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 COMPUETR 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

2015 – 2018

M.Phil., COMPUTER SCIENCE

S.No.	Subject	Contact Hours	Exam Duration	Int. Marks	Ext. Marks	Tot. Marks
1.	**I Semester**					
	1.Research Methodology	6	3	40	60	100
	2.Foundation in Computer Science	6	3	40	60	100
	3. General Skills	6	3	40	60	100
2.	**II Semester**					
	4. Elective Paper	6	3	100	-	100
	5. Dissertation	-	-	40	60	100

Grading of Dissertation: As done for other regular M.Phil. courses offered in MTWU.

Elective Subject: One from the elective papers list may be selected by the students depending on the area of their research.

Teachers: Only teachers with Ph.D. or M.Phil. qualification and having atleast two years of teaching PG courses can handle classes and guide the Dissertation work.

Pass Percentage: 50% of the marks in Subjects.

Eligibility for Admission: Candidates who have completed 1. M.Sc. (CS), 2. M.C.A., 3. M.Sc. (IT), 4. M.Sc. (Maths/Physics/Statistics) with PGDCA, and having atleast 55% of marks in their PG course are eligible for admission.

Note: Only degrees obtained after 10+2+3+2 years for M.Sc. and 10+2+3+3 years for M.C.A. will be considered.

PAPER 1 – RESEARCH METHODOLOGY

Unit 1: Data Collection, Processing and its Analysis: Methods of Primary data collection. Collection of data through questionnaires, Schedule. Collection of Secondary data. Processing Operations, Elements of Analysis. Use of library, research books, monograph, periodicals, abstract, documents, review of relevant literature.

Elements in research methodology: Identification and formation of research problem (Hypothesis). Research design: CRD (Completely Randomized Design), RBD (Randomized Block Design), and LSD (Latin Square Design). Scientific database: Science Direct and DOAJ *(Direct Open Access Journals)*

Scientific body in research: Ethical, legal, social and scientific issues in research. A brief idea about the funding agencies such as DST (Department of Science and Technology), DBT (D*epartment of Biotechnology*), ICMR (Indian Council of Medical Research), CSIR (Council of Scientific & Industrial Research) and UGC (*University Grants Commission*). Role of IPR *(Intellectual Property Rights)* in Research and Development.

Unit 2: Research Report: Structure of Report – Contents Steps in Drafting – Layout of Research Report – Styles of Reporting- Types of Report – Guidelines to Review Report – Typing Instructions – Oral Presentation – Page and Chapter Management – Format Footnotes – Tables and Figures – References and Appendices – Editing the Final Draft – Evaluation of Final Draft.

Unit 3: Fundamentals of Algorithm: What is an Algorithm – Algorithm Specification – Performance Analysis – Randomized Algorithm.

Design and Analysis of Algorithms

Parallel Algorithms, Basics of Linear-Programming Algorithms, Graph Algorithms, Geometric Algorithms, Approximation Algorithms

Unit 4: Data Input Methods: Data Input – Coding Techniques – Detection of Error in Codes – Validating Input Data – Interactive Data Input.

Unit 5: Distributed Databases: Standalone v/s Distributed databases, Replication, Fragmentation, Client / Server architecture, types of distributed databases.

Object – Relational Databases: Abstract Data Types, Nested Tables, Varying Arrays, Large Objects, Naming Conventions for Objects.

References:

1. Research Methodology-C.R Kothari, New Age International.
2. Research Methodology- C.H. Chaudhary, RBSA Publication.
3. Research Methodology- G.R. Basotia and K.K. Sharma.

4. Research Methodology - Panneer Selvam.R-Prentice Hall of India, New Delhi.
5. Statistics by T.R Jain & S C Aggarwal, VK (India) Enterprises, Darya Ganj (New Delhi).
6. Fundamentals of Computer Algorithms – Ellis Horoqitz, Sartaj Shani, Sanguthevar Rajasekaran – Galgotia Publications.
7. T. H. Cormen, C. E. Leiserson and R. L. Rivest, Introduction to Algorithms, MIT Press.
8. Analysis and Design of Information systems – V.Rajaraman – Prentice Hall of India – 2nd Edition.
9. V. Aho, J. E. Hopcroft and J. D. Ullman, the Design and Analysis of Algorithms, Addison- Wesley.
10. Database System Concepts by Korth, Silberschatz, Sudarshan - McGraw Hill

PAPER II: FOUNDATION IN COMPUTER SCIENCE

Unit 1: **Digital Image Processing**: Introduction – Origins of Digital Image Processing – Applications – Fundamental Step in Image Processing – Components of Digital Image Processing System.

Unit 2: **Digital Image Fundamentals**: Elements of Visual Perception – Light and Electro Magnetic Spectrum – Image Sensing and Acquisition – Image Sampling and Quantization – Basic Relationships between Pixels – Linear and Non-linear Operations.

Unit 3: **Data Mining**: Introduction – Source of Data – Datamining Functionalities – Classification of Datamining – Major Issues in Data Mining.

Data warehouse and OLAP Technology for Data Mining : Introduction to Datawarehouse – A multi-dimensional data model – Data warehouse architecture – Datawarehouse implementation – Further development of Data Cube Technology – From Data warehousing to Datamining.

Data Preprocessing: Introduction – Data Cleaning – Data Integration and Transformation – Data Reduction – Discretization and Concept Hierarchy Generations.

Unit 4: **Network Security**: Benefits of Good Security Practices – Security Methodology. Risk Analysis and Defence Models: Threat Definition and Risk Analysis – Defence Models.

Cryptography: Introduction - Classical Encryption Techniques: Symmetric Cipher Model: Substitution Techniques – Transportation Techniques – Rotor Machines – Steganography.

Unit 5: **Mobile Computing**: Introduction – Mobility of bits and bytes – Wireless The beginning – Mobile Computing – Dialogue control – Networks – Middleware and Gateways – Applications and Services – Developing Mobile Computing Applications – Security in Mobile Computing – Standards – Why it is necessary – Standard Bodies – Players in the wireless space.

Mobile Computing Architecture : History of Computers – History of Internet – Internet – Ubiquitous network – Architecture for Mobile Computing – Three Tier Architecture – Design Considerations for Mobile Computing –Mobile Computing through Internet – Making existing Applications mobile enabled.

Reference:

1. Rafael C.Gonzalez and Richard E. Woods, “Digital Image Processing”, Prentice Hall of India, 2nd Edition, 2006.
2. Jiawei Han and Michelline Kamber, “Data Mining: Concepts and Techniques”, Elsevier, 2003.

3. Bragg Rhodes-Ousely Strassberg , et al., “Network Security – The Complete Reference”, Tata McGraw-Hill Edition, 2007.
4. William Stallings, “Cryptography and Network Security”, Third Edition.
5. Mobile Communication – Jochen Schiller 2nd edition Pearson 2003.

PAPER III: GENERAL SKILLS

Unit 1: **Introduction to Computers**: Block diagram of a computer – Functions of each unit – Input/Output Devices – Modern Memory Devices – Pen Drive, CD, DVD.

MS-Office: **MS-Word**: Creating and Editing a Document - Formatting a document – Printing a Document - Organisational Chart - Equation Editor - Mail Merge.

Unit 2: **MS-Excel**: Worksheet – Statistical Functions – Mathematical – Charts.

MS-Powerpoint: Preparation of Slides – Design – Background Design –Transition Effects – Inserting Images – Audio Effects.

Internet: Internet Services – e-mail – FTP – Telnet and TCP/IP – Search Engine – Mail Creation – Attaching Files.

PAPER IV (E1): DIGITAL IMAGE PROCESSING

Unit 1: Digital Image Fundamentals: Introduction – An Image Model – Sampling and Quantization – Basic Relationships between Pixels – Image Geometry.

Unit 2: Image Transforms: Properties of 2D Fourier Transform – FFT Algorithm and Other Separable Image Transforms – Walsh Transforms: Hadamard, Cosine, Haar, Slant Transforms, KL Transforms and their properties.

Unit 3: Image Enhancement: Background, Enhancement by Point Processing, Histogram Processing, Spatial Filtering and Enhancement in Frequency Domain, Color Image Processing.

Unit 4: Image Filtering and Restoration – Degradation Model, Diagnolisation of Circulant and Block Circulate Matrices, Algebraic Approach to Restoration, Inverse Filtering, Least Mean Squares and Interactive Restoration, Geometric Transformations.

Unit 5: Image Compression: Fundamentals – Image Compression Models – Error Free Compression – Lossy Compression – Image Compression Standards.

Image Segmentation: Detection of Discontinuities – Edge Linking and Boundary Detection – Thresholding – Region Oriented Segmentation – Use of Motion in Segmentation.

References:

1. A.K.Jain, “Fundamentals of Digital Image Processing”, Prentice Hall of India
2. C.Gonzalez and R.E.Woods, “Digital Image Processing”, Addison Wesley.

PAPER IV (E2): NETWORK SECURITY AND CRYPTOGRAPHY

Unit 1: Network Security Overview: Benefits of Good Security Practices – Security Methodology. Risk Analysis and Defence Models: Threat Definition and Risk Analysis – Defence Models.

Unit 2: Security Policy Development: Developing a Security Policy – Sample Security Policy Topics – Implementing a Security Policy.

Unit 3: Security Organization: Roles and Responsibilities – Separation of Duties – Security Operations Management – Security Life Cycle Management – Security Awareness – Enforcement – Information Classification – Documentation – Security Audit – Managed Security Services.

Unit 4: Introduction - Classical Encryption Techniques: Symmetric Cipher Model: Substitution Techniques – Transportation Techniques – Rotor Machines – Steganography.

Unit 5: Block Ciphers and the Data Encryption Standard: Simplified DES – Block Cipher Principles – The Data Encryption Standard – The Strength of DES – Differential and Linear Cryptanalysis – Block Cipher Design Principles – Block Cipher Modes of Operation.

References:

1. Bragg Rhodes-Ousely Strassberg , et al., "Network Security – The Complete Reference", Tata McGraw-Hill Edition, 2007.
2. William Stallings, "Cryptography and Network Security", Third Edition.

PAPER- IV (E3) : NEURAL NETWORKS AND MINING TECHNOLOGIES

UNIT 1:

Introduction to Neural Network – Artificial Neural Network – Biological Neural Network – Neural Network Architecture .

UNIT 2: Perceptron Model – XOR Problem – ADA Line, M-ADA Line – Linear Separability – Learning Rules.

UNIT 3:

Feed Forward Network – Radial Basis function – Back Propagation – Adaptive Resonance Theory – Bidirectional Associative Memory – Counter Propogation Networks – Applications of Neural Network.

UNIT 4:

Definition of a Fuzzy Set – Fuzzy Sets Vs Crisp Sets – Operations on Fuzzy Sets - Fuzzy Relations: – Fuzzy Functions – Fuzzy Measures – Fuzzy Reasoning – Applications of Fuzzy relations.

UNIT 5:

Web Mining – Text Mining – Spatial Mining

REFERENCE BOOKS:

1. 'Introduction to Artificial Neural Systems', J.M.Zurada, Jaico Publishers.
2. 'Elements of Artificial Neural Networks', Kishan Mehrotra, Chelkuri K.Mohan, Sanjay Ranka, Penram International.
3. 'Fuzzy Sets and Fuzzy Logic – Theory and Applications' – George J.Klir /Bo Yuan.

PAPER IV (E4): ADVANCED DATABASES

Unit 1: Introduction: Distributed Data Processing, Distributed Database 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 2: **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 3: **Transaction Management**: Definition – Properties of Transaction – Types of Transactions – Distributed Concurrency Control – Serialization – Concurrency Control Mechanism and Algorithms – Time Stamped and Optimistic Concurrency Control Algorithms – Deadlock Management.

Unit 4: **Distributed Object Database Management Systems**: Fundamental Object Concepts and Models – Object Distributed Design – Architectural Issues – Object Management – Distributed Object Storage – Object Query Processing.

Unit 5: **Object Oriented Data Model**: Inheritance – Object Identity – Persistent Programming Languages – Persistence of objects – Comparing OODBMS and ORDBMS.

Text Books:

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