University of Malakand
Department of Computer Science & Information Technology

UNDERGRADUATE CURRICULUM
BS (IT)

A Student majoring in Bachelor Studies in Information Technology BS (IT) must complete minimum of 132 Credit Hours courses. The courses list is as follows:

First Semester

Course #	Title	Credit Hours.
MT411	Calculus and Analytical Geometry	3-0
IT412	Introduction to Information and Communication Technologies (ICTs)	4 (3-1)
IT413	Programming Fundamentals	4(3-1)
PS414	Pak Studies	2-0
PS415	Islamiat	2-0
EG416	Functional English	3-0
	Total Semester Cred Hrs	18

Second Semester

Course #	Title	Credit Hours
IT421	Object Oriented Programming	4 (3-1)
EG422	Technical and Business Writing	3-0
MT423	Statistics & Probability	3-0
MT424	Discrete Mathematical Structures	3-0
IT425	Data Structures	3 (2-1)
MS426	Principles of Management	3-0
	Total Semester Credit Hours	19

Third Semester

Course #	Title	Credit Hours.
EG431	Communication & Presentation Skills	3-0
IT432	Digital Logic Design	3-0
IT433	Operating Systems	3-0
MS434	Marketing Management	3-0
MT435	Linear Algebra and Applications	3-0
MS436	Financial Accounting	3-0
	Total Semester Credit Hours	18

Fourth Semester

Course #	Title	Credit Hours
IT441	Introduction to Databases	4(3-1)
IT442	Advanced Object Oriented Programming	4(3-1)
MS443	Organizational Behavior	3-0
IT444	Analysis of Algorithms	3-0
IT445	Data Communication and Networks	3 (2-1)
	Total Semester Credit Hours	17

Fifth Semester

Course #	Title	Credit Hours
EC551	Fundamentals of Economics	
SE552	Software Engineering-I	3-0
IT553	Network Strategies	3-0
IT554	Web Technologies	3 (2-1)
IT555	Financial Management	4(3-1)
IT556	Database Administration	3-0
	Total Semester Credit Hours	3 (2-1)
		19

Sixth Semester

Course #	Title	Credit Hours
SE561	Software Engineering-II	
IT562	Theory of Automata and Formal languages	3-0
IT563	System and Network Administration	3-0
IT564	Advanced Internet Applications	3 (2-1)
IT565	Human Resource Management	4(3-1)
IT566	Computer Graphics	3-0
	Total Semester Credit Hours	3-0
		19

Seventh Semester

Course #	Title	Credit Hours
IT571	Software Project Development	
IT572	Software Project Management	0-6
IT573	Management Information System	3-0
IT574	Computer Architecture	3-0
	Total Semester Credit Hours	3-0
		15

Eight Semester

Course #	Title	Credit Hours
IT581	Professional Ethics	
IT582	E-Commerce	3-0
IT583	Information Security	3-0
	Total Semester Credit Hours	3-0
		09

Note:

Total Credit Hours: 134

The courses and semester plan can be modified subject to the decision of board of studies.

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Course Code Details

The course code consists of two letters and three digits. The letters represent the major area of the course. The left most digit is reserved for the level (4 for the first two years and 5 for the last two years). The digit in the middle represents the semester and the right most digit is for the serial number of the course.

IT = Information Technology

MT = Mathematics

EG = English

PS = Pak Studies

IS = Islamiat

EE = Electronics Engineering

PH = Physics

SE = Software Engineering

Hayat Ullah
Deputy Registrar Academics
University of Malakand

Assistant Registrar (Academics)
University of Malakand

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PS415	Islamiat	2-0
EG416	Functional English	3-0
	Total Semester Cred Hrs	**18**

Second Semester

Course #	Title	Credit Hours
IT421	Object Oriented Programming	4 (3-1)
EG422	Technical and Business Writing	3-0
MT423	Statistics & Probability	3-0
MT424	Discrete Mathematical Structures	3-0
IT425	Data Structures	3 (2-1)
MS426	Principles of Management	3-0
	Total Semester Credit Hours	**19**

Third Semester

Course #	Title	Credit Hours.
EG431	Communication & Presentation Skills	3-0
IT432	Digital Logic Design	3-0
IT433	Operating Systems	3-0
MS434	Marketing Management	3-0
MT435	Linear Algebra and Applications	3-0
MS436	Financial Accounting	3-0
	Total Semester Credit Hours	**18**

Fourth Semester

Course #	Title	Credit Hours
IT441	Introduction to Databases	4(3-1)
IT442	Advanced Object Oriented Programming	4(3-1)
MS443	Organizational Behavior	3-0
IT444	Analysis of Algorithms	3-0
IT445	Data Communication and Networks	3 (2-1)
	Total Semester Credit Hours	**17**

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Fifth Semester

Course #	Title	Credit Hours
EC551	Fundamentals of Economics	3-0
SE552	Software Engineering-I	3-0
IT553	Network Strategies	3 (2-1)
IT554	Web Technologies	4(3-1)
IT555	Financial Management	3-0
IT556	Database Administration	3 (2-1)
	Total Semester Credit Hours	19

Sixth Semester

Course #	Title	Credit Hours
SE561	Software Engineering-II	3-0
IT562	Theory of Automata and Formal languages	3-0
IT563	System and Network Administration	3 (2-1)
IT564	Advanced Internet Applications	4(3-1)
IT565	Human Resource Management	3-0
IT566	Computer Graphics	3-0
	Total Semester Credit Hours	19

Seventh Semester

Course #	Title	Credit Hours
IT571	Software Project Development	0-6
IT572	Software Project Management	3-0
IT573	Management Information System	3-0
IT574	Computer Architecture	3-0
	Total Semester Credit Hours	15

Eight Semester

Course #	Title	Credit Hours
IT581	Professional Ethics	3-0
IT582	E-Commerce	3-0
IT583	Information Security	3-0
	Total Semester Credit Hours	09

Note:

Total Credit Hours: 134
The courses and semester plan can be modified subject to the decision of board of studies.

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Course Code Details

The course code consists of two letters and three digits. The letters represent the major area of the course. The left most digit is reserved for the level (4 for the first two years and 5 for the last two years). The digit in the middle represents the semester and the right most digit is for the serial number of the course.

IT = Information Technology

MT = Mathematics

EG = English

PS = Pak Studies

IS = Islamiat

EE = Electronics Engineering

PH = Physics

- SE = Software Engineering

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REQUIRED COURSES:

S.No.	Course Title	Credit Hours
1	Computing (Refer to Computing part)	40
2	Information Technology	17
3	Software Project Management	3
4	Web Technologies	4
5	System and Network Administration	3
6	Information Security	3
7	Rich Internet Applications	4
8	Computing-Supporting Sciences (Refer to Computing part)	12
9	Information Technology-Supporting Sciences	9
10	Principles of Management	3
11	Organizational Behavior	3
12	Management Information Systems	3
13	Computing-General Education (Refer to Computing part)	16

Computing — Requirements for Bachelor Degree Programs

#	Required Computing Courses	
	Knowledge Area	Credit hours
1	Computing Core Areas	40
2	Supporting Sciences	12
3	General Education	16
	Total	**68/134**

#	Courses Breakup	
	Knowledge Area	Credit hours
1	Computing Core Areas	40
2	Supporting Sciences	12
3	General Education	16
4	IT-Supporting Sciences	9
5	IT	17
6	Elective Courses (IT + CS)	22
7	University Elective (Recommended Courses)	18
	Total	**134**

Computing — Core Courses (40 Credits Hours)

	Required Computing Courses				
#	Code	Preq	Course Title	Credit Hours	Proposed Semester
1	CS		Introduction to Information and Communication Technologies	4(3-3)	1
2	CS	-	Programming Fundamentals	4 (3-3)	1
3	CS	2	Object Oriented Programming	4 (3-3)	3
4	CS	-	Discrete Mathematical Structures	3 (3-0)	2
5	CS	2	Data Structures	3 (3-0)	2
6	CS	1	Digital Logic Design	3 (3-0)	2
6	CS	5	Operating Systems	3 (2-3)	3
8	CS	5	Introduction to Databases	4 (3-3)	3
9	CS	5	Software Engineering-I	3 (3-0)	4
10	CS	7	Data Communication and Networks	3 (3-0)	5
11	CS	-	Senior Design Project (40/134)	6 (0-18)	7

Computing — Supporting Sciences (12 Credits Hours)

	Required Supporting Courses				
#	Code	Preq	Course Title	Credit Hours	Proposed Semester
12	MT	-	Calculus and Analytical Geometry	3 (3-0)	1
13	MT	-	Statistics and Probability	3 (3-0)	2
14	MT	-	Linear Algebra and Applications	3 (3-0)	4
15	PH	-	Physics (Electromagnetism) (12 /134)	3 (3-0)	1

Computing — General Education (16 Credits Hours)

#	Code	Preq	Course Title	Credit Hours	Proposed Semester
			Required General Education Courses		
1	EG	-	Functional English	3 (3-0)	1
2	EG	-	Technical and Business Writing	3 (3-0)	2
3	EG	-	Communication and Presentation Skills	3 (3-0)	3
4	IS & PS	-	Islamiat and Pak Studies	4 (4-0)	1,3
5	SS	-	Professional Practices **(16/134)**	3 (3-0)	8

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Computing — Detail of Courses

Course Name: Introduction to Information and Communication Technologies (ICTs)	
Course Structure: Lectures: 3 / Labs: 3	**Credit Hours:** 4
Prerequisites: None	

Objectives: This course focuses on a breadth-first coverage of computer science discipline, introducing computing environments, general application software, basic computing hardware, operating systems, desktop publishing, Internet, software applications and tools and computer usage concepts; Introducing Software engineering and Information technology within the broader domain of computing, Social issues of computing.

Course Outline: Number Systems, Binary numbers, Boolean logic, History computer system, basic machine organization, Von Neumann Architecture, Algorithm definition, design, and implementation, Programming paradigms and languages, Graphical programming, Overview of Software Engineering and Information Technology, Operating system, Compiler, Computer networks and internet, Computer graphics, AI, Social and legal issues.

Reference Material:
Computers: Information Technology in Perspective, 9/e by Larry Long and Nancy Long,
Prentice Hall, 2002/ISBN: 0130929891.
An Invitation to Computer Science, Schneider and Gersting, Brooks/Cole Thomson Learning, 2000.
Computer Science: An overview of Computer Science, Sherer.
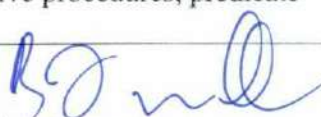
Course Name: Programming Fundamentals	
Course Structure: Lectures: 3 / Labs: 3	**Credit Hours:** 4
Prerequisites: None	

Objectives: The course is designed to familiarize students with the basic structured programming skills. It emphasizes upon problem analysis, algorithm designing, and programme development and testing.

Course Outline: Algorithms and problem solving, development of basic algorithms, analyzing problem, designing solution, testing designed solution, fundamental programming constructs, translation of algorithms to programmes, data types, control structures, functions, arrays, records, files, testing programmes.

Reference Material:
Programme Design with Pseudo-code, Bailey and Lundgaard, Brooks/Cole Publishing, 1988
Simple Programme Design: A step-by-step approach, 4/e, Lesley Anne Robertson, ISBN: 0-619-16046-2 © 2004.

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Course Name: Object Oriented Programming	
Course Structure: Lectures: 3 / Labs: 3	**Credit Hours:** 4
Prerequisites: Introduction to Computing, Programming Fundamentals	
Objectives: The course aims to focus on object-oriented concepts, analysis and software development.	
Course Outline: Evolution of OO, OO concepts and principles, problem solving in OO paradigm, OO programme design process, classes, methods, objects and encapsulation; constructors and destructors, operator and function overloading, virtual functions, derived classes, inheritance and polymorphism. I/O and file processing, exception handling	
Reference Material: *Understanding Object Oriented Programming,* Budd, Addison Wesley. *Java: How to Programme,* 5/e, Deitel and Deitel, Prentice Hall, 0131016210/ 0131202367 International Edition. *C++: How to Programme,* Deitel and Deitel, 4/e, Pearson. *Thinking in C++,* 2nd Edition, Bruce Eckel, Prentice Hall.	

Course Name: Data Structures	
Course Structure: Lectures: 2 / Labs: 1	**Credit Hours:** 3
Prerequisites: Object Oriented Programming	
Objectives: The course is designed to teach students structures and schemes, which allow them to write programmes to efficiently manipulate, store, and retrieve data. Students are exposed to the concepts of time and space complexity of computer programmes.	
Course Outline: Introduction to data structures; Arrays, Stacks, Queues, Priority Queues, Linked Lists, Trees, and Graphs. Recursion, sorting and searching algorithms, Hashing, Storage and retrieval properties and techniques for the various data structures. Algorithm Complexity, Polynomial and Intractable Algorithms, Classes of Efficient Algorithms, Divide and Conquer, Dynamic, Greedy	
Reference Material: *Data Abstraction and Problem Solving with C++,* 2nd ed, Frank M. Carrano, Paul Helman, Robert Verof, Addison-Wesley, 1998. *Data Structures and Algorithms* (SAMS teach yourself), Lafore, Sams Publishing, 1999. *Fundamentals of Data Structures in C++,* Horowitz, Sahni, and Mehta, Computer Science Press, 1995. *Data Structures in JAVA,* Standish, Addison Wesley, 2000	

Course Name: Discrete Mathematical Structures	
Course Structure: Lectures: 3 / Labs:0	**Credit Hours:** 3
Prerequisites: None	
Objectives: Introduces the foundations of discrete mathematics as they apply to Computer Science, focusing on providing a solid theoretical foundation for further work. Further, this course aims to develop understanding and appreciation of the finite nature inherent in most Computer Science problems and structures through study of combinatorial reasoning, abstract algebra, iterative procedures, predicate calculus, tree and graph structures.	

Course Outline: Introduction to logic and proofs: Direct proofs; proof by contradiction, Sets, Combinatorics, Sequences, Formal logic, Prepositional and predicate calculus, Methods of Proof, Mathematical Induction and Recursion, loop invariants, Relations and functions, Pigeon whole principle, Trees and Graphs, Elementary number theory, Optimization and matching. Fundamental structures: Functions (surjections, injections, inverses, composition); relations (reflexivity, symmetry, transitivity, equivalence relations); sets (Venn diagrams, complements, Cartesian products, power sets); pigeonhole principle; cardinality and countability.

Reference Material:
Discrete Mathematics and Its Applications, 5th edition; by Rosen; McGraw-Hill; 0-0 7-242434-6.

Course Name: Digital Logic Design	
Course Structure: Lectures: 3 / Labs: 0	**Credit Hours: 3**
Prerequisites: Discrete Structures, Introduction to Computing	

Objectives: This course introduces the concept of digital logic, gates and the digital circuits. Further, it focuses on the design and analysis combinational and sequential circuits. It also serves to familiarize the student with the logic design of basic computer hardware components.

Course Outline: Overview of Binary Numbers, Boolean Algebra, switching algebra, and logic gates, Karnaugh Map and Quin-McCluskey methods, simplification of Boolean functions, Combinational Design; two level NAND/NOR implementation, Tabular Minimization, Combinational Logic Design: adders, subtracters. code converters, parity checkers, multilevel NAND/NOR/XOR circuits, MSI Components, design and use of encoders, decoders, multiplexers, BCD adders, and comparators, Latches and flip-flops, Synchronous sequential circuit design and analysis, Registers, synchronous and asynchronous counters, and memories, Control Logic Design, Wired logic and characteristics of logic gate families, ROMs, PLDs, and PLAs, State Reduction and good State Variable Assignments, Algorithmic State Machine (ASM) Charts,

Reference Material:
Digital Design, 2nd Ed., M. Morris Mano, Prentice Hall, 1991.
Practical Digital Logic Design and Testing, P K Lala, Prentice Hall, 1996.

Course Name: Introduction to Databases

Course Structure: Lectures: 3 / Labs: 3	**Credit Hours: 4**

Prerequisites: Data Structures

Objectives: The course aims to introduce basic database concepts, different data models, data storage and retrieval techniques and database design techniques. The course primarily focuses on relational data model and DBMS concepts.

Course Outline: Basic database concepts; Entity Relationship modelling, Relational data model and algebra, Structured Query language; RDBMS; Database design, functional dependencies and normal forms; Transaction processing and optimization concepts; concurrency control and recovery techniques; Database recovery techniques; Database security and authorization. Small Group Project implementing a database. Physical database design: Storage and file structure; indexed files; hashed files; signature files; b-trees; files with dense index; files with variable length records; database efficiency and tuning Data Warehousing and Data Mining, Emerging Database Technologies and Applications.

Reference Material:
Database Systems, C.J.Date, Addison Wesley Pub. Co. (2004).
Database Systems: A Practical Approach to Design, Implementation and Management, R.Connolly and P.Begg, Addison-Wesley Pub. Co (2003).
Fundamentals of Database Systems, 3/E, Elmasri and Navathe, Addison-Wesley, ISBN: 0-201-74153-9.

Course Name: Operating Systems

Course Structure: Lectures: 3 / Labs: 0	**Credit Hours: 3**

Prerequisites: Data Structures

Objectives: The objective of this course is to give students knowledge of construction and working of Operating systems, to enable them to understand management and sharing of computer resources, communication and concurrency and develop effective and efficient applications and also to appreciate the problems and issues regarding multi-user, multitasking, and distributed systems.

Course Outline: History and Goals, Evolution of multi-user systems, Process and CPU management, Multithreading, Kernel and User Modes, Protection, Problems of cooperative processes, Synchronization, Deadlocks, Memory management and virtual memory, Relocation, External Fragmentation, Paging and Demand Paging, Secondary storage, Security and Protection, File systems, I/O systems, Introduction to distributed operating systems. Scheduling and dispatch, Introduction to concurrency. Lab assignments involving different single and multithreaded OS algorithms.

Reference Material:
Applied Operating Systems Concepts, 6th Edition, Silberschatz A., Peterson, J.L., & Galvin P.C. 1998.*Modern Operating Systems*, 2nd Edition, Tanenmaum A.S., 2001.

Course Name: Data Communication and Networks

Course Structure: Lectures: 2 / Labs: 1	**Credit Hours:** 3

Prerequisites: Operating Systems

Objectives: To introduce students to the concept of computer communication. Analogue & digital transmission. Network Layers, Network models (OSI, TCP/IP) and Protocol Standards. Emphasis is given on the understanding of modern network concepts.

Course Outline: Analogue and digital Transmission, Noise, Media, Encoding, Asynchronous and Synchronous transmission, Protocol design issues. Network system architectures (OSI, TCP/IP), Error Control, Flow Control, Data Link Protocols (HDLC, PPP). Local Area Networks and MAC Layer protocols

(Ethernet, Token ring), Multiplexing,   Switched and IP Networks, Internetworking, Routing, Bridging, Transport layer protocols TCP/IP, UDP.

Network   security   issues.   Programming   exercises   or   projects   involving implementation of protocols at different layers.

Reference Material:
Introduction to Computer Networks, Tanenbaum
Unix Network Programming, Richard Stevens
Computer networks: a systems approach, Larry Peterson, Bruce Davie, Princeton Univ., Princeton.
Computer Networking: A Top-Down Approach Featuring the Internet, 2/e, James F Kurose, Keith W Ross, Addison Wesley 2003. ISBN: 0-201-97699-4.

Course Name: Software Engineering-I

Course Structure: Lectures: 3 / Labs: 0	**Credit Hours:** 3

Prerequisites: Data Structures

Objectives: To study various software development models and phases of software development life cycle. The concepts of project management, change control, process management, software development and testing are introduced through hands-on Team Projects.

Course Outline: Introduction to Computer-based System Engineering; Project Management;   Software   Specification;   Requirements   Engineering,   System Modelling; Requirements Specifications; Software Prototyping; Software Design: Architectural Design, Object-Oriented Design, UML modelling, Function-Oriented Design, User Interface Design; Quality Assurance; Processes & Configuration   Management;   Introduction to   advanced issues: Reusability, Patterns; Assignments and projects on various stages and deliverables of SDLC.

Reference Material:
Software Engineering: A Practioner's Approach, Roger Pressman, McGraw-Hill, 2001.

Course Name: Software Project Development	
Course Structure: Lectures: 0 / Labs: 6	**Credit Hours:** 6
Prerequisites: Software Engineering – I, Introduction to Databases, Computer Architecture	
Objectives: The software project involves research, conceive, plan and develop a real and substantial project related to computer science. It provides an opportunity to the students to crystallize their acquired professional competence in the form of a demonstrable software product. Make oral and written project presentations.	
Resources: *Software Project Management in Practice* by Jalote, Pankaj.	

Computing-Supporting Sciences (12 Credits Hours)

Course Name: Calculus and Analytic Geometry	
Course Structure: Lectures: 3 / Labs: 0	**Credit Hours:** 3
Prerequisites: None	

Objectives: To build the basic calculus and analytical geometry background.

Course Outline: Complex Numbers, DeMoivre's Theorem and its Applications, Simple Cartesian Curves, Functions and Graphs, Symmetrical Properties, Curve Tracing, Limit and Continuity, Differentiation of Functions. Derivative as Slope of Tangent to a Curve and as Rate of Change, Application to Tangent and Normal, Linearization, Maxima/Minima and Point of Inflexion, Taylor and Maclaurin Expansions and their convergence. Integral as Anti-derivative, Indefinite Integration of Simple Functions. Methods of Integration: Integration by Substitution, by Parts, and by Partial Fractions, Definite Integral as Limit of a Sum, Application to Area, Arc Length, Volume and Surface of Revolution.

Reference Material:
Calculus and Analytical Geometry By Swokowski, Olinick and Pence.
Calculus, *H. Anton, John Wiley and Sons (WIE), ISBN: 0471572608.*
Calculus, William E. Boyce Richard C. Diprima, John Wiley & Sons, ISBN: 0471093335

Course Name: Statistics and Probability	
Course Structure: Lectures: 3 / Labs: 0	**Credit Hours:** 3
Prerequisites:	

Objectives: To introduce the concept of statistics, randomness and probability and build on these concepts to develop tools and techniques to work with random variables

Course Outline: Introduction to Statistics, Descriptive Statistics, Statistics in decision making, Graphical representation of Data Stem-and Lead plot, Box-Cox plots, Histograms and Ogive, measures of central tendencies, dispersion for grouped and ungrouped Data, Moments of frequency distribution; examples with real life, use of Elementary statistical packages for explanatory Data analysis. Counting techniques, definition of probability with classical and relative frequency and subjective approaches, sample space, events, laws of probability. *General Probability Distributions,* Conditional probability and Bayes theorem with application to Random variable (Discrete and continuous) Binomial, Poisson, Geometric, Negative Binomial Distributions; Exponential Gamma and Normal

Reference Material:
Introduction to Statistics, Walpole, 1982 Prentice Hall, ISBN: 0024241504.
Statistical Data Analysis, G. Cowan G, 1998, Clarendon, Oxford.
Advances in Statistical Analysis and Statistical Computing III Mariano R (Ed.), (1993),

Course Name: Linear Algebra and Applications	
Course Structure: Lectures: 3 / Labs: 0	**Credit Hours:** 3
Objectives: Fundamentals of Linear Algebra with emphasis on problem-solving	
Course Outline: Vectors, Vector Spaces, Matrices & Determinants, Cofactor and Inverse, Rank, Linear Independence, Solution of Linear systems, Gaussian Elimination, Positive Definite matrix, Linear Transformations, Operations on matrices, Inner products, Eigenvalues & Eigenvectors. Applications to Systems of Equations and to Geometry.	
Reference Material: *Linear Algebra,* David C Lay, Pearson Addison Wesley, 1999, ISBN: 0201660369	

Computing-General Education (15 Credits Hours)

Course Name: Functional English	
Course Structure: Lectures: 3 / Labs: 0	**Credit Hours:** 3
Prerequisites: None	
Objectives: To develop good English writing, language usage and reading skills.	
Course Outline: Principles of writing good English, understanding the composition process: writing clearly; word, sentence and paragraph. Comprehension and expression. Use of grammar and punctuation. Process of writing, observing, audience analysis, collecting, composing, drafting and revising, persuasive writing, reading skills, listening skills and comprehension, skills for taking notes in class, skills for exams.	
Reference Material: *Warriner's English Grammar and Composition,* John E. Warriner	

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Course Name: Communication and Presentation Skills

Course Structure: Lectures: 3 / Labs: 0   **Credit Hours:** 3

Prerequisites: None

Objectives: To develop good English writing, language usage and reading skills. To appreciate the importance of business communication and to develop understanding of communication concepts, principles, theories and problems. To develop good oral communication and presentation skills.˙

Course Outline: Principles of writing good English, understanding the composition process: writing clearly; words, sentence and paragraphs. Comprehension and expression. Use of grammar and punctuation. Process of writing, observing, audience collecting, composing, drafting and revising, persuasive writing, reading skills, listening skills and comprehension, skills for taking notes in class, skills for exams. Business communications; planning messages, writing concise but with impact. Letter formats, mechanics of business, letter writing, letters, memo and applications, summaries, proposals, writing resumes, styles and formats, oral communications, verbal and non-verbal communication, conducting meetings, small group communication, taking minutes. Presentation skills; presentation strategies, defining the objective, scope and audience of the presentation, material gathering material organization strategies, time management, opening and concluding, use of audio-visual aids, delivery and presentation.

Reference Material:
Business English, Vawdrey, Stoddard, Bell.

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Course Name: Technical and Business Writing	
Course Structure: Lectures: 3 / Labs: 0	**Credit Hours:** 3
Prerequisites: None	

Objectives: To develop efficient literature survey, analysis, report writing and document designing skills.

Course Outline: Overview of technical reporting, use of library and information gathering, administering questionnaires, reviewing the gathered information. Technical exposition; topical arrangement, exemplification, definition, classification and division, casual analysis, effective exposition, technical narration, description and argumentation, persuasive strategy. Organizing information and generation solution: brainstorming, organizing material, construction of the formal outline, outlining conventions, electronic communication, generation solutions. Polishing style: paragraphs, listening sentence structure, clarity, length and order, pomposity, empty words, pompous vocabulary, document design: document structure, preamble, summaries, abstracts, table of contents, footnotes, glossaries, cross-referencing, plagiarism, citation and bibliography, glossaries, index, appendices, typesetting systems, creating the professional report; elements, mechanical elements and graphical elements. Reports: Proposals, progress reports, Leaflets, brochures, handbooks, magazines articles, research papers, feasibility reports, project reports, technical

research reports, manuals and documentation, thesis. Electronic documents, Linear verses hierarchical structure documents.

Reference Material:
Greenfield, T., Research Methods, Guidance for Postgraduates, Arnold, 1996, 034064629.

Course Name: Islamiat & Pak Studies
Course Structure: Lectures: 4 / Labs: 0   **Credit Hours:** 4
Prerequisites: None
Objectives: To impart an understanding of the fundamental principles and teachings of Islam through study of selected verses of the Quran and Prophetic Sayings. Important facets of the Prophet's life and salient, features of Islamic Civilization. To provide appreciation of other prominent religions, systems of ethics and cultures to prepare students to survive in international and multicultural work place. To take an analytical view in the history and development of Muslim society and culture in the sub-continent, emergence of Pakistan and its constitutional development. To develop an appreciation of the issues and challenges currently being faced in Pakistan. The strengths of its people and strategies to deal with
Course Outline: Fundamentals of Islam. (Aqaid, Ibadat, Islamic Dawah etc.); Ethical values of Islam; Ser ah of the Holy Prophet (PBUH); Islamic Civilization and its affects on humanity. Study of other prominent world religions and ethical systems in comparison with Islamic viewpoint. Multicultural societies. Historical background of Pakistan: Muslim society in Indo-Pakistan, the movement led by the societies, The downfall of Islamic society, The establishment of British Raj- Causes and consequences. Political evolution of Muslims in the twentieth century: Sir Syed Ahmed Khan; Muslim League; Nehru; Allama Iqbal: Independence Movement; Lahore Resolution; Pakistan culture and society, Constitutional and Administrative issues, Pakistan and its geo-political dimension, Pakistan and International Affairs, Pakistan and the challenges ahead.
Reference Material: *Chaudary M. Ali ,The Emergence of Pakistan, 1967.* *K.K.Aziz,The making of Pakistan, 1976.*

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Course Name: Professional Ethics	
Course Structure: Lectures:3 / Labs: 0	**Credit Hours:** 3
Prerequisites: None	

Objectives: A Computing graduate as professional has some responsibilities with respect to the society. This course develops student understanding about historical, social, economic, ethical, and professional issues related to the discipline of Computing. It identifies key sources for information and opinion about professionalism and ethics. Students analyze, evaluate, and assess ethical and professional computing case studies.

Outline: Historical, social, and economic context of Computing (software engineering, Computer Science, Information Technology); Definitions of Computing (software engineering, Computer Science, Information Technology) subject areas and professional activities; professional societies; professional ethics; professional competency and life-long learning; uses, misuses, and risks of software; information security and privacy; business practices and the economics of software; intellectual property and software law (cyber law); social responsibilities, software related contracts, Software house organization

Resources:
Professional Issues in Software Engineering, M.F. Bott et al.

Courses for BS Program:

Bachelor of Science in Information Technology; BS (IT)

		Area	Course		
Elective Information Technology Courses (Not Limited to the List below)				
1	CS	**Numerical Computation**	Numerical Computing	3 (3-0)	5
2	CS	**Computer Graphics**	Computer Graphics	3 (3-0)	6
3	CS	**Software Engineering**	Software Engineering-II	3 (3-0)	5
4	CS	**Languages and Translators**	Compiler Construction	3 (3-0)	7
5	CS		Principles of Programming Languages	3 (3-0)	4
6	CS	**Computer/ Communication**	Data Communication and Networks	3 (3-0)	6
7	CS	**Networks**	Distributed Computing	3 (3-0)	6
8			Network Strategies	3(3-0)	5
9	CS		Data and Network Security	3(3-0)	7
10	CS		Wireless Networks	3(3-0)	
11	CS	**Visual Programming**	Visual Programming	3 (3-0)	7

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12 13	CS	Computer Architecture	Computer Architecture	3(3-0)	
			Microprocessor Interfacing	3(3-0)	
14	CS	Signal Processing	Digital Signal Processing	3(3-0)	
15	CS		Digital Image Processing	3(3-0)	
16	CS	Web Engineering	Web Technologies	4 (3-3)	5
17	CS	Systems Software	System Programming	4 (3-3)	7
18	CS	Database Systems	Distributed Database Systems	3 (3-0)	7
19	CS	Human Computer Interaction (HCI)	Human Computer Interaction	3(2-3)	6-7
			(22/134)		

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Computing Requirements-Supporting Sciences 12 Credit Hours (Refer to Computing part)

IT Required Supporting Courses					
5	MS	38	Principles of Management	3 (3-0)	4
6	MS		Organizational Behavior	3(3-0)	4
7	CS	-	Information System **(9/134)**	3 (3-0)	5

Computing Requirements-General Education 12 Credit Hours (Refer to Computing part)

University Electives-Recommended Courses (Not Limited to the List below)					
46	MS	-	Financial Accounting		
47	MS	-	Financial Management	3 (3-0)	4
48	MS	-	Human Resource Management	3 (3-0)	5
49	MS	-	Marketing Management	3 (3-0)	6
50	SS	-	Economics	3 (3-0)	7
51	PS	-	Psychology	3 (3-0)	6
52	SS	-	International Relations	3 (3-0)	7
53	SS	-	Foreign Language (French, German, etc.)	3 (3-0)	7-8
54	SS	-	Philosophy	3(3-0)	6-8
			(18/ 136)		

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BS Information Technology Courses (Core)

Course Name: Web Technologies	
Course Structure: Lectures: 3 /Labs: 1	**Credit Hours:** 4
Prerequisites: None	

Course Outline: An overview of web design concepts, including usability, accessibility, information design, graphic design in the context of web, introduction to web site technologies, Overview of Protocols: TCP/IP, HTTP, Overview of 3-tier Architecture, Web Based Applications Architecture. Developing Front End Applications: Front End Development Tools, HTML, DHTML, Scripting (Java Script, Jscript, VB script), Java Applets, ActiveX.

Reference Material:
Web enabled Commercial Application Development Using... HTML, DHTML, JavaScript, Perl, CGI by Ivan Bayross.

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Course Name: System and Network Administration	
Course Structure: Lectures: 3/Labs: 0	**Credit Hours: 3**
Prerequisites: None	

Course Outline: A survey of the tools and techniques used in the administration of computing systems, System installation, booting and halting the system, file systems and directory permission structures, print and disk quotas, device configuration and management, user account administration, security, client administration, disk maintenance, remote access, remote administration, the use of schedulers, and the use of advanced scripting to ease system administration tasks.

Reference Material:
The Ultimate Windows 2000 System Administrator's Guide By Robert Williams, Mark Walla.

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Course Name: Information Security	
Course Structure: Lectures: 3 / Labs: 0	**Credit Hours: 3**

Objectives: This course provides a broad overview of the threats to the security of information systems, the responsibilities and basic tools for information security, and the levels of training and expertise needed in organizations to reach and maintain a state of acceptable security. It covers concepts and applications of system and data security. Areas of particular focus include secure network design, implementation and transition issues, and techniques for responding to security breaches.

Course Outline Information Security Attacks & Vulnerabilities, Anatomy of Attack, Awareness and Management Commitment to Security, Security Policy, Information Security Network Architecture Design Rules, Rules for Selecting Security Hardware & Software, Physical Security Rules, Network Hardware Security, Operating System Security Rules, PC Operating Security Rules, Internet Security Rules, Application Security Rules, Software Validation and Verification Rules, Data Encryption Rules, Configuration Management Rules, Network Monitoring Rules, Maintenance and Troubleshooting Security Rules, Emergency Rules Attacks, An introduction to confidentiality, integrity, availability; authentication technologies and models, Controls and protection models, Security kernels, Secure programming, Information Auditing, Intrusion detection and response, Operational security issues, Physical security issues, Personnel security, Policy formation and enforcement, Access controls, Information flow, Legal, privacy and social issues, Identification and authentication in local and distributed systems; classification and trust modelling, Risks and vulnerabilities, Risk assessment, Database security, Encryption, Host-based and network-based security issues, Areas of particular focus include secure network design, implementation and transition issues, and techniques for responding to security breaches.

Reference Material:
Information Security Best Practices by George L. Stefanek, 2006.

Course Name: Theory of Automata and Formal Languages		
Course Structure: Lectures: 3 / Labs: 0	**Credit Hours:** 3	
Prerequisites: Discrete Structures		

Objectives: The course aims to develop an appreciation of the theoretical foundations of computer science through study of mathematical & abstract models of computers and the theory of formal languages. *Theory of formal languages* and use of various abstract machines as 'recognizers' and parsing will be studied for identifying/validating the synthetic characteristics of programming languages. Some of the abstract machines shall also study as 'Transducers'.

Course Outline: *Finite State Models:* Language definitions preliminaries, Regular expressions/Regular languages, Finite automata (FAs), Transition graphs (TGs), NFAs, kleene's theorem, Transducers (automata with output), Pumping lemma and non regular language *Grammars and PDA:* Context free grammars, Derivations, derivation trees and ambiguity, Simplifying   CFLs , Normal form grammars and parsing, Push-down Automata, Pumping lemma and non-context free languages, Decidability, Chom sky's hierarchy of grammars *Turing Machines Theory:* Turing machines, Post machine, Variations on TM, TM encoding, Universal Turing Machine, Context sensitive Grammars, Defining Computers by TMs.

Reference Material:
Introduction to Computer Theory, Denial Cohen, John Wiley & Sons, Inc.
Introduction to Automata Theory, Languages and Computation, J Hopcraft, D. Ullman.
Languages and Machines, An Into to the Theory of Comp. Sc., 2/e Thomas A. Sudkamp, Addison Wesley.

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BS (IT Courses)(Elective)

Course Name: Software Project Management	
Course Structure: Lectures: 3 / Lab 0	**Credit Hours:** 3
Prerequisites: Data Structures, Software Engineering–I	

Objectives: To develop ability to plan and manage software development projects successfully, maximizing the return from each stage of the software development life cycle.

Reference Material:
Software Project Management, Richard H. Thayer, Wiley IEEE Press 2002, ISBN 0-7695-1199-6.
Software Engineering: A Practitioner's Approach, 4th edition, Roger S. Pressman, McGraw-Hill Higher Education, ISBN: 0070521824.

Course Name: Computer Graphics	
Course Structure: Lectures: 3 / Labs: 0	**Credit Hours:** 3
Prerequisites: Object Oriented Programming , Visual Programming	

Objectives: Study of various algorithms in computer graphics and their implementation in any programming language.

Course Outline: Graphics hardware. Fundamental algorithms. Applications of graphics. Interactive graphics programming — graph plotting, windows and clipping, and segmentation. Programming raster display systems, panning and zooming. Raster algorithms and software — Scan-Converting lines, characters and circles. Region filling and clipping. Two and three dimensional imaging geometry and transformations. Curve and surface design, rendering, shading, colour and animation.

Reference Material:
1. Computer Graphics, Principles and Practice, J. D. Foley, A. van Dam, S. K. Feiner and J. F. Hughes, Addison-Wesley ISBN: 0-201-12110-7.
2. Computer Graphics, F.S.Hill, Maxwell MacMillan ISBN: 0-02-354860-6.

Course Name: Analysis of Algorithms	
Course Structure: Lectures: 3 / Labs: 0	**Credit Hours:** 3
Prerequisites: Discrete Mathematical Structures, Data Structures	
Objectives: Detailed study of the basic notions of the design of algorithms and the underlying data structures. Several measures of complexity are introduced. Emphasis on the structure, complexity, and efficiency of algorithms.	
Course Outline: Introduction; Asymptotic notations; Recursion and recurrence relations; Divide-and-conquer approach; Sorting; Search trees; Heaps; Hashing; Greedy approach; Dynamic programming; Graph algorithms; Shortest paths; Network flow; Disjoint Sets; Polynomial and matrix calculations; String matching; NP complete problems; Approximation algorithms.	
Reference Material: *Introduction to Algorithms*, T. H. Cormen, C. E. Leiserson, and R. L. Rivest, MIT	

Course Name: Database Administration	
Course Structure: Lectures: 2 / Labs: 1	**Credit Hours:** 3
Prerequisites: Introduction to Databases	
Objectives: The student will learn the design, algorithms and techniques involved in distributed database system and their implementation.	
Course Outline: 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.	
Reference Material: Distributed Databases: Principles and System, *Ceri and Pelagatti McGraw-Hil Book Company 1984, ISBN: 0-07-010829-3.*	

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Course Name: E-Commerce	
Course Structures Lectures: 3 Labs: 0	Credit Hours: 3

Fundamentals of E-Commerce Technologies: An overview of the principles of E-Commerce. The origin and growth of E-Commerce. Technologies that support the development of E-Commerce applications. Business models and strategies for E-Commerce. Legal issues related to E-Commerce such as privacy, consumer rights and intellectual property.

Electronic Payments Systems: Electronic money, electronic contracts, micro-payments, authenticity, integrity and reliability of transactions, the encryption and digital signature techniques available to support secure transactions on the internet.

Cryptography, Information Security and E-Commerce: Symmetric cryptography, Asymmetric cryptography, Digital signature, one-way hashing, zero-knowledge proof, certificate and certificate authority. Secure information infrastructure, virtual private network (VPN), online shopping and payment systems, e-crash. Economic impact. Smart card, steganography, time stamping. Cryptanalysis technology. Authentication protocols, analysis and evaluation.

Distributed Systems and Software: Architectural models for distributed systems, server techniques, remote procedure call and multicast communication, emerging standard and platforms (CORBA, DCOM), distributed transactions, concurrency control, reliability and security issues.

Network and Web Programming: Client-server system design; interprocess communication; sockets; blocking and nonblocking I/O; multithreaded process; iterative and concurrent server designs; Web programming includes HTML, JAVA, Web page design and construction.

Open Systems for E-Commerce: Introduction to open system standards and protocols. Transaction protocols. Electronic commerce applications using open system and artificial intelligence technologies. Application of intelligent agents for automated transaction processing. Integration of Web programming techniques with information and communication systems.

Project in E-Commerce Technologies: An individual or a team project on E-Commerce technologies. *Project in E-Commerce Technologies are designed to allow students to gain first hand experience in studying and developing real-world systems for E-Commerce. These could be conducted either individually or by teamwork. Possible projects include, but are not limited to: On-line Banking and Financial Systems Supply Chain, Web-based Forecasting and pricing Electronic Payment Systems, Internet Shopping, Virtual Store or Virtual Campus, Electronic Office, Cryptography Servers, Security Fire Wall, Network Management and Quality of Service, Distributed System Technologies in CORBA or DCOM,

HTML(Hypertext Markup Language): Internet, web & HTMLK Fundamentals, The world Wide Web & Web Servers,

Creating Static Web Pages with HTML:

Advanced HTML:

Java Script: Data Type, Control Structures, Object & Function, Event Handling,

VB Script: Introduction, Data Types, Syntax, Control, etc,

Active Server Pages:

Common Gateway Interface (CGI) Script:

Database Connectivity: Using ASP, Using CGI,

Recommended Books:
Ann Navarro, Todd Stauffer, HTML by Example
Andrew Wooldrige, Mike Morgan, Mona Everett, Scott J. Walter, Special Edition Using Java Script

Course Title: Advanced Internet Applications

Course Structures: Lectures: 3 Labs: 3	Credit Hours: 4

Course Description:

The Rich Internet Applications (RIA) course concentrates primarily on the theory and practice of building cross platform rich client web applications in the browser for desktop and mobile devices. This course explores the new category of engaging web applications being developed using tools such as Flex, Flash ActionScript, AJAX and Silverlight. Rich Internet Applications (RIAs) can combine rich media (such as video, audio, and animation) to achieve powerful data visualizations. Along with the fundamentals underlying these technologies, several applications will be showcased as case studies. Students work with these technologies starting with simple applications and then examining real world complex applications. At the end of this course, students would have mastered the latest and widely used RIA methodologies.

Objectives:

- Build and deploy cross-platform Rich Internet Applications (RIA) and content
- Create engaging animations to attract and retain users
- Generate interactive dynamic content and special effects
- Connect to relational databases and XML datasets to build real-time, data-driven applications
- Encode and deliver streaming video to create innovative, mixed-media content
- Integrate and distribute Flash content on multiple platforms, including DVD, web and Mobile

Course Outline:

Rich Internet Applications: Introduction, History, Evolution
RIA Tools and their Features: Flash, Flex, Actionscript, Adobe Air, and Silverlight
RIA APIs and IDEs HTML5: Overview of HTML5, Canvas and Scalable Vector Graphics, Audio and Video, Geolocation, Communication, Web Sockets, Forms, Drag and Drop, Web Workers, Web Storage, Offline Web Applications, CSS AJAX: Purpose, Frameworks, XML, JSON, DOM, XMLHttpRequest Object jQuery UI: jQuery Review, Controls, Drag and Drop jQuery Mobile: Navigation, Form Elements and Lists, Views, Server Integration Techniques
Flex: Flex Programming elements, MXML, Events, Data Access, User Interface Components, Flex Mobile Project Presentations

Reference Material

Pro HTML5 Programming, 2nd edition, by Peter Lubbers, Brian Albers, and Frank Salim, APress, 2011. ISBN13: 978-1-4302-3864-5.
Head First HTML5 Programming, Building Web Apps with JavaScript, Eric Freeman and Elisabeth Robson, O'Reilly, 2011. ISBN 13: 978-1-4493-9054-9.
jQuery UI, by Eric Sarrion, O'Reilly, 2012. ISBN 13: 978-1-449-31699-0
jQuery Mobile: Up and Running, by Maximiliano Firtman, O'Reilly, 2012. ISBN 13: 978-1-449-39765-4.
Adobe Flex 4.5 Fundamentals: Training from the Source, by Labriola, M. and Tapper, J., Adobe Press, 2011. ISBN 13: 978-0-321-77712-6 (Reference book)
Flex Mobile in Action, by Jonathan Campos, Manning Publications, 2012. ISBN 13: 9781617290619
Various online resources

Course Name: Network Strategies	
Course Structure: Lectures 2/ Labs: 1	Credit Hours: 3
Prerequisites: Computer Networks	

Objectives:

❖ **OSI Model:** The Layers Concepts, TCP/IP Protocol Suite
❖ **Switching Techniques:** Circut switching, Packet switching, Virtual Circut Switching, Frame Relay, ATM
❖ **Application Layer:** Domain Name System (DNS), Simple Mail Transfer Protocol (SMTP), Hypertext Transfer Protocol (HTTP)
❖ **Transport Layer:** User Datagram Protocol (UDP), User Datagram Format, UDP Operation, Uses of UDP, Transmission Control Protocol (TCP), TCP Features, TCP Connection
❖ **Network Layer:** Distance Vector Routing, Routing Information Protocol (RIP), Link State Routing, Open Shortest Path First (OSPF), Path Vector Routing, Border Gatway Protocol (BGP), Internet Protocol (IP), IPV4 Addresses, IPV6, Transition from IPV4 to IPV6, Introduction to ICMP,IGMP,ARP,RARP
❖ **DataLink Layer:** High-Level Data Link Control (HDLC), Transfer Modes (NRM,ABM), Frame Structure, Point to Point Protocol (PPP), PPP Services, Frame format

Reference Books:
1. Data Communications and Networking 4th Edition by Behrouz A.Forouzan
2. Data and Computer Communication 5th Edition By William Stalling.

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Course Name: Advanced Object Oriented Programming	
Course Structures Lectures 3: Labs: 3	**Credit Hours: 4**

Introduction to java

History of java, Features of java, Java Environment-How it works, Comparison between java and C++, Basic object oriented concepts, Modifiers for (class, methods and variables)

Basic java data types, syntax, Writing simple java console applications.,Control structures. (if, if-else, nested if-else, switch, for, while, do-while),Examples of java applications

Packages and interfaces, Overview of Java Packages, What is java package? Packages levels, Why we use packages? Creating packages(Syntax of packages) Default package. Example of packages, What is interface? Why we use interface? Syntax and example of interface. Comparison between interfaces and abstract class.

JAVA Exception handling Overview of Exceptions ,Error and Exceptions, Catching a Runtime Exception, Handling Multiple Exceptions., The finally Clause, The throws Clause, When to use Exceptions , When not to use Exceptions

JAVA Multithreading, Overview of Multithreading, The thread control methods, The thread life cycle, Implementation of Multithreading(EXTENDING A THREAD CLASS)

Applets, Basics of Java Applet., Advantages and disadvantages of java Applets, Life cycle of java Applet, Examples.

AWT The java Abstract Window Toolkit(AWT) Package. Implantation of AWT controls.

Servlets Client side vs. Server side technologies., Different Server side technologies, Introduction to Servlets, Servlets life cycle, Software Requirements, Developing Basic Servlets example., doPost, doGet, SSI, Session management.

Recommended Books:

Java 2.0 by Ivan Bayross

The Complete Reference 5the Edition

Jamie Jaworski, Java Developer's Guide, Macmillan Computer Pub. 1996.

Dustin R. Callaway, Inside Servlets : Server-side Programming for Java Platform, 2nd Edition, Addison Wesley Publishing Company, 2001.

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Course Name: Software Engineering-II	
Course Structures: Lectures: 3 Labs: 0	**Credit Hours: 3**
Objectives:	
Course Contents: Object Oriented Analysis and Design **Introduction** Introduction to Software engineering –II, Why software engineering-II, Software Crises Basic concepts of OO software Engineering-II, Object Oriented paradigm, Abstraction, Objects, Classes Inheritance, Polymorphism Encapsulation **Object Modeling,** Define Model, Objects & Class, Links & Associations, Generalization & Inheritance Grouping Constructs, Aggregation, Abstract Class, Multiple Inheritance, Meta Data, Candidate Key **Object oriented development,** Introduction, How to Identify objects, How to Identify association, How to Identifying multiplicities **Object Oriented Metrics,** Introduction, Metrics Suite for Objected Oriented design, The MOOD Metrics **Object Oriented Testing,** Introduction, MM testing, Function pair Coverage **Formal Notations,** Introduction, Formal Specification, Object Constraint Language (OCL), UML **Case Study: Compiler Design** Using object oriented approach, submit a detail report on Compiler design. (Draw UML Diagrams) which clearly show the	
Books: 1. *Software Engineering DAVID GUSTAFSON,P.hD,schaum's Outline Series James R.Rumbaugh, Michael R.Blaha, William Premerlani, Frederick Eddy,* *William Lorensen,Object Oriented Modeling and Design with UML, 2nd Edition,* *Prentice Hall, 2004*	

Course Name: Computer Architecture	
Course Structure: Lectures: 3 / Labs: 0	**Credit Hours: 3**
Prerequisites: Digital Logic Design	

Course Outline: Introduction Computer Organization and Architecture, Structure and Function, **History of Computer Evaluation**: Generation of Computer, Von Neumann Machine Architecture **Execution:** Introduction of Execution Unit (EU), Register Section, General Register Design **Processor Control Unit**: Basic Concepts Design Methods (Hardwired Control Design and Micro Programmed Control Unit **Cache Memory:** Characteristics of Memory System, Location, Capacity, Unit of Transfer, Access Method, Performance, Physical Type, Physical Characteristics, Organization **Memory Hierarchy:** Cache Memory Principles ,Elements of Cache Design **Internal Memory** Organization, DRAM vs SRAM, Types of ROM
External Memory Magnetic Disk, RAID, RAID Level 0 to 6 **Advanced Topics**: Programmed I/O , Interrupt Driven I/O, DMA (Direct Memory Access)

Reference Material:

Books:

1. *M. Moris Mano, Modern Computer architecture, 3rd Edition, Prentice Hall, 1992.*

2. *William Stallings, Computer Organization and Architecture, 7th Editition*

BS IT Courses (Elective General Courses)

Course Name: Principles of Management	
Course Structure: Lectures: 3/Labs: 0	**Credit Hours:** 3
Prerequisites: None	

Course Outline: Managers & Management, The Evolution of Management, Managerial Environment, Decision Making, Planning, Strategic Management, Organizing, Human Resource Management, Motivation, Leading, Controlling, Quality, Productivity and Customer Satisfaction and Case Studies.

Reference Material:
Management by Robins Stephen.
Principle of Management by Griffen.

Course Name: Organizational Behavior	
Course Structure: Lectures: 3/Labs: 0	**Credit Hours:** 3
Prerequisites: None	

Course Outline: Fundamentals of Organizational Behaviour, Behavioural Science and Organizational Behaviour, Individual Behaviour in Organizations, Personality, perception and attitudes, Learning and reinforcement, Motivation, Group Behaviour in Organizations, Group dimensions in organizations, Group dynamics, Leadership, Organizational Structure and Organizational Behaviour, Organizational design, Job design, Stress 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.

Reference Material:
Organizational Behaviour by Fred Luthans.

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Course Name: Management Information System	
Course Structure: Lectures: 3/Labs: 0	Credit Hours: 3
Prerequisites: None	

Course Outline: Systems theory and concepts; information systems and organizational system; decision support; quality; level of systems: strategic, tactical, and operational; system components and relationships; information systems strategies; roles of information and information technology; roles of people using, developing, and managing systems; IS planning and change management; human-computer interface; IS development process; evaluation of system performance; societal and ethical issues related to IS design and use.

Reference Material:
Information Systems Development, Paul Lewis, Pitman Publishing

Course Name: Financial Accounting	
Course Structure: Lectures: 3 / Labs: 0	Credit Hours: 3
Prerequisites: None	

Course Outline: Introduction to Accounting and its concepts. Recording Business Transactions: Journal, Ledger, Trial Balance. Preparation of Financial Statements: Balance Sheet, Income Statement, Completion of Accounting Cycle: Adjustments. Closing, Work Sheet Accounting for purchase and sales of merchandise. Receivable and payable, Inventories, Payroll Systems. Plant and Equipment: Acquisition, Depreciation, Disposal. Corporations: Organization and stock-holders equity, Operations, Earning per share and dividends.

Reference Material:
Accounting: The Basis for Business Decisions by Meigs & Meigs, 10th Edition.

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Course Name: Financial Management

Course Structure: Lectures: 3 / Labs: 0	**Credit Hours:** 3

Prerequisites: None

Course Outline: Introduction to Financial Management, Concepts and Models in Valuation, The time value of money, Fundamentals of risk and portfolio analysis, Valuation of stocks and bonds, The capital Asset Pricing Model, the Arbitrage Pricing Model and other valuation models. The Cost of Capital: Capital structure and Dividend Policy, The cost of capital, Capital structure theory, Capital structure policy and optimal capital structure, Internal financing and dividends   policy Capital Budgeting: The   basis   of capital budgeting, The determination and use of cash flow, Mutually exclusive investments and capital rationing, Annual equivalent cost and replacement decisions, Risk analysis and the optimal capital budget, Islamic guidelines for financial management: The rational of prohibition of interest, Alternate capital structure, Capital Budgeting in an Interest free economy, working Capital Management in 100% equity capital structure.

Reference Material: *Financial Management* by Charles H. Gibson.

Course Name: Human Resource Management

Course Structure: Lectures: 3 / Labs: 0	**Credit Hours:** 3

Prerequisites: None

Course Outline: An overview of Human Resource Management and Human Resource Manager. The Environment of Human Resource Management, external and Internal Environment. Equal Employment Opportunity and Affirmative Action. Job Analysis: A Basic Human Resource Tool. Human Resource Planning, Recruitment, and Selection. Organization Change and Human   Resource   Development.   Corporate   Culture   and   Organization Development. Career Planning Development. Performance Appraisal.

Reference Material:
Managing Human Resource by Wayne F. Cascio.

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Course Name: Marketing Management

Course Structure: Lectures: 3 / Labs: 0	Credit Hours: 3

Prerequisites: None

Course Outline: Marketing: an overview: The importance and scope of marketing, The marketing concept and social responsibility, The basic functions of marketing.

An organization's external environment, An organization's internal environment, Evaluating and Managing SWOT Analysis.

Marketing information systems: Concept and components of marketing information systems, MKIS, MRS, MDSS.

Buyer behavior analysis: The consumer's decision process, Demographic dimensions of consumer market, Behavioral dimensions of consumer market, Organizational markets, buying objectives & structures.

Segmenting, targeting and positioning strategies, Product marketing strategies, Pricing strategies and policies, Marketing channel systems, Promotion mix decisions

Reference Material:

Philip Kotler: Marketing Management, Analysis, Planning, Control, Prentice Hall.

Jegdesh Sheth and Dennis E. Garrett: Marketing Management: A Comprehensive Reader, South Western Publishing.

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Course Name: Fundamentals of Economics

Course Structure: Lectures: 3 / Labs: 0	**Credit Hours:** 3

Prerequisites: None

Introduction

Nature, scope and importance of Economics, Microeconomics vs. Macroeconomics, Scarcity and choice, Opportunity cost, Factors of production, Production possibility frontier.

Demand, Supply and Equilibrium

Concepts of demand and supply, Laws of demand and supply, Market equilibrium, Shifts in demand and supply curves, and market equilibrium.

Elasticity

Concept of elasticity, Price elasticity of demand, Income elasticity of demand, Cross Elasticity of Demand, Price elasticity of supply, Application of elasticity.

Utility Theory

Consumer behavior, Preferences, Utility function, Laws of Increasing and diminishing marginal utility, Law of Equi-marginal utility.

Theory of Firm

Factors of production and their rewards, Total, average, and marginal products, Laws of returns, Cost of production, Total, average, and marginal costs, Total, average, and marginal revenue. Concept of profit maximization/Cost minimization.

Market Structure

Perfect competition & imperfect competition: assumptions and Price/Output determination in short run and long run. Monopoly, Short-Run and Long-Run Equilibrium of Monopoly, Regulation of Monopoly.

National Income

Concepts of national income, GDP & GNP, Real vs. nominal GNP, NNP, NI, PDY, Saving and Personal Consumption.

Macroeconomic Issues

Concept of inflation, unemployment, Balance of payment, Exchange rate and Business cycles. Monetary Policy and Fiscal Policy and their role in the economy.

Reading Material:

1. Michel Parkin. 2004. Economics, 5th Ed., Addison Wesley.
2. Paul A. Samualson and W.D. Nordhaus. 2004. Economics, 18th Ed., McGraw Hills, Inc.
3. John Sloman, Economics (Latest edition).
4. Lipsey and Crystal, Economics, (Latest edition).

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S.No	Name/Group	Supervisor	Title
1	Imran Khan Sohail Khan	Mr. Nasir Rashid	Data Base Management system for Chakdara Museum
2	Nasar Khan Aftab Alam	Dr. Fawad Qayum	Student information system for Deptt of Physics
3	Javed Iqbal Jawad Hussain	Dr. Sehat Ullah	Student information System for Deptt of Law
4	Noman Khan Zakir Hussain	Mr. M. Salam	Medical Store Information management system
5	Zakria Waqas Ahmad	Mr. Nasir Rashid	Patient Information system
6	Maaz Ullah Muhammad Altaf Hussain	Mr. M. Salam	Web Based library Management system
7	Muhammad Sardar	Mr. M. Salam	Web Application for Chief Proctor office, UOM
8	Mujahid Farooq Sadiqui Waheed Ullah	Dr. Sehat Ullah	Vehicle Assigning system, UOM
9	Waseem Ullah	Mr. Shah Khalid	Thesis Management system for Deptt of CS & IT

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