e-Learning Source	1. http://interactivepython.org/courselib/static/pythonds 2. http://www.ibiblio.org/g2swap/byteofpython/read/ 3. http://www.diveintopython3.net/ **4.** http://docs.python.org/3/tutorial/index.html

Course Learning Outcome (for Mapping with POs and PSOs)

Students will be able to

CO's	Course Outcomes
CLO1	Explain the basic concepts in python language.
CLO2	Apply the various data types and identify the usage of control statements, loops, functions and modules in python for processing the data
CLO3	Analyze and solve problems using basic constructs and techniques of python.
CLO4	Assess the approaches used in the development of interactive application.
CLO5	To build realtime programs using python

CO/PSO	PSO1	PSO 2	PSO3	PSO4	PSO5	PSO6
CLO1	3	3	3	3	2	2

CLO2	3	3	3	3	3	2
CLO3	3	2	3	3	3	3
CLO4	3	3	3	3	3	3
CLO5	3	3	3	3	3	3
Weightage of course contribute to eachPSO	15	13	15	15	13	15

<table>
<tr><td colspan="2">Title of the Course</td><td colspan="7">PYTHON PROGRAMMING – PRACTICAL</td></tr>
<tr><td colspan="2">Paper Number</td><td colspan="7">CORE II</td></tr>
<tr><td rowspan="2">Category</td><td rowspan="2">Core</td><td>Year</td><td>I</td><td>Credits</td><td>4</td><td>Course Code</td><td>P23ITP12</td></tr>
<tr><td>Semester</td><td>I</td></tr>
<tr><td colspan="2" rowspan="2">Instructional Hours per week</td><td>Lecture</td><td colspan="2">Tutorial</td><td colspan="2">Lab Practice</td><td>Total</td></tr>
<tr><td>-</td><td colspan="2">1</td><td colspan="2">4</td><td>5</td></tr>
<tr><td colspan="2">Pre-requisite</td><td colspan="7">Basic understanding of C, C++ and Java programming languages</td></tr>
<tr><td colspan="2">Objectives of the Course</td><td colspan="7">This course gives practical experience in Python basics, Object Oriented programming like Classes, Inheritance, and Polymorphism, GUI Applications and Database connection.</td></tr>
<tr><td colspan="2">Course Outline</td><td colspan="7">1. PythonBasicprograms
2. ControlStructures
3. Lists
4. FunctionsandRecursions
5. Modules
6. StringProcessing
7. DictionariesandSets
8. ClassesandObjects
9. Polymorphism
10. Inheritance
11. GUIApplication
12. Workingwith Database</td></tr>
<tr><td colspan="2">Extended Professional Component (is a part of internal component only, Not to be included in the External Examination question paper)</td><td colspan="7">Questions related to the above topics, from various competitive examinations UPSC / TRB / NET / UGC – CSIR / GATE / TNPSC / others to be solved

(To be discussed during the Tutorial hour)</td></tr>
<tr><td colspan="2">Skills acquired from this course</td><td colspan="7">Knowledge, Problem Solving, Analytical ability, Professional Competency, Professional Communication and Transferrable Skill</td></tr>
<tr><td colspan="2">Recommended Text</td><td colspan="7">Wesley J. Chun, (2007), “Core Python Programming”, Pearson Education, Second Edition –</td></tr>
<tr><td colspan="2">Reference Books</td><td colspan="7">1. MarkLutz,(2013),“Learning Python Powerful Object Oriented Programming”, Oreilly Media, 5 th Edition.
2. TimothyA.Budd,(2011),“Exploring Python”,TataMCGrawHillEducationPrivateLimited,First Edition.
3. AllenDowney, JeffreyElkner, ChrisMeyers, (2012), “How to think like a computer scientist: learning with Python”</td></tr>
</table>

Website and **e-Learning Source**	1. http://interactivepython.org/courselib/static/pythonds 2. http://www.ibiblio.org/g2swap/byteofpython/read/ 3. http://www.diveintopython3.net/ http://docs.python.org/3/tutorial/index.html

Course Learning Outcome (for Mapping with POs and PSOs)

Students will be able to

CO's	Course Outcomes
CLO1	Understand the significance of control statements, loops and functions in creating simple programs.
CLO2	Apply the core datastructures available in python to store, process and sort the data
CLO3	Analyze the realtime problem using suitable python concepts
CLO4	Assess the complex problems using appropriate concepts in python
CLO5	Develop the realtime applications using python programming language.

CO/PSO	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6
CLO1	**3**	**3**	**3**	**3**	**2**	**2**
CLO2	**3**	**3**	**3**	**3**	**3**	**2**
CLO3	**3**	**2**	**3**	**3**	**3**	**3**
CLO4	**3**	**3**	**3**	**3**	**3**	**3**
CLO5	**3**	**3**	**3**	**3**	**3**	**3**
Weightage of course contribute to eachPSO	**15**	**13**	**15**	**15**	**13**	**15**

<table>
<tr><td colspan="2">Title of the Course</td><td colspan="6">WEB DEVELOPMENT USING WORD PRESS - PRACTICAL</td></tr>
<tr><td colspan="2">Paper Number</td><td colspan="6">CORE III</td></tr>
<tr><td rowspan="2">Category</td><td rowspan="2">Core</td><td>Year</td><td>I</td><td rowspan="2">Credits</td><td rowspan="2">4</td><td rowspan="2">Course Code</td><td rowspan="2">P23ITT13</td></tr>
<tr><td>Semester</td><td>I</td></tr>
<tr><td colspan="2" rowspan="2">Instructional Hours per week</td><td>Lecture</td><td colspan="2">Tutorial</td><td>Lab Practice</td><td colspan="2">Total</td></tr>
<tr><td>-</td><td colspan="2">1</td><td>4</td><td colspan="2">5</td></tr>
<tr><td colspan="2">Pre-requisite</td><td colspan="6">Basic understanding on HTML and CSS</td></tr>
<tr><td colspan="2">Objectives of the Course</td><td colspan="6">Theprimarycourseobjectiveofthispaperistolearnthefundamentalsofbasicweb concepts, HTML, DHTML, JavaScriptand Word Press</td></tr>
<tr><td colspan="2">Course Outline</td><td colspan="6">UNIT-I :
IntroductiontoHTML-Lists-AddingGraphicstoHTMLDocuments-Tables-LinkingDocuments-Frames-DevelopingHTMLForms</td></tr>
<tr><td colspan="2"></td><td colspan="6">UNIT-II :
DynamicHTML-CascadingStyleSheets-UseofSPANTag-ExternalStyleSheets-UseofDIVTag -Developing Websites</td></tr>
<tr><td colspan="2"></td><td colspan="6">UNIT-III :
Introduction to JavaScript - JavaScript in Web Pages - Advantages - Writing JavaScript intoHTML - Basic Programming Techniques - Operators and Expressions- JavaScript ProgrammingConstruct: Conditional Checking, Controlled Loops, Functions: Built-in Functions, User-DefinedFunctions-PlacingText in aBrowser-DialogBoxes.</td></tr>
<tr><td colspan="2"></td><td colspan="6">UNIT-IV :
JavaScriptDocumentObjectModel:Introduction-UnderstandingObjectsinHTML-HandlingEvents usingJavaScript. Formsused byaWebsite:Form Object-Built-in Objects.</td></tr>
<tr><td colspan="2"></td><td colspan="6">UNIT-V:
Word Press: Installation - Stetting and administration- Word press: Theming basics - Our FirstWord Press Website - Theme Foundation - Menu and navigation- Home page - DynamicSidebarsand Widgets- Page-archive Pageresults-TestingandLaunching</td></tr>
<tr><td colspan="2">Extended Professional Component (is a part of internal component only, Not to be included in the External Examination question paper)</td><td colspan="6">Questions related to the above topics, from various competitive examinations UPSC / TRB / NET / UGC – CSIR / GATE / TNPSC / others to be solved
(To be discussed during the Tutorial hour)</td></tr>
<tr><td colspan="2">Skills acquired from this course</td><td colspan="6">Knowledge, Problem Solving, Analytical ability, Professional Competency, Professional Communication and Transferrable Skill</td></tr>
</table>

Recommended Text	1. IvanN.Bayross,(2005),WebEnabledCommercialApplications DevelopmentUsingHTML, DHTML,JavaScript,perlCGI,3rdEdition,BPBPublications.(Unit I,II,IIIandIV) **2.** JesseFriedman,(2012),WebDesigner'sGuidetoWordPress:Plan,Theme,Build,Launch(VoicesThat Matter), 1stEdition , NewRiders. (Unit V)
Reference Books	1. N.P.Gopalan,J.Akilandeswari,(2009),WebTechnology:ADeveloper‟sPerspective,EasternEconomyEdition, PHILearningPrivateLimited. 2. Deitel&Deitel,(2000),InternetandWorldWideWebHowtoprogram,PrenticeHall. 3. JonDuckett,(2004),BeginningWebProgrammingwithHTML, XHTML,andCSS,WileyPublishing,Inc.
Website and e-Learning Source	1. http://www.sergey.com/web_course/content.html 2. http://www.pageresource.com/jscript/index.html 3. http://www.peachpit.com/guides/content.aspx 4. https://www.tutorialspoint.com/wordpress/index.htm

Course Learning Outcome (for Mapping with POs and PSOs)

Students will be able to

CO's	Course Outcomes
CLO1	Identify the tools which will be suitable for the requirement of the webpage.
CLO2	Implement Javascript and Style Sheets effectively in the Web Pages
CLO3	Analyze the different tools and built-in functions available to be applied in the web page
CLO4	Rate the design and effectiveness of the Web Pages created.
CLO5	Design and publish a website using Wordpress

CO/PSO	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6
CLO1	**3**	**3**	**3**	**2**	**2**	**3**
CLO2	**3**	**3**	**3**	**2**	**2**	**3**
CLO3	**3**	**3**	**3**	**2**	**2**	**3**
CLO4	**3**	**3**	**3**	**2**	**2**	**3**
CLO5	**3**	**3**	**3**	**3**	**3**	**3**
Weightage of course contribute to eachPSO	**15**	**15**	**15**	**11**	**11**	**15**

Semester – 1 - Elective

<table>
<tr><td colspan="2">Title of the Course</td><td colspan="6">DATA STRUCTURES</td></tr>
<tr><td colspan="2">Paper Number</td><td colspan="6">ELECTIVE I (EC1)</td></tr>
<tr><td>Category</td><td>Elective</td><td>Year</td><td>I</td><td>Credits</td><td>3</td><td>Course Code</td><td>P23ITE11</td></tr>
<tr><td colspan="2"></td><td>Semester</td><td>I</td><td colspan="4"></td></tr>
<tr><td colspan="2" rowspan="2">Instructional Hours per week</td><td>Lecture</td><td>Tutorial</td><td>Lab Practice</td><td colspan="3">Total</td></tr>
<tr><td>4</td><td>1</td><td>-</td><td colspan="3">5</td></tr>
<tr><td colspan="2">Pre-requisite</td><td colspan="6">Basic understanding of programming and foundational concepts in computer science</td></tr>
<tr><td colspan="2">Objectives of the Course</td><td colspan="6">To become familiar with the various data structures and their applications and to increase the understanding of basic concepts of the design and use of algorithms</td></tr>
<tr><td colspan="2">Course Outline</td><td colspan="6"></td></tr>
<tr><td colspan="2"></td><td colspan="6">UNIT-I :
Introduction and Overview: Definitions – Concept of Data Structures – Overview of Data Structures – Implementation of Data Structures – Arrays: Definition – One Dimensional Array – Multidimensional Arrays: Two Dimensional Array – Sparse Matrices – Three dimensional and n-dimensional Arrays – Stacks : Introduction – Definition – Representation of Stack – Operations on Stack – Applications of Stacks: Evaluation of Arithmetic Expressions – Implementation of Recursion - Tower of HanoiProblem</td></tr>
<tr><td colspan="2" rowspan="3"></td><td colspan="6">UNIT-II :
Queues: Introduction – Definition – Representation of Queues – Various Queue Structures : Circular Queue – Deque – Priority Queue – Applications of Queues : Simulation – CPU Scheduling in a Multiprogramming Environment – Round Robin Algorithm – Linked Lists: Single Linked List – Circular Linked List – Double Linked List – Circular Double Linked List – Applications of Linked List: Polynomial Representation</td></tr>
<tr><td colspan="6">UNIT-III :
Trees: Basic Terminologies – Representation of Binary Tree: Linear Representation – Linked Representation – Operations: Traversals – Types of Binary Trees: Expression Tree – Binary Search Tree – Splay tree</td></tr>
<tr><td colspan="6">UNIT-IV :
Sorting: Bubble Sort, Insertion Sort, Selection Sort, Shell Sort – Quick Sort - Merge Sort - Radix Sort - Heap Sort – Searching: Linear Search - BinarySearch</td></tr>
</table>

	UNIT-V: **Graphs:** Introduction – Graph representation and its operations – Path Matrix – GraphTraversal - Application of DFS – Shortest Path Algorithm - **Minimum Spanning Tree :** Prim‟sAlgorithm–Kruskal‟sAlgorthim-Greedy–Knapsack–BackTracking–8Queens
Extended Professional Component (is a part of internal component only, Not to be included in the External Examination question paper)	Questions related to the above topics, from various competitive examinations UPSC / TRB / NET / UGC – CSIR / GATE / TNPSC / others to be solved (To be discussed during the Tutorial hour)
Skills acquired from this course	Knowledge, Problem Solving, Analytical ability, Professional Competency, Professional Communication and Transferrable Skill
Recommended Text	1. Debasis Samantha (2013), Classic Data Structures, Second Edition, PHI Learning Private Limited. 2. P. Sudharsan, J. John Manoj Kumar, C & Data Structures, Third Edition, RBA Publications. Unit 4: Chapter 14, Unit 5: Chapter13 3. Ellis Horowitz, SartajSahni, SanguthevarRajeshakaran, (2007), Fundamentals of Computer Algorithms, Second Edition, Universities Press (P)Limited
Reference Books	1. Sara Baase, (1991), Computer Algorithms – Introduction to Design and Analysis, Addison- Wesley PublishingCompany 2. RobertKruse,C.L.Tondo,BruceLeung,DataStructuresandProgramDesigninC ,2nd Edition, PHIPublications.
Website and e-Learning Source	1. http://www.cs.sunysb.edu/~skiena/214/lectures/ 2. http://datastructures.itgo.com/graphs/dfsbfs.htm 3. http://oopweb.com/Algorithms/Documents/PLDS210/VolumeFrames.html 4. http://discuss.codechef.com/questions/48877/data-structures-and-algorithms 5. http://code.tutsplus.com/tutorials/algorithms-and-data-structures--cms-20437

Course Learning Outcome (for Mapping with POs and PSOs)

Students will be able to

CO's	Course Outcomes
CLO1	Outline the basic data structures
CLO2	Identify the different operations and memory representations
CLO3	Interpret different techniques with their complexities
CLO4	Compare the applications of various data structures
CLO5	Choose an algorithm to solve simple problems suited for appropriate situations

CO/PSO	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6
CLO1	**3**	**1**	**2**	**2**	**1**	**2**
CLO2	**3**	**2**	**2**	**2**	**2**	**3**
CLO3	**3**	**2**	**3**	**3**	**3**	**2**
CLO4	**3**	**3**	**2**	**3**	**3**	**3**
CLO5	**3**	**3**	**3**	**3**	**3**	**2**
Weightage of course contribute to eachPSO	**15**	**11**	**12**	**13**	**12**	**14**

Generic Elective – 2

Women Empowerment

Course Code: P23ITG11

Semester - II

<table>
<tr><td colspan="2">Title of the Course</td><td colspan="6">DATA BASE SYSTEMS</td></tr>
<tr><td colspan="2">Paper Number</td><td colspan="6">CORE IV</td></tr>
<tr><td rowspan="2">Category</td><td rowspan="2">Core</td><td>Year</td><td>I</td><td rowspan="2">Credits</td><td rowspan="2">4</td><td rowspan="2">Course Code</td><td rowspan="2">P23ITT24</td></tr>
<tr><td>Semester</td><td>II</td></tr>
<tr><td colspan="2" rowspan="2">Instructional Hours per week</td><td>Lecture</td><td colspan="2">Tutorial</td><td>Lab Practice</td><td colspan="2">Total</td></tr>
<tr><td>4</td><td colspan="2">1</td><td>-</td><td colspan="2">5</td></tr>
<tr><td colspan="2">Pre-requisite</td><td colspan="6">Fundamental computer knowledge that includes the hardware and memory storage.</td></tr>
<tr><td colspan="2">Objectives of the Course</td><td colspan="6">To understand the basic DBMS models, architecture, query and to normalize the database. To Learn Transaction Processing, Recovery and Distributed Database.</td></tr>
<tr><td colspan="2" rowspan="3">Course Outline</td><td colspan="6">UNIT-I : Introduction: Database System Applications-Purpose of Database Systems – View of Data – Database Users and Administrators. Relational Database: Structure of Relational Databases-Databases Schema- Keys-Schema Diagrams-Formal Relational Query Languages: Relational Algebra-TupleRelational Calculus</td></tr>
<tr><td colspan="6">UNIT-II :Database Design: Overview of Design Process- The Entity Relationship Model – Constraints –Removing Redundant Attributes in Entity Sets – Entity – Relationship Diagrams-Reduction to Relational Schemas – Extended E-R features-Alternative Notations for Modeling Data. Relational Database Design: Features of Good Relational Design-Functional Dependency - Normalization: 1NF, 2NF, 3NF, BCNF, 4NF, 5NF-Functional Dependency Theory</td></tr>
<tr><td colspan="6">UNIT-III : Transaction Management: Transaction Concept-Simple Transaction Model-Storage Structure-Transaction Atomicity and Durability- Transaction Isolation -Serializability. Concurrency Control: Lock Based Protocols – Locks - Granting of Locks-Two Phase Locking Protocol –Time Stamp Based Protocol - Recovery System: Failure Classification -Recovery and Atomicity: Log Records-Database Modification-Concurrency Control and Recovery-Recovery Algorithm</td></tr>
</table>

	UNIT-IV : Distributed Database: Homogeneous and Heterogeneous Databases-Distributed Data storage-Distributed Transactions – Commit Protocols-Concurrency Control in Distributed Databases-Distributed Query Processing. Case study: Mongo DB
	UNIT-V:SQL - Table Fundamentals - Viewing Data - Inserting - Deleting - Updating - Modifying -Constraints-Functions - Grouping-Subqueries-Joins-Views.**PL/SQL**:Introduction-PL/SQLBlock-DataTypesAndVariables-ControlStructure-Cursors - PL/SQL Security - Locks. PL/SQL Database Objects: Exception Handling- Packages -Proceduresand Functions-DatabaseTriggers
Extended Professional Component (is a part of internal component only, Not to be included in the External Examination question paper)	Questions related to the above topics, from various competitive examinations UPSC / TRB / NET / UGC – CSIR / GATE / TNPSC / others to be solved (To be discussed during the Tutorial hour)
Skills acquired from this course	Knowledge, Problem Solving, Analytical ability, Professional Competency, Professional Communication and Transferrable Skill
Recommended Text	1. AbrahamSilberchatz,HenryF.Korth,S.Sudarshan,DatabaseSystemsConcepts,SixthEdition,Tata McgrawHill. 2. IvanBayross,SQL,PL/SQLTheProgrammingLanguageofORACLE,Fourthedition,BPBPublications.UnitIV& V
Reference Books	1. AtulKahate,IntroductiontoDatabaseManagementsystems,Pearsoneducation. 2. CarloZaniolo,StefanoCeri,ChristosFaloustsos,R.T.Snodgrass, V.S.Subrahmanian,(1997),AdvancedDatabaseSystems, Morgan Kaufman. 3. GeorgeKoch,KelvinLoney,(2002),Oracle9i:TheCompleteReference,OraclePress,TataMcGrawHillPublication. 4. RamezElmasri,ShamkantB.Navathe(2014),"DatabaseSystems",Sixthedition,PearsonEducation,NewDelhi
Website and **e-Learning Source**	1. http://awtrey.com/tutorials/dbeweb/database.php 2. http://www.slideshare.net/SalamaAlbusaidi/emerging-database-technology-multimedia- database. 3. http://www.tutorialspoint.com/dbms/index.htm 4. http://www.tutorialspoint.com/plsql/index.htm 5. https://opentextbc.ca/dbdesign/chapter/chapter-11-functional-dependencies/(FunctionalDependencies)

Course Learning Outcome (for Mapping with POs and PSOs)

Students will be able to

CO's	Course Outcomes
CLO1	Explain the relational databases and uses of PL/SQL
CLO2	Apply Schema, ER-Model, normalization, transaction, concurrency, and recovery on tables using SQL and PL/SQL.
CLO3	Analyze and manage relational & distributed, database, transaction, Concurrency control and query languages
CLO4	Assess databases based on models and Normal Forms.
CLO5	Design and construct tables and manipulate it effectively using PL/SQL database objects

CO/PSO	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6
CLO1	**3**	**3**	**3**	**3**	**3**	**3**
CLO2	**3**	**3**	**3**	**3**	**3**	**2**
CLO3	**3**	**2**	**3**	**3**	**3**	**2**
CLO4	**3**	**3**	**3**	**3**	**3**	**2**
CLO5	**3**	**3**	**3**	**3**	**3**	**3**
Weightage of course contribute to eachPSO	**15**	**13**	**15**	**15**	**15**	**12**

<table>
<tr><td colspan="2">Title of the Course</td><td colspan="6">RDBMS LAB</td></tr>
<tr><td colspan="2">Paper Number</td><td colspan="6">CORE V</td></tr>
<tr><td rowspan="2">Category</td><td rowspan="2">Core</td><td>Year</td><td>I</td><td rowspan="2">Credits</td><td rowspan="2">4</td><td rowspan="2">Course Code</td><td rowspan="2">P23ITP25</td></tr>
<tr><td>Semester</td><td>II</td></tr>
<tr><td colspan="2" rowspan="2">Instructional Hours per week</td><td>Lecture</td><td colspan="2">Tutorial</td><td colspan="2">Lab Practice</td><td>Total</td></tr>
<tr><td>-</td><td colspan="2">1</td><td colspan="2">4</td><td>5</td></tr>
<tr><td colspan="2">Pre-requisite</td><td colspan="6">Basic understanding of SQL queries</td></tr>
<tr><td colspan="2">Objectives of the Course</td><td colspan="6">The primary Course Objective of this paper is to learn and implement SQL & PL/SQL.</td></tr>
<tr><td colspan="2">Course Outline</td><td colspan="6">1. DDL Commands
2. DML Commands
3. DCL Commands
4. Usage of Sub Queries in DML and Create-SQL
5. Solving queries using built-in functions
6. Simple programs in PL/SQL block
7. Exception Handling in PL/SQL
8. Programs using Implicit Cursors
9. Programs using Explicit Cursors
10. Procedures &User-defined functions
11. Creation of Triggers</td></tr>
<tr><td colspan="2">Extended Professional Component (is a part of internal component only, Not to be included in the External Examination question paper)</td><td colspan="6">Questions related to the above topics, from various competitive examinations UPSC / TRB / NET / UGC – CSIR / GATE / TNPSC / others to be solved
(To be discussed during the Tutorial hour)</td></tr>
<tr><td colspan="2">Skills acquired from this course</td><td colspan="6">Knowledge, Problem Solving, Analytical ability, Professional Competency, Professional Communication and Transferrable Skill</td></tr>
<tr><td colspan="2">Recommended Text</td><td colspan="6">IvanBayross,SQL,PL/SQLTheProgrammingLanguageofORACLE,Fourthedition,BPBPublications</td></tr>
<tr><td colspan="2">Reference Books</td><td colspan="6">RamezElmasri,ShamkantB.Navathe(2014),“DatabaseSystems”, Sixthedition,PearsonEducation,NewDelhi</td></tr>
<tr><td colspan="2">Website and e-Learning Source</td><td colspan="6">1. http://awtrey.com/tutorials/dbeweb/database.php
2. http://www.slideshare.net/SalamaAlbusaidi/emerging -database-technology-multimedia- database.
3. http://www.tutorialspoint.com/dbms/index.htm
4. http://www.tutorialspoint.com/plsql/index.htm</td></tr>
</table>

Course Learning Outcome (for Mapping with POs and PSOs)

Students will be able to

CO's	Course Outcomes
CLO1	Choose appropriate SQL queries and PL/SQL blocks for the database.
CLO2	Implement SQL and PL/SQL blocks for the given problem effectively.
CLO3	Analyse the problem and Exceptions using queries and PL/SQL blocks.
CLO4	Validate the database for normalization using SQL and Pl/SQL blocks.
CLO5	Design Database tables, create Procedures, user-defined functions and Triggers.

CO/PSO	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6
CLO1	**3**	**3**	**2**	**3**	**3**	**3**
CLO2	**3**	**3**	**3**	**3**	**3**	**3**
CLO3	**3**	**3**	**2**	**3**	**3**	**3**
CLO4	**3**	**3**	**2**	**3**	**3**	**2**
CLO5	**3**	**3**	**3**	**3**	**3**	**3**
Weightage of course contribute to each PSO	**15**	**15**	**12**	**15**	**15**	**14**

<table>
<tr><td colspan="2">Title of the Course</td><td colspan="6">OPENSOURCETECHNOLOGIES-PRACTICAL</td></tr>
<tr><td colspan="2">Paper Number</td><td colspan="6">CORE VI</td></tr>
<tr><td rowspan="2">Category</td><td rowspan="2">Core</td><td>Year</td><td>I</td><td rowspan="2">Credits</td><td rowspan="2">4</td><td rowspan="2">Course Code</td><td rowspan="2">P23ITP26</td></tr>
<tr><td>Semester</td><td>II</td></tr>
<tr><td colspan="2" rowspan="2">Instructional Hours per week</td><td>Lecture</td><td colspan="2">Tutorial</td><td colspan="2">Lab Practice</td><td>Total</td></tr>
<tr><td>-</td><td colspan="2">1</td><td colspan="2">4</td><td>5</td></tr>
<tr><td colspan="2">Pre-requisite</td><td colspan="6">Basic understanding of computer programming, Internet and HTML/XHTML</td></tr>
<tr><td colspan="2">Objectives of the Course</td><td colspan="6">To learn the efficiency of Open Source Technology and to train to have a good practical knowledge of how to write successful PHP and Ruby code and utilizing a database using PHP.</td></tr>
<tr><td colspan="2" rowspan="4">Course Outline</td><td colspan="6">UNIT-I :

PHP:Introduction – Creating a PHP page– Running PHP page – HTML and PHP – PrintingText – Comment Statements – Working with variables – Storing data in variables - Interpolatingstrings – Constants - Understanding Internal Datatypes – Operators – Flow Control – Strings:String Functions - Converting to and from strings -Formatting text strings - Working withnumbers.</td></tr>
<tr><td colspan="6">UNIT-II :

DateandTime-CreateanArray-UseanAssociativeArray-FunctionstoWorkwithArrays-Workwith Arrays of Arrays-Createand UseFunctions</td></tr>
<tr><td colspan="6">UNIT-III :

Reading Data in web pages: Handling various controls - PHP Browser-Handling power: DataValidation - File Handling : Opening a file – Reading Text from a file – Closing a file- Workingwith Databases: Creating , Inserting , Accessing , Updating , Deleting and Sorting Database -Workwith Cookies and Sessions</td></tr>
<tr><td colspan="6">UNIT-IV :

Ruby: Getting Started with Ruby –Working with Numbers and Strings – Variables – Constants – Operators – Conditionals and Loops</td></tr>
</table>

	UNIT-V: Arrays-Hashes-Methods-Blocks:ClassesandObjects:CreatingaClassandanObject-ExceptionHandling– FileHandling
Extended Professional Component (is a part of internal component only, Not to be included in the External Examination question paper)	Questions related to the above topics, from various competitive examinations UPSC / TRB / NET / UGC – CSIR / GATE / TNPSC / others to be solved (To be discussed during the Tutorial hour)
Skills acquired from this course	Knowledge, Problem Solving, Analytical ability, Professional Competency, Professional Communication and Transferrable Skill
Recommended Text	1. Steven Holzner, (2016), "PHP: The Complete Reference", McGraw Hill Education PrivateLimited,Indian Edition.(UnitI,II) 2. RachnaKapur, Mario Briggs, Tapas Saha, Ulisses Costa, Pedro Carvalho, Raul F. Chong,Peter Kohlmann (2010), "Getting Started with Open Source Development", DB2 on CampusBookSeries. (UnitIII) 3. http://indexof.es/Ruby/Beginning%20Ruby%20On%20Rails.pdf(UnitIV) 4. http://www.cs.uni.edu/~wallingf/teaching/agile-may2010/ruby/programming-ruby.pdf(Unit V)
Reference Books	1. W.JasonGilmore(2010),"BeginningPHP&MySql",Apress. 2. JoelMurach,RayHarris (2010),"PHPandMySQL",ShroffPublishers &Distributors 3. LarryUllman(2008), "PHP6andMySQL5",PearsonEducation. 4. JohnCoggeshall(2006),"PHP5",PearsonEducation. 5. MichaleC.Glass(2004),"BeginningPHP,Apache,MySQLWebDevelopment",WileyDreamTechPress.
Website and **e-Learning Source**	1. http://www.w3schools.com/php/ 2. http://howtostartprogramming.com/PHP/ 3. http://www.massey.ac.nz/~nhreyes/MASSEY/159339/Lectures/Lecture%2011%20-%20PHP%20-%20Part%205%20-%20CookiesSessions.pdf 4. http://www.tutorialspoint.com/mysql/

Course Learning Outcome (for Mapping with POs and PSOs)

Students will be able to

CO's	Course Outcomes
CLO1	Demonstrate the set up and configuration of development environment to write PHP and Ruby Scripts
CLO2	Select the appropriate language fundamentals and techniques to write and compile PHP and Ruby programs
CLO3	Examine the bugs and analyze how to prevent and remove the bugs
CLO4	Test and debug the application with sample inputs to check the correctness and consistency of the scripts
CLO5	Create simple programs that make use of various PHP and Ruby features and Functions and solve web application and database tasks using PHP

CO/PSO	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6
CLO1	**3**	**3**	**3**	**1**	**2**	**3**
CLO2	**3**	**3**	**3**	**2**	**2**	**2**
CLO3	**3**	**2**	**3**	**3**	**2**	**2**
CLO4	**3**	**2**	**3**	**2**	**3**	**3**
CLO5	**3**	**3**	**3**	**3**	**2**	**3**
Weightage of course contribute to eachPSO	**15**	**13**	**15**	**11**	**11**	**13**

Title of the Course		**NETWORKS AND SECURITY**					
Paper Number		**ELECTIVE III (EC3)**					
Category	Elective	**Year**	I	**Credits**	3	**Course Code**	**P23ITE22**
		Semester	I				
Instructional Hours per week		**Lecture**	**Tutorial**		**Lab Practice**	**Total**	
		4	1		-	5	
Pre-requisite		Basic knowledge about computer networks					
Objectives of the Course		To understand the importance of networking and the basic model followed in network design and to understand necessary approaches and techniques to build protection mechanisms in order to secure computernetworks					

Course Outline	
	UNIT-I : Uses of Computer Networks – Network Hardware – Line Configuration – Topology – Transmission Modes – **Reference Models:** OSI Reference Model – TCP/IP Reference Model – **Physical Layer:** Guided Transmission Media – Wireless Transmission – Communication Satellites – **Public Switched Telephone Network**: Local Loop – Multiplexing – Switching
	UNIT-II : **Data Link Layer:** Design Issues - Error Detection and Correction - **Network Layer :** Design Issues – **Routing Algorithms** : Shortest Path Routing – Distance Vector Routing – Link State Routing – Broadcast Routing – Multicast Routing – Congestion Control
	UNIT-III : **Network Layer in the Internet:** IP Addresses –**Transport Layer:** Elements of Transport Protocols: Addressing – Connection Establishment – Connection Release – **Application Layer:** Domain Name System – **Email:** Architecture andServices
	UNIT-IV : **Network Security:** Introduction to Cryptography - Symmetric - Key Cryptography - Asymmetric- key Cryptography – Security Services: Message Confidentiality - Message Integrity - Message Authentication - Digital Signature - Entity Authentication – **Security in the Internet:** IPSecurity - SSL/TLS: SSL services - SSL Protocols -Firewalls
	UNIT-V: **Security for Wireless Networks:** Introduction – Protecting the wireless networks – Physical Security – Authentication and access control- **Smartphone Security:** Security Threats - Steps to smartphone security –**Websites and Web application Security:** Definition – Available Technologies - Threats - Strategies. **Case Study: To study recent Wi -Fi and Smartphone technologies**
Extended Professional Component (is a part of internal component only, Not to be included in the External Examination question paper)	Questions related to the above topics, from various competitive examinations UPSC / TRB / NET / UGC – CSIR / GATE / TNPSC / others to be solved (To be discussed during the Tutorial hour)
Skills acquired from this course	Knowledge, Problem Solving, Analytical ability, Professional Competency, Professional Communication and Transferrable Skill

Recommended Text	1. Andrew S.Tanenbaum, David J. Wetherall (2010), Computer Networks, Prentice Hall of India, V Edition. (Unit I - Unit- III) Unit I – Chapter 1,2 Unit II – Chapter 3,5 Unit III – Chapter 5,6,7 2. Behrouz A. Forouzan, (2016), Data Communications and Networking, Tata McGraw-Hill Publishing Company Limited, IV Edition. (Unit IV) Unit IV - Chapter 30, 31,32
Reference Books	1. CharlesP. Pfleeger, Shari Lawrence Pfleeger(2002), Security in Computing, 3rdEdition, PearsonEducation. 2. James F. Kurose,KeithW. Ross(2005),Computer Networking, 3rdEdition, Addison Wesley,. 3. William Stallings(2006), Cryptography and Network Security: Principles and Practice, 3rd Edition,PHI.
Website and e-Learning Source	1. http://wndw.net/pdf/wndw3-en/ch09-security-for-wireless-networks.pdf(Unit V- Wireless NetworksSecurity) 2. https://www.fcc.gov/sites/default/files/smartphone_master_document.pdf(Unit V- Steps to smartphonesecurity) 3. https://www.csoonline.com/article/3241727/mobile-security/6-mobile-security-threats-you-should-take-seriously-in-2019.html (Unit V – SmartPhone SecurityThreats) 4. https://kgk.uni-obuda.hu/sites/default/files/12_Kadena.pdf(Unit V – SmartPhone SecurityThreats) 5. https://www.goodfirms.co/glossary/web-security/ (Unit V – Web Security)

Course Learning Outcome (for Mapping with POs and PSOs)

Students will be able to

CO's	Course Outcomes
CLO1	Outline the concepts and fundamentals of data communication and computer networks
CLO2	Identify the usage and importance of layered model, network security and web security
CLO3	Classify the techniques based on required application
CLO4	Analyze the significant applications of protocols and layers used in data communication and networking
CLO5	Explain the functionality of various techniques and algorithms that works at different layers

CO/PSO	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6
CLO1	3	2	3	3	2	3
CLO2	3	2	2	2	2	2
CLO3	3	2	3	2	2	3
CLO4	3	2	2	2	3	2
CLO5	3	3	3	3	3	3
Weightage of course contribute to eachPSO	15	11	13	12	12	13

Generic Elective – Cyber Security

Course Code: P23ITG22

Skill Enhancement Course -SEC 1 – Documentation using LATEX / other packages

Course Code: P23ITS21

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