MASTER OF PHILOSOPHY

SYLLABUS – 2018

Under
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PG & RESEARCH DEPARTMENT OF COMPUTER SCIENCE

JAMAL MOHAMED COLLEGE (AUTONOMOUS)

College with Potential for Excellence

Re-accredited (3rd Cycle) with 'A' Grade by NAAC

TIRUCHIRAPPALLI – 620 020

SEM.	SUBJECT CODE	COURSE	SUBJECT TITLE	HRS/ WEEK	CREDIT	CIA MARK	SE MARK	TOTAL MARK
I	18MPCS1C1	CORE I	Research Methodology	4*	4	25	75	100
	18MPCS1C2	CORE II	Advanced Concepts in Computer Science	4*	4	25	75	100
	18MPCS1C3	CORE III	Research Topics in Computer Science	4*	4	25	75	100
	18MPCS1C4	CORE IV	Teaching and Learning Methodologies	4*	4	25	75	100
*** One Hour Library hour for each course**								
TOTAL				**16**	**16**	**100**	**300**	**400**
II	18MPCS2PW	Project Work	Dissertation**	-	8	-	-	200
GRAND TOTAL				**-**	**24**	**-**	**-**	**600**

** (Evaluation of the Dissertation shall be made jointly by the Research Supervisor and the External Examiner)

SEMESTER : I CORE - I
RESEARCH METHODOLOGY

Course Code : 18MPCS1C1 | **Max. Marks : 100**
Hours/Week : 4 | **Internal Marks : 25**
Credit : 4 | **External Marks : 75**

Objective:

To impart the basic concepts on sampling theory and reliability which are required for research and to give knowledge on research, thesis writing and research tools.

UNIT I **12 hours**

Introduction to Research: Meaning of Research – Objectives of Research – Motivation in Research – Types of Research – Research Approaches – Significance of Research – Research Methods versus Methodology – Research and Scientific Method – Importance of knowing how research is done – Research Process – Criteria of Good Research – Defining the Research Problem – Selecting the Problem – Necessity – Techniques involved in defining a problem – Research Design – Meaning – #Need# – Features of Good Design.

UNIT II **12 hours**

Thesis Writing: Literature Survey – Writing Reviews and Journal Articles – Publication of Papers – Planning a Thesis – General Format – Page and Chapter Format – #Footnotes# – Tables and Figures – References and Appendices.

UNIT III **12 hours**

Reliability: Definition of Reliability – Failure-Data Analysis - Hazard Models – Constant Hazard – Linearly-Increasing Hazard – The Weibull Model – #System Reliability# – Series Configuration – Parallel Configuration – Mixed Configuration – Applications to Specific Hazard Models – Related Problems.

UNIT IV **12 hours**

Sampling Theory and Testing of Hypotheses: Types of Samples – Parameter and Statistic – Tests of Significance – Procedure for Testing Hypothesis – Applications of t-test – t-test for Single Mean – Paired t-test for difference of means – F-test for equality of two Population variances – Analysis of Variance – Assumptions – Technique of Analysis of Variance – One Way Classification Model – Two Way Classification Model.

UNIT V **12 hours**

Research Tools: Introduction – SPSS – MATLAB – LaTeX – NS/2 – #Weka#

 # ..... # self-study portion

Text Books:

1. C.R. Kothari, *Research Methodology Methods and Techniques*, Wiley Eastern limited, 2nd Edition, 2004.
   UNIT I Chapters: 1, 2, 3
2. Janathan Anderson, Berry H. Durston, Millicent Poole, *Thesis and Assignment Writing*, Wiley Eastern Limited, 1992.
   UNIT II
3. L.S. Srinath, *Reliability Engineering*, Affiliated East-West Press Pvt. Ltd., New Delhi, Fourth Edition, Reprint 2009. Chapters: 2, 3, 4.1 to 4.4, 6.1 to 6.5
   UNIT III
4. S.C. Gupta, V.K. Kapoor, *Fundamentals of Mathematical Statistics*, Sultan Chand & Sons, New Delhi, 11th Edition, 2002. Chapters: 14.1 to 14.6, 16.3.1, 16.3.3
   UNIT IV
5. S.P. Gupta, *Statistical Methods*, Sultan Chand & Sons Publishers, New Delhi, Fortieth Revised Edition, 2011. Volume II, Chapter 5
   UNIT IV
6. Web site References
   UNIT V

Books for Reference:

1. Hunt / Lipsman / Rosenberg, A Guide to MATLAB: For beginners and experienced users, 3rd edition, Cambridge University Press, 2014.

SEMESTER : I : CORE – II

ADVANCED CONCEPTS IN COMPUTER SCIENCE

Course Code : 18MPCS1C2	**Max. Marks : 100**
Hours/Week : 4	**Internal Marks : 25**
Credit : 4	**External Marks : 75**

Objective:

To impart the knowledge in the advanced concepts of Computer Science.

UNIT I **12 hours**

Design and Analysis of Algorithm: Analyzing and Designing Algorithms – Heap Sort – Quick Sort – Hash Tables – Binary Search Trees – Red-Black Trees – Dynamic Programming – Greedy Algorithms – B-Trees – Graph Algorithms – Minimum Spanning Trees – #Single-Source Shortest Paths# – All-Pairs Shortest Paths.

UNIT II **12 hours**

Digital Logic Circuit Design: Design of Combinational Circuits: Analysis Procedure – Design Procedure – Design of Course Code Converters – Implementation of Boolean Functions using Multiplexers – Design of Sequential Circuits: Analysis Procedure – Design Procedure – Design of Counters – Design with State Equations – Sequential Logic Implementation – #Design of Serial Adder using Sequential Logic Procedure# – Design of Accumulator.

UNIT III **12 hours**

Parallel Processing: Parallel Computer Structures – Architectural Classification Schemes – Parallel Processing Applications – Pipelining : An Overlapped Parallelism – Instruction and Arithmetic Pipelines – Principles of Designing Pipelined Processors – SIMD Array Processors – SIMD Interconnection Networks – Associative Array Processing – Multiprocessors Architecture and Programming – Functional Structures – Interconnection Networks – #Multiprocessor Scheduling Strategies#.

UNIT IV **12 hours**

Genetic Algorithm: Introduction to Genetic Algorithm – Working principle of GA – Differences between Genetic Algorithm and Traditional Methods – Terminology used in Genetic Algorithm – Genetic Operators – Selection – Crossover – Mutation – Parameters of GA – Designing the Genetic Structures – Applications of Genetic Algorithm for Simple Optimization Problem – Traveling Sales Man Problem – Other Applications.

UNIT V **12 hours**

Human Computer Interaction: The Human: Introduction – Human Memory – Thinking – Emotion – The Computer: Positioning, Pointing, and drawing – The Interaction: Models of interaction – Frameworks and HCI – Ergonomics – Paradigms: Paradigms for interaction – HCI in the software process: Usability Engineering – Design rationale – #Design Rules: Standards# – Guidelines – Golden rules and heuristics – HCI Patterns – Implementation Support**:** Programming the application – Evaluation Techniques: Goals of evaluation – Evaluation through expert analysis – Universal Design: Universal design principles – Multi-modal interaction – User Support: Requirements of user support – Approaches to user support.

 # ..... # self-study portion

Text Books:

1. Thomas H. Cormen, Charles E. Leiserson, Ronald L. Rivest, Clifford Stein*, Introduction to Algorithms,* PHI, Third Edition, 2010.
2. M. Morris Mano, *Digital Logic and Computer Design*, Pearson Education, 2008.
3. M. Morris Mano, *Digital Design,* Prentice Hall of India, 3rd Edition, 2002.
4. Stephen Brown, Zvonko Vranesic, *Fundamentals of Digital Logic with Verilog Design*, Tata McGraw Hill, 2004.
5. Kai Hwang and Faye A. Briggs, *Computer Architecture and Parallel Processing,* McGraw Hill International Edition in Computer Science Series, 1985.
6. David E. Goldberg, *Genetic Algorithms in Search, Optimization and Machine Learning*, Addison Wesley.
7. M. Mitchell, *An Introduction to Genetic Algorithms*, Prentice-Hall.
8. Z. Michalewicz, *Genetic Algorithms + Data Structures = Evolution Programs*, Springer-Verlag.
9. Alan Dix, Janet Finlay, Gregory D. Abowd, Russell Beale, *Human–Computer Interaction*, Pearson Education, Third Edition, 2008.

UNIT-V Chapter-1 Section (1.1, 1.3-1.5), Chapter-2 (2.3), Chapter-3 Section (3.2-3.4), Chapter-4 (4.2) Chapter-6 Section (6.3, 6.5), Chapter-7 Section (7.3-7.7), Chapter-8 Section (8.3), Chapter-9 Section (9.2, 9.3), Chapter-10 Section (10.2, 10.3), Chapter-11 Section (11.2, 11.3)

Books for Reference:

1. John M. Carroll, Human Computer Interaction in the new millennium, Pearson Education, 2007.

SEMESTER : I : CORE – III
WIRELESS SENSOR NETWORKS

Course Code : 18MPCS1C3 **Max. Marks : 100**
Hours/Week : 4 **Internal Marks : 25**
Credit : 4 **External Marks : 75**

Objective:

To impart the knowledge in WSN Routing protocols, TCP procols, and WSN operating sytemes.

UNIT I **12 hours**

Introduction and Overview of Wireless Sensor Networks – Applications of Wireless Sensor Networks – Basic Wireless Sensor Technology, Sensor Taxonomy, Wireless Network Environment, Wireless Network Trends.

UNIT II **12 hours**

Wireless Transmission Technology – Radio Technology primer, Available Wireless Technologies – Fundamentals of Medium Access Control (MAC) Protocols – MAC Protocols for WSNs: Schedule-Based Protocols and Random-#Access Based Protocols# – Case Study, IEEE 802.15 4LR WPAN, Standard Case Study.

UNIT III **12 hours**

Routing protocols for WSNs: Data Dissemination and Gathering – Routing Challenges and Design Issues: Network Scale and Time-Varying Characteristics – Resource Constraints – Routing Strategies in WSN – Energy Aware Routing, WSN Routing Techniques, Flooding and its Variants – Low-Energy Adaptive Clustering Hierarchy – Power-Efficient Gathering in Sensor Information Systems – #Directed Diffusion# – Geographical Routing.

UNIT IV **12 hours**

Transport Control Protocols for Wireless Sensors Network – #Traditional Transport Control Protoco#l, Transport Protocol Design Issues, Examples of Existing Transport Control Protocol, Performance of TCP – Network Management for WSNs: Network Management Requirements – Network Management Design Issues – Issues Related to Network Management: Naming and Localization.

UNIT V **12 hours**

Operating Systems for WSNs: Operating System Design – Examples of Operating Systems – Tiny OS, Mate and MANTIS – Performance and Traffic Management : Performance Modeling – Performance Metrics – Basic Network Models – Simple Computation of System Life Span – #WSN Applications#.

 # ..... # self-study portion

Text Book:

1. Kazem Sohraby, Daniel Minoli and Taieb Znati, *Wireless Sensor Networks – Technology, Protocols and Applications,* Wiley, 2007.

Books for Reference:

1. Dr Ian F. Akyildiz, Mehmet Can Vuran, Wireless Sensor Networks, Wiley Online Library, 2010.

SEMESTER : I : CORE – III
GRID COMPUTING

Course Code : 18MPCS1C3	**Max. Marks : 100**
Hours/Week : 4	**Internal Marks : 25**
Credit : 4	**External Marks : 75**

Objective:

To impart the knowledge in Grid computing organization, Anatomy, Road Map, and Grid Services architecture.

UNIT I **12 hours**

Introduction: Early Grid Activity, Current Grid Activity, Overview of Grid Business areas, Grid Applications, Grid Infrastructures.

UNIT II **12 hours**

Grid Computing organization and their Roles: Organizations Developing Grid Standards, and Best practice Guidelines, Global Grid Forum (GCF), #Organization Developing Grid Computing Toolkits and Framework#, Organization and building and using grid based solutions to solve computing, commercial organization building and Grid Based solutions.

UNIT III **12 hours**

Grid Computing Anatomy: The Grid Problem, The conceptual of virtual organizations, Grid Architecture and relationship to other distributed technology.

UNIT IV **12 hours**

The Grid Computing Road Map: Autonomic computing, Business on demand and infrastructure virtualization, Service-Oriented Architecture and Grid, #Semantic Grids#.

UNIT V **12 hours**

Merging the Grid services Architecture with the Web Services Architecture: Service-Oriented Architecture, Web Service Architecture, #XML messages and Enveloping#, Service message description Mechanisms, Relationship between Web Services and Grid Services, Web services Interoperability and the role of the WS-I Organization.

 # ..... # self-study portion

Text Book:

1. Joshy Joseph and Craig Fellenstein, *Grid computing*, Pearson / IBM Press, PTR, 2004.

Books for Reference:

1. Ahmer Abbas and Graig computing, *A Practical Guide to technology and applications*, Charles River Media, 2003.

SEMESTER : I : CORE – III
DATA MINING

Course Code : 18MPCS1C3 | **Max. Marks : 100**
Hours/Week : 4 | **Internal Marks : 25**
Credit : 4 | **External Marks : 75**

Objective:

To impart the knowledge in data mining functionalities, Frequency pattern, Cluster analysis, and Mining streams.

UNIT I **12 hours**

Data Mining Functionalities – Classification of Data Mining Systems – Data Mining Task Primitives – Integration of a Data Mining System with a Database or Data Warehouse System – Major Issues in Data Mining – Data Preprocessing – Descriptive Data Summarization – #Data Cleaning# – Data Integration and Transformation – Data Reduction – Data Discretization and Concept Hierarchy Generation.

UNIT II **12 hours**

Mining Frequent Patterns, Associations, and Correlations – Efficient and Scalable Frequent Itemset Mining Methods – Mining Various Kinds of Association Rules – From Association Mining to Correlation Analysis – Constraint–#Based Association Mining#.

UNIT III **12 hours**

Classification and Prediction – Issues Regarding Classification and Prediction – Classification by Decision Tree Induction – Bayesian Classification – Rule-Based Classification – Classification by Back propagation – Associative Classification – Lazy Learners – Prediction – #Accuracy and Error Measures# – Evaluating the Accuracy of a Classifier or Predictor – Model Selection.

UNIT IV **12 hours**

Cluster Analysis – Types of Data in Cluster Analysis – A Categorization of Major Clustering Methods – Partitioning Methods – Hierarchical Methods – Density-Based Methods – Grid – Based Methods – Model-Based Clustering – Clustering High-Dimensional Data – Constraint – Based Cluster – Outlier Analysis.

UNIT V **12 hours**

Mining Data Streams – Social Network Analysis – Spatial Data Mining – Multimedia Data Mining – Text Mining – Mining the World Wide Web – #Applications and Trends in Data Mining#.

 # ..... # self-study portion

Text Book:

1. Jiawei Han, Micheline Kamber, *Data Mining: Concepts and Techniques*, Morgan Kaufmann Publishers, Second Edition, 2006.

Books for Reference:

1. Margaret H. Dunham, *Data Mining, Introductory and Advanced Topics*, Prentice Hall, 2002.
2. Ian H. Witten, Eibe Frank, Mark A. Hall, *Data Mining Practical Machine Learning Tools and Techniques*, Morgan Kaufmann Publishers, Third Edition, 2011.
3. G.K. Gupta, *Introduction to Data Mining with Case Studies*, Prentice Hall of India, 2008.

SEMESTER : I : CORE – III
SOFTWARE METRICS

Course Code : 18MPCS1C3	**Max. Marks : 100**
Hours/Week : 4	**Internal Marks : 25**
Credit : 4	**External Marks : 75**

Objective:

To impart the knowledge in Software Engineering, Internal & External product attributes, and Resource measurement.

UNIT I **12 hours**

Measurement in every day life – Measurement in software engineering – The Scope Software Metrics – The representational theory of Measurements – Measurements and Models – Measurement Scales – #Scale types#.

UNIT II **12 hours**

Classifying Software Measures – Empirical Investigation – Four Principles of Investigation – Analyzing the Results of Experiments.

UNIT III **12 hours**

Measuring Internal Product Attributes: Size – #Aspects of Software size# – Length – Reuse – functionality – Complexity.

Measuring internal product attributes: Structure – Types of Structures Measures – #Control flow Structure# – Modularity and Information flow Attributes.

UNIT IV **12 hours**

Measuring External Product Attributes – Modeling Software quality – measuring aspects of Quality – Software reliability – Measurement and Prediction.

UNIT V **12 hours**

Resource Measurement – Productivity, Team and Tools – Good Estimates – #Cost Estimation# – Models Effort and Cost – Planning a Measurement program – measurement in Practice– Empirical Research Software Engineering.

 # ..... # self-study portion

Text Book:

1. Shari Lawrence Pfleefar and E. Fenton, *Software Metrics,* International Thomson Publication Inc., UK, 1996.

Books for Reference:

1. Stephen H. Kan, *Metrics and Models in Software Quality Engineering,* Pearson Education, 2nd Edition, 2007.

SEMESTER : I : CORE – III
DIGITAL IMAGE PROCESSING

Course Code : 18MPCS1C3	**Max. Marks : 100**
Hours/Week : 4	**Internal Marks : 25**
Credit : 4	**External Marks : 75**

Objective:

To impart the knowledge in image processing systems, techniques, restoration, detection, and standards.

UNIT I **12 hours**

Elements of digital image processing systems, Vidicon and Digital Camera working principles, Elements of visual perception, brightness, contrast, hue, saturation, mach band effect, Color image fundamentals – RGB, HSI models, Image sampling, Quantization, dither, Two- dimensional mathematical preliminaries, 2D transforms – #DFT, DCT, KLT, SVD#.

UNIT II **12 hours**

Histogram equalization and specification techniques, #Noise distributions#, Spatial averaging, Directional Smoothing, Median, Geometric mean, Harmonic mean, Contra harmonic mean filters, Homomorphic filtering, Color image enhancement.

UNIT III **12 hours**

Image Restoration – degradation model, unconstrained restoration – Lagrange multiplier and Constrained restoration, Inverse filtering-removal of blur caused by uniform linear motion, Wiener filtering, Geometric transformations-spatial transformations.

UNIT IV **12 hours**

Edge detection, Edge linking via Hough transform – #Thresholding# – Region based segmentation – Region growing – Region splitting and Merging – Segmentation by morphological watersheds – basic concepts – Dam construction – Watershed segmentation algorithm.

UNIT V **12 hours**

Need for data compression, Huffman, Run Length Encoding, Shift Course Codes, Arithmetic coding, Vector Quantization, Transform coding, JPEG standard, #MPEG#.

 # ..... # self-study portion

Text Books:

1. Rafael C. Gonzalez, Richard E. Woods, *Digital Image Processing*, Pearson, Second Edition, 2004.
2. Anil K. Jain, *Fundamentals of Digital Image Processing*, Pearson, 2002.

Books for Reference:

1. Kenneth R. Castleman, *Digital Image Processing*, Pearson, 2006.
2. Rafael C. Gonzalez, Richard E. Woods and Steven Eddins, *Digital Image Processing Using MATLAB*, Pearson Education Inc., 2004.
3. D.E. Dudgeon and RM. Mersereau, *Multidimensional Digital Signal Processing*, Prentice Hall Professional Technical Reference, 1990.
4. William K. Pratt, *Digital Image Processing*, John Wiley, New York, 2002.
5. Milan Sonka et al., *Image Processing, Analysis and Machine Vision*, Brookes / Cole, Vikas Publishing House, 2nd Edition, 1999.
6. Jeyaraman and Esakki Raja, *Digital Image Processing*, Tata McGraw Hill, 2009.

SEMESTER : I : CORE – III
NETWORK SECURITY

Course Code : 18MPCS1C3 | **Max. Marks : 100**
Hours/Week : 4 | **Internal Marks : 25**
Credit : 4 | **External Marks : 75**

Objective:

To impart the knowledge in security trends, encryption standards, key management, and e-mail security.

UNIT I **12 hours**

Introduction: Security Trends – The OSI Security Architecture – Security Attacks – Security Services – Security Mechanisms – A Model for Network Security – Classification Encryption Techniques: Symmetric Cipher Model – Substitution Techniques – Transposition Techniques – #Steganography#.

UNIT II **12 hours**

Block Ciphers and the Data Encryption Standard: Block Cipher Principles – The Data Encryption Standard – Advanced Encryption Standard: Evaluation Criteria for AES – The AES Cipher – More on Symmetric Ciphers: Multiple Encryption and Triple DES – #Stream Ciphers and RC4# – Public-Key Cryptography and RSA: Principles of Public-Key Cryptosystems – The RSA Algorithm.

UNIT III **12 hours**

Key Management: Key Management – Diffie-Hellman Key Exchange – Elliptic Curve Arithmetic – Elliptic Curve Cryptography – Message Authentication and Hash Functions: Authentication Requirements – Authentication Functions – Message Authentication Course Codes – Hash Functions – Security of Hash Functions and MACs – Hash and MAC Algorithms: Secure Hash Algorithm – HMAC – #CMAC#.

UNIT IV **12 hours**

Digital Signatures and Authentication Protocols: Digital Signatures – Authentication Protocols – Digital signature Standard – Authentication Applications: Kerberos – X.509 Authentication Service – Public-Key Infrastructure – #Firewalls: Firewall Design Principles# – Trusted Systems.

UNIT V **12 hours**

Electronic Mail Security: Pretty Good Privacy – IP Security: IP Security Overview – IP Security Architecture – Authentication Header – Encapsulating Payload – Combining Security Associations – Key Management – Web Security: Secure Socket Layer and Transport Layer Security – Secure Electronic Transaction.

 # ..... # self-study portion

Text Book:

1. William Stallings, *Cryptography and Network Security Principles and Practices,* Prentice-Hall of India, New Delhi, Fourth Edition, 2007.
   - **UNIT I** Chapter-1 Section (1.1-1.6) Chapter-2 Section (2.1-2.3, 2.5)
   - **UNIT II** Chapter-1 Section (3.1, 3.2) Chapter-5 Section (5.1, 5.2) Chapter-6 Section (6.1, 6.3) Chapter-9 Section (9.1, 9.2)
   - **UNIT III** Chapter-10 Section (10.1-10.4) Chapter-11 Section (11.1-11.5) Chapter-12 Section (12.1, 12.3, 12.4)
   - **UNIT IV** Chapter-13 Section (13.1-13.3) Chapter-14 Section (14.1-14.3) Chapter-20 Section (20.1-20.2)
   - **UNIT V** Chapter-15 Section (15.1) Chapter-16 Section (16.1-16.6) Chapter-17 Section (17.2, 17.3)

Books for Reference:

1. William Stallings, *Network Security Essentials: Applications and Standards,* Pearson Education, Delhi, 2004.

SEMESTER : I : CORE – III
DISTRIBUTED DATABASE SYSTEMS

Course Code : 18MPCS1C3	**Max. Marks : 100**
Hours/Week : 4	**Internal Marks : 25**
Credit : 4	**External Marks : 75**

Objective:

To impart the knowledge in database systems, architecture, semantic data control, transaction management, and parallel database systems.

UNIT I **12 hours**

Introduction: What is distributed database system – Promises of DDSs – Complicating Factors – Problem Areas. Overview of relational DBMS: Concepts – #Normalization# – Integrity Rules – Relational database languages.

UNIT II **12 hours**

Distributed DBMS Architecture: Architecture Models for distributed DBMS – #Distributed DBMS Architecture#. Distributed Database design: Alternative Design strategies – Distributed Design issues – Fragmentation.

UNIT III **12 hours**

Semantic Data Control: View Management – #Data Security# – semantic Integrity control. Overview of Query Processing: Objectives – characteristics of query processing. Query Decomposition. Optimization of Distributed Queries: Query optimization – Join ordering in Fragment Queries. Distributed Query Optimization Algorithm.

UNIT IV **12 hours**

Introduction Transaction Management : Definition of a transaction Properties – Types. Distributed Concurrency control: Serializability Theory – #Locking based Concurrency control# – Time stamp Based concurrency control – Optimistic concurrency control Deadlock.

UNIT V **12 hours**

Parallel Database System: Database Servers – Parallel Architectures – Paralleled DBMS techniques – Paralleled SBMS technique – DBMS Reliability: Concepts and Measures failures in Distributed DBMS – Local Reliability – #Distributed Reliability Protocols#.

 # ..... # self-study portion

Text Book:

1. OZSU, M. Tamer and Patrick Valduriez, *Principles of Distributed Database Systems*, Perntice Hall, 2nd Edition, 1999.

Books for Reference:

1. Stefano Ceri and Gieceseppe, *Distributed Database: Principles & Systems*, 1988.

SEMESTER : I : CORE – III
NETWORK MANAGEMENT

Course Code : 18MPCS1C3 **Max. Marks : 100**
Hours/Week : 4 **Internal Marks : 25**
Credit : 4 **External Marks : 75**

Objective:

To impart the knowledge in network management, broadband and TMN management, services, and management tools.

UNIT I **12 hours**

Data Communication and Network Management Overview: Analogy of Telephone Network Management – Data and Telecommunication Network- Distributed Computing Environments – TCP/IP- Based Networks – Communication Protocols and Standards – Case Histories – Challenges of Information Technology Managers- Network Management: Goals, Organization and Functions – #Network and System Management# – Network Management System Platform – Current Status and Future of Network Management – Fundamental of Computer Network Technology: Network Topology, LAN, Network Node components – #WAN# – Transmission Technology- Integrated Services: ISDN, Frame Relay, and Broadband.

UNIT II **12 hours**

SNMP, Broadband and TMN Management – Basic Foundations: Network Management Standards, Network Management Model – Organization Model – Information Model – Communication model – Encoding Structure – Macros – Functional Model – SNMPv1 Network Management: Organization and Information Models – Management Network – The History of SNMP Management – Internet Organizations and Standards – The SNMP Model – #The Organization Model# – System Overview – The Information Model – SNMPv1 Network Management: Communication Model and Functional Models.

UNIT III **12 hours**

SNMP Management: Major Changes in SNMPv2 – SNMPv2 System – Architecture – SNMPv2 Structure of Management Information – The SNMPv2 Management Information Base – SNMPv2 Protocol – Compatibility with SNMPv1 – SNMPv3 – SNMPv3 Documentation – SNMPv3 Documentation Architecture- Architecture – SNMPv3 Applications – SNMPv3 Management Information Base – Security – SNMPv3 User – Based Security Model – Access Control- SNMP Management: RMON – Remote Monitoring – RMON SMI and MIBRMON1 – RMON2 – ATM Remote Monitoring –# Case Study#.

UNIT IV **12 hours**

Broadband Networks and services – ATM Technology – ATM Network Management- Broadband Access networks and Technologies – #HFC Technology# – Data over Cable Reference Architecture – HFC Management – DSL Technologies – ADSL technology – ADSL Management.

UNIT V **12 hours**

Network Management Tools and Systems: System Utilities for Management- Network Statistics Measurement Systems- MIB Engineering – NMS Design – Network Management Systems – Network Management Applications: Configuration Management – Fault Management – Performance Management – Event correlation Techniques – Security Management – #Accounting Management# – Report Management – Policy Based Management.

 # ..... # self-study portion

Text Book:

1. Mani Subramanian, *Network Management: Principles and Practice*, Pearson Education, 2010.

Books for Reference:

1. William Stallings, *SNMP, SNMPv2, SNMPv3, and RMON 1 and 2*, Addison-Wesley, 1999.

SEMESTER : I : CORE – III
CLOUD COMPUTING

Course Code : 18MPCS1C3 | **Max. Marks : 100**
Hours/Week : 4 | **Internal Marks : 25**
Credit : 4 | **External Marks : 75**

Objective:

To impart the knowledge in cloud computing infrastructure, service, monitoring and management, and applications.

UNIT I **12 hours**

Introduction to Cloud Computing: Roots of Cloud Computing – Layers and Types of Cloud – Features of a Cloud – Infrastructure Management – Cloud Services – Challenges and Risks. Migrating into a Cloud: Introduction – Broad Approaches – #Seven Step Model#. Integration as a Service-Integration Methodologies – SaaS.

UNIT II **12 hours**

Infrastructure as a Service: Virtual Machines – Layered Architecture-Life Cycle – VM Provisioning Process – Provisioning and Migration Services. Management of Virtual Machines Infrastructure – Scheduling Techniques. Cluster as a service – #RVWS Design# – Logical Design. Cloud Storage – Data Security in cloud Storage – Technologies.

UNIT III **12 hours**

Platform and Software as a Service: Integration of Public and Private Cloud – Techniques and tools – framework architecture – resource provisioning services – Hybrid Cloud. Cloud based solutions for business Applications – Dynamic ICT services – Importance of quality and Security in clouds – Dynamic Data center – case studies. Workflow Engine in the cloud – Architecture – Utilization. Scientific Applications for Cloud – Issues – Classification – SAGA – #Map Reduce Implementation#.

UNIT IV **12 hours**

Monitoring and Management: An Architecture for federated Cloud Computing – Usecase –Principles – Model – Security Considerations. SLA Management – Traditional Approaches to SLO – Types of SLA – Lifecycle of SLA – Automated Policy. Performance Prediction of HPC – #Grid and Cloud# – HPC Performance related issues.

UNIT V **12 hours**

Applications: Best Practices in Architecting cloud applications in the AWS cloud – Massively multiplayer online Game hosting on cloud Resources – #Building content delivery Networks using clouds# – Resource cloud Mashups.

 # ..... # self-study portion

Text Book:

1. Rajkumar Buyya, James Broberg, and Andrzej Goscinski, *Cloud Computing Principles and Paradigms*, John Wiley and Sons, Inc, 2011.

UNIT I Chapter 1 : Section 1.2 – 1.8
Chapter 2 : Section 2.1 – 2.3
Chapter 3 : Section 3.1,3.7,3.9,3.8

UNIT II Chapter 5 : Section 5.4,5.5,6.2,6.3
Chapter 6 : Section 6.2,6.3
Chapter 7 : Section 7.3,7.4
Chapter 8 : Section 8.2,8.3

UNIT III Chapter 9 : Section 9.1,9.2
Chapter 10 : Section 10.4
Chapter 11 : Section 11.5,11.4
Chapter 12 : Section 12.5
Chapter 13 : Section 13.1-13.3

UNIT IV Chapter 15 : Section 15.1-15.5, Chapter 16 : Section 16.2-16.3,16.6
Chapter 17 : Section 17.1,17.3,17.4

UNIT V Chapter 18 : Section 18.1-18.6
Chapter 19 : Section 19.1-19.6
Chapter 20 : Section 20.1-20.5, Chapter 21 : Section 21.1-21.3

Books for Reference:

1. George Reese, *Cloud Application Architectures*, O'Reilly Media, Inc, First Edition, 2009.
2. Michael Miller, *Cloud Computing: Web based Applications That Change the Way You Work and Collaborate Online*, QUE Publishing, 2009.

SEMESTER : I : CORE - III
MOBILE COMPUTING

Course Code : 18MPCS1C3 **Max. Marks : 100**
Hours/Week : 4 **Internal Marks : 25**
Credit : 4 **External Marks : 75**

Objective:

To impart the knowledge in emerging technologies, GPRS, wireless LAN, and Palm OS architecture and applications.

UNIT I **12 hours**

Introduction – Mobile Computing Architecture – Internet – The Ubiquitous Network – Three –Tier Architecture – Design Considerations – Mobile Computing through Internet – Making Existing Applications Mobile Enabled – Mobile Computing through Telephony – #Multiple Access Procedures# – Developing an IVR Application – Voice XML – TAPI.

UNIT II **12 hours**

Emerging Technologies – Bluetooth – Radio Frequency Identification (RFID) – Wireless Broadband (WiMAX) – Mobile IP – Internet Protocol Version 6 – Java Card – Global System for Mobile Communications (GSM) – GSM Architecture – Entities – Call Routing in GSM – PLNM Interfaces – GSM Address and Identifiers – Network Aspects – #Frequency Allocation# – Authentication and Security – Short Message Service (SMS) – Mobile Computing over SMS – Value Added Services through SMS – Accessing the SMS Bearer.

UNIT III **12 hours**

General Pocket Radio Service (GPRS) – GPRS and Packet Data Network – GPRS Network Architecture – Operations – Data Services – Applications – Limitations – Wireless Application Protocol (WAP) – MMS – GPRS Applications – CDMA and 3G – Spread-Spectrum Technology – IS-95 – CDMA versus GSM – Wireless Data – #3G Networks# – Applications.

UNIT IV **12 hours**

Wireless LAN – Advantages – IEEE 802.11 Standards – Wireless LAN Architecture – Mobility – Deploying Wireless LAN – Mobile Ad Hoc Networks and Sensor Networks – Wireless LAN Security – WiFi versus 3G – Internet Networks and Interworking – Call Processing – Intelligence in Networks – SS#7 Signaling – IN Conceptual Model (INCM) – Softswitch – Programmable Networks – Technologies and Interfaces for IN – Client Programming – Mobile Phones – PDA –#Design Constraints#.

UNIT V **12 hours**

Palm OS – Architecture – Application Development – Communication in Palm OS – Multimedia – Voice over Internet Protocol and Convergence – H.323 Framework – Session Initiation Protocol (SIP) – Real Time Protocols – Convergence Technologies – Call Routing – Voice over IP Applications – IP Multimedia Subsystem – Mobile VoIP – Security Issues in Mobile Computing – Information Security – Security Techniques and Algorithms – Security Protocols – #Public Key Infrastructure# – Security Models – Security Frameworks for Mobile Environment.

 # ..... # self-study portion

Text Book:

1. Asoke K Talukder, Roopa R Yavagal, *Mobile Computing – Technology, Applications and Service Creation*, Tata McGraw-Hill Publishing Company Ltd., Eleventh Reprint, 2009.

Books for Reference:

1. Tomasz Imielinski, Henry F. Korth, *Mobile Computing*, Kluwer Academic Publishers, 2006.
2. Raj Kamal, *Mobile Computing*, Oxford University Press, 2008.
3. Uwe Hansmann, Lothar Merk, Martin S. Nicklous, Thomas Stober, *Principles of Mobile Computing*, Springer International Edition, 2008
4. Garg Kumkum, *Mobile Computing: Theory and Practice*, Pearson Education India, 2010.

SEMESTER : I : CORE –IV
TEACHING AND LEARNING METHODOLOGIES

Course Code : 18MPCS1C4	**Max. Marks : 100**
Hours/Week : 4	**Internal Marks : 25**
Credit : 4	**External Marks : 75**

Objective:

To impart the basic concepts on E-Learning, Educational Psychology, Soft Skills, E-Content and Teaching Practices.

UNIT I **12 hours**

E-Learning: Introduction – Why E-Learning – Types of E-Learning – Blended Learning – Standard Learning – Component of E-Learning – #Standards of E-Learning#.

UNIT II **12 hours**

Educational Psychology: Introduction – Social, Moral and Cognitive Development – Learning and Cognition – Motivation – #Research Methodology# – Application in Instructional Design and Technology – Application in Teaching – Careers in Educational Psychology.

UNIT III **12 hours**

Soft Skills: Attitude and Altitude – Lateral Thinking – Time is Money – Are Leaders Born or Made – Team Building – Inter-Personal Skills – Business Communication in English – Presentation Skills – Business Correspondence – Interviews – Group Dynamics – #Internet for Job Seekers#.

UNIT IV **12 hours**

Computer Practical Session: Preparation of E-Content – #Lesson Plan Preparation for Teaching#.

UNIT V **12 hours**

Teaching Practices in Computer Science Subjects: Programming Languages – Computer Networks – Computer Graphics – Simulation and Modeling – Data Structures and Algorithms – Parallel Processing – Multimedia Systems and Design – Computer Organization and Architecture – Principles of Compiler Design – Numerical and Statistical Methods – Optimization Techniques – #Operating Systems# – Artificial Intelligence and Expert Systems – Web Technology.

 # ..... # self-study portion

Text Books:

1. G. Ravindran, S.P.B.Elango and L. Arockiam , *Success Through Soft Skills,* Institute for Communication and Technology, Tiruchirappalli, 2nd Edition, 2008.
2. Jack Snowman and Robert Biehler*, Psychology Applied to Teaching*. HMH, 8th Edition, 1997.
3. Web site references: www.kontis.net, en.wikipedia.org.

Books for Reference:

1. Som Naidu, E-Learning: A Guide book of Principles, Procedures, and Practices, 2nd Revised Edition, CEMCA, 2006

SEMESTER : II
PROJECT WORK

Course Code : 18MPCS2PW	**Max. Marks : 200**
Hours/Week : --	**Internal Marks : --**
Credit : 8	**External Marks : --**