

**SAKTHI COLLEGE OF ARTS AND SCIENCE FOR WOMEN, ODDANCHATRAM**

**(Recognized Under Section 2(f) and 12(B) of UGC Act 1956)**

**(Affiliated to Mother Teresa Women's University, Kodaikanal)**

**PG AND RESEARCH DEPARTMENT OF COMPUTER SCIENCE**

**CURRICULUM FRAMEWORK AND SYLLABUS FOR**

**OUTCOME BASED EDUCATION IN**

**SYLLABUS FOR**

**M.Phil., COMPUTER SCIENCE**

**FRAMED BY**

**MOTHER TERESA WOMEN'S UNIVERSITY, KODAIKANAL**

**UNDER**

**CHOICE BASED CREDIT SYSTEM**

**2018 - 2021**

## **REGULATIONS**

### **Eligibility:**

A candidate with Postgraduate Degree in Computer Science or any related discipline with minimum of 55% marks.

### **Duration:**

One year

### **Medium of Instruction:**

English only

### **Examinations:**

The M.Phil, Programme in Computer Science comprises of Theory courses (3 in the 1<sup>st</sup> Semester and 1 in the 2<sup>nd</sup> Semester) and one Dissertation cum Viva – Voce. Paper I, II, III and IV are common for all the candidates.

### **Attendance:**

- Normally a student must secure a minimum of 80% attendance to become eligible to take the End – Semester Examination (ESE) in a course. However, condonation of shortage of attendance may be granted on genuine medical grounds upto a maximum of 10% of the contact days. For this purpose, the student must, immediately upon returning to class after the period of illness, apply for the condonation, submitting valid medical certificate (s) from registered medical practitioner (s) through his/her advisor to the Head of the Department (HOD), who will decide upon the application for condonation of shortage of attendance. Medical certificates submitted on the eve of the ESE will not be accepted.
- If a student who has no genuine medical grounds and has earned 70% or more but less than 80% of attendance in a course in a semester that student will be debarred from the ESE in that course in that semester. However the student may take the ESE when offered in later semester.
- If a student has earned less than 70% attendance, that student will be debarred from the ESE in the course and the statement of grades will read IA (Inadequate Attendance) against that course. Such a student must repeat that course when offered in a later semester. Attendance in a course will always be reckoned from the days of joining the course to the last day of the course.

### **Redoing of the Programme**

A student who has been debarred from the ESE for lack of attendance must repeat the course at the later semester, paying the prescribed fees for the course. No

student will be permitted to repeat a course or reappear for a CIA test or an ESE for improvement of Grade Points. A student, who has fulfilled all the course requirements but has not been able to take the ESE alone, can take the same at a later semester. A student who has failed in an ESE need take only the ESE in that course when it is next offered. Such students need take only the fee for ESE of the course.

Students interested in redoing of course(s) have to get prior official permission for the same by applying to the Registrar through the HOD on before 5<sup>th</sup> June (of redoing of old semester courses) or 5<sup>th</sup> November (for redoing Even Semester Courses) every year.

A student may be permitted to break his/her study on valid grounds. Such break of study is entertained only if the student has completed at least two semesters of student. For availing break of study, the student has to apply to the Registrar along with the recommendations of the Class Advisor and the HOD in the format prescribed enclosing documentary evidences(s) as a proof for his/her claim for break of study and after paying prescribed fee. Unauthorized break of study will not be permitted under any circumstance. Break of study will be permitted subject to the formalities of readmission as well as the availability of courses to be completed and the examination norms.

#### **Assessment:**

Assessment of the students will be two-fold consisting of Continuous Internal Assessment (CIA) and End Semester Examination (ESE). The ratio between CIA and ESE will normally be 40:60.

#### **Continuous Internal Assessment (CIA)**

The CIA marks shall be awarded based on the following:	Marks
Scores of Best two tests out of three tests	20
Assignment	10
Seminar/Quiz	10
<b>Total</b>	<b>40</b>

#### **End Semester Examination (ESE):**

Except in the case of Project-work Summer Placement Training and exclusively practical/ field placement courses, the ESE will consist of a written examination of three hours duration reckoned for a maximum 60 marks.

Part-A (5\*12=60)

5 Questions out of 10

**Time extension for submission of Dissertation:**

Extension for submission of dissertation shall be granted as per the University norms and conditions.

**Passing Minimum Marks:**

There will be no minimum for internal assessment in papers I, II, and III. A candidate will be declared to have passed in a course if she gets a minimum of 50% marks in the University examination and 50% marks in total, putting together the continuous internal assessment marks and University examination marks in that course. A candidate should have secured 50% in Dissertation and Viva-Voce to get a pass.

**Classification of Candidates**

If a candidate secured 60% and above in both the parts put together, she is deemed to have passed in First Class.

If a candidate secured 50% and above but less than 60% in both the parts put together, she is deemed to have passed in Second Class.

If a candidate secures less than 50% in both the parts put together, she is deemed to have failed in the course.

**Failed Candidates:**

A candidate who fails in any course/courses may appear again in those course/courses as per University rules.

**Completion of the program:**

The students have to complete their program within 3 years from the completion of the duration of program, failing which their registration will stand automatically cancelled and they have to register afresh, if they want to pursue the program.

**Award of degree:**

A student will be declared to be eligible for the award of a degree if she has:

- Registered for and undergone all the courses under the different parts of the curriculum of her program.
- No dues to the University, hostel, NSS, Library, Clubs, Associations etc., and
- No disciplinary action pending against her.

**Other regulations:**

Besides the above, the common regulations of the University shall also be applicable to this program.

## **PREAMBLE:**

Having been launched in the year 2009 – 2010 with the Under-graduation Programme, the Department of Computer Science has been progressing in leaps and bounds and has attained the status of being a Research Department with the introduction of M.Sc., (CS) in 2015 and M.Phil., (CS) Programme in 2014. The curricula, specifically designed by Mother Teresa Women's University, Kodaikanal, for these Programmes reflect the depth and breadth of computer science. The department serves with the ultimate aim of bringing the young rural women students to the scenario of higher education. Specialized courses, to suit the industry needs have been introduced in the curriculum, based on the inputs collected from experts in academia and industry. To enhance the quality of the programmes further, the department adheres to Outcome Based Education (OBE) since 2018-2019.

## **VISION:**

- ✚ Employing women in the field of Information Technology.
- ✚ Moulding rural women into Future Leaders.

## **MISSION:**

- ✚ Training students in latest trends in IT Field.
- ✚ Motivating students to organize IT related competitions.
- ✚ Conducting special lectures for the students to advance the state of the art in computer science and IT Field.
- ✚ Training students to do projects in recent technologies.

## **OBJECTIVES:**

- ✚ Producing employable workforce, that will have a breadth and depth of knowledge in the discipline of computer science.
- ✚ Developing academically competent and professionally motivated personnel, equipped with objective, critical thinking, right moral and ethical values that compassionately foster the scientific temper with a sense of social responsibility.
- ✚ Developing skilled manpower in the various areas like: Data base management, Software Development, Computer-Languages, Software engineering, Web based applications etc.

## **FIXING THE LEARNING OBJECTIVES:**

Since the Academic year 2018 – 2019, the learning objectives and outcomes of the Programmes of B.Sc., (CS), M.Sc., (CS) and M.Phil., (CS) have been set, following the Bloom's Taxonomy Cognitive Domain. Accordingly, it is broken into six levels of learning objectives of each course. They are -

K1 / Knowledge = Remember

K2 / Comprehension = Understand

K3 / Application = Apply

K4 / Analysis = Analyze

K5 / Evaluation = Evaluate

K6 / Synthesis = Create

### **MAPPING COS WITH POS:**

For each Programme, the Educational Objectives and the Specific Objectives are specified. The Programme Outcomes are designed according to the curriculum, teaching, learning and evaluation process. For each course, the definite Outcomes are set, giving challenge to the cognitive domain. The Course Outcomes are mapped with the Programme Outcomes. The performance of the stakeholders is assessed and the attainment rate is fixed, by using the measurements 'high', 'medium' and 'low'. The restructuring of the curriculum is done based on the rate of attainment.

### **INSTITUTIONAL OBJECTIVES:**

The institution has certain definite Institutional Objectives to be attained.

- Skill Development & Capacity Building
- Women Empowerment
- Self-reliance
- Gender Equity & Integrity

### **PROGRAMME EDUCATIONAL OBJECTIVES:**

The Programmes B.Sc., M.Sc., and M. Phil., (CS) are offered with certain Specific Educational Objectives.

**PSO1:** Understanding of the basics of computer science.

**PSO2:** Applying fundamental principles and methods of Computer Science to a wide range of applications and mathematical and scientific reasoning to a variety of computational problems.

**PSO3:** Developing foundational skills to install and maintain computer networks, troubleshoot hardware and software problems.

### **Mapping PEOs with IOs:**

<b>Programme Educational Objectives</b>	<b>Institutional Objectives</b>			
<b>B.Sc., M.Sc., and M. Phil., (CS)</b>	<b>1</b>	<b>2</b>	<b>3</b>	<b>4</b>
<b>PEO1:</b> Understanding of the basics of computer science.	*			
<b>PEO2:</b> Applying fundamental principles and methods of Computer Science to a wide range of applications and mathematical and scientific reasoning to a variety of computational problems.		*		
<b>PEO3:</b> Developing foundational skills to install and maintain				

computer networks, troubleshoot hardware and software problems.			*	*
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**Measuring: H – High; M – Medium; L – Low**

### **M.Phil., (Computer Science)**

#### **PROGRAMME SPECIFIC OBJECTIVES:**

The Pre-doctoral Programme M.Phil., (CS) is offered with certain Specific Objectives.

- Scholars are oriented towards becoming globally competent.
- To develop the ability amongst the scholars to apply industry and research.
- To enable scholars to work in a team with multidisciplinary approach.
- To promote and inculcate ethics and code of professional practice among students.

#### **PROGRAMME OUTCOMES:**

After successful completion of Master of Philosophy in Computer Science, certain outcomes are expected from the scholars.

- **PO1:** Demonstrating basic knowledge in Computer Science.
- **PO2:** Using research tools in their chosen area of specialization.
- **PO3:** Exhibiting ability in the critical evaluation of research techniques and methodologies.
- **PO4:** Acquiring basic knowledge of research and skills to solve problems, analyze data and interpret the results.
- **PO5:** Gaining fundamental strength in analyzing, designing and solving research and industry related problems.
- **PO6:** Attaining holistic development towards a successful career in academic and research institutes.
- **PO7:** Becoming capable of communicating effectively and demonstrating professional and ethical responsibilities.

**COMMON STRUCTURE / M.Phil., (CS) / 2018 - 2021**

Sem	Sub. Code	Title of the Course	HRS	CREDITS	CIA	CE	Total
<b>I</b>	MCST1	Research Methodology	6	4	40	60	100
	MCST2	High Performance Computing	6	4	40	60	100
	MPST13	Professional Skills	6	4	40	60	100
<b>II</b>	MCST21	Area Paper	6	4	40	60	100
	MCSD22	Dissertation and Viva-voce		14			200
<b>Total</b>				<b>30</b>			<b>600</b>

**For each course other than the Dissertation**

Continuous Internal Assessment	:	40 Marks
End Semester Examination	:	60 Marks
Total	:	100 Marks

**Question Pattern:**

**Answer any Five Questions (5 x 12 = 60)**

Question 1	(or)	Question 2	→	Unit 1
Question 3	(or)	Question 4	→	Unit 2
Question 5	(or)	Question 6	→	Unit 3
Question 7	(or)	Question 8	→	Unit 4
Question 9	(or)	Question 10	→	Unit 5

## MCST11-RESEARCH METHODOLOGY

Hours 6 / Credits 4

### Course Outcomes:

After completion of the course, certain outcomes are expected from the learners.

Description of COs	Bloom's Taxonomy Level
Gaining knowledge to use tools related to research in Computer Science.	Knowledge (Level 1)
Comprehending the concepts of Logic and Natural Deduction Systems.	Comprehension (Level 2)
Applying the gained knowledge to calculate the computing time of algorithms and ideas related to NP Completeness.	Application (Level 3)
Gaining mastery over the formal language of Computer Science, its grammar and its applications	Synthesis (Level 6)
Using probability and applications of probability in areas such as System Reliability	Synthesis (Level 6)

## COURSE CONTENT

### Unit I

**Research Methodology:** Introduction – Mathematical tools for analysis – Research problems – Types of research – Research Process – Data Collection – Primary data – Secondary data – Data Presentation – Mathematical Tool for Analysis – Ethics in Research – Importance – Integrity in Research – Scientific Misconduct and Consequences.

### Unit II

**Scientific Research Methods** – Research process – Criteria for good Research – Problems encountered by Researchers - Journal Reading Techniques - Defining the Research problem– Selecting the Problem – Necessity of Defining the problem – Technique involved in Defining the Problem – An illustration.

**Research Design** – Need for Research Design – Features of good design – Important concepts relating to Research Design – Different Research Design – Basic principles of Experimental Designs – Conclusion – Developing a Research Plan.

### Unit III

**Algorithmic Research:** Algorithmic Research Problems – Types of Algorithmic Research– Solution Procedure/Algorithm – Scope of Algorithms – Steps in Development of Algorithms –Time and Space Complexity of Algorithms

### Unit IV

**Design Of Algorithms:** Backtracking - Subset sum problem – Branch and Bound - Assignment problem – Knapsack problem – Traveling salesman problem – Greedy method – Prim’s algorithm – Kruskal’s algorithm – Dijkstra’s algorithm.

#### **Unit V**

**Thesis Writing:** Writing at the Tertiary Level – Planning the thesis – Computer tools for writing and publishing – The General Format – Page and Chapter Format – Footnotes – Tables and Figures – References – Appendices.

#### **References:**

1. “Research Methodology Methods and Techniques” C.R. Kothari, 2<sup>nd</sup> Edition New Age International Publishers 2009.
2. “Design and Analysis of Algorithms”, R Pannerselvam, PHI, New Delhi, 2007.
3. “Cryptography and Network Security”, Behrouz A. Forouzan, Debdeep Mukhopadhyay, McGraw Hill, 2011.
4. “Thesis & Assignment Writing” By Anderson, Berny H. Dujrston, H. Pote, Wiley Publications, 4th Edition 2008, New Delhi.
5. T.S. Rajasekaran & G.A. Vijaylakshmi Pai, “Neural Networks, Fuzzy Logic & Genetic Algorithms– Synthesis & applications”, PHI, 2009

## MCST12 - HIGH PERFORMANCE COMPUTING

Hours 6/Credits 4

### Course Outcomes:

After completion of the course, certain outcomes are expected from the learners.

Description of COs	Bloom's Taxonomy Level
Understanding of basic ideas of Data Science and capacity to analyze big data sets.	Comprehension (Level 2)
Understanding the Cloud Computing as an emerging area of public and scientific use and applications of Cloud Computing in the current social and research contexts.	Comprehension (Level 2)
Gaining knowledge of Virtualization and its various uses for practical applications.	Knowledge (Level 1)
Appreciating IoT as a fast growing paradigm of Computer Science and its uses in research.	Synthesis (Level 6)
Appreciating Cryptography as a tool of security in the areas of Database, Program and Computer Networks and to pursue further learning of the same.	Synthesis (Level 6)

## COURSE CONTENT

### Unit I

**Emerging Technologies:** Grid and Cloud Computing,- Mobile computing - Internet of Things - Logical Design of IoT - Physical Design of IoT– IoT Enabling Technologies – IoT & Deployment Templates

### Unit II

**Advanced Computing Methods:** Fundamentals of Neural Networks: Properties – Architecture - learning methods: activation functions; Feed forward, Feedback & recurrent Neural Networks. Genetic Algorithm : Basic concept - Role of GA in optimization - Fitness function - Cross over – Mutation – Inversion – Deletion

### Unit III

**Digital Image Processing:** Digital Image Fundamentals - Components of Image Processing System- Sampling and Quantization - Color Image Processing – Color models – Pseudo color Image processing - Image Segmentation- Detection of discontinuities – Edge Linking and Boundary Detection – Thresholding – Region Based Segmentation

### Unit IV

**Data Mining:** Introduction to Data Mining: Functionalities – Classification of Data Mining Systems – Data Processing -Characterization and Comparison - Association Rule Mining - Clustering - Classification and prediction-Multidimensional analysis and descriptive mining of complex data objects

## Unit V

**Network Security:** Cryptography - Introduction -Submission Ciphers – Transposition Ciphers - One time pads – Cryptographic Principles – Symmetric Key Algorithms: DES - AES – Cipher Modes -Cryptanalysis –Public Key Algorithms – Digital Signatures: Symmetric Key Signatures – Public Key Signatures - Message Digests - The Birth Day Attack – Management of public keys: Certificates – X 509 - Public Key Infrastructure.

### References:

1. Elis Horowitz and Sartaj Sahni, „Fundamentals of Computer algorithms“, Galgotia Publications, New Delhi 2000
2. Rafael C. Gonzalez and Richard E. Woods, —Digital Image Processin, Pearson Education, New Delhi, Second Edition, 2002.
3. Jiawei Han and Micheline Kamber, —Data Mining: Concepts and Techniques, Morgan Kaufman Publishers ( Elsevier Science ), 2001
4. “Internet of Things” – ArshdeepBahga, Vijay Madiseti, Universities Press(INDIA) Private Ltd., 2015.
5. William Stallings – Cryptography and New Network Security, Pearson Education, Delhi 2006
6. Mark A. WeissAddison-Wesley, *Data Structures and Algorithm Analysis in Java*, 2/E,2007

## MPST13 - PROFESSIONAL SKILLS (Common Paper)

Hours 6/ Credits 4

### Course Outcomes:

After completing the course, certain outcomes are expected from the learners.

Description of COs	Bloom's Taxonomy Level
Acquiring knowledge of communication skills with special reference to its elements, types, development and styles.	Knowledge (Level 1)
Understanding the terms like Communication technology, Computer Mediated Teaching	Comprehension (Level 2)
Developing skills in ICT and applying them in teaching, learning contexts and research.	Synthesis (Level 6)
Developing Multimedia/E-contents in their respective subjects.	Synthesis (Level 6)
Integrating Technology into Teaching and Learning	Synthesis (Level 6)

### COURSE CONTENT

#### Unit I - Computer Application Skills

Fundamentals of Computers and windows, Operating System – MS – Office Components; Word: Equation editor, Table Manipulation – Formatting Features – organizational Chart. MS – EXCEL: Statistical Functions – Number Manipulation – Chart Preparation with various types of graphs. MS Powerpoint: Powerpoint presentation with multimedia features. Internet and its applications: E-mail and attachments – working with search engines.

#### Unit II - Communication Skills (English/Tamil/Both)

English: Skills of Communication: Listening, Speaking, reading and Writing – Writing Synopsis, Abstract and proposals. Developing good language abilities – Public speaking – Writing Skills.

Tamil: பயிற்றுவிக்கும் திறன் - பேச்சுத்திறன் - வெளிப்பாட்டுத் திறன் - ஆய்வுத்திட்டம் - ஆய்வுச்சூக்கம் தயாரித்தல்.

#### Unit III - Communication technology

Computer Mediated Teaching: Multimedia, E – Content, Satellite Based Communication – EDUSAT and ETV channels. Web: Internet I Education.

#### Unit IV - Pedagogical Skills

Micro teaching Skills: Skill of Induction, Skill of Stimulus Variation. Skill of Explaining, Skill of Probing Questions, Skill of Blackboard, Writing and Skill of Closure – Integration of Teaching Skills – Evaluation of Teaching Skills – Research Extension and Consultancy.

#### Unit V - Industrial Technology

Lecture Techniques: Steps, Planning of a lecture, Lecture Notes, Updating, Delivery of Lecture. Teaching – Learning Techniques: Team teaching, Group Discussion. Seminar,

Workshops, Symposium and Panel Discussion – Games and Simulations – Web Based Instructions.

### **References**

- Micael D. and William (2000). Integrating Technology into Teaching and Learning: Concepts and Applications, Prentice Hall, New York.
- Information and Communication Technology in Education: A Curriculum for Schools and Programme of Teacher development. Jonathan Anderson
- Pandey S.K.(2005). Teaching communication. Commonwealth publisher, Delhi
- Sharma. R.A.(2006), Fundamentals of education technology, Surya publication, Meerut
- Kum Babu A. and Dandapani S. (2006), Microteaching, Neelkamal Publications, Hyderabad
- Vanaja M and Rajasekhar S. (2006), Computer Education, Neelkamal Publications, Hyderabad

**MCST21: AREA PAPER - I**  
**DIGITAL IMAGE PROCESSING**

**Hours 6/ Credits 4**

**Course Outcomes:**

After completing the course, certain outcomes are expected from the learners.

Description of COs	Bloom's Taxonomy Level
Gaining clear knowledge on image enhancement, image segmentation and image restoration techniques	Knowledge (Level 1)
Comprehending the concept of Image representation and experimenting with colour coordinates of images.	Comprehension (Level 2)
Analyzing the image fundamentals and mathematical transforms necessary for image processing	Analysis (Level 4)
Gaining mastery over image compression procedures	Synthesis (Level 6)
Becoming familiar with different segmentation techniques	Synthesis (Level 6)

**COURSE CONTENT**

**Unit I**

Digital Image representation - Fundamental steps in Image Processing - Elements of Digital Image Processing Systems - Sampling and Quantization

**Unit II**

Basic relationships between pixels - Imaging Geometry - Transformation Technology - The Fourier Transform, The Hadamard Transform, The Discrete Cosine Transform.

**Unit III**

Image Enhancement: The Spatial Domain Methods, The Frequency Domain Methods - Image Segmentation: Pixel Classification by Thresholding, Histogram Techniques, Smoothing and Thresholding - Gradient Based Segmentation: Gradient Image, Boundary Tracking, Laplacian Edge Detection.

**Unit IV**

Color image processing – Color models – Pseudo color Image processing – Basic of full color Image Processing – Color transformations – Smoothing and Sharpening – Color Segmentation – Noise in Color Images – Color Image Compression.

**Unit V**

Image segmentation – Detection of discontinuities – Edge Linking and Boundary Detection – Thresholding – Region Based Segmentation – Segmentation by Morphological Watersheds – The use of Motion in Segmentation.

**References:**

1. Rafael C. Gonzalez, Richard E. Woods, "Digital Image Processing", Eastern Economy Edition
2. C. Gonzalez and R.E. Woods, " Digital Image Processing" , Addison Wasley
3. A.K.Jain, " Fundamentals of Digital Image Processing", Prentice Hall of India

## CLOUD COMPUTING - AREA PAPER - II

### Course Outcomes:

After completing the course, certain outcomes are expected from the learners.

Description of COs	Bloom's Taxonomy Level
Gaining a comprehensive and in-depth knowledge of Cloud Computing concepts, technologies, architecture and applications.	Knowledge (Level 1)
Recognizing the cloud file systems and their applications in industry and articulating the main concepts, key technologies, strengths and limitations of Virtualization and Cloud computing.	Comprehension (Level 2)
Analyzing the core issues of cloud computing such as energy efficiency, security, privacy and interoperability.	Analysis (Level 4)
Identifying problems, explaining, analyzing and evaluating various cloud computing solutions.	Evaluation (Level 5)
Initiating research in Cloud Computing fundamental issues, Research technologies, applications and implementations.	Synthesis (Level 6)

## COURSE CONTENT

### Unit I

**Overview of Distributed Computing**-Trends of computing-Introduction to distributed computing-Next big thing: cloud computing, Application availability, performance, security and disaster recovery; next generation Cloud Applications.

### Unit II

Introduction to Cloud Computing-What's cloud computing-Properties & Characteristics-Service models-Deployment models, cloud architecture, advantages and disadvantages

### Unit III

Infrastructure as a Service (IaaS)-Introduction to IaaS-Resource Virtualization-Server-Storage-Network-Case studies, Performance and scalability of services, tools and technologies used to manage cloud services deployment

### Unit IV

Platform as a Service (PaaS)-Introduction to PaaS-Cloud platform & Management-Computation-Storage-Case studies

### Unit V

Software as a Service (SaaS)-Introduction to SaaS-Web services, Cloud based service, applications and development platform deployment so as to improve the total cost of ownership (TCO).

### References

1. Cloud Computing Bible, Barrie Sosinsky, Wiley-India, 2010

2. Cloud Computing: Principles and Paradigms, Editors: Rajkumar Buyya, James Broberg, Andrzej M. Goscinski, Wiley, 2011
3. Cloud Computing: Principles, Systems and Applications, Editors: Nikos Antonopoulos, Lee Gillam, Springer, 2012
4. Cloud Security: A Comprehensive Guide to Secure Cloud Computing, Ronald L. Krutz, Russell Dean Vines, Wiley-India, 2010

## NETWORK SECURITY - AREA PAPER - III

### Course Outcomes:

After completing the course, certain outcomes are expected from the learners.

Description of COs	Bloom's Taxonomy Level
Obtaining thorough knowledge over advanced encryption standard.	Knowledge (Level 1)
Understanding the conceptual knowledge of authentication and Identity verification	Comprehension (Level 2)
Exploring the encryption techniques through symmetric cipher.	Analysis (Level 4)
Comparing and contrasting the logic behind RSA and Diffie Hellman algorithms.	Evaluation (Level 5)
Investigating the security measures coupled with protocols.	Synthesis (Level 6)

## COURSE CONTENT

### Unit-1: Introduction

Services and Mechanism: Security Attacks, Security services-Classical Encryption techniques-Cipher Principles-Data Encryption Standard-Block Cipher Design Principles and modes of Operation-

Evaluation criteria for AES- AES Cipher- Triple DES- Placement of Encryption function-Traffic Confidentiality.

### Unit-2: Public Key Cryptography

Key Management- Diffie - Hellman Key Exchange-Elliptic Curve Architecture and Cryptography-Introduction to Number Theory- confidentiality using Symmetric .Encryption- public Key Cryptography and RSA.

### Unit-3: Authentication And Hash Function

Authentication requirements-Authentication functions-Message Authentication Codes –Hash functions-Security of Hash Functions and MACs-MD5 message algorithm-secure Hash Algorithm-RIPEMD-HMAC Digital Signatures-Authentication Protocols-Digital Signature Standard.

### Unit-4: Network Security

Authentication Applications: Kerberos-X.509 Authentication Service-Electronic Mail Security-

PGP-S/MIME-IP Security, Network Security: Electronic mail security, IP Security, Network Management Security

### Unit-5: System Level Security

Intrusion detection-password management-Viruses and related Threats-Virus Counter measures -Firewall Design principles –Trusted Systems, SSL, SET, Intrusion Detection.

**References:**

1. Williams Stallings " Cryptography and Network Security-Principles and Practices", prentice Hall of India, Third Edition, 2003.
2. Atual Kahate , Cryptography and Network Security, McGraw Hill.
3. Bruce Schenier , "Applied Cryptography', John Wiley & Sons Inc,2001.

## BIOMETRIC GAIT ANALYSIS – AREA PAPER – IV

### Course Outcomes:

After completing the course, certain outcomes are expected from the learners.

Description of COs	Bloom's Taxonomy Level
Gaining knowledge on biometric matching basics, authentication, identification, and verification approaches for application on real time problems.	Knowledge (Level 1)
Understanding the basics of Biometrics and its functionalities	Comprehension (Level 2)
Analyzing the data for development of personal identification in real time	Analysis (Level 4)
Developing applications with biometric security	Synthesis (Level 6)
Designing and developing different algorithms of a biometric system	Synthesis (Level 6)

## COURSE CONTENT

### Unit I

Biometric gait recognition- introduction – behavioural biometric – biometric sensing from distance - gait as a biometric- Gait authentication – identification – challenges, issues , and prospects.

### Unit II

Biometric Gait recognition- strength and weakness – why gait recognition – keystroke dynamics in gait recognition – motion based gait recognition – model based gait recognition – Types of phases in gait cycle

### Unit III

Image based recognition – Signal based recognition : kinetic , knematic , pose, Electromyography(EMG) – marker based recognition- devices used in biometric gait recognition.

### Unit IV

Gait analysis : 2D and 3D- biomechanics of standing – ground reaction of normal gait- pressure and movement, measurement, evaluation , description – technology challenges- clinical gait analysis

### Unit V

Error types – threshold score distribution – FAR/FRR – system design issues – gait velocity matching performance – system vulnerabilities – circumvention – covert acquisition – quality control – template generation – interoperability – data storage

### References:

1. Christopher Kirtley, "Clinical Gait Analysis", Elsevier Churchill Livingstone.

2. Adam M.Fullenkamp, “ A hybrid Gait recognition solution using video and ground contact information”
3. Samir Nanavati, Michael Thieme, Raj Nanavati, “Biometrics – Identity “

## ADVANCED DATABASES – AREA PAPER - V

### Course Outcomes:

After completing the course, certain outcomes are expected from the learners.

Description of COs	Bloom's Taxonomy Level
Gaining knowledge on the basic concepts and terminology related to DBMS and Relational Database Design.	Knowledge (Level 1)
Understanding the advanced DBMS techniques to construct tables and write effective queries, forms, and reports.	Comprehension (Level 2)
Designing and implementing Distributed Databases	Analysis (Level 4)
Writing complex queries including full outer joins, self-join, sub queries, and set theoretic queries	Synthesis (Level 6)
Handling the file organization, Query Optimization, Transaction management, and database administration techniques.	Synthesis (Level 6)

### COURSE CONTENT

#### Unit I:

**Introduction** – Distributed Data Processing, Distributed Data System – Promises of DDBS- Problem Areas **Overview of Relational DBMS** :Relational Database Concepts – Normalization-Integrity-Rules-Relational Data Languages.

**Distributed DBMS Architecture:**Architectural Models for Distributed DBMS-DDBMS Architecture.**Distributed Database Design:**Alternative Design Strategies-Distribution Design Issues-Fragmentation-Allocation.

#### Unit II:

**Query Processing and Decomposition:**Query Processing Objectives-Characterization of Query Processor-Layers of Query of Query Processing-Query Decomposition-Localization of Distributed Data.

**Distributed Query Optimization:**Query Optimization-Centralized Query Optimization-Distributed Query Optimization Algorithms.

#### Unit III:

**Transaction Management:**Definition-Properties of Transaction-Types of Transaction-Distributed Concurrency Control-Serialization-Concurrency control Mechanism and Algorithms-Time Stamped and Optimistic Concurrency Control Algorithms-Deadlock Management.

#### Unit IV:

**Distributed Object Database Management Systems:**Fundamental Object Concepts and Models-Object Distributed Design-Architectural Issues-Object Management-Distributed Object Storage-Object Query Processing.

**Unit V:**

**Object Oriented Data Model:**Inheritance-Object Identity-Persistent Programming Languages-Persistence of object-Comparing OODBMS and ORDBMS.

**References:**

1. M.Texter OZSU and Patuck Valduries,"Principles of Distributed Database Systems",Pearson Edition,2001.
2. Stefan Cari and Willipse Peiagatti, "Distributed Database",McGraw Hill.
3. Henry P.Korth, A Silberschatz and Sundarshan,Database System Concepts",McGraw Hill.
4. Raghuramakrishnan and Johanes Geheke,"Database Management Systems",McGraw Hill.