ETHIRAJ COLLEGE FOR WOMEN (AUTONOMOUS)

Chennai-600 008

Syllabus

(Offered from the academic year 2018-2019)

Master of Philosophy

in

Computer Science

(under Autonomous Pattern – Self Supporting stream)

ETHIRAJ COLLEGE FOR WOMEN (AUTONOMOUS)
CHENNAI - 600 008
M. Phil - COMPUTER SCIENCE (Full -Time)
(under Autonomous Pattern – Self Supporting stream)

OBJECTIVES OF THE MASTER OF PHILOSOPHY PROGRAMME

1. ELIGIBILITY FOR ADMISSION

All candidates should have passed a two or three year PG degree course with Computer Science/Computer Applications or equivalent as major after three year Bachelor's degree course and Higher Secondary course of two year duration after 10 year SSLC (i.e., 10+2+3+2/3 years of study).

Candidates belonging to the following categories are eligible to register for Full-Time M. Phil programme.

A candidate having a minimum 55% (for SC/ST candidates the minimum eligibility is 50%) marks and above in the Master's degree in Computer Science / Applications / Information Technology and working as Full-time Research Fellows / Technical Assistants / Research Assistants in time-bound Research schemes.

2. DURATION

The duration of M. Phil (full time) programme shall extend over a period of one academic year (12 months) commencing from 1st August.

3. COURSE OF STUDY

   The course of study for M. Phil., degree programme shall consist of three written papers under Part-I and a Dissertation under Part-II.

PAPERS - PART I:

PAPER I	:	**Research Methodology**
		(Research Methods)
PAPER II	:	**Advanced Technologies in Computer Science**
PAPER III	:	**Research Specialization Paper**
		(Pertaining to the area of specialization chosen by the candidate and / or research Supervisor's specialization)

DISSERTATION - PART II:

   Candidate shall be required to choose a research problem in her chosen area of research and submit a dissertation incorporating the results of her investigation carried out under the supervision of the recognized supervisor.

4. REGISTRATION

   All candidates who are admitted into M. Phil programme (Full-time) will be registered under the supervision of recognized supervisors to do research in the chosen topics.

5. ATTENDANCE

   Candidates admitted to M. Phil. Programme (Full-time) shall secure 75% attendance during the entire course including short-term training programme, workshop, seminar, conference, etc., attended by them outside the college on the recommendation of the research supervisor and with prior permission of the Head of Department and Principal of the college.

6. EVALUATION

(i) PART – I: CORE and SPECIALIZATION

   There shall be **two** Continuous Internal Assessment (CIA) tests of two hours duration and **one** External examination of three hours duration for the core courses. Continuous Assessment will be evaluated by one or more participatory tools such as objective tests, assignments, paper presentation, laboratory activities etc., whichever would be suitable to the course.

For the specialization paper the question paper setting and the corresponding end semester evaluation will be carried out by the concern Research Supervisor.

Duration of examination: 3 hours;   Max. Marks: 100.

(ii) PART – II: DISSERTATION AND VIVA-VOCE:

CIA Marks	**:**	50 Marks
End Semester Marks	**:**	150 Marks
Total Marks	**:**	200 Marks

7. QUESTION PAPER PATTERN:

KNOWLEDGE LEVEL (as per the revised Bloom's Taxonomy levels)	MAXIMUM MARKS - 100
K3, K4 (Applying & Analyzing)	**PART –A (5 X 8 = 40 Marks)** Answer **ALL Questions** (Each question carries **8 Marks**) 1. a Question from Unit I (Or) b. Question from Unit I 2. a. Question from Unit II (Or) b. Question from Unit II 3. a. Question from Unit III (Or) b. Question from Unit III 4. a. Question from Unit IV (Or) b. Question from Unit IV 5. a. Question from Unit V (Or) b. Question from Unit V
K5, K6 (Evaluating & Creating)	**PART - B (3X20=60 marks)** Answer any **THREE** questions out of **FIVE** questions (Each question carries **20 Marks**) 11. Question from Unit I 12. Question from Unit II 13. Question from Unit III

	14. Question from Unit IV 15. Question from Unit V

COURSE PROFILE

(i)   PART – I: CORE and SPECIALIZATION

COURSE	PAPER CODE	PAPER TITLE	HRS /WK	CREDITS	CA MARKS	END - SEM MARKS	TOTAL
PART I	18M16/RMY	RESEARCH METHODOLOGY	6	5	40	60	100
	18M16/ATC	ADVANCED TECHNOLOGIES IN COMPUTER SCIENCE	6	5	40	60	100
	18M16/DWM	1. DATA WAREHOUSING AND MINING					
	18M16/DIP	2. DIGITAL IMAGE PROCESSING					
	18M16/NLP	3. NATURAL LANGUAGE PROCESSING					
	18M16/CCG	4. CLOUD COMPUTING	6	5	40	60	100
	18M16/CNS	5. CRYPTOGRAPHY AND NETWORK SECURITY					
	18M16/ANN	6. ARTIFICIAL NEURAL NETWORKS					
PART II	18M16/DIS	DISSERTATION		21	50	150	200
		TOTAL CREDITS:					**36**

CREDITS DISTRIBUTION

S.NO	TITLE OF THE PAPER	CORE/ SPECIALIZATION	CREDITS
1	**PAPER-I:** Research Methodology	**CORE**	**5**
2	**PAPER-II:** Advanced Technologies in Computer science	**CORE**	**5**
3	**PAPER-III:** 1. Data Warehousing and Mining 2. Digital Image Processing 3. Cloud Computing 4. Cryptography and Network Security 5. Artificial Neural Networks	**SPECIALIZATION**	**5**
4	**DISSERTATION**	**SPECIALIZATION**	**21**
		TOTAL CREDITS	**36**

M. Phil., Computer Science (2018-19 onwards)

S.NO	CORE/ SPECIALIZATION	TITLE OF THE PAPER	PAPER CODE
1	**CORE**	**PAPER-I:** Research Methodology	18M18/RMY
2	**CORE**	**PAPER-II:** Advanced Technologies in Computer science	18M18/ATC
3	**SPECIALIZATION**	**PAPER-III:** 1. Data Warehousing and Mining	18M18/DWM
		2. Digital Image Processing	18M18/DIP
		3. Cloud Computing	18M18/CCG

		4. Cryptography and Network Security	18M18/CNS
		5. Artificial Neural Networks	18M18/ANN
4	**SPECIALIZATION**	**DISSERTATION**	18M18/DIS

(i)   DISSERTATION AND VIVA-VOCE:

Continuous Assessment (Internal Guide)		**Marks**
Reviews & Dissertation work	**:**	40 marks
Oral Presentation	**:**	10 marks
TOTAL	**:**	50 marks

External Assessment		**Marks**
Choice of Subject & Review of Literature	**:**	10 marks
National , International Conference / Journal Communicated / Presented	**:**	20 marks
Organization & Interpretation	**:**	20 marks
Project Presentation	**:**	20 marks
Final Report	**:**	30 marks
Viva-Voce	**:**	50 marks
TOTAL	**:**	150 marks

SYLLABUS - PART I

PAPER I   : RESEARCH METHODOLOGY

PAPER II : ADVANCED TECHNOLOGIES IN COMPUTER SCIENCE

PAPER III : 1. DATA WAREHOUSING AND MINING

2. DIGITAL IMAGE PROCESSING

3. CLOUD COMPUTING

4. CRYPTOGRAPHY AND NETWORK SECURITY

5. ARTIFICIAL NEURAL NETWORKS

PAPER I
RESEARCH METHODOLOGY

COURSE CODE: 18M18/RMY   **CREDITS:5**

COURSE OBJECTIVES:

To enable the research scholars to,

1. Find the sources of research problem for further exploration.
2. Investigate the sampling design and Scaling techniques.
3. Check for the methods for data collection and analysis.
4. Know the importance of Experimenting and generating reports.
5. Present the conceptual view of the domain of their interest.

COURSE OUTLINE:

UNIT I: Research Problem: The research problem – Sources of research problem – Information, how to deal with it – Criteria / characteristics of a good research problem – Errors in selecting a good research problem – Types of research – Nature and use of arguments.

UNIT II: Sampling Design and Scaling Techniques: Census and Sample survey – Steps in Sampling Design – Different types of Sample Designs – Complex Random Sampling Designs – Measurement scales – Techniques of Developing Measurement Tools – Scaling – Important Scaling Techniques.

UNIT III: Methods of data collection and analysis of data: Collection of Primary Data – different types – Some other methods of Data Collection – Collection of Secondary Data – Processing Operations – Types of Analysis – Measures of Central tendency – Measures of Dispersion.

UNIT IV: Experiments and Reports: Design of Experiments – Tools of Research –**.** Research Report – Action Research – Organization of Statistical Data – Measures of Central Tendency – Measures of Variability.

UNIT V: CASE STUDY: Presentation by students on their area of research.

RECOMMENDED TEXTBOOKS:

1. Kothari, C.R., "Research Methodology: Methods and Techniques", 2nd Edition, New Age International, New Delhi, 2012.
2. Nicholas Walliman, "Your Research Project", 2nd Edition, Vistaar Publication, New Delhi, 2005.

REFERENCE BOOKS:

1. Richard A. Johnson, "Miller and Freund's Probability and Statistics for Engineers", 8th Edition, Pearson Education, Asia, 2011.

JOURNALS:

1. https://www.journals.elsevier.com/network-security
2. https://ieeexplore.ieee.org/document/4646371

E-LEARNING RESOURCES:

1 https://nptel.ac.in/courses/106105031/
2 https://wanguolin.github.io/assets/cryptography_and_network_security.pdf
3 https://www.academia.edu/38969883/Full_Book_Cryptography_And_Network_Security_Principles_And_Practice_7th_Edition_PDF_WP
4 https://www.pearson.com/us/higher-education/program/Stallings-Cryptography-and-Network-Security-Principles-and-Practice-7th-Edition/PGM334401.html

QUESTION PAPER PATTERN

End Semester Examination

Knowledge Level	Section	Word Limit	Marks	Total
K3, K4 (APPLYING & ANALYZING)	A – 5 x 8 Marks Q.No.1 to 5(Internal Choice)	300	40	100
K5, K6 (EVALUATING & CREATING)	B – 3 x 20 Marks 3 Question out of 5 (open choice) Q.No. 6 to 10	500	60	

PAPER II
ADVANCED TECHNOLOGIES IN COMPUTER SCIENCE

COURSE CODE: 18M18/RMY   **CREDITS: 5**

COURSE OBJECTIVES:

To enable the research scholars to

1. Practice various database domains suitable for research and explore various technically thrust areas of emerging database types.
2. Utilize knowledge and skills in Service Oriented Architecture and Web services
3. Understand various advanced data structures, design, implement, and evaluate a computing-based solutions for tree traversals, probing and hashing
4. Explore various types of attacks and the protocols for network security to protect against the threats in the networks.
5. To gain knowledge about the emerging trends s in Wireless Communication networks in the communication world and to know about various big data technologies.

COURSE OUTLINE:

UNIT I: Advanced databases :Spatial and multimedia Databases: Spatial data – spatial databases – spatial data model – spatial queries – multimedia data bases – multimedia sources – image data bases Mobile databases.

UNIT II: XML and SOA: XML: XML Basics-Components of XML- DTD-SOAP Message Structure-Web Services- Characteristics of SOA- Anatomy of SOA-SOA platform basics- SOA Support in J2EE.

UNIT III: Advanced Data Structures:AVL –Introduction to Red Black trees and Splay tree– B Trees Implementations –Tree Traversals- Spanning Trees –Graph Traversals: hash table Representation, hash functions - collision resolution - separate chaining open addressing - linear probing -quadratic probing -double hashing –rehashing.

UNIT IV: Security in Computing: Attacks – Meaning of computer security – methods of defense – Cryptography – Program Security – Security in networks.

UNIT V: Emerging Technologies: Wireless Communication – GSM – DECT – TETRA – IEEE standards – 802.11 – HiperLAN – WATM – WAP Architecture – Big Data Analytics – Big Data Technologies- Hadoop Architecture and streams.

RECOMMENDED TEXTBOOKS:

UNIT - I

1. Abraham Silberschatz , Henry F. Korth , S. Sudarshan " Database System concepts, 6th Edition, McGraw Hill Education, 2013.
2. C.J.Date, A.Kannan, S.Swamynathan, "An Introduction to Database Systems", Eighth Edition, Pearson Education
3. Alexis leon and Mathews Leon, Database Managements systems, Vikas Publishing House Ltd.,

UNIT - II
1. XML,Web services and the Data Revolution"- Frank. P.Coyle – Pearson Education, 2002
2. Service oriented Architecture: Concepts, Technology and Design- Thomas Erl- Pearson Education, 2005

UNIT - III

1. Mark Allen Weiss, ―Data Structures and Algorithm Analysis in C+, Pearson Education, 2002.
2. Aho Hopcroft Ullman, ―Data Structures and Algorithm, Pearson Education
3. Horowitz Sahni, Rajasekaran , ―Computer Algorithm, Galgotia, 2000.

UNIT - IV

1. Charles P. Pfleeger , Shari Lawrence Pfleeger , "Security in Computing", Pearson 4th edition – 2016. Chapters 1,2, 3, 7

UNIT – V

1. Jochen Schiller, "Mobile Communication", Pearson Education , 2014.
2. William Stallings,"Wireless Communications & Networks", Pearson Education, 2014.
3. Arvind Sath, "Big Data Analytics: Disruptive Technologies for Changing the Game", MC Press, LLC, 2012.
4. Garry Turkington, "Hadoop Beginner's Guide: Learn how to crunch big data to extract meaning from the data avalanche", Packt Publishing Limited, 2013
5. Uyless D.Black, "Data Communications & Distributed Networks", Prentice Hall, 1997.

JOURNALS:

1.https://link.springer.com/journal/11390
2.https://globaljournals.org/journals/computer-science-journal

E-LEARNING RESOURCES:

1   hhttps://www.researchgate.net/publication/242324742_New_Technologies_in_Computer_Science_Education

2   https://www.computerscienceonline.org/online-computer-science-courses/

3   https://www.computersciencezone.org/50-essential-online-tools-for-every-computer-science-student/

4   https://link.springer.com/book/10.1007/978-3-642-24267-0

End Semester Examination

Knowledge Level	Section	Word Limit	Marks	Total
K3, K4 (APPLYING & ANALYZING)	A – 5 x 8 Marks Q.No.1 to 5(Internal Choice)	300	40	100
K5, K6 (EVALUATING & CREATING)	B – 3 x 20 Marks 3 Question out of 5 (open choice) Q.No. 6 to 10	500	60	

PAPER-III
1. DATA WAREHOUSING AND MINING

ELECTIVE PAPER: I   **CREDITS: 5**

COURSE CODE: 18M18/DWM

COURSE OBJECTIVES:

   To enable the research scholars to

1   Understand the basics of data mining, the technologies used , various types of data and about data visualization tools related to research
2   Know about various preprocessing techniques about data cleaning, data transformation and data generalization. The students gain indepth knowledge into various analytical Processing tools , data warehouse architecture and multidimensional data models
3   Explore the fundamentals of data cube technology, multidimensional data models – snowflake schema, fact cancellation and frequent item set mining and various evaluation methods like association rule mining and apriori analysis
4   Analyze various classification methods like decision tree induction, bayes, rule based classification, support vector machines, bayes classification etc.,
5   Know about various cluster analysis methods, outlier detection and recent research trends in data mining

COURSE OUTLINE:

UNIT I: **Introduction –** Why Data Mining? What is Data Mining? What kinds of Data can be mined? What kinds of Patterns can be Mined? Technologies used- Kinds of applications targeted – major issues - Know your Data – Data Objects and Attribute Types - Basic Descriptions of Data – Data Visualization – Measuring Data Similarity and Dissimilarity

UNIT II: Data preprocessing – Overview- Data Cleaning – Data Integration – Data Reduction – Data Transformation and Data Discretization - Data Warehousing and Online Analytical Processing – Basic Concepts – Data Warehouse Modeling – Data Warehouse Design and Usage – Data Warehouse Implementation – Data Generalization

UNIT III: Data Cube Technology – Data Cube Computation and Methods – Exploring Cube Technology – Multidimensional Data Analysis   - Mining Frequent Patterns – Basic concepts – Frequent Item set Mining Methods – Pattern Evaluation Methods

UNIT IV   **Classification** - Basic concepts – Decision Tree Induction – Bayes Classification Methods – Rule Based Classification – Advanced Methods – Bayesian Belief Networks – Back Propagation – Support Vector Machines.

UNIT V Cluster Analysis - Partitioning methods –Advanced Cluster Analysis – Clustering High Dimensional Data – Network Data - Outlier Detection – Outlier DetectionMethods – Data Mining Trends and Research Frontiers.

RECOMMENDED TEXTBOOKS:

1   J. Han, M. Kamber, "Data Mining: Concepts and Techniques", Morgan Kauffman, 2011.
2   Margaret H.Dunham, "Data Mining: Introductory and Advanced Topics", PearsonEducation 2004
3   Sam Anahory, Dennis Murry, "Data Warehousing in the real world", Pearson Education 2003
4   David Hand, Heikki Manila, PadhraicSymth, "Principles of Data Mining", PHI 2004
5   Alex Bezon, Stephen J.Smith, "Data Warehousing, Data Mining & OLAP", McGraw-Hill Edition, 2001.

REFERENCE BOOKS:

1   Charu C. Aggarwal, "Data Mining: The Textbook" , Springer 2015 Edition
2   **Da Ruan**, "Intelligent Data Mining: Techniques and Applications " Springer 2007
3   Mohammed J. Zaki, Wagner Meira, Jr, Wagner Meira, "Data Mining and Analysis: Fundamental Concepts and Algorithms", Cambridge University Press
4   Ian H. Witten, Eibe Frank, Mark A. Hall, Christopher J. Pal ,"Data Mining: Practical Machine Learning Tools and Techniques", Morgan Kaufmann, Fourth Edition 2017
5   Arun K. Pujari, "Data Mining Techniques", Universities Press, 2005

JOURNALS:

1   https://link.springer.com/journal/10618
2   https://www.inderscience.com/jhome.php?jcode=ijdmmm
3   http://www.sciencepublishinggroup.com/journal/index?journalid=603
4   https://tist.acm.org/
5   https://www.scimagojr.com/journalsearch.php?q=19700190323&tip=sid

E-LEARNING RESOURCES:

1   https://www.classcentral.com/course/coursera-pattern-discovery-in-data-mining-2733
2   https://www.classcentral.com/subject/data-mining
3   https://web.ccsu.edu/datamining/resources.html?redirected
4   http://whitepapers.virtualprivatelibrary.net/Data%20Mining%20Resources.pdf
5   https://www.guru99.com/data-mining-tutorial.html

QUESTION PAPER PATTERN:

End Semester Examination

Knowledge Level	Section	Word Limit	Marks	Total
K3, K4 (APPLYING & ANALYZING)	A – 5 x 8 Marks Q.No.1 to 5(Internal Choice)	300	40	100
K5, K6 (EVALUATING & CREATING)	B – 3 x 20 Marks 3 Question out of 5 (open choice) Q.No. 6 to 10	500	60	

PAPER-III
2. DIGITAL IMAGE PROCESSING

ELECTIVE PAPER: II   **CREDITS: 5**

COURSE CODE: 18M18/DIP

COURSE OBJECTIVES:

To enable the research scholars to

1. Understand the need for image transforms different types of image transforms and their properties.
2. Learn different techniques employed for the enhancement of images.
3. Learn different causes for image degradation and overview of image restoration techniques.
4. Understand the need for image compression and to learn the spatial and frequency domain techniques of image compression.
5. Learn different feature extraction techniques for image analysis and recognition

COURSE OUTCOMES:

UNIT I INTRODUCTION TO IMAGE PROCESSING: Digital image processing – fundamental steps in digital image processing-components of an image processing system-elements of visual perception-light and the electromagnetic spectrum-image sensing and acquisition-image sampling and quantization-some basic relationships between pixels.

UNIT II   INTENSITY TRANSFORMATIONS AND IMAGE FILTERING: Intensity Transformation functions – Histogram processing – Fundamentals of Spatial filtering-smoothing spatial filters.

UNIT III   GEOMETRIC TRANSFORAMTIONS AND IMAGE REGISTRATION: Transforming points-Affine transformations-projective transformations-applying geometric transformations to images-image coordinate systems in MATLAB-image interpolation-image registration.

UNIT IV   WAVELETS AND MULTI RESOLUTION PROCESSING: Background-multi resolution expansions-wavelet transforms in one dimension-The fast wavelet transform-wavelet transforms in two dimensions-image compression-fundamentals- some basic compression methods.

UNIT V   IMAGE SEGMENTATION: Fundamentals-Point, Line and Edge Detection-Thres holding –Region-Based segmentation-segmentation using morphological watersheds.

RECOMMENDED TEXTBOOKS:

1. Rafael C. Gonzalez, Richard E. Woods, Digital Image Processing , Pearson Prentice Hall, Third Edition,2013.
2. Rafael C.Gonzalez, Richard E.Woods, Steven L.Eddins, Digital Image Processing Using MATLAB, McGraw Hill Education (India) Private Limited., 2014.
3. Chanda.B., Dutta Majumder .D., Digital Image Processing and Analysis, Prentice Hall of India, New Delhi, 2007.
4. Scott E.Umbaug, Computer Vision and Image Processing, Prentice Hall International, New Delhi, 1998.

REFERENCE BOOKS:

1. A. K. Jain, "Fundamentals of Digital Image processing", Prentice Hall of India, New Delhi, 2nd Edition, 1997.
2. Rafael C. Gonzalez, "Digital Image processing using MATLAB", Richard E. Woods and Steven Low price Edition, Pearson Education Asia, India, 2nd Edition, 2004.
3. William K. Pratt, "Digital Image Processing", John Wiley & Sons, New Delhi, India, 3rd edition, 2004.
3. Arthur R. Weeks, Jr, "Fundamentals of Electronic Image Processing", SPIE Optical Engineering Press, New Delhi, India, 2nd Edition, 1996.

JOURNALS:

1. https://link.springer.com/journal/10278
2. www.ciitresearch.org/dip.html
3. https://sites.google.com/site/ijcsis/digital-image-processing

E-LEARNING RESOURCES:
1. https://www.coursera.org/learn/digital
2. https://ufonline.ufl.edu/courses/gis4037-digital-image-processing/
3. http://www.eucourses.eu/en/courses-available/digital-extra
4. https://www.online.colostate.edu/courses/ECE/ECE513.dot
5. https://alison.com/tag/digital-image-editing

QUESTION PAPER PATTERN:

Knowledge Level	Section	Word Limit	Marks	Total
K3, K4 (APPLYING & ANALYZING)	A – 5 x 8 Marks Q.No.1 to 5(Internal Choice)	300	40	100
K5, K6 (EVALUATING & CREATING)	B – 3 x 20 Marks 3 Question out of 5 (open choice) Q.No. 6 to 10	500	60	

PAPER III
CLOUD COMPUTING

COURSE CODE: 18M18/CCG   **CREDITS:5**

COURSE OBJECTIVES:

To enable the research scholars to,

1. Provides a comprehensive and in-depth knowledge of Cloud Computing concepts, technologies, architecture and applications.
2. Affords introduction and research to the state-of-the-art in Cloud Computing fundamental issues, Research technologies, applications and implementations

COURSE OUTLINE:

UNIT I: Introduction: Cloud Computing – Overview – Applications-Intranets and the Cloud – Companies in the Cloud Today- Cloud Computing Services- On Demand Computing – Discovering Cloud Services-Development Services and Tools.

UNIT II: Hardware And Infrastructure: Cloud hardware and infrastructure-clients-security-network-services-Accessing cloud -cloud storage-Cloud standards.

UNIT III: Cloud Services: Types of Cloud Services: Software as a Service - Platform as a Service - Infrastructure as a Service - Monitoring as a Service - Communication as a Services – Building Cloud Network – Virtualization.

UNIT IV: Cloud Types: Public cloud – Private Cloud – Hybrid cloud – Enterprise Cloud – Comparisons.

UNIT V: Governance And Case Studies: Organizational Readiness and Change Management in Cloud – Data Security in Cloud – Legal issues in Cloud Computing – Production Readiness for cloud services.

RECOMMENDED TEXTBOOKS:

1. Anthony T.Velte, Toby J.Velte, Robert Elsenpeter, "Cloud Computing –A Practical Approach", Tata McGraw Hill Education Pvt. Ltd, 2018.
2. Rajkumar Buyya, James Broberg, Andrzej Goscinski, " Cloud Computing – Principles and Paradigms" , Wiley Publications, 2017.

REFERENCE BOOKS:

2. Michael Miller, " Cloud Computing – Web-Based Appplications that change the way you work and Collaborate Online" , Pearson Education, 2016.

3. John W. Rittinghouse, James F. Ransome , "Cloud Computing – Implementation , Management and Security", CRC Press, 2016.

JOURNALS:

1. https://journalofcloudcomputing.springeropen.com/
2. https://www.inderscience.com/jhome.php?jcode=ijcc
3. https://link.springer.com/journal/13677
4. http://www.imanagerpublications.com/journalsfulldetails/23/JournalonCloudComputing
5.

E-LEARNING RESOURCES:

1.https://nptel.ac.in/courses/106105167/
2.https://www.udemy.com/topic/virtualization/
3.https://www.edx.org/school/aws
4.https://aws.amazon.com/types-of-cloud-computing/
5.https://www.esds.co.in/blog/cloud-computing-types-cloud/#sthash.NdcMd32C.dpbs

QUESTION PAPER PATTERN:

Knowledge Level	Section	Word Limit	Marks	Total
K3, K4 (APPLYING & ANALYZING)	A – 5 x 8 Marks Q.No.1 to 5(Internal Choice)	300	40	100
K5, K6 (EVALUATING & CREATING)	B – 3 x 20 Marks 3 Question out of 5 (open choice) Q.No. 6 to 10	500	60	

PAPER III
CRYPTOGRAPHY AND NETWORK SECURITY

COURSE CODE: 18M18/CNS   **CREDITS: 5**

COURSE OBJECTIVES:

To enable the research scholars to,

1. Analyze the underlying logic behind symmetric ciphers.
2. Incorporate the transformation functions.
3. Depict the functionality of public key encryption.
4. Investigate the functions associated with MAC.
5. Understand the security features wrapped with electronic mail.

COURSE OUTLINE:

UNIT I: Introduction: Symmetric Ciphers: Classical Encryption Techniques, Block Ciphers and the Data Encryption Standard.

UNIT II: AES: Transformation Functions – Key Expansions - Block Cipher Operation – Multiple Encryption and Triple DES – ECB – CBC – CFM – OFM – Counter Mode.

UNIT III: Public Key Encryption: Principles of Public Key Cryptosystems - RSA Algorithm - Diffie-Hellman Key Exchange.

UNIT IV: MAC: Functions – Authentication codes – HMAC – Key Management and Distribution – Distribution of Public keys – X.509 Authentication Service – User Authentication – Kerberos – Federated Identity Management – Personal Identity Verification.

UNIT V: Electronic Mail Security: PGP – S/MIME - IP Security – Overview – IP Security Policy – Encapsulating Security Payload.

RECOMMENDED TEXTBOOKS:

1. William Stallings, "Cryptography And Network Security – Principles and Practices", Pearson, Sixth Edition, 2016.
2. AtulKahate, "Cryptography and Network Security", Tata McGraw-Hill, 2015.

REFERENCE BOOKS:

1. Bruce Schneier, "Applied Cryptography", John Wiley & Sons Inc, 2016.
2. Charles B. Pfleeger, Shari Lawrence Pfleeger, "Security in Computing", Third Edition, Pearson Education, 2016.

JOURNALS:

1. https://www.journals.elsevier.com/network-security
2. https://ieeexplore.ieee.org/document/4646371

E-LEARNING RESOURCES:

1. https://nptel.ac.in/courses/106105031/
2. https://wanguolin.github.io/assets/cryptography_and_network_security.pdf
3. https://www.academia.edu/38969883/Full_Book_Cryptography_And_Network_Security_Principles_And_Practice_7th_Edition_PDF_WP
4. https://www.pearson.com/us/higher-education/program/Stallings-Cryptography-and-Network-Security-Principles-and-Practice-7th-Edition/PGM334401.html

QUESTION PAPER PATTERN:

Knowledge Level	Section	Word Limit	Marks	Total
K3, K4 (APPLYING & ANALYZING)	A – 5 x 8 Marks Q.No.1 to 5(Internal Choice)	300	40	100
K5, K6 (EVALUATING & CREATING)	B – 3 x 20 Marks 3 Question out of 5 (open choice) Q.No. 6 to 10	500	60	

ARTIFICIAL NEURAL NETWORKS

COURSE CODE: 18M18/ANN   **CREDITS: 5**

COURSE OBJECTIVES:

To enable the research scholars to,

1. To Provide knowledge on fuzzy logic neural network to principles
2. To understand models of ANN
3. To use the fuzzy logic and neural network for application for pattern classification
4. To Apply genetic algorithm to various layers of the network
5. To familiar with various unsupervised algorithms

COURSE OUTLINE:

UNIT I: Introduction to Pattern Recognition, Bayesian decision theory

Classifiers, Discriminant functions, Decision surfaces, Normal density and Discriminant functions, discrete features.

UNIT II: Maximum Likelihood and Bayesian Estimation

Parameter estimation methods, Maximum- Likelihood estimation, Bayesian estimation, Bayesian Parameter Estimation, Gaussian Case, General Theory, Problem of Dimensionality, Accuracy, Dimension, and Training Sample Size, Computational Complexity and Overfitting, Component Analysis and Discriminants, Principal Component Analysis (PCA), Expectation Maximization (EM), Hidden Markov models for sequential pattern classification, First-Order Markov Models, First-Order Hidden Markov Models, Hidden Markov Model Computation, Evaluation, Decoding and Learning.

UNIT III: Nonparametric

Density estimation, Parzen-window method, Probabilistic Neural Networks (PNNs), K-Nearest Neighbor , Estimation and rules, Nearest Neighbour and Fuzzy Classification. Linear Discriminant

function based classifiers**:** Perceptron, Linear Programming Algorithm, Support Vector Machines (SVM).

UNIT IV: Multilayer Neural Network:

Feed Forward Classification, Back Propagation Algorithm, Error Surface Stochastic Data: Stochastic search, Boltzmann Learning, Evolutionary method and Genetic Programming.

UNIT V:Nonmetric methods for pattern classification:

Decision trees, Classification and Regression Trees (CART) and other tree methods, String recognition and Rule Based method. Unsupervised learning and clustering : Mixture Densities and Identifiability, Maximum Likelihood estimation, Application Normal Mixture, Unsupervised Bayesian Learning, Data Description and Clustering, Hierarchical Clustering, Graph theory method, Problem of validity, Component analysis.

RECOMMENDED TEXTBOOKS:

1. R.O.Duda, P.E.Hart and D.G.Stork, "Pattern Classification 2nd Edition", John Wiley, 2007

2. Christopher M. Bishop, "Neural Network for Pattern Recognition", Oxford Ohio Press.

REFERENCE BOOKS:

1. E. Gose, R. Johansonbargh, "Pattern Recognition and Image Analysis", PHI
2. Ethen Alpaydin, "Introduction to Machine Learning", PHI
3. Satish Kumar,"Neural Network- A Classroom Approach", McGraw Hill.
4. S.Theodoridis and K.Koutroumbas, "Pattern Recognition", 4th Ed., Academic Press
5. C.M.Bishop, "Pattern Recognition and Machine Learning", Springer, 2006.

JOURNALS:

1.https://www.inderscience.com/jhome.php?jcode=ijaisc
2.http://jaiscr.eu/

E-LEARNING RESOURCES:

1   http://www-scf.usc.edu/~csci567/
2   https://www.comp.nus.edu.sg/~cs4243/lecture/tsim-prec.pdf
3   http://www.public.asu.edu/~bli24/CSE591.html
4   http://people.idsia.ch/~foerster/patternclassification.html
5   https://cse.buffalo.edu/~jcorso/t/2010S_555/

QUESTION PAPER PATTERN:

End Semester Examination

Knowledge Level	Section	Word Limit	Marks	Total
K3, K4 (APPLYING & ANALYZING)	A – 5 x 8 Marks Q.No.1 to 5(Internal Choice)	300	40	100
K5, K6 (EVALUATING & CREATING)	B – 3 x 20 Marks 3 Question out of 5 (open choice) Q.No. 6 to 10	500	60	