



UNIVERSITY OF MYSORE DIRECTORATE OF OUTREACH AND ONLINE PROGRAMS

MASTER OF COMPUTER APPLICATIONS

SEMESTER – II

Hard Core Courses

1. Data Communication and Networks
2. Artificial Intelligence
3. .Net with C#

Softcore courses

1. Cloud Computing
2. Data Mining and Data Warehousing
3. Cryptography and Network Security

II Semester

Hardcore Courses

Data Communication and Networks (3:0:1)

Course Outcome:

- Understand the data communications system and its components.
- Summarize signal conversions techniques for digital communication.
- Identify and categorize various types of transmission media.
- Understand various analog and digital services for data communication.
- Evaluate bandwidth utilization using multiplexing techniques.
- Implement advanced technique such as Data encoding and Compression for Image processing Applications.

Course Content:

Unit –I

Data Communication, Component and Basic Concepts – Introduction, Characteristics – Delivery, Accuracy, Timeliness and Jitter, Components, Topology – Mesh, Star, Tree, Bus, Ring and Hybrid Topologies Transmission modes – Simplex, Half Duplex, Full Duplex Categories of networks – LAN, MAN, WAN, Network Components – Signal Transmission – Analog Signaling, concept of ASK, FSK, PSK, Digital Signaling, concept of Unipolar, Polar, Return-to-Zero(RZ), Biphase,

Unit –II

Manchester, Differential Manchester, Non-Return-to-Zero (NRZ), Bit Synchronization, Asynchronous Bit Synchronization and Synchronous Bit Synchronization, Baseband and Broadband Transmissions.

Transmission Media - Guided Media – Twisted-Pair Cable, Coaxial Cable, Fiber-Optic Cable Unguided Media – Radio Wave Transmission Systems, Microwave Transmission Systems, Infrared Transmission Systems and Satellite Communication System.

Unit –III

The OSI Model – Functions of all the Seven Layers, Networking Devices – Functions and Applications of Hub, Switches, Bridges, Repeaters Internetworking Devices – Functions and

Applications of Routers and Gateways, IP Addressing – Dynamic IP Addressing, Static IP Addressing, Types of IP Addresses, Protocols –TCP, UDP, IP, IPV4, IPV6, TCP/IP Suite, SMTP, ARP, RARP, OSPF, BGP, ALOHA.

Unit–IV

Packet Switching Networks – Network Services and Internal Network Operations, Packet Network Topology, Datagrams and Virtual Circuits, Connectionless Packet Switching, Virtual Circuit Packet Switching.

Routing Concepts – Routing Tables, Dijkstra’s Shortest Path Routing Algorithm, Flooding, Distance Vector Routing, Congestion Control Algorithms-Leaky Bucket Algorithm.

Data Link Issues –Single bit error and Burst Error, concepts of Redundancy, Checksum, Single Bit Error correction and Hamming Code correction method.

Reference Books:

1. Introduction to Data Communications and Networking by Behrouz Forouzan.
2. Computer Networks by Andrew S Tanenbaum.
3. Networking Essentials – Third Edition – Jeffrey S. Beasley, Piyasat Nilkaew

Artificial Intelligence (3:0:1)

Course Outcome

- Explain what constitutes "Artificial" Intelligence and how to identify systems with Artificial Intelligence.
- Explain how Artificial Intelligence enables capabilities that are beyond conventional technology, for example, chess-playing computers, self-driving cars, robotic vacuum cleaners.
- Use classical Artificial Intelligence techniques, such as search algorithms, minimax algorithm, neural networks, tracking, robot localization.
- Ability to apply Artificial Intelligence techniques for problem solving.
- Explain the limitations of current Artificial Intelligence techniques.

Course Content

Unit-I

Introduction: Origin of AI, AI solution to problems, characteristics of AI problems; State space search - blind searches, heuristic searches; Search in game tree.

Unit-II

Predicate logic: Backward reasoning, Resolution; Other reasoning methods - Probabilistic, Fuzzy, Non monotonic

Unit-III

Knowledge representation: Overview of Semantic nets, Frames, Conceptual dependency, Scripts; Planning - Goal stack, Non linear, Hierarchical.

Unit-IV

Expert systems Learning: Rote, By Advice, By Analogy, Macro.

Reference Books

1. Artificial Intelligence, Elaine Rich, Kevin Knight, Shivashankar Nair, Tata McGraw Hill
2. Artificial Intelligence, Patrick Henry Winston, AWL
3. Artificial Intelligence and Expert Systems, Dan W. Patterson, PHI
4. Artificial Intelligence, Nils J Nilson, Elsevier, Morgan Kaufmann

.Net with C# (2:1:1)

Course Outcome

- Understand the .Net frame work and the features of C# programming language to design and implement web-based applications as per the requirement.

Course Content:

Unit-I

Introduction: An overview of the .NET framework. CLR, FCL, ASP.NET to support Internet development and ADO.NET to support database applications. Languages supported by .NET, introduction to Visual Studio .NET.

Unit-II

Introduction to C#: Program structure, Basic IO, data types, operators and expressions, relational and logical operations, control structures. Writing methods, Recursion and overloading arrays and data representation. Class definitions. Properties, indexers, and access Arrays control. Inheritance and polymorphism, delegates. Exception handling.

Unit-III

ADO.NET: Introduction to SQL. ADO.NET after Native Drivers, ODBC Drivers, DAO/RDO and ADO. Database using VS.NET Establishing Connection with Database.

Unit- IV

ASP.NET: Web forms in ASP.NET, States, Validation, Login; ASP.NET Administrative tasks ASP.NET Data controls, Ajax Extensions, LINQ, Working with XML data, Web Services.

Reference Books

1. Pro C# with .NET 3.0 by Andrew Troelsen.
2. Microsoft ASP.NET by G.Andrew Duthie.
3. Building ASP.NET WebPages with Microsoft web Matrix. By Steve Lydford

Softcore Courses

Cloud Computing (3:1:0)

Course Outcome:

- Define Cloud Computing and memorize the different Cloud service and deployment models.
- Describe importance of virtualization along with their technologies.
- Use and Examine different cloud computing services.
- Analyze the components of open stack & Google Cloud platform and understand Mobile Cloud Computing.
- Design & develop backup strategies for cloud data based on features.

Course Content

Unit-I

Introduction: Cloud models-Evolution of Cloud Computing –System Models for Distributed and Cloud Computing – NIST Cloud Computing Reference Architecture – On-demand Provisioning – Elasticity in Cloud – deployment models – service models-cloud service providers.

Virtualization: Basics of Virtualization- Types of Virtualization- Implementation Levels of Virtualization, Virtualization Structures - Tools and Mechanisms – resource sharing and resource pooling Desktop Virtualization – Server Virtualization.

Unit-II

Cloud Infrastructure: Architectural Design of Compute and Storage Clouds – Layered Cloud Architecture Development – Design Challenges - Inter Cloud Resource Management – Resource Provisioning and Platform Deployment – Global Exchange of Cloud Resources.

Unit-III

Programming Model: Parallel and Distributed Programming Paradigms – Map Reduce, Twister and Iterative Map Reduce – Hadoop Library from Apache – Mapping Applications - Programming Support.

Security in the Cloud: Security Overview – Cloud Security Challenges – Access control mechanisms – Security Governance – Risk Management – Security Monitoring – Security Architecture Design – Virtual Machine Security.

Unit-IV

Enterprise Cloud-Based High Performance Computing (HPC): Overview of High Performance Computing (HPC) on Cloud-Enterprises HPC applications (high-performance grid computing, high-performance big data computing/analytics, high performance reasoning)- HPC Cloud vendor solutions: compute grids (Windows HPC, Hadoop, Platform Symphony ,Gridgain), data grids (Oracle coherence, IBM Object grid, Cassandra, HBase, Memcached, HPChardware (GPGPU, SSD, Infiniband, Non-blocking switches)

Setting up own cloud: Cloud setup-How to build private cloud using open source tools- Understanding various cloud plugins- Setting up your own cloud environment-Auto

provisioning- Custom images-Integrating tools like Nagio-Integration of Public and Private cloud.

Reference Books

1. Kai Hwang, Geoffrey C Fox, Jack G Dongarra, Distributed and Cloud Computing, From
2. Parallel Processing to the Internet of Things, 2012, 1st Edition, Morgan Kaufmann Publishers.
3. Katarina Stanoevska-Slabeva, Thomas Wozniak, SantiRistol, Grid and Cloud Computing – A Business Perspective on Technology and Applications, 2010, Springer.
4. John W.Rittinghouse and James F.Ransome, Cloud Computing: Implementation, Management, and Security”, 2010, CRC Press.
5. Toby Velte, Anthony Velte, Robert Elsenpeter, Cloud Computing, A Practical Approach, 2009, TMH.
6. George Reese, Cloud Application Architectures: Building Applications and Infrastructure in the Cloud O'Reilly, 2009.

Data Mining and Data Warehousing (3:1:0)

Course Outcome

- Acquire the knowledge of data preprocessing and data quality; modeling and design of data warehouses and algorithms for data mining.
- Be able to design data warehouses and apply acquired knowledge for understanding data and select suitable methods for data analysis.

Course Content

Unit-I

Introduction to data mining and Data Warehousing, Modeling: Data Cube and OLAP, Data Warehouse Implementation, Data Mining – types of data, types of patterns, Data cleaning, Data integration.

Unit-II

Data Reduction, Wavelet Transforms, Attribute Subset Selection, Histogram, Clustering, Sampling, Data Cube Aggregation Data Transformation: Strategies Overview, Data Transformation by Normalization.

UNIT-III

Mining Frequent Patterns, Associations & Correlations: pattern evaluation methods. Classification, Decision tree Induction, Attribute Selection Measures, Tree Pruning, Bayes Classification Methods.

Unit-IV

Cluster Analysis: Requirement for Cluster Analysis, clustering methods Data Mining Applications & Trends: Mining Sequence Data; Time Series, Symbolic, Statistical Data Mining, Visual Data Mining, Data Mining Applications.

Reference Books:

1. Jiawei Micheline Kamber, 'Data Mining Concepts and Techniques', Morgan Kauf Mann Publishers.
2. George M. Marakas, 'Modern Data Warehousing, Mining and Visualization', Pearson Education, 2003.
3. W.H. Inmon, 'Building the Data Warehouse', Wiley dreamtech, 3rd Edition.
4. Mastering Data Mining – Michael J.A. Berry & Gordon S. Linoff (Wiley Pub.).
5. Data Warehousing (Pearson Ed.) – Sam Anahory & Dennis Murray.

Cryptography and Network Security (3:1:0)

Course Outcome

- Analyze the vulnerabilities in any computing system and hence be able to design a security solution.
- Identify the security issues in the network and resolve it.
- Evaluate security mechanisms using rigorous approaches, including theoretical.
- Compare and Contrast different IEEE standards and electronic mail security.

Course Content

Unit-I

Introduction-computer security concepts, attacks, security services, security mechanisms; Classical encryption techniques-symmetric cipher models, substitution techniques, transposition techniques, rotor machines

Unit-II

Symmetric ciphers-Block cipher principles; DES-Algorithm, strengths and weaknesses of DES, attacks on DES and defense, multiple encryptions; Asymmetric ciphers-Essential mathematics, public key cryptography.

Unit-III

RSA, Diffie Hellman key exchange, random number generation, Data integrity and authentication Hash functions; MAC; Digital signatures;

Unit-IV

Key management; Authentication, Web and system security, Web security; IP security; E mail security; System security-intruders, malicious software, firewalls

References Books

1. Cryptography and Network Security - Principles and Practice, William Stallings, PEARSON
2. Cryptography and Network Security, AtulKahate, Tata McGraw Hill