

MOTHER TERESA WOMEN'S UNIVERSITY

KODAIKANAL

DEPARTMENT OF COMPUTER SCIENCE



MPhil SYLLABUS

2018-2019 Onwards

CURRICULUM UNDER CHOICE BASED CREDIT SYSTEM

M.PHIL. COMPUTER SCIENCE

Semester	Course Code	Title of the Paper	Int. Marks	Ext. Marks	Total Marks	Credits
I	MCST1	Research Methodology	40	60	100	4
	MCST2	High Performance Computing	40	60	100	4
	MPST13	Professional Skills	40	60	100	4
II	MCST21	Area Paper	40	60	100	4
	MCSD22	Dissertation and Viva-voce			200	14
Total					600	30

For each course other than the Dissertation

Continuous Internal Assessment	:	40 Marks
End Semester Examination	:	40 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

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, 2nd 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.Pode, Wily Publications , 4th Edition 2008, NewDelhi.
5. T.S.Rajasekaran & G.A. Vijaylakshmi Pai, “Neural Networks, Fuzzy Logic & Genetic Algorithms– Synthesis & applications”, PHI, 2009

MCST12- HIGH PERFORMANCE COMPUTING

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 Madisetti, 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

I Semester - Core III - (Theory)
PROFESSIONAL SKILLS (Common Paper)

Objectives:

After completing the course, the scholars will be able to

- Develop skills to ICT and apply them in teaching, learning contexts and research.
- Acquire the knowledge of communication skills with special reference to its elements, types, development and styles.
- Understand the terms: Communication technology, Computer Mediated Teaching and develop Multimedia/E-contents in their respective subjects.
- Develop different teaching skills for putting the content across to targeted audience.

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 - ஆய்வுச்சுருக்கம் 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
DIGITAL IMAGE PROCESSING

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

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

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-T: 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

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

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.