MAHATMA GANDHI UNIVERSITY

SCHEME AND SYLLABI

FOR

M. Tech. DEGREE PROGRAMME

IN

COMPUTER SCIENCE AND ENGINEERING

(2013 ADMISSION ONWARDS)

SCHEME AND SYLLABI
FOR
M.TECH DEGREE PROGRAMME
IN
COMPUTER SCIENCE AND ENGINEERING

SEMESTER – II

Sl. No	*Course No.*	*Subjects*	**Hrs/ week**			Evaluation Scheme(Marks)					Credits(C)
			L	*T*	*P*	*Sessional*			*ESE Theory / Practical*	*Total*	
						TA	*CT*	Sub Total			
1	MCSCS 201	Modern Database Management	3	1	0	25	25	50	100	150	4
2	MCSCS 202	Modern Computer Networks	3	1	0	25	25	50	100	150	4
3	MCSCS 203	Operating System Design Concepts	3	1	0	25	25	50	100	150	4
4	MCSCS 204	Web Services	3	1	0	25	25	50	100	150	4
5	MCSCS 205	Elective III	3	0	0	25	25	50	100	150	3
6	MCSCS 206	Elective IV	3	0	0	25	25	50	100	150	3
7	MCSCS 207	Network Simulation Lab	-	-	3	25	25	50	100	150	2
8	MCSCS 208	Seminar II	-	-	2	50	-	50	0	50	1
		Total	18	4	5	225	175	400	700	1100	25

Elective – III (MCSCS 205)		**Elective – IV (MCSCS 206)**	
MCSCS 205-1	Virtualization Systems	MCSCS 206-1	Social Network Analytics
MCSCS 205-2	Grid Computing	MCSCS 206-2	Digital Image Processing
MCSCS 205-3	Advanced Computer Architecture	MCSCS 206-3	Embedded Systems
MCSCS 205-4	Parallel Algorithms	MCSCS 206-4	Ontology Driven Knowledge Management

L – Lecture, **T** – Tutorial, **P** – Practical

TA - Teacher's Assessment (Assignments, attendance, group discussion, quiz, tutorial, seminar etc.)

CT - Class Test (Minimum of two tests to be conducted by the Institute)

ESE - End Semester Examination to be conducted by the University

Electives - New Electives may be added by the department according to the needs of emerging fields of technology. The name of the elective and its syllabus should be submitted to the University before the course is offered..

Seminar - Students may select a topic for their seminar preferably in the same area as that of their project.

MCSCS 201 MODERN DATABASE MANAGEMENT

L	T	P	C
3	1	0	4

Module 1

Web Databases: NoSQL Databases - MongoDB example -Semi-structured data management- XML, XPath and XQuery, Document data-stores -Examples, Key-Value data-stores – Examples- In-memory databases-VoltDB example
Embeeded Databases - definition- Example - SQLite internal architecture and data types

Module 2

Advanced databases: Spatial Data Management: Types Of Spatial Data And Queries- Point And Region Data-Queries-Applications Involving Spatial Data, -Spatial Indexes-indexing using Space Filling Curves- Region Quad Trees and Z Ordering – Index Structures - Grid Files, Rtrees
Distributed databases- distributed file systems- Examples- distributed query processing-

Module 3

Next Generation Databases: Cloud Databases- methods to run- virtual machine deployment, as a service- Column Stores-Examples- Cassandra, HBase-Aggregation and Join, - Case study- BigTable Google's distributed storage system for structured data-building blocks-GFS, Scheduler, Lock Service, MapReduce
Graph databases- Comparison of Twitter's FlockDB and Neo4j- Overview of NewSQL- Case study -Google's Spanner

Module 4

Emerging Technologies:
Multimedia Databases-Multimedia Sources-Image Databases-Compressed Representations-Similarity Based Retrieval
Mobile Databases- Mobile Database Systems-Issues and Applications-Query processing-Query types – Transaction Execution in MDS- Mobile Transaction Models -Concurrency Control Mechanism-Transaction Commit Protocols- Mobile database Recovery: Log management in mobile database systems

References:

1. Serge Abiteboul, Ioana Manolescu, Philippe Rigaux, Marie -Christine Rousset, Pierre Senellart, Web Data Management, Cambridge University Press, 450 pages,2011. (also available online)
2. Bhavani Thuraisingham, XML Databases and the Semantic Web, CRC Press, 2002.
3. Elmasri R., Navathe S.B., "Fundamentals of Database Systems", Pearson Education/Addison Wesley, Fifth Edition, 2007.
4. Henry F Korth, Abraham Silberschatz, Sudharshan S., "Database System Concepts", McGraw Hill, Fifth Edition, 2006.
5. SQLite, FromWikipedia,the free encyclopedia, http://en.wikipedia.org/wiki/SQLite
6. Raghu Ramakrishnan, Johannes Gehrke, "Database Management Systems", McGraw Hill, Third Edition, 2004.
7. VoltDB The NewSQL database for high velocity applications http://odbms.org/download/VoltDBTechnicalOverview.pdf

8. Dale Anderson, Big Data and NoSQL Technologies at http://dbbest.com/blog/big-data-nosql-technologies/
9. Dale Anderson, Column Oriented Database Technologies at http://dbbest.com/blog/column-oriented-database-technologies/
10. Big Table and Column Databases,Ling Liu,College of Computing http://www.cc.gatech.edu/~lingliu/courses/cs4440/notes/17.BigTableColumnDB.pdf
11. Fay Chang, Jeffrey Dean, Sanjay Ghemawat, Wilson C. Hsieh, Deborah A. Wallach Mike Burrows, Tushar Chandra, Andrew Fikes, Robert E. Gruber, Bigtable: A Distributed Storage System for Structured Data at http://static.googleusercontent.com/external_content/untrusted_dlcp/research.google.com/en//archive/bigtable-osdi06.pdf
12. Graph databases- Ian Robinson, Jim Webber, Emil Eifrem, O'Reilly
13. Klint Finley, 5 *Graph Databases* to Consider at http://readwrite.com/2011/04/20/5-graph-databases-to-consider
14. Vijay Kumar, "Mobile Database Systems", A John Wiley & Sons, Inc., Publication.

MCSCS 202 **MODERN COMPUTER NETWORKS**

L	T	P	C
3	1	0	4

Module 1

Physical Layer: Data Transmission- Analog and Digital Transmission, Transmission Impairments, Channel Capacity. Transmission Media- Wired Transmission, Wireless Transmission, Wireless Propagation, Line-of Sight Transmission, Signal Encoding Techniques

Data link layer: TCP/IP Protocol Architecture, Framing, Reliable Transmission, Ethernet (802.3) and Token Ring (802.5)

Module 2

Network Layer: Connecting Devices. ARP, RARP. IP Address – Sub netting / Super netting, Packet Forwarding with Classful / Classless Addressing, Datagram Fragmentation, Components in IP software, Private IP and NAT. ICMP. Routing Protocols -Distance Vector Routing-RIP, Link-State Routing-OSPF

Module 3

Transport Layer: UDP- Port Addressing, UDP datagram, UDP operation. TCP- TCP services and features, TCP segment, TCP connection, TCP state transitions, TCP module's algorithm, Flow and Error control, Congestion control, TCP Timers. SCTP- SCTP services and features, Packet format, SCTP connection, State Transitions, Flow and Error control.

Module 4

Application Layer: DNS- Distribution of Name Space, Name Resolution, DNS messages, HTTP-Architecture, HTTP Transaction, DHCP - Address allocation, Packet format. SNMP-SMI, MIB, SNMP PDUs, Real Time Data Transfer- RTP, RTCP, Voice over IP-Session Initiation Protocol.

References:

1. William Stallings, "Data and Computer Communications" , Pearson Education.

2. Behrouz A Forouzan, "TCP/IP Protocol Suite", Tata McGraw-Hill.

3. Peterson and Davie, "Computer Networks A systems approach" , Elsevier.

4. Kurose and Ross, "Computer Networks A systems approach" , Pearson Education.

5. Behurouz A Forouzan, "Data Communications & Networking",4th edition, McGraw-Hill.

MCSCS 203 OPERATING SYSTEM DESIGN CONCEPTS

L	T	P	C
3	1	0	4

Module 1

Overview of the System - Evolution of operating system -Characteristics of modern operating system- Traditional and Modern Unix systems-Introduction to the Kernel - Architecture of the UNIX operating system - Introduction to system concepts - Kernel data structures - System administration. The Buffer Cache: Buffer headers - Structure of the buffer pool - Scenarios for retrieval of a buffer - Reading and writing disk blocks - Advantages and disadvantages of the buffer cache.

Module 2

File Subsystems - Inode - Regular file - Directories - Conversion of a path name to an Inode - Super block – Inode assignment to a new file - Allocation of disk blocks- System Calls for the file system: Open - Read - Write - File and record locking - Adjusting the position of file I/O - lseek - close - File creation - Creation of special files - Changing directory, root, owner, mode - stat and fstat - Pipes - Dup - Mounting and unmounting file systems - link- unlink - File system abstraction and maintenance

Module 3

Processes - Process states and models - Process context - Manipulation of the process address space -Sleep- Process Control - Process creation - Signals - Process termination - Invoking other programs - user id of a process - Changing the size of a process - Shell - System boot and the INIT process- Process Scheduling-Unix concurrency mechanisms- Distributed Process Management – Process migration-Distributed Mutual Exclusion

Module 4

Memory Management -Swapping - Demand paging - Hybrid System- I/O Subsystem - Driver Interface - Disk Drivers - Terminal Drivers- Streams - Inter process communication- Process tracing - System V IPC - Network Communications - Sockets.

References:

1. Maurice J. Bach, "The Design of the Unix Operating System", First Edition, Prentice Hall of India, 1986.
2. William Stallings, "Operating Systems",Fourth Edition, Pearson Education, 2004
3. Uresh Vahalia, "Unix Internals - The new Frontiers", Pearson Education, 2006
4. B. Goodheart, J. Cox, "The Magic Garden Explained", Prentice Hall of India, 1986.
5. S. J. Leffler, M. K. Mckusick, M. J. .Karels and J. S. Quarterman., "The Design And Implementation of the 4.3 BSD Unix Operating System", Addison Wesley, 1998

MCSCS 204 **WEB SERVICES**

L	T	P	C
3	1	0	4

Module 1:

Web Services – Introduction to Web Services , Web Services Architecture, Web Services Communication Models, Implementing Web Services.

Module 2:

SOAP- Anatomy of a SOAP Message, SOAP Encoding, SOAP Message Exchange Model, SOAP Communication, SOAP Messaging, SOAP Bindings for Transport Protocols, SOAP Security, Building SOAP Web Services, Developing SOAP Web Services Using Java

Module 3:

WSDL- Anatomy of a WSDL Definition Document, WSDL Bindings, WSDL Tools

UDDI- UDDI Registries, Programming with UDDI, Implementations of UDD, Registering as a Systinet, UDDI Registry User ,Publishing Information to a UDDI Registry, Searching Information in a UDDI Registry,Deleting Information from a UDDI Registry

Module 4:

XML Processing and Data Binding with Java APIs - Extensible Markup Language (XML)Basics, Java API for XML Processing (JAXP), Java Architecture for XML Binding (JAXB)

XML Messaging Using JAXM and SAAJ - The Role of JAXM in Web Services, JAXM API Programming Model, Basic Programming Steps for Using JAXM, JAXM Deployment Model, Developing JAXM-Based Web Services

References:

1. Ramesh Nagappan, Robert Skoczylas,Rima Patel Sriganesh, Developing Java Web Services, Wiley Publishing Inc.,2003.
2. Richard Monson Haefel, J2EE Web Services, Pearson Education, 2004.
3. Travis Vandersypen, Jason Bloomberg, Madhu Siddalingaiah, Sam Hunting, Michael D Qualls, David Houlding, Chad Darby, Diane Kennedy, XML and Web Services Unleashed, Pearson Education, 2002.
4. Frank P Coyle, XML Web Services and Data Revolution, Pearson Education, 2002.
5. Mark Hansen, SOA Using Java Web Services, Pearson Education, 2007.

MCSCS 205-1 VIRTUALIZATION SYSTEMS

L	T	P	C
3	0	0	3

Module 1:

Overview: Why server virtualization –History and re-emergence –General structures. Architectures comparison. Commercial solutions –VMWare, Xen.
Virtual machines: CPU virtualization -Privileged instructions handling -Hypervisor - Paravirtualization. Hardware-assisted virtualization. Booting up. Time keeping. CPU scheduling. Commercial examples

Module 2:

Memory management in virtualization: partitioning –reclamation –ballooning. Memory sharing. OS-level virtualization –VM Ware –Red Hat Enterprise Virtualization.

Module 3:

I/O virtualization: Virtualizing I/O devices -monolithic model -virtual I/O server. Virtual networking –tunneling –overlay networks. Commercial examples. Virtual storage: Granularity -file system level –blocks level.

Module 4:

Virtualized computing: Virtual machine based distributed computing, elastic cloud computing, clustering, cold and hot migration. Commercial examples. Challenges and future trends.

References:

1. Virtual Machines: Versatile Platforms for Systems and Processes (1st Ed): Jim Smith, Ravi Nair; Morgan Kaufmann (2005)
2. Applied Virtualization Technology - Usage models for IT professionals and Software Developers (1st Ed): Sean Campbell Intel Press (2006).

MCSCS 205-2 **GRID COMPUTING**

L	T	P	C
3	0	0	3

Module 1:Grid Computing

Introduction -Definition -Scope of grid computing. Grid computing model- Grid Protocols – Desktop grids: Characteristics – key elements – Role in enterprise computing infrastructure. Data grids: Avaki Data Grid – Data grid Architecture.

Module 2:Grid Computing Initiatives

Grid Computing Organizations and their roles – Grid Computing anatomy – Grid Computing road map. Grid Computing Applications: Merging the Grid services Architecture with the Web Services Architecture.

Module 3:Technologies

OGSA – Sample use cases – OGSA platform components – OGSI – OGSA Basic Services.

Managing Grid Environments: Managing grids – management reporting – monitoring – service level management – data catalogs and replica management.

Module 4:Grid Computing Tool Kits

Globus GT3 Toolkit – Architecture, Programming model, High level services – OGSI .Net middleware Solutions.

References:

1. Joshy Joseph & Craig Fellenstein, “Grid Computing”, PHI, PTR-2003.
2. Ahmar Abbas, “Grid Computing: A Practical Guide to technology and Applications”, Charles River media – 2003.
3. Ian Foster, Carl Kesselman, “The Grid2: Blueprint for a New Computing Infrastructure”. Morgan Kaufman, New Delhi, 2004.
4. Fran Bermn, Geoffrey Fox, Anthony Hey J.G., “Grid Computing: Making the Global Infrastructure a Reality”, Wiley, USA, 2003.
5. Maozhen Li, Mark Baker, “The Grid: Core Technologies”, John Wiley & Sons, 2005.
6. URLs: www.globus.org and glite.web.cern.ch (Unit 5).

MCSCS 205-3 ADVANCED COMPUTER ARCHITECTURE

L	T	P	C
3	0	0	3

Module 1:

Storage Technologies - Memory Hierarchy, Cache memory-generic cache memory organization, mapping techniques , instruction caches and unified caches , performance impact of cache parameter, writing cache-friendly code. Virtual memory, virtual memory as a tool for caching, case study of Pentium/Linux memory system-Pentium address translation, Linux Virtual memory system, memory mapping, dynamic memory allocation, garbage collection- garbage collector basics, mark & sweep garbage collector.

Module 2:

Processor Architecture - Y86 instruction set architecture, sequential Y-86 implementations, organizing processing into stages, sequential hardware structure, sequential timing, sequential stage implementations, General principles of pipelining, Pipelined Y86 implementation.

Module 3:

Optimizing Program Performance - Capabilities and limitations of optimizing compilers, Eliminating loop inefficiencies, reducing Procedure calls, Eliminating unneeded memory reference, reducing loop overhead, converting to pointer code, enhancing Parallelism -loop splitting, register spilling, limits of parallelism, Branch prediction and misprediction penalties , memory performance, performance bottlenecks.

Module 4:

Measuring Program Execution Time - Flow of time on a computer system, process scheduling and timer interrupts, measuring time by interval counting, operation, reading the processor timers, accuracy of processor timers, IA32 cycle counters, measuring program execution time with cycle counter. Concurrent programming with processes, Concurrent program with Threads

References:

1. Randal E bryant and David O'Hallaron "Computer Systems A programmer's perspective" Pearson Education

2. Kaihwang and Naresh Jotwani, "Advanced Computer Architecture " 2nd edition Tata Mcgraw-Hill

3. . Hennessy J.L and David A. Patterson "Computer Architecture- A Quantitative Approach" Elsevier Publication

4. Sima D,Fountain T and Kacsuk P "Advanced Computer Architecture: A Design Space Apporach"Pearson Education

MCSCS 205-4 PARALLEL ALGORITHMS

L	T	P	C
3	0	0	3

Module 1:

PRAM Model - PRAM Algorithms – Parallel Reduction – Prefix Sums – List Ranking – Preorder Tree Traversal – Merging Two Sorted Lists – Graph Coloring – Reducing Number of Processors

Module 2:

Classifying MIMD Algorithms - Hypercube SIMD Model – Shuffle Exchange SIMD Model – 2D Mesh SIMD Model – UMA Multiprocessor Model – Broadcase – Prefix Sums.

Matrix Multiplication on 2-D Mesh, Hypercube and Shuffle Exchange SIMD Models – Algorithms for Multiprocessors – Algorithms for Multicomputers

Module 3:

Enumeration Sort - Lower Bound on Parallel Sorting – Odd-Even Transposition Sort – Bitonic Merge –Complexity of Parallel Search – Searching on Multiprocessors – Ellis's Algorithm – Manber and Ladner's Algorithm

OpenMP- Introduction, The OpenMP for Pragma- Dijkstra Shortest-Path Algorithm with Parallel for Loops, Task Directive- Quicksort, OpenMP Synchronization Issues

Module 4:

P-Depth Search - Breadth Death Search – Breadth First Search – Connected Components – All pair Shortest Path – Single Source Shortest Path – Minimum Cost Spanning Tree – Sollin's Algorithm – Kruskal's Algorithm

References:

1. Michael J. Quinn, Parallel Computing : Theory & Practice, Tata McGraw Hill Edition, Second Edition, 2008.
2. Ananth Grame, George Karpis, Vipin Kumar and Anshul Gupta, Introduction to Parallel Computing, 2nd Edition, Addison Wesley, 2003
3. Norm Matlo, Programming on Parallel Machines, University of California

MCSCS 206-1 SOCIAL NETWORK ANALYTICS

L	T	P	C
3	0	0	3

Module 1:Social Media Defined

Social media design framework – social media examples – The Network perspective – types of networks

Module 2: Web Analytics 2.0 paradigm

Clickstream Analysis – Eight critical web metrices – Bounce rate – Exit rate – Conversion rate – Engagement – Attributes of great metrics – A Web Analytics Primer Understanding Visitor Acquisition Strengths – Click Density Analysis – Measuring Visits to Purchase – Search Engine Optimization (SEO) Analysis – Direct Traffic Analysis

Module 3: Measuring outcome

Key Performance Indicators (KPIs) – Moving beyond Conversion Rates – Measuring Macro and Micro Conversions – Measuring Success for a Non-ecommerce Website – Lab Usability tests – Surveys – Types of Surveys

Module 4: A/B Testing

Multivariate Testing – Competitive Intelligence Data Sources, Types, and Secrets – Website Traffic Analysis – Search and Keyword Analysis – Audience Identification and Segmentation Analysis

References:-

1. Derek L. Hansen,Ben Sheiderman, ,Marc A. Smith, .Analyzing Social Media Networks with NodeXL, Morgan Kaufmann, 2011
2. Avinash Kaushik. 2009. Web Analytics 2.0, Wiley Publishing, Inc, 2010.

MCSCS 206-2 **DIGITAL IMAGE PROCESSING**

L	T	P	C
3	0	0	3

Module 1

Introduction to Digital Image Processing, fundamental steps in Digital Image Processing, elements of visual perception, image sensing and acquisition, sampling and quantisation, relationship between pixels, intensity transformations and spatial filtering: basic intensity transformation functions, histogram processing, spatial filtering, smoothing and sharpening filters.

Module 2

Filtering in frequency domain: preliminary concepts, Fourier transform of sampled functions, Discrete Fourier Transform of one and two variables, Fast Fourier Transform, filtering in the frequency domain: smoothing and sharpening filters, Image restoration: noise models, restoration in the presence of noise only, periodic noise reduction.

Module 3

Wavelets and multiresolution processing: Image pyramids, subband coding, the Haar transform, multiresolution expansions, wavelet transform in one and two dimensions, fast wavelet transform, wavelet packets. Image compression: fundamentals, compression models and standards, basic compression methods: Huffman coding, Golomb coding, arithmetic coding, LZW coding, run-length coding, wavelet coding.

Module 4

Image segmentation: point, line, and edge detection, thresholding, region based segmentation; representation, boundary descriptors, regional descriptors.

References:

1. Gonzalez R. C. & Woods R. E., *Digital Image Processing*, 3rd ed, PHI Learning, 2008.
2. Sonka M, Vaclav Hlavac, and Roger Boyle, *Image Processing, Analysis and Machine Vision*, Brooks Cole, 3rd ed, 2008
3. Jain A K, Fundamentals of Digital Image Processing, Prentice-Hall India, 2007.

MCSCS 206-3 **EMBEDDED SYSTEMS**

L	T	P	C
3	0	0	3

Module 1

Introduction to Embedded Systems: Definition, Characteristics and Classification –Overview of Processors and hardware units in an embedded system – Software embedded into the system – Embedded System design process- Exemplary Embedded Systems.

Module 2

Devices and Buses for Devices Network: I/O Devices -Device I/O Types and Examples – Synchronous -Iso-synchronous and Asynchronous Communications from Serial Devices - Examples of Internal Serial-Communication Devices -UART and HDLC - Parallel Port Devices - Sophisticated interfacing features in Devices/Ports-Timer and Counting Devices - '12C', 'USB', 'CAN' and advanced I/O Serial high speed buses- ISA, PCI, PCI-X, cPCI and advanced buses.

Module 3

Embedded Programming: Programming in assembly language (ALP) vs. High Level Language -C Program Elements, Macros and functions -Use of Pointers -NULL Pointers -Use of Function Calls

– Multiple function calls in a Cyclic Order in the Main Function Pointers – Function Queues and Interrupt Service Routines Queues Pointers – Concepts of EMBEDDED PROGRAMMING in C++ -Objected Oriented Programming – Embedded Programming in C++, 'C' Program compilers
– Cross compiler – Optimization of memory codes.

Module 4

Real Time Operating Systems – Part -1 OS Services – Interrupt Routines Handling, Task scheduling models -Handling of task scheduling and latency and deadlines as performance metrics -Inter Process Communication And Synchronisation – Shared data problem – Use of Semaphore(s) – Priority Inversion Problem and Deadlock Situations – Inter Process Communications using Signals – Semaphore Flag or mutex as Resource key – Message Queues – Mailboxes – Pipes – Virtual (Logical) Sockets – RPCs.

References:

1. David E. Simon, "An Embedded Software Primer", Pearson Education Asia, First Indian Reprint 2000.
2. Wayne Wolf "Computers as Components: Principles of Embedded Computing System Design", Morgan Kaufman Publishers, 2008.
3. Rajkamal, "Embedded Systems Architecture, Programming and Design", TATA McGraw Hill, First reprint 2003.
4. Dr. Prasad K. V. K. K., "Embedded / Real-Time systems: Concepts, Design and Programming: The Ultimate Reference", Dreamtech Press,2004

MCSCS 206-4ONTOLOGY DRIVEN KNOWLEDGE MANAGEMENT

L	T	P	C
3	0	0	3

Module 1: Foundations of Semantic Web

Today's web and keyword based search, Semantic Web, Examples, Semantic web technologies- Sources of semantic Data- using Semantic search- Linked Data-Vocabularies, Taxonomies and Ontologies - Overview of Ontology Elements Requirements of ontology languages, Examples of published Ontology- Semantic Web versus Artificial Intelligence, A Layered approach to Semantic Web

Module 2: Modeling Information

Resource Description Framework –RDF triple form- RDF Graph-simple examples-advantages-RDF Schema- Basic Ideas, Language- Exchanging Information With RDF, Statements As Points, RDF Serializations , RDF/XML, Blank Nodes In RDF, Reification, , Limitations Of RDF Schema, RDFS entailment -SPARQL- Simple Query Example

Module 3: Knowledge Representation

Web Ontology Language OWL, Examples- Sublanguages-OWL DL- Description Logics- A Box T Box split

Predicate Logic and Rule Systems, Horn Logic-Monotonic Rule Systems, Non Monotonic Rule- Systems -Rule Languages- RuleML,SWRL,ORL

Module 4: Logic and Inference

Semantic Web Frameworks , Retrieving Information in a Knowledgebase , Realizing the Semantics of OWL , Understanding Forward Chaining Inference , Understanding Backward Chaining Inference , Choosing the Right Inference Method- Common Frameworks and Components- Jena, Seasme - RDF store implementations-Retrieval Components-Reasoning Engines

References:

1. Grigoris Antoniou and Frank van Harmelen. A Semantic Web Primer, MIT Press,2004.
2. John Hebeler, Matthew Fisher, Ryan Blace, Andrew Perez-Lopez, Semantic Web Programming, Wiley Publishing, Inc, 2009.
3. Thomas B. Passin,Explorer's Guide to the Semantic Web, Manning, Pearson, July 2004.
4. John Davies, Dieter Fensel, Towards the Semantic Web: Ontology-driven Knowledge management,John Wiley& Sons Ltd, 2003.
5. Davies, John, Rudi Studer, and Paul Warren, Semantic Web Technologies : Trends and Research in Ontology-Based Systems, John Wiley & Sons, 2006.
6. Bhavani Thuraisingham, XML Databases and the Semantic Web, CRC Press, 2002.
7. Dieter Fensel, James A. Hendler, Henry Lieberman and Wolfgang Wahlster, Spinning the Semantic Web- Bringing the World Wide Web to Its Full Potential, MIT Press, 2002
8. The Fundamental Importance of Keeping an ABox and TBox Split,Ontology Best Practices for Data-driven Applications: Part 2, http://www.mkbergman.com/489/ontology-best-practices-for-data-driven-applications-part-2/
9. Toby Segaran,Colin Evans,Jamie Taylor, Programming the semantic web, O'Reilly, July 2009

MCSCS 207 **NETWORK SIMULATION LAB**

L	T	P	C
0	0	3	2

List of Experiments:

1. A thorough study of packet capturing tool called WireShark.
2. Familiarizing Network Simulator – 2 (NS2) with suitable examples
3. Simulate a wired network consisting of TCP and UDP Traffic using NS2 and then calculate their respective throughput using AWK script.
4. Performance evaluation of different routing protocols in wired network environment using NS2
5. Performance evaluation of different queues and effect of queues and buffers in wired network environment using NS2
6. Compare the behavior of different variants of TCP (Tahoe, Reno, Vegas….) in wired network using NS2. Comparison can be done on the congestion window behavior by plotting graph.
7. Simulation of wireless Ad hoc networks using NS2
8. Simulate a wireless network consisting of TCP and UDP Traffic using NS2 and then calculate their respective throughput using AWK script.
9. Performance evaluation of different ad-hoc wireless routing protocols (DSDV, DSR, AODV …) using NS2
10. Create different Wired-cum-Wireless networks and MobileIP Simulations using NS2

MCSCS 208 **SEMINAR – II**

L	T	P	C
-	-	2	1

Each student shall present a seminar on any topic of interest related to the core / elective courses offered in the first semester of the M. Tech. Programme. He / she shall select the topic based on the References: from international journals of repute, preferably IEEE journals. They should get the paper approved by the Programme Co-ordinator / Faculty member in charge of the seminar and shall present it in the class. Every student shall participate in the seminar. The students should undertake a detailed study on the topic and submit a report at the end of the semester. Marks will be awarded based on the topic, presentation, participation in the seminar and the report submitted.