



## School of Computing & Information Technology Department of Computer Science & Engineering

### Departmental Board of Studies (BoS) Meeting Minutes of Meeting

The meeting of BoS for Department of Computer Science & Engineering was scheduled on 14<sup>th</sup> July 2015 in SCIT Board Room.

#### The following members were present: -

- |   |                     |
|---|---------------------|
| 1. Dr. Kumkum Garg, Professor (CSE)                 | - Chairperson       |
| 2. Dr. R S Shekhawat, Professor and Director (SCIT) | - Member            |
| 3. Dr. R Bhatnagar, Professor (CSE)                 | - Member            |
| 4. Dr. U S Rawat, Professor (CSE)                   | - Member            |
| 5. Dr. S. Joshi, Professor (CSE)                    | - Member            |
| 6. Dr. Vandana Suhag, Registrar                     | - Ex-officio Member |
| 7. Dr. M S Gaur, Professor (CSE) – MNIT, Jaipur     | - External Member   |

#### Agenda for the meeting:

1. Approval of the title for the first year SCIT course.
2. Approval of the syllabus for the first year SCIT course.
3. Revision of the following M.Tech – CSE syllabi
  - a. MA2186 - Graph Theory
  - b. CS2101 - Formal Methods in Computer Science
  - c. CS2202 – AI & Soft Computing
  - d. CS2250 - Adv. Computer Networks

#### Minutes of the Meeting:

Following suggestion were made by the committee of experts:

1. The course title for the code – CS1101 is revised to “Programming in C” from 2015 – 16 onwards.
2. The lab courses for “Programming in C” will have 10-12 experiment list along with a Mini Project.
3. The course content will include the Linux OS fundamental in theory and its commands hands-on in lab experiments.
4. The revision of the M.Tech – CSE syllabi was approved and recommended by the committee.

**HoD – CSE**  
**HoD, CSE**  
**MANIPAL UNIVERSITY**  
**JAIPUR-303007**

(Prof Robert Bhatnagar)



<b>Name of Program with code: M.Tech. (CSE) / 93004</b>	
<b>Name of Course with Code:</b> Advance Computer Network (CS2250)	<b>Name of Course with Code:</b> Advance Computer Network (CS2250)
<b>Syllabus Prior Revision</b>	<b>Syllabus Post Revision</b>
<p>Introduction: Requirements, Network architecture, Networking principles, Network services and Layered architecture, Network services and Layered architecture, Future networks (Internet, ATM, Cable TV, Wireless – Bluetooth, Wi-Fi, WiMax, Cell phone). Advanced Technologies: Virtual circuits, Fixed-size packets, Small size packets, Integrated service, History, Challenges, ATM Network protocols, IP over ATM, Wireless networks: Wireless communication basics, architecture, mobility management, wireless network protocols. Ad-hoc networks Basic concepts, routing; Bluetooth (802.15.1), Wi-Fi (802.11), WiMAX (802.16), Optical Network: links, WDM system, Optical LANs, Optical paths and networks. Performance of Networks: Control of networks: objectives and methods of control, Circuit-switched networks, datagram and ATM networks. Mathematical background for control of networks like Circuit-switched networks, Datagram and ATM networks. Advanced Routing – I Routing architecture, Routing between peers (BGP), IP switching and Multi-Protocol Label Switching (MPLS); MPLS Architecture and related protocols, Traffic Engineering (TE) and TE with MPLS, NAT and Virtual Private Networks (L2, L3, and Hybrid), CIDR – Introduction, CIDR addressing, CIDR address blocks and Bit masks. Advanced Routing – II Mobile IP characteristics; Mobile IP operation, Security related issues: Mobility in networks. Voice and Video over IP (RTP, RSVP, QoS) IPv6: Why IPv6, basic protocol, extensions and options, support for QoS, security, etc., neighbour discovery, auto-configuration, routing. Changes to other protocols. Application Programming Interface for IPv6: Ad Hoc Networking an Introduction, A DoD Perspective on Mobile Ad Hoc Networks, DSDV: Routing over a multihop Wireless Network of Mobile Computers, Cluster-Based Networks, DSR: The Dynamic Source Routing Protocol for</p>	<p>Brief Overview of TCP/IP suite of protocols: UDP, TCP, IP, ARP, ICMP, UDP, TCP, SMTP, FTP, HTTP</p> <p>Review of networking devices: routing and switching, Distance Vector Routing: RIP, algorithm, routing table format, routing update format, Link State Routing: OSPF, algorithm, routing table format, routing update format, IPV4 addressing format, IP Multicasting. Multicast routing protocols, address assignments, session discovery. Virtual Private Networks - L2 and L3 Switches, CIDR –Introduction, CIDR addressing, CIDR address blocks and Bit masks, Mobile IP-characteristics, Mobile IP operation, Security related issues. IPSec, Why IPv6, basic protocol, extensions and</p> <p>options, support for QoS, security, etc., neighbour discovery, auto-configuration, routing.</p> <p>Packet Switching: X.25. ATM, Frame Relay, Virtual circuits MPLS Architecture and related protocols, Traffic Engineering (TE) and TE with MPLS, Transport protocols and congestion control, Quality of Service (QoS) with MPLS technology, Network recovery and restoration with MPLS technology.</p> <p>Voice over IP (VOIP): VOIP protocols: overview of H323 and SIP (session initiation protocol). Overview of VOIP call flows, IVR calls, Advanced Routing and switching: Review of networking devices, routing and switching.</p> <p>Security Issues in TCP/IP and BGP, DoS/DDoS attacks, Mitigation with recent trends, Cryptography, Intrusion Detection; Common Management Information services/protocol (CMIS/CMIP), Network Trouble Shooting, QoS MAC protocols for high-speed LANS, MANs, and wireless LANs. (For example, FDDI, DQDB, HIPPI, Gigabit Ethernet, Wireless Ethernet, etc.) Fast access technologies. (For example, ADSL, Cable Modem, etc.)</p>



Multihop Wireless Ad Hoc Networks.

**Text Books:**

1. Larry L. Peterson, Bruce S. "Computer Networks: A Systems Approach", 4th edition, Davie

Publisher: Elsevier/Morgan Kaufmann, ISBN: 13:978-0-12-370548-8; 10:0-12-370548-7

2. Douglas E. Comer, "Internetworking with TCP/IP Vol -I", 5th Edition Publisher: Prentice Hall, 5th edition.

3. Jean Walrand and Pravin Varniya, "High Performance Communication Networks" second edition Publisher: Morgan Kaufmann Publisher Elsevier ISBN: 1-5580-574-6 Indian ISBN: 81-8147-652-2

4. Charles E. Perkins, "Ad Hoc Networking", PEARSON, ISBN: 9788131720967

**Reference Books:**

1. Sam Halabi, "Metro Ethernet", Publisher: Cisco Press ISBN: 158705096X

2. A. S. Tanenbaum, "Computer Networks", Publisher: Pearson Education;

3. Krishna M. Sivalingham, Suresh Subramaniam, "Emerging Optical Network Technologies",

Publisher: Springer ISBN: 0-387-22582-X

4. Wayne Grover, "Mesh Based Survivable Networks", Publisher: Prentice Hall, ISBN: 013494576X

5. W. R. Stevens, "TCP/IP Illustrated, Volume 1,2,3", Publisher: Pearson Education

Ad Hoc Networking: An Introduction, A DoD Perspective on Mobile Ad Hoc Networks, DSDV: Routing over a Multi-hop Wireless Network of Mobile Computers, Cluster-Based Networks, DSR: The Dynamic Source Routing Protocol for Multi-hop Wireless Ad Hoc Networks

**Text Books:**

1. W. R. Stevens. "TCP/IP Illustrated, Volume 1: The protocols," Addison Wesley, 1994.

2. Behrouz A. Forouzan, "TCP/IP Protocol Suite", Tata McGraw Hill, 4th Edition, 2010.

3. G. R. Wright and W. R. Stevens. "TCP/IP Illustrated", Volume 2: The Implementation, Addison Wesley, 1995

**Reference Book:**

1. W. R. Stevens, "TCP/IP Illustrated, Volume 3: TCP for Transactions, HTTP, NNTP, and the Unix Domain

Protocols", Addison Wesley, 1996.

2. Peter Loshin, "IPv6 Clearly Explained", Morgan Kauffman, 1999.

3. M. Gonsalves and K. Niles. "IPv6 Networks", McGraw Hill, 1998.

<b>Name of Program with code: M.Tech. (CSE) / 93004</b>	
<b>Name of Course with Code: FORMAL METHODS IN COMPUTER SCIENCE (CS2101)</b>	<b>Name of Course with Code: FORMAL METHODS IN COMPUTER SCIENCE (CS2101)</b>
<b>Syllabus Prior Revision</b>	<b>Syllabus Post Revision</b>
<p><del>Introduction, Set Theory, Sequences, Tuples, Functions, Relations, Graphs, Turing Machines, Enumerators, Dovetailing, The Church Turing Thesis, Hilbert's Tenth Problem, Decidable Languages, The Acceptance Problem for DFAs, The Halting Problem, Universal TM, Undecidability of the Halting Problem, Linear Bounded Automata, Computation Histories, Context Free Grammars, Russell's Paradox, Emptiness Problem, Post Correspondence Problem, Computable Functions, Reducibility, Recursion Theorem, Logical Theories, Godel's Theorem, Oracles, Turing Reducibility, A definition of Information, Incompressible Strings, Complexity Theory, Big Oh and Little Oh Notations, Time Complexity, Non-Deterministic Time, The Class P, The Class NP, Polynomial Time Verifiers, Subset Sum Problem, Satisfiability, NP Completeness, 3-Color Problem, The Cook Levin Theorem, Independent Sets Problem, Clique, Vertex Cover, Hamiltonian Path Problem, The Subset Sum Problem, The Traveling Salesman Problem, Space Complexity, Relationship between Space and Time Complexity, PSPACE Completeness, TQBF, Prove that TQBF is PSPACE Complete, FORMULA GAME, Generalized Geography, LOGSPACE Transducer, Prove the Theorem: NL = co-NL.</del></p> <p><b>Text Books:</b></p> <ol style="list-style-type: none"> <li>1. An Introduction to Automata Theory, Languages and Computations - J. E. Hopcroft, R. Motwani, J. Ullman, Pearson Education, Third Edition, 2006.</li> <li>2. Introduction to the Theory of Computation – Michael Sipser, Cengage Learning, Third Edition, 2012.</li> </ol>	<p>Mathematical Preliminaries and Notation: Introduction: Set Theory, Sequences, Tuples, Functions, Relations, Finite Automata: The Acceptance Problem for DFAs, Context Free Grammars, Linear Bound Automata, Turing Machines: The Halting Problem, The Church Turing Thesis, Universal Turing Machine, Hilbert's Tenth Problem, Enumerators, Decidable Languages, Computation Histories, Russell's Paradox, Emptiness Problem, Post Correspondence Problem, Computable Functions: Reducibility, Recursion Theorem, Logical Theories, , Oracle's Turing Reducibility, A definition of Information, Incompressible Strings, Complexity Theory and Notations: Time Complexity, Non Deterministic Time, P Class and NP Class Polynomial Time Verifiers, Subset Sum Problem, NP Completeness.</p> <p><b>Text Books:</b></p> <ol style="list-style-type: none"> <li>1. J. E. Hopcroft, R. Motwani, J. Ullman, Introduction to Automata Theory, Languages and Computations, Pearson Education, 2003.</li> <li>2. H. Lewis, C. Papadimitriou, Elements of the Theory of Computation, Pearson Education, 2003.</li> </ol> <p><b>Reference Book:</b></p> <ol style="list-style-type: none"> <li>1. Introduction to Formal Languages and Automata – Peter Linz, Jones and Bartlett Student Edition, Fifth Edition, 2011.</li> <li>2. Introduction to Languages and the Theory of</li> </ol>



**Reference Book:**

1. Introduction to Formal Languages and Automata – Peter Linz, Jones and Bartlett Student Edition, Fifth Edition, 2011.

2. Introduction to Languages and the Theory of Computation – John Martin, Tata McGraw Hill, Fourth Edition, 2010.

Computation – John Martin, Tata McGraw Hill, Fourth Edition, 2010.

<b>Name of Program with code: M.Tech. (CSE) / 93004</b>	
<b>Name of Course with Code:</b> Graph Theory (MA2186)	<b>Name of Course with Code:</b> Graph Theory (MA2107)
<b>Syllabus Prior Revision</b>	<b>Syllabus Post Revision</b>
<p><del>Vertex Cover, Matchings, Pathcover, Connectivity, Hamiltonicity, Vertex Coloring, Edge Coloring Other Coloring Problems, Perfect graphs, Planar graphs, Other special classes of graphs, Network flow, Introduction to minor theory, Probabilistic Methods: Basics Markov, Chebishey Inequalities, Lovasz Local Lemma, Random graph.</del></p> <p><b>Text Books:</b></p> <ol style="list-style-type: none"> <li>1. R. Diestel, <i>Graph Theory</i>, Springer-Verlag, 2nd edition, 2000.</li> <li>2. N. Alon, J. Spenser, <i>Probabilistic Methods</i>, John Wiley and Sons, 2nd edition, 2000.</li> </ol>	<p>Graphs: Definition and examples of graphs, Incidence and degree, Handshaking lemma, Isomorphism Sub-graphs, Weighted Graphs, Eulerian Graphs, Hamiltonian Graphs, Walks, Paths and Circuits, Connectedness algorithm, Shortest Path Algorithm, Fleury's Algorithm Chinese Postman problem, Traveling Salesman problem. Trees: Definition and properties of trees Pendent vertices, Centre of a tree Rooted and binary tree, spanning trees, minimum spanning tree algorithms Fundamental circuits, cut sets and cut vertices, fundamental cut sets, connectivity and separativity, max-flow min-cut theorem Planar Graphs: Combinational and geometric duals Kuratowski's graphs Detection of planarity, Thickness and crossings Matrix Representation of Graphs: Incidence, Adjacency Matrices and their properties Colouring: Chromatic Number, Chromatic Polynomial, the six and five colour theorems, the four colour theorem Directed Graphs: Types of digraphs, directed paths and connectedness, Euler digraphs, Directed trees, Arborescence, Tournaments, Acyclic digraphs and de cyclisation. Enumeration of Graphs: Counting of labelled and unlabelled trees, Poly's theorem, Graph enumeration with Poly's theorem</p> <p><b>Text Books:</b></p> <ol style="list-style-type: none"> <li>1. Bondy, J. A. &amp; U. S. R. Murty, "Graph Theory with Applications", MacMillan and sons [1976]</li> <li>2. Deo, Narsing "Graph Theory with Applications to Engineering and Computer Science", Prentice Hall [1974]</li> </ol> <p><b>Reference Book:</b></p> <ol style="list-style-type: none"> <li>1. R. Diestel, "Graph Theory", Springer-Verlag, 2nd edition, 2000.</li> </ol>

	<p>2. N. Alon and J. Spenser, "Probabilistic Methods", John Wiley and Sons, 2nd edition, 2000.</p>
--	--



<b>Name of Program with code: M.Tech. (CSE) / 93004</b>	
<b>Name of Course with Code:</b> Artificial Intelligence and Soft Computing (CS2202)	<b>Name of Course with Code:</b> Artificial Intelligence and Soft Computing (CS2202)
<b>Syllabus Prior Revision</b>	<b>Syllabus Post Revision</b>
<p><del>Artificial Intelligence: Introduction, Intelligent Agents, Solving problems by searching, Informed Search methods, Game Playing, Knowledge Representation: Semantic Nets, Scripts, Frames, Expert Systems(ES): Introduction, Phases in building Expert Systems, Expert system architecture, ES versus traditional systems, Rule based ES, Blackboard systems, Truth Maintenance Systems, Applications; Neural Networks: Introduction, Basic Neural Computational Models, Learning: Supervised versus unsupervised, Mathematical modeling; Fuzzy Systems: Basic concepts of fuzzy logic, Fuzzy sets, Fuzzy If Then Rules, Neuro-Fuzzy Systems; Introduction to GA and NLP.</del></p> <p><b>Text Books:</b></p> <ol style="list-style-type: none"> <li>1. S. Russell, P. Norvig, Artificial Intelligence- A Modern Approach, Pearson Education Asia, 2002.</li> <li>2. L. Fu, Neural Networks in Computer Intelligence, TMH, 2003.</li> <li>3. J. Yen, R. Langari, Fuzzy Logic- Intelligence, Control, &amp; Information, Pearson Education Asia, 2003.</li> </ol>	<p>Fundamental Concept: Intelligent Systems, Foundation and Application of AI, Current Trends in AI; Intelligent Agents: Agent v/s Software Program, Classification of Agents, Working of an Agent, Single and Multi-Agent System, Performance Evaluation of Agents, Architecture of Intelligent Agents; Problem Solving Techniques; Game Playing; Search Techniques: Uninformed search, heuristic search, adversarial search and game trees, Solution to Constraint satisfaction problem using search; Knowledge Representation: Semantic Networks, conceptual/Graph Dependency, structured representation, frames, scripts; Propositional and Predicate Logic: Propositional and Predicate calculus, semantics for predicate calculus, theorem prover, inference rules, unification, Resolution, Refutation in predicate logic; Natural Language Processing: Introduction, parsing using context free grammars, Chomsky hierarchy, case grammar; Soft Computing: Fuzzy sets, set theoretic operations, membership functions, Fuzzy rules; Neural Networks: Perceptron, Back Propagation, Hop-field Networks; Introduction to Genetic Algorithm.</p> <p><b>Text Books:</b></p> <ol style="list-style-type: none"> <li>1. Russell, S. and Norvig, P., "Artificial Intelligence: A Modern Approach", Prentice Hall, 2011.</li> <li>2. Rich, E., Knight, K. and Nair, S.B., "Artificial Intelligence", 3RD Ed., Tata McGraw Hill, 2009.</li> </ol> <p><b>Reference Books</b></p> <ol style="list-style-type: none"> <li>1. Nilsson, N. J., "Artificial Intelligence: A New Synthesis", Morgan, 2009.</li> </ol>



	<p>2. Patterson, Introduction to Artificial Intelligence And Expert Systems, Prentice-Hall of India Pvt. Limited, 1990</p>
--	--