Bachelor of Science in Information Technology *BS (IT)*

4 years Program.
150 credit hours spread over 8 semesters.

Eligibility:
FSc. Pre-Engineering, FSc. Pre-Medical, Intermediate in General Science, Intermediate in Computer Science, Intermediate in Commerce.

Scheme of Study for BS (IT)

Semester 1 (18 credit hours)

		Subject	Credit hours
1	IT-301	Introduction to Information Technology	4(3-2)
2	IT-303	Fundamentals of Algorithms	3(2-2)
3	MBA-307	Introduction To Economics	3(3-0)
4	*Math-303	Calculus and Analytical Geometry	4(4-0)
5	*Eng-301	Introductory Exercises in Reading, Comprehension and Communication Skills	2(2-0)
6	*SSH-402	Pakistan Studies	2(2-0)

Semester 2 (18 credit hours)

		Subject	Credit hours
1	IT-302	Introduction to Computer Programming	4(3-2)
2	IT-304	Discrete Mathematics	4(4-0)
3	*MBA-306	Financial Accounting	3(3-0)
4	*Phy-305	Basic Electronics	3(2-2)
5	Eng-304	Technical & Business Writing	2(2-0)
6	*IS-401	Islamic Studies	2(2-0)

Semester 3 (20 credit hours)

		Subject	Credit hours
1	IT-401	Data Structures	4(3-2)
2	IT-403	Introduction to Computer Architecture	4(3-2)
3	MBA-309	Fundamentals of Management	3(3-0)
4	MBA-311	Introduction to Marketing	3(3-0)
5	*Math-304	Multivariable Calculus	4(4-0)
6	*Eng-302	Advanced Exercises in Reading, Comprehension and Communication Skills	2(2-0)

Semester 4 (20 credit hours)

		Subject	Credit hours
1	IT-402	Operating System Concepts	4(3-2)
2	IT-404	Data Communication	4(3-2)
3	IT-406	Database Systems	3(2-2)
4	MBA-308	Organizational Behavior	3(3-0)
5	MBA-310	Marketing Management	3(3-0)
6	*Stat-507	Statistics and Probability	3(3-0)

Semester 5 (20 credit hours)

		Subject	Credit hours	
1	IT-501	Software Engineering I	4(3-2)	
2	IT-503	Object Oriented Programming	4(3-2)	
3	IT-505	Multimedia Technologies		3(2-2)
4	IT-507	Telecommunication Systems	3(2-2)	
5	*MBA-407	Human Resource Management	3(3-0)	
6	MBA-409	Business Finance	3(3-0)	

Semester 6 (20 credit hours)

		Subject	Credit hours
1	IT-502	Web Design & Development	4(3-2)
2	IT-504	Software Engineering II	4(3-2)
3	IT-506	Computer Networks	3(2-2)
4	IT-508	Distributed Database Systems	3(2-2)
5	*MBA-404	Financial Management	3(3-0)
6	MBA-410	Entrepreneurship	3(3-0)

Semester 7 (20 credit hours)

		Subject	Credit hours
1	IT-601	Software Project Management	3(2-2)
2	IT-603	Modern Programming Languages	4(3-2)
3	IT-605	E-commerce Technologies	3(2-2)
4	IT-607	Client Server Technologies	3(2-2)
5	IT-609	Visual Programming	4(3-2)
6	MBA-411	Quantitative Business Analysis	3(3-0)

Semester 8 (14 credit hours)

		Subject	Credit hours
1	IT-602	Network Management	4(3-2)
2	*IT-604	Software Project	10(0-20)

Total   150

*Already approved

COURSE CONTENTS OF BS(IT)

IT-301   **Introduction to Information Technology**   4(3-2)

Information Technology, Personal Advantages and IT, business Advantages & IT, Application software, System Software, Input, Output devices, CPU & Internal Memory, Storage devices, Communications, Tools for developing IT applications.

Recommended Books:
1. Haag S. and P. Keen., 1998. Information Technology. McGraw Hill Inc. N. Y.
2. Efraim T. 2001. Introduction to Information Technology. Wiley John Wiley & Sons, Inc, New York.
3. Hang S. & P. Keen. 1996. Introduction to Information Technology. McGraw Hill Company, Inc. USA.

IT-302   **Introduction to Computer Programming**   4(3-2)

Programming and problem analysis. Development of basic algorithms. Translation of algorithms into programs. Standard data types. Basic control structures and Functions. Structured data types; arrays, structures, Pointers and Files. Debugging and testing programmes

Practical: programming assignments in C++

Books Recommended:
1. Terrence W.P. 1997. Programming Languages. Prentice Hall International Inc., USA.
2. Perry G. and M. Johnson 1992. Turbo C++ by examples. Library of Congress, USA.

IT-303   **Fundamentals of Algorithms**   3(2-2)

Using pseudo-language as a base. Introduction to algorithms, Introduction to matrices and their manipulation, Searching and sorting algorithm, Graphs and related algorithms, Trees and related algorithms. Introduction to concepts of iteration and recursion, Tracing and Timing. Introduction to order of magnitude and algorithm complexity.

Practical: Implementation of algorithms using C++

Books Recommended:
1. Weiss, M.A. 1995. Data Structure and Algorithm Analysis. Benjamin / Cummings Publishing Company, USA.
2. Langsam, Y. and M.J. Augenstein 1996. Data Structures Using C and C++. Prentice Hall Inc., USA.

IT-304   **Discrete Mathematics**   4(4-0)

Sets, Sequences and functions, Elementary logic. Prepositional calculus, Methods of proof, Mathematical induction, recurrence relation, loop invariants. Relations. Equivalence of relations and partitions. Partially ordered sets. Properties of general relations, Introduction to combinatorics. Basic counting techniques. Elementary probability, Inclusion-exclusion principle and binomial methods. Counting and partitions. Pigeon hole principle. Algebraic structures, groups and semi-groups.

Books Recommended:
1. John, G.M., 1993. Application of Discrete Applied Mathematics. McGraw Hill Inc. USA.
2. Judith, L. 1990. Mathematical Structure for Computer Science. McGraw Hill. Inc., USA.

IT-401   **Data Structures**   4(3-2)

Basic data structures. Static and dynamic data structures. Abstraction and Abstract Data Types (ADT's). Time and space requirements of various implementations of

ADTs. Space/Time trade-Offs. Queues, stacks, trees and graphs. Implementations of tree and graph traversals. Height balanced trees. Heaps. Storage management. Hashing techniques.

Practical: programming of different techniques of data structure in C++

Books Recommended:
1. Weiss, M.A. 1995. Data Structure and Algorithm Analysis. Benjamin / Cummings Publishing Company, USA.
2. Langsam, Y. and M.J. Augenstein 1996. Data Structures Using C and C++. Prentice Hall Inc., USA.

IT-402   Operating System Concepts   4(3-2)

History and evolution of operating systems. Types of operating systems. Case histories of significant operating systems. Processes, Inter-process communication, process co-ordination and synchronisation. Process scheduling. Memory management. File systems. Security and protection. Case operating systems.

Practical: Windows, Unix

Books Recommended:
1. Silberschatz, A. and J. Peterson, 1991. Operating Systems Concepts. Addison Wesley Publishing Company, Inc., USA.
2. Ritchie, C. 1997. Operating Systems. BPB publications, New Delhi.

IT-403   Introduction to Computer Architecture   4(3-2)

Computer organization: Control unit design, Instruction execution and sequencing of control signals. Hardwired and Micro programmed control. Input-output – Programmed, Interrupt driven and DMA I/O and interface design. Arithmetic logic unit implementation, addition, subtraction, multiplication and division Operations for Integer and Floating point numbers. Memory organization, Memory Hierarchy, Cache memories - mapping functions and page replacement policies, memory management requirements and Virtual memory hardware support. Fundamentals of computer communications and error control.

Practical: Input-Output Programming

Books Recommended:
1. Stalling, W., 1996. Computer organization & Architecture. McGraw Hill, Inc., USA.
2. Mono M.M. 1998. Digital Logic & Computer Design. Prentice Hall Inc., USA.

IT-404   Data Communications   4(3-2)

Time and frequency domain concepts, Fourier Transform. Introduction to Analog and Digital signals. A/D conversion, Quantization. Introduction to modulation and demodulation. Amplitude modulation, frequency modulation and phase modulation. ON-OFF keying, FSK and PSK. Binary codes for transmission (NRZ, RZ, HDB3, Manchester code), delta modulation. Serial and Parallel communication, RS232. Modems.

Practical: Data Communication ,Analog and Digital Signal

Books Recommended:
1. Satllings, W., 1997. Data and Computer Communications. Prentice Hall International Inc., U.S.A.
2. Prakash C. 1999. Data Communication, Prentice Hall International Inc., U.S.A.

IT-406   Database Systems   3(2-2)

Basic database concepts. Conceptual modelling. Hierarchical, Network and Relational data models. Relational theory and languages. Database Design. Database security and integrity. Query languages: Relational Calculus, Relational Algebra, SQL. Introduction to query processing and optimization. Introduction to concurrency and recovery. Front- end and Back-end Databases.

Practical: Oracle, sql, Pl/sql

Books Recommended:
1. McFadden, F.R. and J.A. Hoffer, 1994. Modern Database Management. Benjaman Publishing Company Inc., USA.
2. Date, C.J., 1998. An introduction to Database systems. Addison-Wesley Publishing Company, USA.

IT-501   Software Engineering-I   4(3-2)
          Software development life-cycles and models,   System specification, Project control and development of team structures, Software analysis and design, Structured analysis, Functional and object-oriented design,   Programming, testing and debugging, validation, maintenance and modifications, Software development tools. Software quality. Process models. Report writing, Introduction to Case Tools.
Practical: designing and development of software by using different models

Books recommended:
1.   Kemerer, C.F. 1997. Software Project Management. McGraw-Hill, Inc., USA.
2.   PressMan, R.S. 1997. Software Engineering. McGraw-Hill, Inc., USA.

IT-502   Web Design and Development   4(3-2)
          Overview of Protocols: TCP/IP, HTTP, Overview of 3-tier architecture, Web Based Application's Architecture. Developing Front End Applications : Front End Development Tools, HTML, DHTML, Scripting (Java Script, Jscript, VB-script), Java Applets, ActiveX.
Practical: Web page development

Books Recommended:
1.   Deitel H.M. and P.J. Deitel., 1998. Java How to Program. Prentice Hall International, USA.
2.   Naughton, P. and H. Schildt. 1998. The Complete Reference Java 2. Third Edition. McGraw Hill California, USA.

IT-503   Object Oriented Programming   4(3-2)
          Introduction to object-oriented programming. Objects, classes and inheritance. The concept of encapsulation and polymorphism, Early and late binding. Operator overloading and function overloading. Constructors and Destructors. Friend functions. In-line functions. Virtual functions. Class libraries.
Practical: Object-oriented software development in C++

Books Recommended:
1.   Straley, S.J., 1996. Object-Oriented Programming with Visual Objects. Addison-Wesley Publishing Company, USA.
2.   Perry, G. and M. Johnson, 1992. Turbo C++ by examples. Library of Congress, USA.

IT-504   Software Engineering-II   4(3-2)
          Software verification and validation: Techniques to evaluate software correctness, Efficiency, Performance and Reliability, Integration of these techniques into a verification and validation plan. Technical reviews, Software testing, program verification, prototyping and requirement tracing. Attitude of industry toward reliability and performance.
Practical: Designing and development of different software relating to verification and
                    validation

Books Recommended:
1.   Cris, F.K 1997. Software Project Management. McGraw Hill, Inc., USA.
2.   Roger,S. 1997. Software Engineering. McGraw Hill, Inc., USA.

IT-505   Multimedia Technologies   3(2-2)
          Introduction to Multimedia Programming, Scope of Multimedia Programming, convention and trends, Media types used in current applications (including digital video, audio, and graphics). System level issues of performance synchronization, storage and server schemes, dynamic interactivity, hyper linking, multimedia device control, distributed media development and delivery, non-standard media and programming frame works. Introduction to Multi-media Networks.

Books Recommended:
1   Jennifer A., 2000. Hypermedia and Applications. Prentice Hall, Inc, USA.
2   John V. 2001. Multimedia An Introduction. Prentice Hall International Inc., U. S. A.

IT-506   Computer Networks   3(2-2)
          Introduction to Computer networks, Network requirements and Layered architectures. ISO reference model. Data encoding/framing, Error Detection and Correction, DLL protocols (stop wait & sliding windows), Ethernet and FDDI. Network layer and WANs, IP and routing, Cell Switching and ATM, Bridges, internetworking – the global internet. End to End Protocols, UDP, TCP, and RPC. Application layer, Security, Domain name system (DNS), and the WWW protocols.
Practical: Network Programming

Books Recommended:
1. Tanenbaun, A.S., 1996. Computer Networks. Printice Hall, Inc., USA.
2. Stalings, W., 1997. Data & Computer Communication. Printice Hall Inc., USA.

IT-507   Telecommunication Systems   3(2-2)
          Introduction to media, bandwidth and noise. Twisted pair (UTP, STP), coaxial cables (types and specifications), optical fibers (types and losses), Introduction to optical sources and detectors. Microwave links, satellite communication and infrared links. Frequency Division Multiplexing (FDM), TDM, FDMA, TDMA and CDMA. Switching: circuit and packet switching. Introduction to mobile and cellular communications. Block diagram and current trends.

Recommended Books:
1.   Leon W., 2001. Digital and Analog Communication Systems. McGraw Hill Inc. N. Y.
2.   Lathi B., 1998. Modern Digital and Analog Communications Systems. Macmillan Publishing Co. N. Y.

IT-508   Distributed Database Systems   3(2-2)
          Advanced data models. Conceptual database design. Concurrency control techniques. Recovery techniques. Query processing and optimization. Integrity and security. Client-Server architecture. Distributed database systems. Current trends in database systems. Database machines.
Practical: using oracle

Books Recommended:
1.   Date, C.J., 1998. An introduction to Database systems. Addison-Wesley Publishing Company, USA.
2.   McFadden, F.R. and J.A. Hoffer, 1994. Modern Database Management. Benjamin Publishing Company Inc., USA.

IT-601   Software Project Management   3(2-2)
          Software Project management: Managing the development of software products, Software estimation, Planning, monitoring and controlling, Metrics and Measurement, Process maturity, Quality assurance, software quality standards, Human factors in people management, Leadership and team building. Developing a Software as a Project.

Recommended Books
1.   Walker R. 1998. Software Project Management, Addison Wesley Longman Inc., USA.
2.   Hold S. 2001. Software process Design, Clays Ltd, England.

IT-602   Network Management   4(3-2)
          Introduction, Overview of Network operating system, Setting up a network server, Setting up network clients, Network design issues, Network client administration, Workgroup and Domain concepts. System Administration Basics, Network Services, Monitoring and logging of various operating system events, security applications and general system events, Monitoring wide variety of system objects, Diagnosing and Troubleshooting hardware, networking and various operating system services, System configuration including screen display, network services, bindings, protocols, servers, services and system devices, User and group management and services used to manage user access to resources, Remote administration, Management of key processes, Network services administration including e-mail,

internet, web and ftp, Heterogeneous network environment, Firewall administration, Controlling access to the machines.

Recommended Books:
1. John R. V, 2002. The Essential Guide to Storage Area Networks. McGraw Hill, Inc., USA
2. Burgess M. 2000. Principles of network and system administration. John Wiley & Sons Ltd, England.

IT-603   Modern Programming Languages   4(3-2)

Developing Back End Applications, java Servlets, CGI/Perl Programming, Cold Fusion, Gateway Interface. Database Connectivity: DBC, ODBC. Performance & Security Issues: E-Commerce Application Security, Presentations, Projects.

Practical: small project s development(on line student information system, on line banking system etc)

Books Recommended:
1. Deitel H.M. and P.J. Deitel., 1998. Java How to Program. Prentice Hall International, USA.
2. Naughton, P. and H. Schildt. 1998. The Complete Reference Java 2 Third Edition. McGraw Hill California, USA.

IT-604   Software Projects   10(0-20)

The students will be required to develop an independent project on software to be recommended for use in a public/private institutions by undergoing an internship training at that institutions. The final evaluation of the project/project report will be done by a committee consisting of the following members:
    i.   Chairman, department of computer science
    ii.   Senior teacher of the department of computer science
    iii.   Supervisor of the Student.

IT-605   E-Commerce Technologies   3(2-2)

From Business to E-Business; E-Commerce, E-Auctions, E-Banking, E-Marketing, E-Directories, E-franchising, Starting our Site, Building the Object Mode, Presenting Our Online Store, Structuring the Online Store, Building the Product Catalog. The Shopping Basket. The Checkout. Order Processing Searching. Hosting and Deployment Customer Service, Creating an Online Community, Web Site promotion, E-Advertising.

Recommended Books:
1. Matthew R., 2000 Beginning E-Commerce with Visual Basic ASP SQL Server 7.0 and MTS. Wrox Press Ltd. India.
2. Ravi K., 2000 .Frontiers of Electronic Commerce. Addison Wesley.

IT-607   Client/Server Technologies   3(2-2)

Client/Server Building Blocks. , Clients, Servers, And Operating systems, NOS: Creating the Single-System Image.RPC, Messaging, and Peer-to-Peer. NOS: Meet the Players. SQL Database Servers. SQL Middleware and Federated Databases. Data Warehouses: Information Where You Want It. EIS/DSS: From Queries, To OLAP, Data Mining. Database: The Magic of Transactions. TP Monitors: Managing Client/Server Transactions. TP-Lite or TP-Heavy? Client/Server Groupware. Distributed Objects, Client/Server Tools and Application Development.

Recommended Books:
1. Robert O. and D. Harkey, 1998.Client/Server Survival Guide. Wiley and Sons, USA
2. Burgess M. 2000. Principles of network and system administration. John Wiley & Sons Ltd, England.

IT-609   Visual Programming   4(3-2)

Introduction to Windows programming, Use of Windows API, MFC Class hierarchy, Class Wizard, Application Wizard and Application Studio, Graphics Device Interface, Menus, document and view architecture, Multiple Views, files and archiving mechanisms, Converting Windows programs to MFC, Sub-classing controls.

Practical: Windows Programming

Books Recommended:
1.   Petroutsos, E., 1999. Mastering Visual Basic. BPB Publishing Company, New Delhi.
2.   Scott, J., 1997. Visual Basic-5. The Coriolis Group Inc., USA.

MBA-307   Introduction to Economics   3(3-0)
          Nature of micro and macroeconomics. Consumers equilibrium. Laws of Demand and equilibrium. Cost and revenue curves. Profit maximization price determination perfect imperfect competition and under monopoly. Factors of production. National and determination of national income consumption and saving function and employment theories. Inflationary and deflationary gaps and measures to stabilize.

Recommended Books:
1.   Marilu H., 1999. An Introduction to Economics. Wiley and Sons. USA
2.   Lieberman M., 1999. Introduction to Economics, MeGraw Hill Inc. N. Y.

MBA-308   Organizational Behavior   3(3-0)
          Fundamentals of Organizational Behaviors, Behavioural Science and Organizational Behavior, Individual Behaviour in Organizations, Personality, perception and attitudes, Learning and reinforcement, Motivation, Group Behavour in Organizations, Group dimensions in organizations, Group dynamics, Leadership, Organizational Structure and Organizational Behaviour, Organizational design, Job design, Strees and work, Organizational Processes, The decision-making process, The communication process, Performance appraisal process, Special Issues in Organizational Behaviour, Management of conflict and change, Organizational development, Impact of computer technology.
Recommended Books:
1.   Stephen P., 2001. Organizational Behavior , Wiley and Sons, USA
2   James L., 1996. A Primer on Organizational Behavior, Macmillan Publishing Co. N. Y.

MBA-309   Fundamentals of Management   3(3-0)
          Management functions. Managerial roles. Terminology and philosophy of management. Management and environment. Planning. Decision making. Strategic management, organizing organization structure. Design. Leadership theories, motivation, motivation theories. In organization. Communication. Controlling. Controlling techniques and methods.
Recommended Books:
   1.   Bovec. C. I., 1996. Management. International Edition. McGraw ill. Inc N. Y.
   2.   Roniz. H.1999, Management. Wiley and Sons. USA.
   3.   Marton. B. 1995. Management. McGraw Hill Inc. N. Y.

MBA-310   Marketing Management   3(3-0)
          Understanding marketing management, managing marketing information, measuring market demand, scanning the marketing environmental. Analyzing markets and buying behavior, Analysis of industries and competitors, Identifying market segments, selecting target markets, Developing marketing strategies, Differentiating, Positioning Developing new products. Product life cycle strategies, managing product lines, Brands and packaging, designing pricing strategies, selecting and managing marketing channels retailing whole selling and market logistics, advertising sales promotion and public relations Managing direct and on line marketing.
Recommended Books:
1.   Dicksan R., 2001. Marketing management International edition. McGraw Hill Inc. N. Y.
2.   Kotler, 2002. Marketing management (latest edition), Prentice Hall, Intl, Inc. N. J.

MBA-311   Introduction to Marketing   3(3-0)
          Overview of marketing, marketing environment. Strategy and management. Consumer demography consumer lifestyle and decision marking. Organizational buyers. Segmentation developing target market. Product management, new product policy, product planning, branding. Packaging servicing and product safety. Marketing channels. Physical distribution, promotion organization and control.

Recommended Books:
1.   Kotler, 1999. Principles of Marketing. Prentice Hall, Int. Inc. N.J.
2.   Evans R., 1998. Principles of Marketing. Prentice Hall. Intl. Inc. N. J.

MBA-409   Business Finance   3(3-0)

Meaning and scope of business finance. Financial considerations in choosing a form of organization. The three areas of financial management. Tools of financial analysis and administration. Profitability and Turnover Ratio analysis, leverage, liquidity. Profit projecting Financial Data, Budgets and Financial Planning. Financing New Business, Promotion. Financial planning of new corporations Capital structure. Short term Financing Principles & working capital. Trade creditors other unsecured credit. Receivables and inventories Intermediate term financing. Term loans and equipment Financing Long-term financing. Capitalization. Equity financing Market securities. Investment Banks. Impact of Inflation on Financial Policies.

Recommended Books:
1.   Dauten. C. A.1998, Business Finance Prentice Hall Inc. USA.
2.   Van Horne. J. C.1998, Fundamentals of Financial Management Prentice Hall Inc. USA.

MBA-410   Entrepreneurship   3(3-0)

Concepts, skills, know-how attitudes and alternatives relevant for start up entrepreneurs. Critical role of opportunity creation and recognition. Entreprenerial psyche in new rent are formations Professionalising the growing business concerns. Issues in family firms.

Recommended Books:
1.   Gnyawali, D. R., and Fogel, D. S. 1994. Experiments forenter preneurship development Key dimensions and risk implications, Entrepreneurship Wiley and Sons. USA.
2.   Covin, J and Slevin D. 1991. A conceptional model of entrepreneurship firm behaviour entrepreneurship theory and practice. Wiley and Sons. USA

MBA-411   Quantitative Business Analysis   3(3-0)

Quantitative analysis and Decision making Process, Linear programming, the graphical method, the simplex method, infeasibility, sensitivity analysis, financial, marketing accounting. Management, other applications. The assignment and traveling saleman problem. The trasporation problems, Inventory Models, Decision Theory.

Recommended Books:
1.   Gass, S. I. 1998. Linear programming, . McGraw Hill Inc. N. Y.
2.   Wagner, H. M. 1999. Principles of Operations Research with Applications to Managerial Decisions, Printice Hall, International, Inc. London.
3.   Taha, H. A. 1992. Operations Research. Macmillan Publishing Co. N. Y.

Eng-304   Technical and Business Writing   2(2-0)

Writing technical reports, research reports, research papers, and memos. Drafting, revising, and editing compositions derived from science and technology to develop skills in narration, persuasion, analysis, and documentation.

Recommended Books:
1   Janis F and D. Lutovich 1997. Professional Writing Skills. Macmillan Publishing Co. N. Y.
2.   Franklin C., 2000. Franklin Covey Style Guide for Business and Technical. Printice Hall, International, Inc. London.