MS Program in Advanced Software Technologies

" Information Technology and Businesses are becoming inextricably interwoven. don't think anybody can talk meaningfully about one without talking about the other."

- Bill Gates

The modern, dynamic and competitive business environment has raised the necessity for improved technological support for achieving the target goal. To keep pace with the dynamic nature of the Internet, Enterprise Applications, Database Technologies, Application Integration issues, Business Dynamics and Technology usage platforms have undergone dramatic changes. Integrated applications, the mainstay of large enterprises, are now a pervasive phenomenon. From being mere text and numeric data stores, databases have evolved with capabilities of handling rich data and varied content. A paradigm shift to rich content and open platform based integrated applications have given rise to new technologies like Enterprise Application Integration, Data Warehousing, Data Mining, Content Management, Business Intelligence, Grid Computing, Mobile Computing systems, Information Security and Intelligent systems that challenge IT professionals to build applications to leverage business.

Program

This autonomous, four Semester, 24-month, 72 Credits, full-time Masters Program in Software Technologies is designed to equip students to accept responsibilities in the following areas:
- Advanced Web Applications
- Enterprise wide Application System
- Database Technologies
- Software Performance Engineering
- Enterprise Application Integration Approaches

Program Structure

- Successful completion requires 72 Credits.
- To bridge the gap between theory and practice project work worth 18 Credits in the last semester.
- The program is distributed over FOUR semesters. First three semester are the academic semester comprises of theoretical courses, laboratory, seminar/mini project. The fourth semester is for final project carrying 18 credits.
- The entire curriculum is distributed over six levels to aim at transcending the students' level of understanding for corporate readiness. The levels are respectively, Bridge, Foundation, Core, Advanced, Electives and Project.
- Students are allowed to take 9 credit courses from this program stream or from any other suitable stream provided they are fit academically for pursuing such courses.
- Students are required to take three electives from one of the specialization stream (Electives).

- To be eligible for MS in AST student has to take minimum subjects worth 63 credits from AST stream out of 72 credits.

Program Pedagogy

All courses are designed to cover theoretical foundations, practical applications and the real life problem solving approach. To achieve that this courses will be delivered using collaborative learning process through class room lectures, laboratory sessions, assignments, student seminars, lectures by industry experts, case studies, relevant industry visits and research / industry projects.

Distinctive Features

- Laboratory sessions to gain hands-on experience on various technological tools and platforms
- Exposure to Web Application Development Technologies like Java technologies, .NET Technologies and Mobile computing
- Elaborate case studies by leading experts from the industry
- Hands-on experience with database administration
- Hands-on experience Enterprise Application Integration and Software Performance Engineering
- Hands-on experience with SAS, SAP and TIBCO
- Option to work on projects that require working with faculty members and students from other streams such as advanced networking and telecom,

Embedded Systems and VLSI.

Eligibility

Graduates with any recognized Bachelors Degree of minimum three years duration with focused education in IT / Electronics, with at least 50% marks at the graduation level. Programming background in C /C++ is desired.

Program Commencement

The program commences in July / October.

Evaluation and Certification

- Continuous evaluation and performance improvement program
- Course-wise Credits
- Balanced assessment based on internals, mid-term test, laboratory, final theory examinations and project
- Detailed transcripts along with certificate

Placement Assistance

- Career guidance at the institute
- Pre-placement facilitation/development and Campus Interview by leading Industries
- Active interface with Technology and user companies

Selection Process

The selection of an applicant for the course is based on the following:
- Application forms shall be scrutinized for academic profile in line with the eligibility criteria.

- Scores received at the Graduation level like BE / B Tech / BCA / B. Sc. (IT) / BCS / M.Sc. etc
- Scores received at the "Accepted Qualifying Examinations" Like GRE / GMAT / XAT / CAT / GATE & Performance in the Entrance Test
- Personal Interview

Basic Courses

COM 001: LIFE SKILLS DEVELOPMENT
This basic course prepares students for the rigors of the master's level program and professional careers that will follow. The course is divided in 9 sections that will be conducted throughout the program.
The course stresses on: communication and presentation, leadership development, working in teams, time management, negotiation skills, stress management through yoga, multicultural and diversity management and offsite experiential learning. The ultimate objective of this course is to develop individuals with high Intelligence, Emotional and Spiritual Quotients (IQ, EQ and SQ).

COM 002: FOREIGN LANGUAGE (Level 1)
In order to equip students to take up global careers, a choice of foreign languages as a major subject is offered. Medium of instruction is English.

Bridge Courses
- Keeping in view the diverse background of students, variety of courses is offered under bridge courses to attain the requisite level of competency for further learning.
- Students will undergo entrance examination and interview as part of selection process. Depending on the performance, students will be advised to undergo the bridge courses.
- Duration of the bridge courses is 3 weeks prior to the beginning of the academic term.
- Performance in the bridge courses count towards partial weightage in the relevant foundation courses.

AST 001: COMPUTER ARCHITECTURE AND OPERATING SYSTEMS
This course covers operating system design concepts with examples from Linux and windows operating system. It also focuses on the study of the hardware structure of computer systems and sub-systems. The topics in operating system include: Operating system structures Process and thread management, Memory management Virtual memory, File system, I/O subsystem and device Communication, Introduction to Linux commands and shell scripts knowledge of a Linux text editor Protection and Security management. The

topics in computer architecture include: Processor architecture Parallelism and pipelining, Cache and memory organization, I/O controllers and interconnection structures.

AST 002: DATABASE TECHNOLOGIES
This course focuses on the theory of database engineering. The course includes topics like file processing, introductory data structures, the differences between file processing and database processing, fundamental concepts of the relational model, normalization of data, database integrity issues, database design, SQL and an overview of the functions of a database management systems.

AST 003: DATA STRUCTURES AND ALGORITHMS USING C
This course focuses on different data structures and their applications in computer programming. The data structures covered here are array, stack, queue, linked lists, binary tree and various sorting and searching algorithms.
Literals, Scope, Namespaces, Primitive Data Types, Conditional and Iterative Constructs, Unconditional Transfer of Control, Basic Operator Syntax and Semantics, Basic I/O, Enumerated Types, Pointers, Arrays, Dynamic Memory Allocation, Run-time, Compile-time and Automatic Memory Allocation, Parameter Passing (simple types, pointers, arrays), Constants, Defining Types with typedef, Typecasting.

NTC002: COMPUTER NETWORKS
This course shall emphasis on developing on understanding of the underlying principle of computer networking. Students will learn fundamental concepts of communication protocol stocks: OSI and TCP / IP, IP addressing schemes, subneting, LAN, MAN, WAN fundamentals, circuit and packets switching, networking devices, network protocols, standards, Internet Intranet, network security and allied technologies

AST 004: FOUNDATION OF C /C++
Literals, Scope, Namespaces, Primitive Data Types, Conditional and Iterative Constructs, Unconditional Transfer of Control, Basic Operator Syntax and Semantics, Basic I/O, Enumerated Types, Pointers, Arrays, Dynamic Memory Allocation, Run-time, Compile-time and Automatic Memory Allocation, Parameter Passing (simple types, pointers, arrays), Constants, Defining Types with typedef, Typecasting, Aggregate Types, The C++ Class, Creating, Passing, Copying and Destroying Objects, Access Modifiers and Inheritance, The Initializer, Multiple Inheritance, Class Variables and Methods,

Friend Classes and Functions, class vs. struct vs. union, Inline Methods and Embedded Classes, The Role of the Constructors and the Destructor, Pointers to Member Functions, Polymorphism, Virtual Methods, Virtual Destructor, Invoking an Overloaded Method from the Base Class, Operator Overloading

Foundation Courses

AST 501: GENERAL MANAGEMENT (1 Credit)
This course aims at bringing students of various field to a common ground from where they can be taken to higher levels of management skills; The main topics covered include principles and practices of management; introduction to management planning, organizing, staffing, directing, co-coordinating; recent trends in management with special emphasis to software industries.

AST 502: MATHEMATICAL FOUNDATION (2 Credits)
Topics include Set Theory, Logic, Induction, Recursion, Combinatorics, Matrices, Algebraic structure, Graphs and digraphs; Perfect Graphs, intersection graphs, Trees; Matrix-Tree theorem, Minimum spanning trees; Traveling Salesman problem; Algorithms for matching and weighted matching; The greedy algorithm; Networks and flows; Random graphs.

AST 503: DATABASE APPLICATION DEVELOPMENT (3 Credits, T=2 L=1)
This course discusses concepts like database transaction handling and concurrency control. It also focuses on the application development features of the databases. Programming features of a database like PL/SQL, PSP, features for web application, Java-stored procedures and SQLJ are covered here.

AST 504: APPLICATION DEVELOPMENT TECHNOLOGIES (3 Credits, T=2 L=1)
This course provides the student with thorough knowledge of web architecture, role of application servers and database management systems and HTML application development. The topics covered include HTML programming, Java script, Core Java applications, applets and multithreading, n-tier architecture

AST 505: XML TECHNOLOGY AND APPLICATIONS (3 Credits, T=2 L=1)
This course introduces XML (its structure and its applications in business), related technologies and its use for e-business application. The topics covered include DTD, schema, messaging, client and server side XML, XSL, SOAP and XML for B2B.

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AST 506: ADVANCED C++ PROGRAMMING (3 Credits, T=2 L=1)
Introduction, Programming Paradigms, Techniques Of Object-Oriented Aggregate Types, The C++ Class, Creating, Passing, Copying and Destroying Objects, Access Modifiers and Inheritance, The Initializer, Multiple Inheritance, Class Variables and Methods, Friend Classes and Functions, class vs. struct vs. union, Inline Methods and Embedded Classes, The Role of the Constructors and the Destructor, Pointers to Member Functions, Polymorphism, Virtual Methods, Virtual Destructor, Invoking an Overloaded Method from the Base Class, Operator Overloading Traditional Error Handling Methods, Enter Exception Handling, Applying Exception Handling, Exceptions During Object's Construction and Destruction, Global Objects: Construction and Destruction, Advanced Exception Handling Techniques, Exception Handling Performance Overhead. Class Templates, Function Templates, Performance Considerations.
Generic Programming, Organization of STL Header Files, Containers, Iterators, Algorithms, Function Objects, Adaptors, Allocators, Specialized Containers, Associative Containers, Class auto_ptr, Nearly Containers, Class string. Sequential Access files, Random Access Files and related Operations.

AST507: LINUX PROGRAMMING (2 Credits, T=1, L=1)
Introduction to Linux operating system, File Handling Introduction to Linux Commands, shell Scripting, gcc, gdb

AST508: SEMINAR - I (1 Credit)
Students have to study the pre-assigned topic in depth, prepare seminar report and present the same to the designated panel.

Core Courses

AST 601: BUSINESS PROCESS MANAGEMENT (1 Credit)
Business Process Management: BPMI focuses on standards development to support the entire life cycle of business process management – from process design, through deployment, execution, maintenance, and optimization.
Business process modeling methodology, Business process integration architecture, Collaborative business processes, Extended business collaboration

architecture and solutions, Business process based business transformation, Return on investment of business process integration and management, Requirements analysis of business process integration and management

AST602: OBJECT-ORIENTED ANALYSIS AND DESIGN USING UML (3 Credits, T=2 L=1)
This course focuses on the major techniques of the Unified Modeling Language (UML), object-oriented analysis and design notation and how these techniques can be applied to improve quality of productivity during the analysis and design of application. The topics covered include object models, analyzing system requirements, modeling concepts provided by UML, analysis and documentation of software designs using the unified process, identification of use cases, behavioral designs, design patterns to refine analysis and design models, implementation, testable and adaptable designs.

AST 603: SOFTWARE ENGINEERING AND PROJECT MANAGEMENT (2 Credits, T=1 L=1)
This course provides a comprehensive analysis of software engineering techniques and shows how they can be applied in practical software projects, all with an object-oriented approach. This course extensively covers software process technology, system integration, requirements management, software project management, verification and validation, risk analysis, pattern-based reuse, dependable systems development, distributed system engineering, and legacy systems.

AST 604: EXTENDED ENTERPRISE APPLICATIONS (3 Credits, T=2 L=1)
This course aims to consolidate the knowledge on enterprise-wide business process integration. This includes understanding of topics like materials management, Sales and distribution, Production planning and Financial Accounting. Design aspects of Integrated Enterprise Application Architecture. Practical exposure on these modules will be through SAP.

AST 605: DATA WAREHOUSING AND DATA MINING USING SAS (3 Credits, T=2 L=1)
The main objective of this course is to unfold

the concepts of data warehouse, OLAP, data mining and the design process. The topics include datamart, data mining, ETL process structure, data transformation services and OLAP service architecture. The course also focuses on the use of SAS (one of the world's leading data warehousing software) and includes topics such as SAS programming, SAS data sets, statistical analysis using ANOVA, regression, logistic regression, designing and creating data warehousing, querying and reporting using enterprise guide.

AST606: APPLICATION SERVER TECHNOLOGY (3 Credits, T=2 L=1)
Introduction to Application Server Framework; Basic functionality of Application Server; WebLogic Server - Introduction to WebLogic Server, WebLogic Server Architecture, JNDI & JDBC, Clustering, Performance Monitoring and Tuning, Security, Web Servers; IBM WebSphere – Introduction to WebSphere, Work with HTTP Servers, Install WebSphere Application Server, Work with WebSphere Administrative Console, Perform Administrative Tasks, Use WebSphere Server Clusters, Manage Application Security, Tune Performance, Resource Pools, Caching, Clustering, Monitor with WebSphere Tools, Troubleshoot WebSphere.

AST607: SEMINAR - II (1 Credit)
Students have to study the pre-assigned topic in depth, prepare seminar report and present the same to the designated panel.

Advanced Courses

AST 701: INFORMATION SECURITY MANAGEMENT (2 Credits)
Introduction: Types of Security Violations, Basic Security Concepts; Security threats - Intruders, Viruses, Worms, Ethical Hacking, Spoofing, Sniffing; Physical and Environment security; Network security-Firewall, Intrusion Detection System (IDS), Scanner, Virtual Private Networks (VPN); Network Security Management; Authentication Authorization and Accounting (AAA) - Access Control Principles and Objectives, Network Authentication, Application Authentication, Hardware Based, Software based; Internet security and Protocol: Risk management and Business Continuity Planning; Security Policy, standards, and organization; Data

Cryptography – Introduction, Various Symmetric and Asymmetric Encryption Algorithms.

AST 702: SOFTWARE PERFORMANCE ENGINEERING (3 Credits, T=2 L=1)
The course covers performance related issues of software which checks dependability of software component, subsystems and systems. It describes , how qualitatively software performance can be enhanced by using dependable software. The course includes discussion on functional attributes of software like – reliability, maintainability and availability. It also covers issue related to software system, their control, quality perspective and means to achieve high performance software using static and dynamic methods of qualifying software for critical application.

AST703: ENTERPRISE APPLICATION INTEGRATION (3 Credits, T=2 L=1)
This course introduces students to the opportunities, Concepts and challenges of integrating different applications (stovepipes) in different heterogeneous platforms, EAI architecture, EAI approaches data level ,application /process level, method level .user interface level, different protocols SOAP,WSDL,UDDI HTTP; Messaging concepts and various types of messaging services, middleware and adapters, transactional middle aware, EAI process methodology. TIBCO introduction to TIBCO product line, TIBCO architecture, TIBCO process methodology, TIBCO BusinessWorks, TIBCO database adapter, TIBCO file adapter, TIBCO SAP adapter.

Electives

The complete sets of elective courses are broken up as per specialized streams (S1 to S4) and are redefined under each of the specialization stream. Each student has to select a specialization stream as per his or her career path. One has to select THREE electives from the specified specialization stream.

Specialization Streams
S1. Advanced Database Management:

AST 811: ADVANCED DATABASE SYSTEMS (3 Credits, T=2 L=1)
This course aims to develop a theoretical and practical understanding of the requirements for implementing practical

large-scale databases in the real world.
At the end of the module the student will have developed: A theoretical and practical understanding of the requirements for transaction management in a multi-user database environment and the means to develop practical applications. A basic understanding of the requirements for a security model for large-scale database application and the mechanisms available to support it. A theoretical and practical understanding of how to communicate effectively between databases both locally and distributed across a network, Client-server, distributed and grid databases. The differences between object-oriented and relational databases and the practical implications of the object-relational approach.

AST 812: DATABASE ADMINISTRATION – I (3 Credits, T=2 L=1)
Database Administration involves the overall design and management of the database. Such tasks include archiving, consistency checks, developing / maintaining indexing and retrieval functionality, migration, monitoring, performance issues, replication issues, and database sizing/space management. The curricula are designed to provide a strong understanding of the concepts and hands-on practices with case studies.

This course introduces the students to the concepts and procedures associated with Oracle architectural components, storage structure components. It also covers installation and configuration of the database in optimal manner. Backup and Recovery including strategies and requirements are covered in-depth. Students will learn about the architecture and configuration of Oracle Net Services including client-server and web implementations. The curriculum will exhaustively cover the performance tuning related areas and troubleshooting. Students will also have hands-on practices on configuring the grid features of Oracle10g.

AST 813: DATABASE ADMINISTRATION – II (3 Credits, T=2 L=1)
Database Administration involves the overall design and management of the database. Such tasks include archiving, consistency checks, developing / maintaining indexing and retrieval functionality, migration, monitoring,

performance issues, replication issues, and database sizing/space management. The curricula are designed to provide a strong understanding of the concepts and hands-on practices with case studies.
This course introduces students with instruction of how to install, manage, monitor, and troubleshoot SQL Server 2000. This includes the advanced features of MS SQL Server 2000 including Installation, Managing the Databases, SQL Server architecture, proper data storage techniques, Security and Data Recovery issues, Managing Data and Maintaining SQL Server 2000. Perform and automate administrative tasks and create custom administrative tools.

AST 814: DATABASE ADMINISTRATION – III (3 Credits, T=2 L=1)
Database Administration involves the overall design and management of the database. Such tasks include archiving, consistency checks, developing / maintaining indexing and retrieval functionality, migration, monitoring, performance issues, replication issues, and database sizing/space management. The curricula are designed to provide a strong understanding of the concepts and hands-on practices with case studies.

This course will provide students with specific skills and knowledge needed to be successful Database Administrator with DB2 Universal Database (UDB). This curriculum will teach students the critical skills needed to plan, define, install, configure, manage, backup & recovery and tune DB2 databases with implementation strategies and maintaining an existing database.

S2. Application Technology Environment – I

AST 821: WEB APPLICATION DEVELOPMENT USING JAVA (3 Credits, T=2 L=1)
Web Application Architecture: Application Sewers & Web Servers, Servlets, Servlets and Servlet APIs, Deploying Servlets, Servlet JDBC, Sessions & Cookies Java Server Pages: Architecture, Syntax, Access Model, ASP/JSP comparison, JSP or Servlets, Deploying JSPs , JSP Implicit Objects & Session Management, Exception Handling, JSP with JavaBeans.

AST 822: ENTERPRISE APPLICATION DEVELOPMENT USING JAVA (3 Credits, T=2 L=1)

Component-architecture, J2EE & introduction to allied technologies, Distributed Computing, RMI - Java technology for distributed computing EJB and its need, EJB Goals, RMI – Corba – EJB difference, Developing EJB, EJB Life Cycle, EJB object, Home object, Local interface, Remote home interface, Local home interface, Session beans – Stateful and Stateless, Entity beans, Persistence

AST 823: ADVANCED ENTERPRISE APPLICATION DEVELOPMENT USING JAVA (3 Credits, T=2 L=1)

Building Mobile applications using J2ME , Introduction to wireless, WAP protocol, E-commerce basis of M-commerce and M-commerce fundamental, Difference between E-commerce and M-commerce, Introduction to the Java 2 Micro Edition (J2ME) Platform, Introduction to Wireless Programming with the MIDP Profile, Programming Strategies for Small Devices, Writing MIDP applications, Session Handling in MIDP, MIDP GUI Programming, MIDP Event Handling , MIDP Inter-Communication with CGI and Servlets, Protecting Network Data , MIDP Database Programming using RMS:, MIDlet Packaging with J2ME, Using XML in Wireless Applications.

AST 824: GAME PROGRAMMING (3 Credits, T=2 L=1)

General Introduction, types of games, J2ME Overview Overview of the gaming world and market, different technologies used in developing games, other topics from J2ME Overview, J2ME Enabled Devices Devices currently available in the market, big players in the mobile handset space, characteristics and specifications of different devices, handset issues to keep in mind when developing a mobile game for a target device, Practicals Setting up the development environment Using different Emulator Plugging the emulator with the IDE used (NetBeans 5.5)Photoshop and Fireworks Transferring a game to a mobile device, High Level API in detail, Practicals Running the first MIDlet Assignments using the High Level API, Low Level API (The canvas class)Game Time(form the book)png file format Developing your first mobile game UI flow, Practicals Developing a simple shooting game with UI Assignments using the low level API, The Graphics (book)Sprite Animations (MIDP 2.0 Game and Sprite class), Practicals Assignment for developing a complete game.

S3. Application Technology Environment – II

AST 831: WEB APPLICATION DEVELOPMENT USING .NET (3 Credits, T=2 L=1)

ASP – using VBScript as scripting language, Introduction to web programming, MVC architecture in designing ASP sites, Control structures, Value types, type conversion, Implicit Objects, Sessions & Cookies, ADO, ASP-XML, Creating COM components, Invoking COM components through ASP script.

AST 832: ENTERPRISE APPLICATION DEVELOPMENT USING .NET (3 Credits, T=2 L=1)

Developing .NET application using various .NET technologies, .NET architecture, ADO.NET, Events and delegate handling, .NET versus J2EE, Role of XML in .NET architecture.

AST 833: ADVANCED ENTERPRISE APPLICATION DEVELOPMENT USING .NET (3 Credits, T=2 L=1)

Building .NET Applications for Mobile Devices, Introducing .NET for the Mobile Web, ASP.NET and the Mobile Internet Toolkit, Developing Mobile Web Applications, Dynamic Mobile Applications, Using the Mobile Internet Toolkit Standard Controls, List Controls, Special-Purpose Controls and Validation Controls, Styles and Device-Specific Rendering, Accessing Data, State Management, Designing Compelling Mobile Web Applications

S4. Enterprise Application Systems:

AST 841: APPLICATION DEVELOPMENT USING SAP (3 Credit T=2, L =1)

SAP R/3 architecture, introduction to ABAP, programming. Data dictionary-tables, views, structures, indexes. Reports-classical report Drill down report and ALV reports. Dialog programming.

AST 842: ADVANCED CONCEPTS IN APPLICATION DEVELOPMENT (3 Credits, T=2 L=1)

Dialog programming , Layouts-sap scripts, smart forms ,ABAP objects, enhancing standard SAP functionality BADI , enhancements. Function module and RFC's. Data transfer method –BDC and BAPI. IDOC and EDI. Deliverable documentation-understanding functional requirements, convert functional specifications to technical specifications, code documentation.

AST 843: E- BUSINESS - I (3 Credits, T=2 L=1)

Understand the distinct categories of on-line business transactions; basic e-business concepts; Fundamental benefits for a company/being online. Various E-Business Models; E-Business Architecture;

Netweaver Fundamentals – architecture and different components. Introduction to BW.

AST 844: E-BUSINESS - II (3 Credit T=2 L=1)

Understand a simple business and technical model for current e-Business operations. Understanding impact of e existing processes and practices of the organization; e-commerce; e- security; advanced BW concepts. Portal programming in netweaver.

AST 845: CUSTOMER RELATIONSHIP MANAGEMENT (3 Credits, T=2 L=1)

Customer loyalty; market intelligence enterprise; CRM basics; preparations for CRM; CRM expenditures; implementation planning; The implementation process; e-CRM fundamentals and automation; eCRM customization; eCRM goals; future trends.

Project

AST 901: MINI PROJECT (2 Credits)

Students are expected to undertake a project that includes an extensive literature survey and/or design and development of system. An internal faculty guides the project. The project has to be submitted in the form of a report that will be examined by experts nominated by the institute.

AST 902: PROJECT (18 Credits)

Students can take up an industry-sponsored project or a research based in-house project leading to Master's level competency.

For industry-sponsored projects, the Career Management Center facilitates interaction between students and the industry. Students are encouraged to work on projects that will enhance their understanding in certain technology domains in real-life scenario. The research project includes researching on the given/chosen seminar topic that will generally be state-of-the-art in the field and then delivering the seminar to peers and faculty along with its documentation in the prescribed IEEE format. Following the seminar the student has to undertake a research project under the guidance of tenure track/visiting faculty/and industry experts. The research project has to be submitted in the form of a dissertation that will be examined by experts nominated by the institute. The research project is the culmination of the student's learning in the institute and is expected to be of high standards as demanded by the industry from time to time.

Total Course Credits: 72

NOTE: Foreign language is an independent certificate program, compulsory for all students.

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Course Structure

	Code	Course Name	Credits*
BRIDGE	AST001	Computer Architecture & operating System	
	AST002	Database Technology	
	AST003	Data Structures & Algorithms using C	
	NTC002	Computer Networks	
FOUNDATION	AST501	General Management	1
	AST502	Mathematical Foundation	2
	AST503	Database Application Development	3
	AST504	Application Development Technology	3
	AST505	XML Technology & Applications	3
	AST506	Advanced C++ Programming	3
	AST507	Linux Programming	2
	AST508	Seminar – I	1
CORE	AST601	Business Process Management	1
	AST602	Object Oriented Analysis & Design (UML)	3
	AST603	Software Engineering & Project Management	3
	AST604	Extended Enterprise Applications	3
	AST605	Data Warehousing & Data Mining (SAS)	3
	AST606	Application Server Technology	3
	AST607	Seminar - II	1
ADVANCED	AST701	Information Security Management	2
	AST702	Software Performance Engineering	3
	AST703	Enterprise Application Integration	3
ELECTIVES	*S1: Advanced Database Management*		
	AST811	Advanced Database Systems	3
	AST812	Database Administration I	3
	AST813	Database Administration II	3
	AST814	Database Administration III	3
	S2: Application Technology Environment - I		
	AST821	Web Application Development using JAVA	3
	AST822	Enterprise Application Development using JAVA	3
	AST823	Advanced Enterprise Application Development using JAVA	3
	AST824	Game Programming	3
	S3: Application Technology Environment - II		
	AST831	Web Application Development using .NET	3
	AST832	Enterprise Application Development using .NET	3
	AST833	Advanced Enterprise Application Development using .NET	3
	S4: Enterprise Application Systems		
	AST841	Application Development using SAP	3
	AST842	Advanced Concepts in Application Development	3
	AST843	e-Business I	3
	AST844	e-Business II	3
	AST845	Customer Relationship Management	3
PROJECT	AST901	Mini Project	2
	AST902	Project	18

* 1 Credit Hr = 16 Class Hrs / 32 Lab Hrs in a semester