Abstracts for Courses for MSc-IT Program (wef 2005-06 – subject to change)

**HM601 Principles of Management (3-0-0-3):** This course is an introduction to the various aspects of management of business: Types of organization; basic concepts of financial management; product development; marketing; operations management; quality management; personnel management; importance of team-work, creativity, personal management and communication skills.

**HM621 Network Economy and Society (3-0-0-3):** This is a sociology/ economics course aimed at analyzing the relationships between information technologies and the society. Topics discussed include: Technology and society; the Information Technology revolution; the Internet society; the network economy; the network enterprise and transformation of work, management and employment; the digital divide; and the issues of governance and politics. The concluding theme touches on technology and social responsibility.

**IT612 Database Design & Programming (3-0-2-5):** This course covers information systems design and implementation within a database management system environment. Students will design and construct a physical system using database software to implement the logical design. Topics include data models and modeling tools/techniques; structured and object design approaches; models for databases: relational and object oriented designs; query languages; design and planning of client-server applications.

**IT613 Computer Organization (3-0-2-4):** Objectives and Outcomes: Students will learn an overview of computer architecture and organization; Students will learn principles of operating systems that manage various computer resources, including virtual memory, process scheduling, and file systems; Students will learn operating system mechanisms such as shared memory, synchronization, and security and protection mechanisms; Students will learn principles of multi-tasking, process and thread management and inter-process communication.

**IT614 Programming Paradigms (3-0-2-4):** Objectives and Outcomes: Students will learn to use well-established programming practices, patterns, and paradigms such as literate programming, structure programming, and object-oriented programming. They will learn how to formulate assertions about program fragments and how to use them to document their programs. They will be able to create C and C++ programs that are self documenting, understandable, self testing, and easily modifiable. They will learn principles of version management and configuration management. They will be able to manage versions of programs and their subcomponents. They will be able to write scripts, e.g., Make files, to automate building of executables and other run-time objects.

**IT623 Algorithms and Data Structures (3-0-2-4):** This course introduces the basic concepts and techniques of data structures and algorithms. These include stacks, queues, arrays, linked lists, trees, graphs, algorithms for manipulating data structures, binary trees, balancing trees and hashing. The course also covers the file processing environment, file organization, searching and sorting. Students will implement algorithms using C++ or Java.

**IT624 Web Applications & Programming (3-0-4-5):** This course focuses on client-server web applications built using different technologies such as HTTP, ASP, XML and sockets; implementation of a database-driven website, and study of the relevant technologies and performance tradeoffs at each tier of the architecture. Students will build a distributed system using distributed object frameworks such as CORBA or
Web Services. Security issues and strategies in an enterprise-wide web-based application will also be discussed.

**IT625 Programming Laboratory I (2-0-4-4):** Objectives and Outcomes: Students will learn capabilities and limitations of Java-based technologies. Students will develop skills for programming in Java using appropriate Java packages and Java programming paradigms and patterns. Students will develop skills for programming using Java concepts such as beans, remote procedures and sockets. Students will develop skills for implementing user-interfaces with Java concepts such as applets and packages such as awt, Swing, Java Faces. Contents: Java programming language - Virtual machine, syntax, semantics, packages. Java-based technologies - Java beans, J2EE (EJB, container). Programming paradigms/patterns. User interface design - Swing, Java faces. Server-based programming using Java.

**IT626 Programming Laboratory II (1-0-4-3):** Objectives and Outcomes: Students will learn capabilities and limitations of web-based technologies. Students will develop skills for programming web pages and web sites using appropriate technologies such as HTML, CSS, XML, Java-Script, JSP, and servlets; and web-based programming paradigms and patterns. Students will develop skills for programming web-based systems. Students will develop skills for implementing web-based user-interfaces. Students will develop skills for implementing connections between web sites, web pages and other systems, including database management systems. Students will develop skills for streaming multi-media over the Internet. Students will develop skills for automatic updates using technologies such as RSS. Students will learn skills for Content management (managing dynamic content) - techniques, downloading, load balancing and deployment.

**IT631 Object Oriented Analysis & Design (3-0-2-4):** This course introduces the Object Oriented Analysis and Design methods using the Unified Modeling Language (UML). Topics include: Review of concepts related to the object model; the process and relevant notation of object-oriented requirements specification, analysis and design; case studies and applications using an object oriented design tool and programming language.

**IT632 Software Engineering (3-0-2-4):** An IT professional needs to have a good understanding of the principles of software engineering, so that he or she can contribute effectively towards the planning and development of software and software systems. This course teaches the fundamentals of software engineering, the life cycle models, and the software process phases including requirements engineering, design, coding, testing and quality assurance.

**IT633 Data Mining and Warehousing (3-0-2-4):** Data warehousing: fundamentals, how to plan and build a data warehouse, OLAP, IBM data warehouse too; Machine Learning: concepts: supervised, unsupervised; Classification: decision trees, instance-based, bayesian, neural networks; Clustering: hierarchical, partition-based algorithms, EM, some tools; Association Rule Mining: A-priori and some recent research; HMM; Web mining, Introduction to NLP; Introduction to spatial mining, temporal mining (time-series analysis); Intro to Bioinformatics. *(Elective)*

**IT634 Information Systems Security (3-0-2-4):** The main objective of this course is to familiarize the students with the various components of “Information Systems Security”. Information Systems security affects the complete process of Information Systems conception, development, implementation, maintenance and execution. There is no part in the complete existence of the Information System that can escape without security concerns. Topics: Introduction to Computer Security; Security Management and Architecture; Application Security; Cryptography; Access Controls and Physical Security; Operations Security; Telecommunications & Network Security; Business Continuity Planning; Law, Investigations & Ethics. *(Elective)*
**IT635 Distributed Computing for IT (3-0-2-4):** This course is intended to provide the students with concepts, requirements and different models of distributed computing. The models include message oriented, client-server, peer-to-peer, Remote Procedure Calls, Object based models like RMI and CORBA, Network model etc. The Enterprise Application development using the distributed computing is also covered. The role of middleware in building the enterprise applications is covered by taking J2EE architecture as example. The APIs provided to solve the problems using different models are also covered which includes socket programming, RMI, CORBA, Servlets, EJBs, and JDBC. *(Elective)*

**IT694 Computer Networks (3-0-2-4):** The course explains the evolution of computer-communication networks and modern network architectures in a top down manner i.e. it begins at the application layer and works its way down toward the physical layer. A thorough treatment of TCP/IP set of protocols will be given. You will not only see how popular applications and protocols work, but also learn how easy it is to create your own network applications and application-level protocols. An introduction to Application Development and Socket Programming will also be given. The associated laboratory component is designed to expose you to basic networking hardware, simulation tools and network programming for analysis of network protocols. At the end of the course, a student should be able to analyze and compare network technologies and use the appropriate tools to design and implement network systems.

**PC612 Communication Skills (2-0-0-2):** This course is designed to provide students with (a) the skills to enhance communication – both verbal and written, as well as presentations skills, (b) skills for job interviews, (c) self-motivation and measurable goal-setting, (d) professional behavior, and (e) principles of consultation as an appropriate tool for relating to others.

**SC611 Mathematics (3-1-0-4):** This course introduces the basic mathematical concepts useful in analyzing and designing information systems. Topics include: propositional logic; sets, relations and functions; partial orders; graphs and trees; phrase structure grammars, regular expressions and finite state machines. Basic numerical techniques: round-off and truncation errors; solution of a system of linear equations; Newton-Raphson method; numerical integration; curve-fitting.