CAUVERY COLLEGE FOR WOMEN (AUTONOMOUS)

NATIONALLY ACCREDITED WITH "A" GRADE BY NAAC

ISO 9001:2015 Certified

TIRUCHIRAPPALLI

PG & RESEARCH DEPARTMENT OF COMPUTER SCIENCE

M. SC COMPUTER SCIENCE

SYLLABUS

2022-2023 and Onwards

CAUVERY COLLEGE FOR WOMEN (AUTONOMOUS)

PG & RESEARCH DEPARTMENT OF COMPUTER SCIENCE

VISION

To create an ambience for a quality academic erudition which drives technologically adept, innovative and globally competent graduates with ethical values

MISSION

- To have a breath of knowledge across the subject areas of Computer Science

- To professionally enrich the students for successful career in Academic, Industry and Research

- To promote and inculcate ethics and code of professional practice among students

PROGRAMME EDUCATIONAL OBJECTIVES (PEOs)

PEOs	Statements
PEO1	**LEARNING ENVIRONMENT** To facilitate value-based holistic and comprehensive learning by integrating innovative learning practices to match the highest quality standards and train the students to be effective leaders in their chosen fields.
PEO2	**ACADEMIC EXCELLENCE** To provide a conducive environment to unleash their hidden talents and to nurture the spirit of critical thinking and encourage them to achieve their goal.
PEO3	**EMPLOYABILITY** To equip students with the required skills in order to adapt to the changing global scenario and gain access to versatile career opportunities in multidisciplinary domains.
PEO4	**PROFESSIONAL ETHICS AND SOCIAL RESPONSIBILITY** To develop a sense of social responsibility by formulating ethics and equity to transform students into committed professionals with a strong attitude towards the development of the nation.
PEO5	**GREEN SUSTAINABILITY** To understand the impact of professional solutions in societal and environmental contexts and demonstrate the knowledge for an overall sustainable development.

PROGRAMME OUTCOMES FOR M.Sc COMPUTER SCIENCE PROGRAMME

PO NO.	Programme Outcome On completion of M.Sc. Computer Science The students will be able to
PO 1	**DOMAIN KNOWLEDGE** Acquire the in-depth computing knowledge both conceptual and applied pertaining to the core discipline
PO 2	**PROBLEM SOLVING** Procure knowledge-based skills to satisfy the needs of society and the industry by providing hands on experience of various technologies in Computer Science
PO 3	**INNOVATION AND CRITICAL THINKING** Critically evaluate global issues, recognize the need and identify sustainable solutions through research capabilities towards Nation building initiatives
PO 4	**LIFE LONG LEARNING** Capable of upgrading and advancing knowledge through innovation and technology as evidenced by current developments
PO 5	**LEADERSHIP AND TEAMWORK** Work in collaborative environment through applications of scientific reasoning and communicate effectively to the stakeholders

PROGRAMME SPECIFIC OUTCOMES FOR M.Sc COMPUTER SCIENCE PROGRAMME

PSO NO.	Programme Specific Outcomes Students of M.Sc Computer Science will be able to	POs Addressed
PSO 1	Identify, formulate and develop solutions for computational challenges	PO 1 PO 2
PSO 2	Inculcate broad knowledge in core areas of Computer Science and emerging technologies in related domains	PO 1 PO 2
PSO 3	Integrate computing knowledge on crafting innovative solutions and to provide a gateway for research.	PO 2 PO 3 PO 4
PSO 4	Develop analytical and technical skills to enhance employment potential and entrepreneurship	PO 3 PO 4 PO 5
PSO 5	Imbibe professional and ethical skills to become a competent citizen for the betterment of society	PO 3 PO 4 PO 5

Cauvery College for Women (Autonomous),Trichy
M.Sc Computer Science
(For the candidates admitted from the Academic year 2022-2023 and onwards**)**

Semester	Course	Course Title	Course Code	Inst.Hrs. /week	Credits	Exam Hrs	Mark Int.	Ext.	Total
I	Core Course– I(CC)	Mathematical Foundation For Computer Science	22PCS1CC1	6	5	3	25	75	100
	Core Course– II(CC)	Web Technologies	22PCS1CC2	6	5	3	25	75	100
	Core Practical– I(CP)	Web Technologies Practical	22PCS1CC1P	6	4	3	40	60	100
	Core Course –III (CC)	Machine Learning Techniques	22PCS1CC3	6	4	3	25	75	100
	Elective Course- I (EC)	Advanced Computer Architecture/ Advanced Database System/ Software Testing	22PCS1EC1A/ 22PCS1EC1B/ 22PCS1EC1C	6	4	3	25	75	100
	Total			**30**	**22**	-	-	-	**500**

Semester: I	Internal Marks: 25		External Marks:75	
COURSE CODE	COURSE TITLE	CATEGORY	HOURS/ WEEK	CREDITS
22PCS1CC1	MATHEMATICAL FOUNDATION FOR COMPUTER SCIENCE	CORE	6	5

Course Objective
- Explore the basic concepts of Discrete Mathematics, Graph Theory
- Acquire the knowledge of Fundamentals in Fuzzy set Theory and combinatorics
- Analyze the method of logical reasoning to solve variety of problems

Prerequisites

Basic Knowledge in Essential Mathematics, Numerical and Statistics.

Course Outcome and Cognitive Level Mapping

CO Number	CO Statement	Cognitive Level
CO 1	Define the various concepts in Discrete Mathematics and Fuzzy set Theory	K1
CO 2	Understand the different terminologies of Discrete Mathematics and Fuzzy set Theory	K2
CO 3	Analyze the problems in different aspects and give solutions in their respective streams	K3
CO 4	Examine some methodologies for the related area in an effective manner	K4
CO 5	Apply the notions to distinct problems and get solutions in a easy way	K5

Mapping of CO with PO and PSO

	PSO 1	PSO 2	PSO 3	PSO 4	PSO 5	PO 1	PO 2	PO 3	PO 4	PO 5
CO 1	2	2	3	2	2	3	2	2	2	3
CO 2	2	2	3	2	2	2	2	2	2	3
CO 3	3	2	3	2	2	3	2	2	3	3
CO 4	3	2	2	2	2	2	2	2	2	2
CO 5	2	2	2	3	3	2	3	3	2	2

"1" – Slight (Low) Correlation "2" – Moderate (Medium) Correlation
"3" – Substantial (High) Correlation "-" indicates there is no correlation.

Syllabus

UNIT I   (18 HOURS)
Mathematical Logic: Statements and notation – Connectives – Negation– Conjunction– Disjunction- Statement Formulas and Truth Tables – Conditional and Bi conditional – Well-formed Formulas – Tautologies – Duality law – Tautological Implications – Theory of inference for the statement calculus– Validity using Truth Tables – Rules of inference – Consistency of Premises and indirect Method of Proof.

UNIT II   (18 HOURS)

Ordering: Partial ordering – Partially Ordered Set: Representation and Associated Terminology.
Lattices and Boolean Algebra: Lattices as Partially ordered sets – Definition and Example- Some Properties of Lattices –Boolean Algebra – Definition and examples- Sub algebra, Direct Product and Homomorphism– Fundamental principles of counting: Permutations – Combinations: The Binomial theorem – combinations with repetition-– the principle of Inclusion and Exclusion: The principle of Inclusion and Exclusion.

UNIT III   (18 HOURS)

Algebraic Structures: Algebraic Systems: Example and General Properties: Definition and Examples - Some Simple Algebraic Systems and General Properties – Semigroups and Monoids: Definitions and Examples – Homomorphism of Semigroups and Monoids – Sub semigroups and Sub monoids – Groups: Definitions and Examples – Subgroups and Homomorphisms – Cosets and Lagrange's Theorem. **Group Codes:** The Communication Model and Basic Notions of Error Correction – Generation of Codes by Using Parity Checks – Error Recovery in Group Codes.

UNIT IV   (18 HOURS)

Graph Theory: Introduction-Definition of a Graph-Application of Graphs-Finite and Infinite graphs-Incidence and degree-Isolated vertex, pendant vertex and null graph. **Paths and Circuits:** Subgraphs-Walks, paths and circuits-Connected graphs, Disconnected graphs and components-Euler graphs-more on Euler graphs-Hamiltonian paths and circuits. **Trees and Fundamental Circuits:** **Trees**– Some Properties of Trees–Pendant Vertices in a Tree.

UNIT V   (18 HOURS)

From Classical (Crisp) Sets to Fuzzy Sets: Fuzzy sets: Basic types – Fuzzy sets: Basic Concepts. **Fuzzy Sets Versus Crisp Sets:** Additional Properties of α – cuts **Operations on Fuzzy Sets:** Types of Operations– Fuzzy Intersections: t-Norms – Fuzzy Unions: t-Conorms (Proof not needed).

UNIT VI   Self Study for Enrichment (Not included for End Semester Examinations)

Equivalence of Formulas – Recurrence relations: First order linear Recurrence Relation – The Application of Residue Arithmetic to Computers: Introduction to Number Systems – Residue Arithmetic – Operations on Graphs, Spanning trees – Fuzzy Complements.

Text Books

1. Tremblay, J.P. & Manohar, R. (1997). *Discrete Mathematical Structures with Applications to Computer Science*, Tata McGraw- Hill Publishing Company Limited, New Delhi.
2. Ralph,P. Grimaldi.(2002). *Discrete and Combinatorial Mathematics,* Pearson Asia Education.
3. Narsingh Deo.(1997). *Graph Theory With Applications To Engineering & Computer Science.* Prentice Hall of India, New Delhi.
4. Klir, G. J. and Yuan . R , (2001).*Fuzzy Sets And Fuzzy Logic,* Prentice Hall of India, New Delhi.

Chapters and Sections
UNIT-I   Chapter 1: Sections 1-1, 1-2(1-2.1 to 1-2.4,1-2.6 to 1-2.8, 1-2.10, 1-2.11)[1],

1-4(1-4.1 to 1-4.3) [1]

UNIT-II   Chapter 2: Sections 2-3(2-3.8, 2-3.9) [1]

                Chapter 4: Sections 4-1(4-1.1, 4-1.2), 4-2(4-2.1, 4-2.2) [1]

                Chapter 1: Sections 1.2 to 1.4 [2]

                Chapter 8: Sections 8.1 [2]

UNIT-III Chapter 3: Sections 3-1, 3-2, 3-5 (3-5.1, 3-5.2 & 3-5.3 Only), 3-7 [1]

UNIT- IV Chapter 1: Sections 1.1 to 1.5 [3]

                Chapter 2: Sections 2.2, 2.4 to 2.6, 2.8, 2.9 [3]

                Chapter 3: 3.1 to 3.3 [3]

UNIT- V Chapter 1: Sections 1.3, 1.4 [4]

                Chapter 2: Sections 2.1 [4]

                Chapter 3: Sections 3.1, 3.3, 3.4 [4]

Reference Books

1. Ganesh, G.J.M. (2006). *Introduction To Fuzzy Sets And Logic*, Prentice-Hall of India, New Delhi.
2. Arumugam, S. & Ramachandran, S. (2001). *Invitation To Graph Theory,* Scitech
   Publications India Pvt Limited, Chennai.
3. Seymour Lipschutz, Marc Laris Lipson.(1999). *Schuam's Outlines Discrete Mathematics.*
   Tata McGraw-   Hill Publishing Co., Ltd.. New Delhi.

Web References

1. https://www.youtube.com/results?search_query=negation+of+the+statement
2. https://www.youtube.com/results?search_query=permutation
3. https://www.youtube.com/results?search_query=graph+theory+definitions+and+examples
4. https://www.youtube.com/results?search_query=trees+in+graph+theory
5. https://www.youtube.com/results?search_query=fuzzi+sets+

Pedagogy

Chalk and Talk, Group discussion, Seminar & Assignment.

Course Designer

Dr.S.Saridha

Semester: I	Internal Marks: 25		External Marks: 75	
	COURSE CODE	COURSE TITLE	CATEGORY	HRS/WEEK	CREDITS

COURSE CODE	COURSE TITLE	CATEGORY	HRS/WEEK	CREDITS
22PCS1CC2	WEB TECHNOLOGIES	CORE	6	5

Course Objective

- To create own web page and how to host own web site on internet
- To familiarize Server Side Programming with Java Servlets, JSP and to commence Client Side Scripting with Java script
- To analyze the basics involved in publishing content on the World Wide Web

Prerequisites

Java, HTML and Scripting

Course Outcome and Cognitive Level Mapping

CO Number	CO Statement	Cognitive Level
CO 1	Recall, Understand and Analyze the fundamentals of web application and web services	K1,K2,K3
CO 2	Determine the essential elements and the attributes to design a web page	K3,K5,K6
CO 3	Identify and Apply appropriate Client side and Server side programming for creating interactive web design	K3,K5
CO 4	Examine and recommend a solution to complex problems using appropriate method, technologies and web services	K4, K5
CO 5	Create and deploy real time web applications in web servers	K6

Mapping of CO with PO and PSO

CO s	PSO 1	PSO 2	PSO 3	PSO 4	PSO 5	PO 1	PO 2	PO 3	PO 4	PO 5
CO 1	3	3	2	3	2	3	3	2	3	2
CO 2	3	3	2	3	2	3	3	2	3	2
CO 3	3	3	2	3	3	3	3	2	3	3
CO 4	3	3	2	3	3	3	3	2	3	3
CO 5	3	3	3	3	3	3	3	3	3	3

"1" – Slight (Low) Correlation　　　　　　　"2" – Moderate (Medium) Correlation
"3" – Substantial (High) Correlation　　　　"-" indicates there is no correlation.

UNIT I   **(16 HOURS)**
Web Essentials - **Clients, Servers, and Communication:** The Internet-Basic Internet Protocols – TCP/IP-UDP-DNS-Domain Names–The World Wide Web-HTTP Request Message-Response Message-Web Clients-Web Servers-**Markup Languages:** An Introduction to HTML- History and Versions-Basic XHTML Syntax and Semantics- Some fundamental HTML Elements-Relative URLs-Lists-tables-Frames-Forms.

UNIT II   **(18 HOURS)**
Style Sheets:CSS -Introduction to Cascading Style Sheets-Features-Core Syntax-Style Sheets and HTML- Style Role Cascading and Inheritance-Text Properties-CSS Box Model- Normal Flow Box Layout- Beyond the Normal Flow: properties for positioning, relative, float, absolute positioning.

UNIT III   **(16 HOURS)**
Client- Side Programming: **The JavaScript Language**: History and Versions - Introduction - JavaScript in Perspective-Syntax -Variables and DataTypes-Statements-Operators-Literals-Functions-Objects-Arrays-Built-in Objects.

UNIT IV   **(20 HOURS)**
Server-Side Programming: Java Servlets: Architecture Overview-A Servlet-Generating Dynamic Content-Life Cycle-Parameter Data-Sessions-Cookies- URL Rewriting - Servlets and Concurrency. RMI Architecture - Working With RMI- Application Development With RMI.

UNIT V   **(20 HOURS)**
 Separating Programming and Presentation: JSP Technology- Introduction to JSP- Running JSP Applications: Web Applications and Parameters- Basic JSP – Support for the Model-View-Controller Paradigm – **Web Services:** Web Services Concepts- Writing a Java Web Service Client -WSDL-Representing Data Types: XML Schema.

 UNIT VI – Self Study for Enrichment **(Not included for End Semester Examinations)**
Search Engine features: Real time applications for client and server side programming (JavaScript, RMI) – Platform supporting for webservices.

Text Book

1. Jeffrey C.Jackson.(2009). *Web Technologies-A Computer Science Perspective*. 1st Edition, Pearson Education.

Reference Books

1. Robert W.Sebesta.(2007). *Programming the World Wide Web*. 4th Edition, Pearson Education.
2. Harvey M.Deitel, Paul .Deitel, Andrew B.Goldberg.(2006). *Internet & World Wide Web How To Program* . 3rd Edition, Pearson Education.
3. Marty Hall, Larry, Brown.(2001) .*Core Web Programming*. 2nd Edition, Volume I& II, Pearson Education.
4. Moseley.(2007). *Developing Web Applications*. 1st Edition,Wiley.
5. Herbert Schildt. (2012). *The Complete Reference–JAVA*. 7thEdition, TMH.

Web References

1. www.w3schools.com
2. www.geeksforgeets.org/web-technology/
3. www.guide.freecodecamp.org
4. www.alphadevx.com

Pedagogy

Chalk and Talk, Group discussion, Seminar & Assignment.

Course Designer

Dr.K.Reka

Semester: I	Internal Marks: 40		External Marks: 60	
COURSE CODE	**COURSE TITLE**	**CATEGORY**	**HRS/WEEK**	**CREDITS**
22PCS1CC1P	**WEB TECHNOLOGIES PRACTICAL**	**CORE**	**6**	**4**

Course Objective
- To provide fundamental concept of Internet, JavaScript, Servlet with a view to developing professional software development skills
- To implement JSP and Servlet concepts to create an interactive application
- To inculcate knowledge in developing application using RMI

Prerequisites

Java, HTML and Scripting

Course Outcome and Cognitive Level Mapping

CO Number	CO Statement	Cognitive Level
CO1	List and Illustrate the usage of HTML Tags	K1,K2
CO2	Demonstrate and make use of Java Script in web applications	K2, K3
CO3	Apply and compare JSP tags to create a web page	K3, K4
CO4	Examine and Evaluate the client/server application using RMI	K4, K5
CO5	Interpret and Develop web application using Servlet	K5,K6

Mapping of CO with PO and PSO

CO s	PSO 1	PSO 2	PSO 3	PSO 4	PSO 5	PO 1	PO 2	PO 3	PO 4	PO 5
CO 1	3	3	2	3	2	3	3	3	3	2
CO 2	3	3	2	3	2	3	2	2	3	2
CO 3	3	3	2	3	3	3	3	3	3	3
CO 4	3	3	3	3	3	3	3	3	3	2
CO 5	3	3	3	3	3	3	3	3	3	3

"1" – Slight (Low) Correlation   "2" – Moderate (Medium) Correlation
"3" – Substantial (High) Correlation   "-" indicates there is no correlation.

Exercises

1. Develop your college web portal using HTML.

2. To develop a Style Sheet using Link, Table, Box, List and Positioning.

3. Write a Java Script code block, which checks the contents entered in a form's text element. If the text entered is in the lower case, convert to uppercase.

4. Write a Java Script code block, which validates a username and password.

   a) If either the name or password field is not entered, display an error message.

   b) If the fields are entered do not match with default values display an error message.

c) If the fields entered match, display the welcome message.

5. Write a program in Java to implement a Client/Server application using RMI.
6. Write a program in Java to create a Cookie and set the expiry time of the same.
7. Write a program in Java to create Servlet to count the number of visitors to a web page.
8. Write a program in Java to create a form and validate a password using Servlet.
9. Create an application using basic JSP tag

Web References

1. https://www.w3.org/TR/html401/present/styles.html
2. www.studytonight.com/java/rmi-in-java.php
3. https://www.tutorialspoint.com/servlets/servlets-session-tracking.htm
4. https://www.edureka.co/blog/servlet-and-jsp-tutorial/

Pedagogy

Demonstration

Course Designer

Ms.S.Udhayapriya

Semester: I	Internal Marks: 25		External Marks: 75	
COURSE CODE	**COURSE TITLE**	**CATEGORY**	**HRS/WEEK**	**CREDITS**
22PCS1CC3	**MACHINE LEARNING TECHNIQUES**	**CORE**	**6**	**4**

Course Objective

• To understand the need of machine learning to solve problems in real time applications
• To study the various learning algorithms in machine learning
• To be able to formulate new approaches in machine learning

Prerequisites

Basic Knowledge in Programming Languages (Python, R), Statistics, Linear Algebra and Calculus

Course Outcome and Cognitive Level Mapping

CO Number	CO Statement	Cognitive Level
CO 1	Recognize and Understand the rudiments of Machine Learning	K1, K2
CO 2	Examine and Infer the hypothesis, limitations of Machine Learning methods	K2, K4
CO 3	Identify, Analyze and Interpret various Learning algorithms	K3, K4, K5
CO 4	Apply and Evaluate the solutions of various Machine Learning techniques	K4, K5
CO 5	Assess, Distinguish and Determine the Machine Learning techniques for Real-world applications	K3, K4, K5

Mapping of CO with PO and PSO

CO s	PSO 1	PSO 2	PSO 3	PSO 4	PSO 5	PO 1	PO 2	PO 3	PO 4	PO 5
CO 1	3	3	3	3	2	3	3	3	3	2
CO 2	3	3	3	3	2	3	3	3	3	3
CO 3	3	3	3	3	3	3	3	3	3	3
CO 4	3	3	3	3	3	3	3	3	3	3
CO 5	3	3	3	3	3	3	3	3	3	3

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Syllabus

UNIT I (12 HOURS)
Let's Integrate with Machine Learning**: General Introduction to Machine Learning –** The Details of Machine Learning **- The Practical Concepts of Machine Learning**: Machine Learning, AI, the Brain and the Business of Intelligence – General Architecture of Machine Learning – Types of Machine Learning

UNIT II   (18 HOURS)

Concept Learning and the General-to-Specific Ordering: A Concept Learning Task– Concept Learning as Search – Version Spaces and Candidate- Elimination Algorithm - Inductive Bias – **Decision Tree learning:** Decision Tree Representation – The Basic Decision Tree Learning Algorithm – Issues in Decision Tree Learning

UNIT III   (20 HOURS)

Artificial Neural Networks: Neural Network Representation – Appropriate Problems for Neural Network Learning – Perceptrons – Multilayer Networks and the Back Propagation Algorithm – **Genetic Algorithms**: Genetic Algorithms –Hypothesis Space Search – Genetic Programming – Models of Evolution and Learning

UNIT IV   (20 HOURS)

Bayesian Learning: Bayes Theorem – Bayes Theorem and Concept Learning –Bayes Optimal Classifier – Gibbs Algorithm – Naïve Bayes Classifier – Bayesian Belief Networks – The EM Algorithm – **Computational Learning Theory:** Sample Complexity for Finite Hypothesis Spaces - Sample Complexity for Infinite Hypothesis Spaces

UNIT V   (20 HOURS)

Instance-Based Learning: K- Nearest Neighbor Learning – Locally Weighted Regression – Radial Basis Functions–Case-Based Reasoning - **Combining Inductive and Analytical Learning:** The EBNN Algorithm – The FOCL Algorithm – **Reinforcement Learning:** Q Learning

UNIT VI Self study for Enrichment (Not included for End Semester Examinations)

Machine Learning Models- Find-S: Finding a Maximally Specific Hypothesis- Advanced Topics in Artificial Neural Networks- The Mistake Bound Model of Learning- Industrial Applications of Machine Learning: Manufacturing Analytics – Healthcare Analytics.

Text Books

1. Patanjali Kashyap(2017). *Machine Learning for Decision Makers*. 1st Edition. Apress. (Unit I)
2. Tom M. Mitchell(2018). *Machine Learning*. 1st Edition, McGraw-Hill Education (India) Private Limited (Units II-V)

Reference Books

1. Ethem Alpaydin (2010). *Introduction to Machine Learning*. Second Edition.The MIT Press.
2. Stephen Marsland (2014). *Machine Learning: An Algorithmic Perspective*. Second Edition. CRC Press.

Web References

1. https://www.simplilearn.com/tutorials/machine-learning-tutorial
2. https://machinelearningmastery.com/start-here/
3. https://www.mygreatlearning.com/blog/machine-learning-tutorial/

Pedagogy

Chalk and talk, Discussion, Quiz, Assignment & PPT

Course Designer

Ms S.Udhayapriya

Semester: I	Internal Marks: 25		External Marks : 75	
COURSE CODE	COURSE TITLE	CATEGORY	HRS/WEEK	CREDITS
22PCS1EC1A	ADVANCED COMPUTER ARCHITECTURE	ELECTIVE	6	4

Course Objective
- To understand the micro-architectural design of processors
- To learn about the various techniques used to obtain performance improvement and power savings in current processors
- To gain knowledge in distributed and Parallel Computing Architecture

Prerequisites
Microprocessor

Course Outcome and Cognitive Level Mapping

CO Number	CO Statement	Cognitive Level
CO 1	Remember and Understand the computer architecture	K1, K2
CO 2	Interpret and Experiment with different pipelined processor	K2, K3, K5
CO 3	Organize and Analyze the architectural features of advanced processors	K3, K4
CO 4	Examine and Evaluate the cache and memory related issues in multiprocessors	K4, K5
CO 5	Assess the historical and current developments in computer architecture and adopt to the needs	K5, K6

Mapping of CO with PO and PSO

CO s	PSO 1	PSO 2	PSO 3	PSO 4	PSO 5	PO 1	PO 2	PO 3	PO 4	PO 5
CO 1	3	3	3	3	3	3	3	3	3	3
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CO 3	2	3	2	3	2	3	3	3	3	3
CO 4	3	3	3	2	3	3	3	3	2	2
CO 5	2	3	3	3	2	2	3	3	3	3

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Syllabus

UNIT I   **(10 HOURS)**

Fundamentals of Quantitative Design and Analysis: Introduction-classes of computers-defining computer architecture-Trends in Technology, Power, Energy and Cost, Dependability.

UNIT II   **(20 HOURS)**

ILP Concepts and challenges: Compiler Techniques for Exposing ILP – Dynamic Branch Prediction-Dynamic Scheduling-Multiple Instruction Issue-Hardware based Speculation-Static Scheduling-Multi threading.

UNIT III (20 HOURS)

Vector Architecture: SIMD Extensions-Graphics Processing Units-Loop Level Parallelism**.**

UNIT IV (20 HOURS)

TLP: Introduction-Centralized Shared Memory- Architectures-Performance of Symmetric shared memory multiprocessor-Synchronization-Models of Memory Consistency.

UNIT V (20 HOURS)

Programming Models and Workloads for Warehouse: Scale Computers- Computer Architecture of Warehouse Scale Computers - Physical Infrastructure and Costs of Warehouse Scale Computers **- Cloud Computing**: The Return of Utility Computing.

UNIT VI Self study for Enrichment (Not included for End Semester Examinations)

Historical Perspectives Quantitative Design and Analysis: Limitations of Instruction-Level Parallelism and Its Exploitation-Fallacies and pitfalls of Data-Level Parallelism in Vector-Cross Cutting Issues in Thread-Level Parallelism-Using Energy Efficiency inside the server.

Text Books

1. John L Hennessey, David A Patterson (2012). *Computer Architecture A Quantitative Approach.* Fifth Edition, Morgan Kaufmann Elsevier.

Reference Books

1. KaiHwang, FayeBrigg(2000). *Computer Architecture And Parallel Processing*. International Edition,McGraw-Hill.
2. Sima D,Fountain T,KacsukP(2000). *Advanced Computer Architectures: A Design Space Approach*.Addison Wesley.

Web References

1. www.cs.iiie.edu.in/
2. https://passlab.githlub.io/CSE565/note

Pedagogy

Chalk and talk & Seminar

Course Designer

Ms.R. Rita Jenifer

Semester: I	Internal Marks: 25		External Marks: 75	
COURSE CODE	**COURSE TITLE**	**CATEGORY**	**HRS/WEEK**	**CREDITS**
22PCS1EC1B	**ADVANCED DATABASE SYSTEM**	**ELECTIVE**	**6**	**4**

Course Objective

- To inculcate knowledge in Transaction Management with ACID properties
- To learn about advanced concepts of Database Management System
- To gain Knowledge in Information retrieval using XML and Internet Databases

Prerequisites
RDBMS

Course Outcome and Cognitive Level Mapping

CO Number	CO Statement	Cognitive Level
CO 1	Remember and Understand the concepts of databases	**K1, K2**
CO 2	Demonstrate and make use of different kinds of databases	**K2,K3**
CO 3	Identify and analyze databases for real life applications	**K3,K4**
CO 4	Compare and evaluate the performance of databases based on its transaction and concurrency control feature	**K4,K5**
CO 5	Interpret and develop parallel, distributed, object oriented and advanced databases for handling real time data	**K5,K6**

Mapping of CO with PO and PSO

CO s	PSO 1	PSO 2	PSO 3	PSO 4	PSO 5	PO 1	PO 2	PO 3	PO 4	PO 5
CO 1	3	3	3	3	3	3	3	3	3	3
CO 2	3	2	3	2	3	3	3	2	2	3
CO 3	2	3	2	3	2	3	3	3	3	3
CO 4	3	3	3	2	3	2	3	3	2	2
CO 5	2	3	3	3	2	3	3	3	3	3

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"3" – Substantial (High) Correlation "-" indicates there is no correlation.

Syllabus

UNIT I   (16 HOURS)
Parallel Databases: I/O Parallelism-Inter Query Parallelism -IntraQuery Parallelism -
Interoperation Parallelism -Query Optimization-Design of Parallel Systems-Parallelism on Multicore
Processors.

UNIT II   (20 HOURS)

Distributed Databases: Homogeneous and Heterogeneous Databases-Distributed Data Storage-Distributed Transactions-Commit Protocol-Concurrency Control in Distributed Databases-Distributes Query Processing- Heterogeneous Distributed Databases-Cloud Based Databases-Directory Systems.

UNIT III   (18 HOURS)

Object Based Databases : Complex Data Types-Structured types and Inheritance in SQL–Table Inheritance-Object Identity and Reference Types in SQL –Implementting O-R features – Object Relational Mapping-Object- Oriented versus Object-Relational.

UNIT IV   (18 HOURS)

Transactions Management: Transaction Concepts—A Simple Transaction Model-Transaction Atomicity and Durability–Transaction Isolation- Transaction Isolation and Atomicity–**Concurrency Control:**Lock based Protocols-Deadlock Handling-Multiple Granularity-Timestamp-Based Protocols-Validation- Based Protocols.

UNIT V   (18 HOURS)

XML: Extensible Markup Language-Structured Semi Structured and Unstructured Data-XML Hierarchical (Tree) Data Model-XML Documents, DTD, XML Schema-Storing and Extracting XML documents from Databases-XML Languages

UNIT VI   Self study for Enrichment (Not included for End Semester Examinations)

Query Optimization techniques supporting platforms (SQL, MYSQL, Oracle)-Most popular Cloud Databases and their Features (DynamoDB, NO SQL)- Popular Object Databases and their Features(Mongo DB)- Transaction and Concurrency control used in Real time Systems-**Advanced Technologies in Database Systems**: Data mining, Information Retrieval (Text DataBase).

Text Books

1.Abraham Silberschatz., Henry F. Korth. S. Sudharshan (2013). *Database System Concepts*. 6th Edition, Tata McGraw Hill. (Unit I-IV)
2.Ramez Elmasri,Shamkant. B.Navathe (2015). *Fundamentals of Database Systems.* 6th Edition, Pearson Education. (Unit V)

Reference Books

1.Thomas Connolly, Carolyn Begg (2015). *Database Systems, A Practical Approach to Design, Implementation and Management*. 6th Edition, Pearson Education.
2.Raghu Ramakrishnan, Johannes Gehrke (2007).*Database Management System*.3rd Edition, McGraw Hill Higher Education.

Web References

1.   https://www.db-book.com/db6/
2.   https://www.worldcat.org

Pedagogy

Chalk and talk, Lecture, Discussion, Quiz, Demonstration and PPT

Course Designer

Ms.G.Sujatha

Semester: I	Internal Marks: 25		External Marks: 75	
COURSE CODE	**COURSE TITLE**	**CATEGORY**	**HRS/WEEK**	**CREDITS**
22PCS1EC1C	**SOFTWARE TESTING**	**ELECTIVE**	**6**	**4**

Course Objective

- To understand the quality aspects of a software
- Able to identify and prevent the defects of the software
- Provides exposure on principles in testing

Prerequisites

Software Engineering

Course Outcome and Cognitive Level Mapping

CO Number	CO Statement	Cognitive Level
CO 1	Remember and Understand testing approaches for the software	**K1, K2**
CO 2	Compare and Identify the testing strategies to be used for efficient software construction	**K2,K3,K4**
CO 3	Identify and Inspect the quality factors and best practices in various testing	**K3,K4**
CO 4	Examine and explain the different phases of testing for the software development	**K4,K5**
CO 5	Analyze and Interpret the tools for software testing	**K4,K5**

Mapping of CO with PO and PSO

CO s	PSO 1	PSO 2	PSO 3	PSO 4	PSO 5	PO 1	PO 2	PO 3	PO 4	PO 5
CO1	3	3	2	2	2	3	3	3	2	3
CO2	3	3	3	3	3	3	3	3	3	3
CO3	3	3	3	3	3	3	3	3	3	3
CO4	3	3	3	3	3	3	3	3	3	3
CO5	3	3	3	3	3	3	3	2	3	3

"1" – Slight (Low) Correlation   "2" – Moderate (Medium) Correlation
"3" – Substantial (High) Correlation   "-" indicates there is no correlation.

Syllabus

UNIT I (20 HOURS)

Software Development Life Cycle Models: Phases of Software Project- Quality, Quality Assurance and Quality control – Testing, Verification & Validation – Process Model – Life Cycle Models - **White Box Testing**– Static Testing – Structural Testing – Black Box Testing.

UNIT II (15 HOURS)

Integration Testing: Integration Testing as a Type of Testing – Integration Testing as a Phase of Testing – Scenario testing – Defect Bash - **System and Acceptance Testing:** Overview –System Testing – Functional Vs Non Functional Testing — Acceptance Testing –Summary of Testing Phases.

UNIT III   (20 HOURS)

Factors governing Performance Testing: Methodology for Performance Testing –Performance Testing – Process for Performance Testing - Regression Testing - Best Practices in Regression Testing.

UNIT IV   (20 HOURS)

Test Phases: Enabling Testing – Locale Testing – Validation – Language Testing – Localization Testing – Tools– **Ad hoc Testing:** Overview – Buddy Testing – Pair Testing – Exploratory Testing – Iterative Testing – Usability and Accessibility Testing: - Usability Testing – Quality Factors – Aesthetics Testing.

UNIT V   (15 HOURS)

Test Planning, Management, Execution and Reporting: Test Planning -Test Management – Test Process – Test Reporting – Best Practices - **Software Test Automation:** Terms used in Automation – Skills Needed for Automation – Automate, Scope of Automation– Process model for Automation – Selecting a Test tool – Automation for Extreme Programming Model – Challenges in Automation.

UNIT VI Self Study for Enrichment (Not included for End Semester Examinations)

 Tools for White Box and Black Box Testing- Specialized Testing types in Functional and Non-Functional Testing-Tools for Regression and performance Testing- Agile and Extreme testing in Real time with example-Different types of Automated tools for Software testing.

Text Book

1.Srinivasan Desikan, Gopalaswamy Ramesh (2011). *Software Testing – Principles & Practices*.1st Edition,Pearson Education.

Reference Books

1.Ron Patton (2006). *Software Testing*. 2nd Edition, Pearson Education.
2.William E. Perry (2006). *Effective Methods for Software Testing*.3rd Edition,Wiley India.
3.Renu Rajani, Pradeep Oak (2004). *Software Testing – Effective Methods, Tools and Techniques*.2nd Edition.TMH Publishing Company Limited.

Web References

1. https://www.gcreddy.com/2021/05/software-testing-syllabus.html
2. https://onlinecourses.nptel.ac.in/noc19_cs71/preview
3. https://www.softwaretestinghelp.com/online-software-testing-course-syllabus/

Pedagogy

   Chalk and talk, PPT, Discussion, Assignment, Quiz and Seminar

Course Designer

   Dr.D.Radhika