

## UNIVERSITY OF THE PUNJAB

### NOTIFICATION

It is hereby notified that the Vice-Chancellor has, under section 15 (3) of the University of the Punjab Act, 1973, in anticipation of the approval of the other relevant bodies, approved the recommendations of the Board of Studies in Information Technology & Computer Science regarding renaming of B.Sc. (Hons.) in Computer Science as BS (Computer Science), and the new curriculum for the four years BS (Computer Science) Degree Programme under Annual System for Affiliated Colleges to be implemented from the session 2006.

The new curriculum is attached vide Annexure 'A'.

**Admin. Block  
Quaid-i-Azam Campus,  
Lahore.**

*Sd/-*  
**Prof. Dr. Muhammad Naeem Khan**  
**Registrar**

No. D/2106/Acad.

Dated: 10-08/2006.

Copy of the above is forwarded to the following for information and necessary action: -

1. Dean, Faculty of Sciences
2. Principal, PUCIT
3. Members of the Board of Studies in Information Technology & Computer Science
4. Director, Undergraduate Programme
5. The Principals, Affiliated Colleges
6. Controller of Examinations
7. Deputy Controller (Examinations)
8. Deputy Registrar (Affiliation)
9. A.O. (Statutes)
10. A.O. (Secrecy)
11. A.O. (Information Cell)
12. Secretary to the Vice-Chancellor
13. Secretary to the Registrar

*[Signature]*  
Deputy Registrar (Academic)  
for Registrar

## Requirements for B.S. Degree in Computer Science

### Course Contents

#### Summary of Computer Science Degree Requirements

Category	Credit Hours
Computing Core Courses	37
Computer Science – Core Courses	24
Computer Science - Technical Electives	18
Mathematics	15
Natural Sciences	06
Humanities and Social Sciences	30
Total Credit Hours	<hr/> 130 <hr/>

(a) General Education Requirements (51 credit hours)	Credit Hours
Mathematics	MA 101 (Calculus I)
	MA 102 (Calculus II)
	MA 210 (Linear Algebra)
	MA 250 (Probability and Statistics)
	MA 310 (Numerical Analysis)
Natural Sciences	NS 101 (Mechanics and Wave Motion)
	NS 103 (Electricity and Magnetism)
Humanities and Social Sciences	
English	EN 101 (Writing Workshop)
	EN 201 (Communication Skills)
	EN 205 (Business and Technical Writing)
Humanities	HM 150 (Islamic Studies I)
	HM 250 (Islamic Studies II)
	HM 260 (Arabic Language)
	Two electives*
Social Sciences	SS 171 (Pakistan Studies)
	Two electives**
	<hr/> 51 <hr/>

\* The following courses are potential electives in the Humanities area:

Introduction to Islamic History, Introduction to Psychology, Introduction to Philosophy, Comparative Religions, English Literature, Urdu Literature, Chinese/French /German/Japanese Language

\*\* The following courses are potential electives in the Social Sciences area:

Introduction to Economics, Introduction to Social Sciences, Introduction to Political Science, Introduction to Management, Introduction to Sociology, History of Civilization

<b>(b) Core Courses in Computing (37 credit hours)</b>		<b>Credit Hours</b>
Programming Fundamentals	CMP 141	3
Discrete Mathematics	CMP 200	4
Data Structures and Algorithms	CMP 210	3
Digital Logic Design	CMP 120	3
Digital Logic Design Lab	CMP 121	1
Computer Organization and Assembly Language	CMP 225	3
Computer Organization and Assembly Language Lab	CMP 226	1
Object Oriented Programming	CMP 241	3
Operating Systems	CMP 325	3
Computer Networks	CMP 330	3
Computer Networks Lab	CMP 331	1
Database Systems	CMP 370	3
Software Engineering	CMP 390	3
Object Oriented Analysis and Design	CMP 391	3
		<hr/> 37 <hr/>
<b>(c) Core Courses in Computer Science (24 credit hours)</b>		<b>Credit Hours</b>
Introduction to Computing	CS 101	3
Theory of Automata and Formal Languages	CS 201	3
Analysis of Algorithms	CS 310	3
Internet Programming	CS 342	3
Artificial Intelligence	CS 360	3
Systems Programming	CS 421	3
Capstone Project I	CS 491	3
Capstone Project II	CS 492	3
		<hr/> 24 <hr/>
<b>(d) Elective Courses in Computer Science (18 credit hours)</b>		<b>Credit Hours</b>
The following is a list of <u>sample</u> elective courses:		
Compiler Construction	CS 400	3
Programming Languages	CS 445	3
Computer Graphics	CS 450	3
Human Computer Interaction	CS 460	3
Advance Database	CS 371	3
Data Warehousing	CS 372	3



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Data Mining	CS 375	3
Project Management	CS 412	3
Design Patterns	CS 440	3
Geographical Information System	CS XXX	3
Internetworking with UNIX TCP/IP	CS 431	3
Wireless Communications and Systems	CS XXX	3
Network Security	CS 432	3



**Punjab University College of Information Technology**  
University of the Punjab, Allama Iqbal (Old) Campus, Lahore 54000.

26

The Controller of Examinations  
University of the Punjab  
Lahore

P.U. College of Information Tech.
No. D. 459-64/PUCIT
Dated. 18/4/08

Subject: SYLLABUS FOR BS COMPUTER SCIENCE

Reference: Your letter No.574-SQP dated 06.03.2008

Copy of the syllabus for BS Computer Science 1<sup>st</sup>, 2<sup>nd</sup>, 3<sup>rd</sup>, and 4<sup>th</sup> year is forwarded for information and office record please.

*me* 16-04-08

Dr. Syed Mansoor Sarwar  
Principal

*me* 16/4/08

Encl: Annex 'A' (pages 20)

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Principals Affiliated Colleges



SYLLABUS – BS COMPUTER SCIENCE

**FIRST YEAR**

**MA101 - Calculus I (Paper I – 100 Marks)**

**Objective**

This course provides a systematic introduction to the aspects of differential and integral calculus. It provides a sound foundation in calculus for students of Mathematics and Computer Science. Emphasis of the course is on modeling and applications. The following topics will be covered in this course: Number systems, Intervals, Inequalities, Functions, Solving absolute value equations and inequalities, Limits, Continuity, Limits and continuity of trigonometric functions, Slopes and rates of change, the Derivative, Local linear approximation, Differentials, Analysis of functions, Rolle's theorem and Mean value theorem, the indefinite integral, the definite integral, L'Hopital's rule; Integration, First order differential equations and applications, Second order linear homogeneous differential equations, Polar coordinates and Graph sketching, Conic sections in calculus.

**Prerequisites**

None

**Text Book**

Anton, Bivens and Davis, *Calculus*, 7<sup>th</sup> Edition, John Wiley and Sons, 2002. ISBN: 9971-51-431-1

**Reference Books**

- Thomas and Finney, *Calculus with Analytic Geometry*, Addison Wesley 10<sup>th</sup> Edition, 2001. ISBN: 0201163209
- Dennis G.Zill & Michael R. Cullen, *Differential equations with boundary value problems*, 3<sup>rd</sup> Edition, 1992. ISBN: 0534418872
- Online Material: [www.mathworld.com](http://www.mathworld.com)

**MA102 - Calculus II (Paper II – 100 Marks)**

**Objective**

The objective of this course is to prepare the students for coordinating problems by various viewpoints and to encourage and motivate the students to think abstractly, and explore possibilities in field of computer science, in particular, computer graphics. Class assignment will be given at the end of each lecture, and Software MATLAB/MATHEMATICA/MAPLE will be used to demonstrate the visualization of surfaces. The following topics will be covered in this course: Motivation and applications of the course, Rectangular coordinates in 3-space, spheres, cylindrical surfaces, Vectors, Scalar (dot) products, projections, Vector (cross) products, Parametric Equations of Lines, Planes in 3-space, Quadric surfaces, Spherical and cylindrical coordinates, Introduction to vector-valued functions, Calculus of vector-valued functions, Change of parameter, Arc





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length, Unit tangent, normal, and Binomial vectors, Curvature, Functions of two or more variables, Partial derivatives, The Chain rule, Directional derivatives and Gradients, Tangent planes and normal vectors, Maxima and minima of functions of two variables, Lagrange multipliers, Double integral, Parametric surfaces; Surface area, Triple integral, Line integrals, Green's Theorem, Surface integrals; application of surface integrals, Divergence Theorem, Stoke's Theorem.

**Prerequisites**

MA 101 – Calculus I

**Text Book**

Anton, Bivens and Davis, *Calculus*, 7th Edition, John Wiley and sons, 2002. ISBN: 9971-51-431-1

**Reference Books**

- Thomas and Finney, *Calculus with Analytic Geometry*, Addison Wesley, 9<sup>th</sup> Ed, 1999. ISBN: 0201163209

**CMP 140 Programming Fundamentals (Paper III – 100 Marks)**

**Objective**

Computer programming is an art of developing computational solutions to precisely describable problems. The purpose of this course is to introduce students with basic concepts of structured programming. After completing this course, they should be able to write elegant structured programs to solve different computational problems. Programs are demonstrated using the C++ programming language. However, the concepts are taught in a language-independent fashion. Note that the basic purpose of this course is to learn programming instead of a particular programming language. The following topics will be covered in this course: Introduction to Programming Languages and Compilers; Flowcharts, Pseudo-code; Data Storage; Introduction to C++, Classes, Objects, and UML; Control Statements; Functions and Recursion; Debugging; Command Line Arguments; Preprocessor; Arrays; Pointers and Pointer-Based Strings; File Processing; Structures and Unions; Self-Referential Classes.

**Prerequisites**

CS100 / IT 100 – Introduction to Computing

**Text Book**

- Deitel & Deitel, *C++ - How to Program 5<sup>th</sup> Edition*, Pearson – Prentice Hall (2005), ISBN: 0130384747

**Reference Books**

- Walter Savitch, *Problem Solving with C++: The Object of Programming*, Addison-Wesley, ISBN-10: 0321268652
- Robert Lafore, *Object-Oriented Programming in C++*, ISBN-10: 0672323087





## Punjab University College of Information Technology

University of the Punjab, Allama Iqbal (Old) Campus, Lahore 54000.

3

### CMP 120 – Digital Logic Design (Paper IV – 100 Marks)

#### Objective

The primary objective of the course is to develop in students a thorough understanding of digital logic design principles. The following topics will be covered in the course: Number Systems, Codes (Parallel/Serial), Logic Gates, Boolean Algebra, Boolean Algebra, Positive/Negative Logic, Boolean Algebra (Dual/De-Morgan), Algebraic simplification, Combinational Logic, Truth Tables, Min/Max terms, Combinational Logic, K-Maps, Don't Cares, Multiple outputs, Combinational Logic, 5-6 K-Maps, Combinational Logic Design Practices, Negative numbers, Addition, multiplication, parity, decoders, Encoder, Multiplexor /Demux, Hazards, Tristate, Latches & Flip Flops, Counters / Registers, Synchronous Counters, Sequential Logic Design Principles (Wakerly), Mealy / Moore Design—Sequential Circuits—(Wakerly), ROMS, SRAMS, DRAMS, Memory Organization, ADC / DAC Interf Analog World, Digital Electronics, Characteristics, Parameters, Digital Electronics, Logic Families, TTL, CMOS, BiCMOS, ECL, Low-Voltage Logic, Open/Tristate Wired Logic, Bus Tnterface Logic, Mixing CMOS/TTL

#### Prerequisites

None

#### Text Book

Tocci & Widmer, *Digital Systems, Principles and Applications*, 8<sup>th</sup> Edition, Published by Pearson Education

#### Reference Books

- John F. Wakerly, *Digital Design, Principles & Practices*, 3<sup>rd</sup> Edition Updated, Published by Prentice Hall

### NS101 - Mechanics and Wave Motion (Paper V – 50 Marks)

#### Objectives

To teach students calculus based general physics by way of learning about the following topics in depth: Measurement and vectors, Motion in one, two and three dimensions, Newton's laws of motions, Work and energy principles, Laws of conservation of momentum and energy, One- and two-dimensional collisions, Rotational kinematics and dynamics, Conservation of angular momentum, Gravitation, Oscillations and waves.

#### Prerequisites

None

#### Textbook

Resnick, Halliday and Krane, *Physics*, vol. 1. ISBN: 978-0-471-32057-9

#### Reference Material

- University Physics, vol. 1, by Sears and Zemansky, ISBN-10: 0201603365





## Punjab University College of Information Technology

University of the Punjab, Allama Iqbal (Old) Campus, Lahore 54000.

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24

### NS103 - Electricity and Magnetism (Paper V – 50 Marks)

#### Objectives

The primary objective of the course is to teach student calculus based general physics, particularly basic concepts of thermodynamics, electricity, and magnetism. The following topics will be covered in the course: Temperature, Thermal expansion, Kinetic theory and the ideal gas, Heat and First law of thermodynamics, Entropy and Second law of thermodynamics, Review of Vectors, Electric Charge and Coulomb's law, Electric field, Gauss's law, Electric potential, Capacitors and dielectrics, Current and resistance, Ohm's Law, Simple resistive circuits (series and parallel), Magnetic field, Ampere's law, Faraday's law of induction, Lien's Laws, Ampere's Law and its applications.

#### Prerequisites

Mechanics and Wave Motion

#### Text Book

Halliday, Resnick, and Walker, *Fundamentals of Physics Extended*, Sixth Edition, ISBN: 978-0-471-32000-5

#### Reference Books

Sears and Zemansky, *University Physics*, vol. 1 and 2. ISBN-10: 0201603365



**SECOND YEAR**

**CMP200 - Discrete Mathematics (Paper VI – 100 Marks)**

**Objectives**

This course introduces the foundations of discrete mathematics as they apply to Computer Science, focusing on providing a solid theoretical foundation for further work. It 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. The following topics will be covered in the course: Introduction to logic and proofs, Direct proofs, proof by contradiction, Sets, Combinatorics, Sequences, Formal logic, Propositional 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 (subjections, injections, inverses, composition), relations (reflexivity, symmetry, transitivity, equivalence relations), sets (Venn diagrams, complements, Cartesian products, power sets), pigeonhole principle; cardinality and countability.

**Prerequisites**

None

**Text Book**

Rosen, *Discrete Mathematics and Its Applications*, 5th edition, McGraw-Hill, ISBN: 0072424346

**Reference Material**

- Richard Johnsonbaugh, *Discrete Mathematics*, Prentice Hall, ISBN: 0135182425
- Kolman, Busby & Ross, *Discrete Mathematical Structures*, 4th Edition, 2000, Prentice-Hall, ISBN: 0130831433

**CMP240 - Object Oriented Programming (Paper VII – 50 Marks)**

**Objectives**

The course aims to focus on object-oriented concepts, analysis and software development. The following topics will be covered in the course: Evolution of OO, OO concepts and principles, problem solving in OO paradigm, OO program 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.

**Prerequisites**

Introduction to Computing, Programming Fundamentals

**Text Book**

Budd, *Understanding Object Oriented Programming*, Addison Wesley.





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6

### Reference Material

- Deitel and Deitel, *Java: How to Programme*, 5/e, Prentice Hall, ISBN: 0131016210/0131202367 International Edition.
- Deitel and Deitel, *C++: How to Programme*, 4/e, Pearson.
- Bruce Eckel, *Thinking in C++*, 2nd Edition, Prentice Hall.

### CMP210 - Data Structures and Algorithms (Paper VII – 50 Marks)

#### Objectives

This course is designed to teach students structures and schemes, which allow them to write programs to efficiently manipulate, store, and retrieve data. "An apprentice carpenter may want only hammer and saw, but a master craftsman employs many precision tools". Computer programming likewise requires sophisticated tools to cope with complexity of real applications and only practice with these tools will build skill in their use. This subject deals to make students convenient in building a memory and time efficient data structures for the implementation of large-scale (data intensive) computer systems. The following topics will be covered in the course: Introduction to Data Structures and Algorithms, Review of Object Oriented Programming Concepts, Algorithm Specification, Big Oh notation, Introduction to ADTs, Sparse Matrices, Stack, Recursion, Queue, Circular and Double Ended Queue, Self-Referencing Classes and Dynamic Memory Allocation, Singly Linked Lists, Doubly Linked Lists, Binary Search Tree, Introduction to Balanced and AVL Trees, Heaps, Searching, Hashing, Overflow Handling, Dynamic Hashing, Sorting types and Techniques (Selection, Bubble, Insertion, Shell, Radix, Merge, Quick, Heap, and Tree sorts), Graphs, Adjacency List and Adjacency Matrix, Breadth First Search and Depth First Search, Spanning Trees (BFSST, DFSST), Standard Template Library.

#### Prerequisites

Object Oriented Programming  
Discrete Mathematics

#### Text Book

Tenenbaum, M. Augenstein, and Y. Lang Sam, "*Data Structures using C and C++*" 2nd Ed., Prentice Hall, 1999, ISBN-10: 0130369977

#### Reference Material

- Frank M. Carrano, Paul Helman, Robert Veroff, *Data Abstraction and Problem Solving with C++*, 2nd edition, Addison-Wesley, 1998. ISBN-10: 0201874024
- Lafore, *Data Structures and Algorithms*, SAMS teach yourself, Sams Publishing, 1999. ISBN 9780672324536.
- Horowitz, Sahni, and Mehta, *Fundamentals of Data Structures in C++*, Computer Science Press, 1995. ISBN-10: 0929306376
- Standish, *Data Structures in JAVA*, Addison Wesley, 2000, ISBN-10: 020130564X
- Robert L. Kruse, *Data Structure and Program Design*, ISBN-10: 0137689950





7

**EN201 - Communication Skills (Paper VIII – 50 Marks)**

**Objectives**

The aim of this course is 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. It will also help in developing good oral communication and presentation skills. The following topics will be covered in the course: Principles of writing good English, understanding the composition process, 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, 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 nonverbal communication, conducting meetings, small group communication, taking minutes, Presentation skills, Presentation strategies, material gathering, material organization strategies, time management, opening and concluding, use of audio-visual aids, delivery and presentation.

**Prerequisites**

None

**Text Book**

Vawdrey, Stoddard, Bell, *Practical Business English*, ISBN-10: 0256102740

**Reference Material**

- Herta A. Murphy, *Effective Business Communication*, ISBN-10: 007044398X

**EN205 - Business and Technical Writing (Paper VIII – 50 Marks)**

**Objectives**

The objective of this course is to upgrade students' ability to write effectively in the world of science, technology and business, to produce experts and specialists in the business and technical writing, to enhance students' skills for the effective delivery of technical information to audience (listeners or viewers). It will help the students to generate thorough understanding of common types of reports, special format items and other technical features of business documents, to develop verbal and non verbal communication skills for an effective display of personality. The following topics will be covered in the course: Business communication overview, Communication and organizational effectiveness, Process of creating effective messages, five planning steps and organizational plans, Different Forms of Written communication including Persuasive messages, Good News and Neutral messages, Bad News, Memorandum writing, Letter writing, Informative and positive messages, Academic, research and business proposals writing, Formal Report Writing, Business Research Methods, Documentation and Research Citation, Oral presentation, Strategies for an effective Audience Analysis, Non-





verbal communication, Employment communication, Cross-cultural communication, Business Communication and the Ethical Contexts.

**Prerequisites:**

None

**Text Book**

Greenfield, T., *Research Methods, Guidance for Postgraduates*, Arnold, 1996, ISBN-10: 0340806567

**Reference Material:**

- Handouts provided by the instructor

**CS211 - Theory of Automata and Formal Languages (Paper IX – 100 Marks)**

**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'. The following topics will be covered in the course: Formal language, Defining Language, Regular Expression, Finite Automata, Transition Graphs, Kleene's Theorem, Finite Automata with output, Regular Languages, Non regular Languages, Decidability, Demonstration Of JFLAP, Context Free Grammars, Grammatical Format, Pushdown Automata (PDA), CFG=PDA, Non-Context-Free Languages, Context-Free Languages, Decidability, Turing Machine, The Chomsky Hierarchy.

**Prerequisites**

Discrete Structures

**Text Book**

Denial Cohen, *Introduction to Computer Theory*, John Wiley & Sons, Inc. ISBN-10: 0471137723

**Reference Material**

- J Hopcraft, D. Ullman, *Introduction to Automata Theory, Languages and Computation*, Addison Wisely, 2<sup>nd</sup> Edition, ISBN-10: 0201441241
- Thomas A. Sudkamp, *Languages and Machines, An Intro to the Theory of Comp. Sc.*, 2/e Addison Wesley. ISBN-10: 0201821362

**CMP223 - Computer Organization and Assembly Language (Paper X – 100 Marks)**

**Objectives**

The main objective of this course is to introduce the organization of computer systems and usage of assembly language for optimization and control. Emphasis should be given to expose the low-level logic employed for problem solving while using assembly language as a tool. The students will be capable to acquire knowledge that is specific to Intel 80x 86





29

processor families, as well as knowledge that is universal. They will learn the programming methodologies showing how to use Assembly Language for Application Software's, System Programming and Terminate and Stay Resident. They will develop programs based on the interaction between Assembly Language and Operating System, Security Software's, encryption and decryption programs, programs for Reverse Engineering, programs for small scale Embedded Systems and Games specially Networking Games using serial and parallel ports. Following topics will be covered in this course: Processor Architecture and Organization, Memory Architecture, Intel 8086 Registers, Addressing Modes, Memory Addressing, MOV The Basic Instruction, Debugger, Mathematical and Bit wise Logical instruction, Stack Instructions, Interrupts, Memory Models, Practice of Program Writing and Debugging, Control Transfer and Conditional Action Instructions, Procedures, Macros, Shift and Rotate Instructions, Procedures to Input and Display Binary, Decimal, Hexadecimal Numbers, Reading DOS Command Tail, Data Communication, File Handling, Recursion, High-Level Logic Structures, Interfacing of Assembly and C++ , Languages, Storage of Real Numbers, Math co-processor, String instructions, Introduction to Machine Code, Protected Mode, Terminate and Stay Resident Programs, Micro Controller Programming (8051)

#### **Prerequisites**

Digital Logic Design

#### **Text Book**

Barry B. Brrey, *The Intel Microprocessors 8086/8088, 80186/80188, 80286, 80386, 80486, Pentium and Pentium Pro Processor*, ISBN-10: 0139954082

Kip R. Irvine, *Assembly Language for Intel Based Computers*, Third Edition, 1999, Prentice-Hall Publishing, 1999, ISBN-10: 0132383101

#### **Reference Material**

- Assembly Language Reference by Que. Corporation.
- I Scott Mackenzie, *8051 Micro-controller Programming*, 3<sup>rd</sup> Edition, ISBN-10: 0137800088

#### **MA210 - Linear Algebra (Paper XI – 50 Marks)**

##### **Objective**

The purpose of this course is to provide a solid foundation in Linear Algebra. It will enable the students to master the concepts and to know when and how to apply linear algebra. Applications are taken from such areas as Cryptography, Fractals, Chaos, Computer Graphics, Game of Strategy, Computer Tomography, Warps and Morphs. The Software MATLAB will be used for the implementation of Linear Algebra. The following topics will be covered in this course: Introduction to Linear Algebra (History, differentiation between Matrix Algebra and Linear Algebra), Concept of a matrix with real entries, Operations of matrices (Addition, multiplication, scalar multiplication, trace, transpose), Determinant of a matrix and its properties. Singular and non-singular matrices, Row/Column elementary Operations defined on a matrix Inversion of a matrix (by elementary operations), Reduction of matrix into echelon and reduced echelon form by





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elementary operations. Rank of a matrix, Introduction to system of linear equations, Solution of system of linear equations by Gauss elimination method, Concept of algebraic Structures (Semi group, Group, abelian group), Sub groups, Cosets, Mappings, Ring and Field, Introduction to vector spaces, Linear combination, linear span, Linear dependence and independence of vectors, Concept of basis and dimension, Linear transformations, Kernel and Range, Matrix representations of a linear transformation, Matrix transformations (dilation, contraction, reflection, compressions and expansion), Affine Transformations (Shearing, Scaling, Rotation, and Translations), Concepts of Eigen value and eigenvector, Characteristic equation, Eigenvalues of an upper & lower triangular matrix, Diagonalization of matrices, Matrix Functions, Concepts of Norm and inner product space.

**Prerequisites**

Calculus – II

**Text Book**

Anton - Rorres "Elementary Linear Algebra, application version". 8th Edition, John Wiley & Sons, Inc. 2000, ISBN: 978-0-471-44902-7

**Reference Material**

- David C Lay, Linear Algebra, Pearson Addison Wesley, 1999, ISBN: 0201660369

**MA250 - Probability and Statistics (Paper XI – 50 Marks)**

**Objectives**

This course is aimed to introduce the concept of statistics, randomness and probability and build on these concepts to develop tools and techniques to work with random variables. The following topics will be covered in this course: 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, subjective approaches, sample space, events, laws of probability. General Probability Distributions, Conditional probability, Bayes theorem with application to Random variable (Discrete and continuous) Binomial, Poisson, Geometric, Negative Binomial Distributions, Exponential Gamma and Normal distributions, Regression and Correlation.

**Prerequisites**

None

**Text Book**

Walpole, *Introduction to Statistics*, Prentice Hall, 1982, ISBN: 0024241504.



**Reference Material:**

- G. Cowan G, *Statistical Data Analysis*, Clarendon, Oxford, 1998, ISBN13: 9780198501558
- Mariano R, *Advances in Statistical Analysis and Statistical Computing III*, JAI Press, Greenwich, Conn, 1993





## Punjab University College of Information Technology

University of the Punjab, Allama Iqbal (Old) Campus, Lahore 54000.

72

### THIRD YEAR

#### CMP 320 Operating Systems (Paper XII – 100 Marks)

##### 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. The following topics will be covered in the course: Introduction to Main Frames System, multi programmed System, batch system, Time sharing system, Desktop System, Multiprocessor system, distributed system, client server, Real time system, Hand held System, Computer System Structure, Caching, Coherency and consistency, Operating System Structure, Process management, System calls, Process control, Communication, micro-kernels, Virtual machines, Processes, Threads, multithreading models, CPU Scheduling, Process Synchronization, Critical section problem, Semaphores, Deadlock, Memory Management, Memory allocation, Fragmentation, Paging, Segmentation, Virtual Memory, Demand paging, Page replacement, Allocation of frames, Thrashing, File System Interface, Directory structure, File system mounting, File System Implementation, NFS, Protection.

##### Prerequisites

Data Structures and Algorithms

##### Text Book

Silberschatz A., Peterson, J.L., and Galvin P.C., *Applied Operating Systems Concepts*, 6th Edition, 1998. ISBN-10: 0471365084

##### Reference Material

- Tanenbaum A.S., *Modern Operating Systems*, 2nd Edition, 2001. ISBN-10: 0130313580
- Silberschatz, Galvin, Gagne, *Operating Systems Concepts*, John Wiley, ISBN-10: 0471694665

#### CMP290 - Software Engineering (Paper XIII – 100 Marks)

##### Objectives

The aim of this is course is 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. The following topics will be covered in the course: The Scope of Software Engineering, Software Process, Software Development Life Cycle, Project Management Concepts, (Planning, Costing, Risk Analysis, Quality Assurance, Risk Management, 4Ps of Project Management), Software Measurement concepts, Product metrics (LOC based and FP based metrics), Software Quality Metrics, Software Project Planning, Software Cost Estimation techniques, COCOMO model, Project Scheduling, (GANTT chart, Critical Path





## Punjab University College of Information Technology

University of the Punjab, Allama Iqbal (Old) Campus, Lahore 54000.

13

Method), Requirements Engineering, Use Case Techniques, Entity Relationship Diagram, State Transition Diagram, Data Flow Diagrams, Software Designing, Abstraction, refinement, modularity, software architecture, Cohesion & Coupling, Architectural Design, Data Design, Mapping ER to Data Model, Interface Design, Human Computer Interface, Modular Design, Mapping Design to Code, Software Testing, White Box Testing & Black Box Testing, Test Case Design using Cyclometric Complexity Technique, Debugging practices, Software Inspection, Software Quality Assurance, Software Quality Standards.

### Prerequisites

Databases

### Text Book

Roger Pressman, *Software Engineering: A Practitioner's Approach*, McGraw-Hill, 2005. ISBN 9780073019338

### Reference Material

- Ian Sommerville, *Software Engineering*, 6th Edition ISBN-10: 020139815X

### CMP370 - Database Systems (Paper XIV – 100 Marks)

### 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. The following topics will be covered in the course: Traditional File Based Systems, Roles in Database Environment, ANSI-SPARC Architecture, Data Manipulation Language (DML), Data Models, Multi-User DBMS Architectures, Relational Data Structures, Database Schemas, Relational Integrity, Introduction to SQL, Data Manipulation, Creating a Database, Tables, Index, Views, Transactions, Database Application Life Cycle, Database Planning, Database Design, Data Administration & Database Administration, Entity Types, Relationship Types, Structural Constraints, Problems with ER Models, Specialization/Generalization For EERD, Anomalies, Functional Dependency, Process of Normalization, Database Design Methodology, Database Security, Client Server Architecture, Centralized and Distributed Databases, Advance Topics.

### Prerequisites

Data Structures and Algorithms

### Text Book

C.J.Date, *Database Systems*, Addison Wesley Publications Co., 2004. ISBN-10: 0321197844

### Reference Material

- R.Connolly and P.Begg, *Database Systems: A Practical Approach to Design, Implementation and Management*, Addison-Wesley Publications Company, 2003. ISBN-10: 0201342871





19

- Elmasri and Navathe, *Fundamentals of Database Systems*, 3/E, Addison-Wesley, ISBN: 0201741539

### **CS310 - Analysis of Algorithms (Paper XV – 100 Marks)**

#### **Objectives:**

The objective of this course involves a detailed study of the basic notions of the design of algorithms and the underlying data structures. Several measures of complexity are introduced. Emphasis will be given on the structure, complexity, and efficiency of algorithms. The following topics will be covered in the course: 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.

#### **Prerequisites**

Discrete Structures, Data Structures

#### **Text Book**

T. H. Cormen, C. E. Leiserson, and R. L. Rivest, *Introduction to Algorithms*, MIT Press, McGraw-Hill, New York, NY, 1990. ISBN-10: 0262531968

#### **Reference Material**

None

### **MA105-Numerical Analysis (Paper XVI – 100 Marks)**

This course is concerned with the design and analysis (Stability, Consistency, Convergence, Accuracy) of methods for solving mathematical problems that arise in many fields, especially science and engineering. Scientific Computing is now mentioned as a third branch, having a status that is essentially equal to, perhaps even eclipsing, that of its two older (theoretical and experimental) siblings. This is due to efficient numerical techniques (which you shall learn during the course). We can thus simulate any physical process numerically, and this leads to the routine solution of complicated problems that would have seemed impossible not so long ago. This course will be taught using JAVA / MATLAB/MAPLE.

Review (Paper XV – 100 Marks) of Calculus (Rolle's Theorem, Mean Value Theorem, Taylor's & Maclaurin's series), Computer arithmetic, Error & its measurements (absolute error, relative error, percentage error), types of error, sources of error. Solution of Equations In One Variable: The Bisection Method, Fixed-Point Iteration, Newton-Raphson Method, Secant Method, Method Of False Position, Error Analysis for Iterative Methods Interpolation and Polynomial Approximation: Interpolation and Language Polynomial, Divided Difference:(Newton forward divided –difference formula & backward divided – difference formula), Cubic Splines Interpolation, Hermite Interpolation, Natural cubic splines, Cubic B-splines, Parabolic and Cubic Runout Splines, Beta-Splines, Bezier Curves and Surfaces. Numerical Differentiation and Integration: (Forward-difference & backward-





15 ✓

difference formulas, Trapezoidal rule & Simpson's rule), Composite Numerical Integration: (Composite Trapezoidal & Simpson's rules), Initial -value Problems for Euler's Method, Second-Order Taylor's Series Methods, Modified Euler Method, Runge - Kutta Method of order 4. Iterative Techniques in Matrix Algebra: Norms of a matrix, Spectral radius & condition number, Approximating Eigenvalues and Eigenvectors by Power Method, LU decomposition. Iterative Techniques for solving linear systems: Jacobi Iterative, Gauss-seidel Iterative.

#### **Prerequisite** Calculus and Linear Algebra

#### **Text Book/s**

Richard L. Burden & J. Douglas Faires "Numerical Analysis ", 7<sup>th</sup> Ed., Publisher's FAQ, 2001,  
Gerald / Wheatley "Applied Numerical Analysis", 6<sup>th</sup> Ed, Publisher's FAQ, 2001.

#### **HM150 - Islamic Studies I (Islamic Studies I & II: Paper XVII – 60 Marks)**

#### **Objectives**

This course provides a comprehensive knowledge of Islam. It covers the basic beliefs and practices of Islam. This course is intended to familiarize students with a range of the most important Islamic beliefs, practices, and issues. It should equip them to recognize, understand and appreciate the different dimensions of Islam that they will encounter in their practical life. This course will enable the students to perform their worship in the manner prescribed by Allah. It will also make them aware of their duties as Muslims, including what is compulsory, what is permitted and what is forbidden for a Muslim in his day-to-day life. This course will also enable the students to appreciate the beauty and excellence of Islamic moral and social teachings and adopt them as their guidance in life thereby demonstrating values and attitudes necessary for a healthy and balanced lifestyle. The following topics will be covered in this course: Aqeedah, Tawheed, Risalah and Al-Akhira, Tahara, Salah, Sujood as-Sahw, Qadda (making up), Qasr (Shortening) and Jama (Joining), Sawm (Fasting), Salah at-Taraaweeh (The Night Prayer), Zakaah, Hajj, Jihad, Birth, Tehneek, Aqeeqah and Circumcision (Khittaah), Death, The Funeral Prayer, Burial, Food and Dress/Adornment, Male/Female relationship, Social Interaction Between Men & Women, Marriage (Nikah), Rights and Obligations of the Spouses, The Law of Divorce, Inheritance, Major Sins (Kabirah), Crime & Punishment, Islamic Economics & Finance, Contemporary issues, Moral/ Manners / Tazkiyah Nafs, concepts of Taqwa, Tazkiyah, Ihsan, Huqooq ullah and Huqooq ul-Ibad.

#### **Text Book**

Dr. Muhammad Hamidullah, *Introduction to Islam*

#### **Reference Material**

- Marwan Ibrahim Al-Kaysi, *Morals And Manners in Islam*, The Islamic Foundation, Leicester, United Kingdom, 1991.





**Punjab University College of Information Technology**  
University of the Punjab, Allama Iqbal (Old) Campus, Lahore 54000.

16

- Mohammad Yusuf Islahi, *Etiquettes of Life In Islam*, Markazi Maktabah Islami Publishers, New Delhi, 2003.
- Dr. Abu Ameenah Bilal Philips, *The Foundations of Islamic Studies*.
- John Esposito, *Islam: The Straight Path*
- Abul A'la Mawdudi, *Al-Jihad Fil Islam*
- Dr. Abu Ameenah Bilal Philips, *Funeral Rites in Islaam*
- Jamal A. Badawi, *At-Taharah: Purity And State Of Undefilement*
- Abul A'la Mawdudi, *Human Rights in Islam*
- Abul A'la Mawdudi, *Ethical Viewpoint of Islam*
- Muhammad Akram Khan, *An Introduction to Islamic Economics*
- Khurshid Ahmad, *Studies in Islamic Economics*

**HM250 - Islamic Studies II**

**Objectives**

The objective of this course is to impart an understanding of the fundamental principles and teachings of Islam through study of selected verses of the Quran and Prophetic Sayings. It also includes the important facets of the Prophet's life and salient features of Islamic Civilization. It will provide appreciation of other prominent religions, systems of ethics and cultures to prepare students to survive in international and multicultural work place. This course introduces students to the basic teachings of Islam so that they can understand the rationale behind Islamic beliefs and practices. The following topics will be covered in the course: Basic sources of teaching, beliefs and their impact on human life, obligation to God, obligations to fellow human beings, and other related issues.

**Prerequisites**

None

**Text Book**

Dr. Muhammad Hamidullah, *Introduction to Islam*

**Reference Material**

- Marwan Ibrahim Al-Kaysi, *Morals And Manners in Islam*, The Islamic Foundation, Leicester, United Kingdom, 1991.
- Mohammad Yusuf Islahi, *Etiquettes of Life In Islam*, Markazi Maktabah Islami Publishers, New Delhi, 2003.
- Dr. Abu Ameenah Bilal Philips, *The Foundations of Islamic Studies*.
- John Esposito, *Islam: The Straight Path*
- Abul A'la Mawdudi, *Al-Jihad Fil Islam*
- Dr. Abu Ameenah Bilal Philips, *Funeral Rites in Islaam*
- Jamal A. Badawi, *At-Taharah: Purity And State Of Undefilement*
- Abul A'la Mawdudi, *Human Rights in Islam*
- Abul A'la Mawdudi, *Ethical Viewpoint of Islam*
- Muhammad Akram Khan, *An Introduction to Islamic Economics*
- Khurshid Ahmad, *Studies in Islamic Economics*



**Punjab University College of Information Technology**  
University of the Punjab, Allama Iqbal (Old) Campus, Lahore 54000.

CT

**SS 171 - Pakistan Studies (Paper XVII – 40 Marks)**

**Objectives**

The main objective of this course is to make the students familiar with the History of Pakistan, its ideology and all the Problems, which have been faced at the time of creation of Pakistan. All the great nations remember their history and it is very important to make the new generation familiar about it to achieve their goals and to set the future trends. Students will learn the reason behind the achievements of the Pakistan. The following topics will be covered in the course: Historical background of Pakistan: Muslim society in Indo-Pakistan, Ideology of Pakistan, Two Nation Theory, the movement led by the societies, the downfall of Islamic society, 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, Creation of Pakistan and transfer of power, Pakistan culture and society, Constitutional and Administrative issues, Pakistan and its geo-political dimension, Pakistan and International Affairs, Pakistan and the challenges ahead.

**Prerequisites**

None

**Text Book**

Dr. Muhammad Sarwar, *A Text book of Pakistan Studies*, Ilmi Kitab Khana, Urdu Bazar, Lahore, 2003

**Reference Material:**

- Ikram ul Haq Raja *Pak. Studies*, Azeem Academy, Urdu Bazar Lahore 2001





**Punjab University College of Information Technology**  
University of the Punjab, Allama Iqbal (Old) Campus, Lahore 54000.

**FOURTH YEAR**

**CMP330 - Computer Networks (Paper XVIII – 100 Marks)**

**Objectives**

The aim of this course is to introduce students to the basic concept of computer networks and communication. It will provide a detailed overview of the Network models (OSI, TCP/IP) and Protocol Standards. Emphasis will be given on the understanding of modern network concepts. The following topics will be covered in the course: 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.

**Prerequisites**

Operating Systems

**Text Book**

Tanenbaum, *Introduction to Computer Networks*, ISBN-10: 0-13-066102-3

**Reference Material**

- Richard Stevens, *Unix Network Programming*, ISBN-10: 013490012X
- Larry Peterson, Bruce Davie, *Computer networks: a systems approach*, Princeton Univ., Princeton. ISBN-10: 1558605142
- James F Kurose, Keith W Ross, *Computer Networking: A Top-Down Approach Featuring the Internet*, 2/e, Addison Wesley 2003. ISBN: 0-201-97699-4.

**CMP390 - Object Oriented Analysis and Design (Paper XIX – 100 Marks)**

**Objectives**

The objective of this course is to demonstrate knowledge and understanding of essential facts, concepts, principles, and theories relating to computer science and software applications. It involves the applications of object-oriented concepts and to Identify and analyze criteria and specifications appropriate to specific object oriented problems, and plan strategies for their solution. It will help the students to analyze, design, and implement computer-based systems. It will also enable them to select and apply appropriate Design Pattern. The following topics will be covered in the course: Introduction to Object Oriented Concepts, Object-Oriented Analysis and Design, Linear and Iterative Process Models, Requirement Engineering utilizing Object-Oriented Techniques, Software Design and Architectures, Object-Oriented Design, UML modeling, Use-Case Modeling, Domain Modeling, Interaction Diagrams, Design Modeling, and Implementation Modeling; Design Patterns (GRASP), User Interface Design, Usage of Rational Rose, Object-Oriented Testing, Object-Oriented Metrics, Component Based Development, Reusability.





## Punjab University College of Information Technology

University of the Punjab, Allama Iqbal (Old) Campus, Lahore 54000.

### Prerequisites

Software Engineering

### Text Book

Stephan Schach, Irwin, *Object-Oriented Software Engineering*, 1999. ISBN: 0072418729  
Craig Larman, *Applying UML and Patterns*, 2002. ISBN-10: 0130925691

### Reference Material

- Roger Pressman, *Software Engineering: A Practitioner's Approach*, McGraw-Hill, 2005. ISBN 9780073019338

### CS360 - Artificial Intelligence (Paper XX – 100 Marks)

#### Objectives

The aim of this course is to introduce students to the diverse field of Artificial Intelligence, give them an insight into its underlying principles and techniques, and enable them mimic human intelligence in problem solving. The following topics will be covered in the course: Introduction to the field, types of problems addressed, Symbolic AI, the physical symbol system hypothesis, Knowledge Representation Schemas, Logic, frames, semantic nets, scripts, Issues in knowledge representation, Search, exhaustive & heuristic search techniques, Logic programming, knowledge representation, Reasoning in logic programming, unification, horn clause logic, resolution, Prolog as example logic programming formalism, Expert systems and case studies of Mycin, Dendral, etc. Advanced topics including Game playing, Planning, Natural language processing, Fuzzy logic, Genetic algorithms, Artificial neural networks, Computer vision and robotics.

#### Prerequisites

Data Structures, Algorithm Analysis, Discrete Math, Calculus II, Statistics

#### Text Book

George F. Luger, *Artificial Intelligence- Structures & Strategies for Complex Problem Solving*, 4<sup>th</sup> edition, Pearson Education. ISBN-10: 0321263189

#### Reference Material

- Elaine Rich and Kevin Knight, *Artificial Intelligence*, 2<sup>nd</sup> edition
- Ben Copping, *Artificial Intelligence Illuminated*, Narosa Publishing
- Eugene Charniak and Drew McDermott, *Introduction to Artificial Intelligence*, Pearson Education.
- Stuart Russell & Peter Norvig, *Artificial Intelligence A Modern Approach*

### CS340 - Internet Programming (Paper XXI – 100 Marks)

#### Objectives

The aim of this course is to enable the students to be enough competent that they can build distributed applications of any kind. It will provide understanding of the architecture of Enterprise applications and also difference between application server and simple web



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**Minutes of meeting of Board of Studies in Computer Science and Information Technology held on 29<sup>th</sup> December, 2010**

Meeting started at 11:00 am in Syndicate Room with the recitation of verses from the Holy Quran. The Convener welcomed the members and then agenda items were presented.

Following were present:

- |   |                     |
|---|---------------------|
| 1. Dr. Syed Mansoor Sarwar                        | (Convener)          |
| Principal, PUCIT                                  |                     |
| 2. Prof. Dr. Muhammad Ali Maud,                   | (Member)            |
| Chairman, Deptt. of Computer Science, UET, Lahore |                     |
| 3. Mr. Tariq Mehmood Butt                         | (Member)            |
| Assistant Professor, PUCIT                        |                     |
| 4. Mrs. Rehana Rashid                             | (Member)            |
| Principal, Islamabad Model College for Girls      |                     |
| 5. Ms. Amina Mustansir                            | (Member)            |
| Lecturer, PUCIT                                   |                     |
| 6. Ms. Qudas                                      | (Nominee of Member) |
| Lecturer, Computer Science, Queen Mary College    |                     |

**Item No.1      Approval of Head/Sub Examiners for M.Sc.IT Examinations 2011**  
**(Affiliated Colleges)**

Principal PUCIT presented the Board the list of Head/Sub Examiners for M.Sc.IT Examinations 2011 (Affiliated Colleges).

**Decision:** The Board approved the list of Head/Sub Examiners for M.Sc.IT Examinations 2011 given in Annexure A. Convener Board of Studies was also granted permission to approve additional Examiners/Sub-Examiners for the said programs whenever required.

**Item No.2      Approval of Head/Sub-Examiners for B.A./B.Sc. Computer Studies**  
**(Theory) Annual Examinations, 2011**

**Decision:** The members of Board of Studies unanimously authorized the Convener to approve the list of Head/Sub-Examiners for B.A./B.Sc. computer Studies (Theory) Examinations, 2011.

**Item No.3      Approval of Paper-Setters Head/Sub-Examiners for B.A./B.Sc. Computer Studies ( practical) Annual Examinations, 2011**

Principal PUCIT informed the board that he received the letter from Controller of Examinations for the list of Practical Examiners for B.A./B.Sc. Computer Studies (Annual Examinations, 2011

**Decision:** The members of Board of Studies unanimously authorized the Convener to approve the list of Head/Sub-Examiners for B.A./B.Sc. computer Studies (Practical) Examinations, 2011. The house also authorized the convener for any addition/deletion in the list.

**Item No.4      Approval of Head/Sub Examiners for BSIT Examinations 2011, 1<sup>ST</sup> Semester at 5 Associated Colleges**

**Decision:** The members of Board of Studies unanimously authorized the Convener to approve the list of Head/Sub-Examiners for B.A./B.Sc. computer Studies (Practical) Examinations, 2011. The house also authorized the convener for any addition/deletion in the list.

**Item No.5      Problems related to Five Affiliated/Associated Colleges**

**Deccision:** Following points were presented to the board regarding 4-year Undergraduate (BSIT) degree program for the five Affiliated/Associated Colleges of the University of Punjab.

- (a) Principal PUCIT informed the members of the Board the names of the Five Affiliated/Associated Colleges offering the 4-years BSIT degree program. Principal also discussed the semester rules and regulations for the said colleges.
- (b) Principal also informed the members that a detailed meeting had already been conducted with the Heads of Departments of the said Affiliated Coll eges to explain to them the semester rules and regulations.

**Item No. 6      PUCIT Students' Miscellaneous cases**

- i. The PUCIT Student Affairs Coordinator (SAC) presented to the Board the case of a student namely Mr. Zeeshan Amjad, Roll No. BCSF04A044, who had completed all the courses except one subject in which he got "F" grade. The student degree time had already expired. He had requested permission for time extension to appear in the upcoming semester to pass the subject.

**Decision:**

The Board approved the application of the students and asked the student to add the failed course in the Spring- 2011 Semester.



- ii. The SAC presented to the Board the case of student namely Mohsin Hameed, Roll No BCSS02A163, who had completed the courses with Fall 2002 (because of rejoin) ending up with 130 credit hours. However, the degree requirement is 131 credit hours. The student requested to add one credit hour to complete their degree requirements.

**Decision:**

The Board approved the application of the students and asked the students to add 1 credit hour course in the Spring- 2011 semester on Pass/Fail basis.

- iii. The SAC presented to the Board the case of a student namely Abdullah Khan, Roll No. BITS04A055, who could not pass entire courses to complete the degree. The student degree time had already expired. He had requested permission for time extension to complete the Two- year degree by taking Two subjects (still left for two year degree option) in the upcoming semester.

**Decision:**

The Board allowed the student to add two courses in the Spring- 2011 semester to get two-year degree. He may avail two chances to complete two-year degree.

- iv. The SAC presented to the Board the case of a student namely Malik Imran Asghar, Roll No. M2E040, who had completed all the course work except the submission of his thesis and final its evaluation. The student degree time had already expired. He had requested permission for time extension to appear in the final evaluation of the thesis.

**Decision:**

The Board requested the SAC to investigate the case in detail and present it in the next BOS meeting.

- v. The SAC presented to the Board the case of a student namely Ms. Nadia Ahsan, Roll No. MECF06E019, who had completed all the course work except the final evaluation of the thesis. The student degree time had already expired. She had requested permission for time extension to appear in the final evaluation of the thesis.

**Decision:**

The Board approved the application of the student and asked the student to appear for the final evaluation.

- vi. The SAC presented to the Board the case of a student namely Razaqullah Khan, Roll No. MCS-96-32, who had completed the course work except the final thesis. The student degree time had already expired. The SAC also informed the Board that the said student applied his case to BOS before this time which was rejected. He had again applied and requested permission for time extension to appear in the final evaluation of the thesis.

**Decision:**

The Board rejected the student request again.

**Item No. 7: Course outline of Basic Electronics ( 3 Cr. Hrs) Course**

As per Item 2 ( Changes in the curricula for BS .... ) of the last BOS meeting held on August 9, 2010, the course outline of Basic Electronics is attached as Annexure-II.

**Item No. 8 Provision for the students of affiliated colleges to attempt Islamic Studies and Pakistan Studies papers either in Urdu or English**

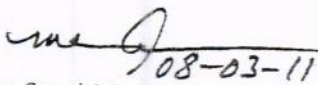
One of the members of the Board requested the convener to allow the students of affiliated colleges to attempt Islamic Studies and Pakistan Studies papers either in Urdu or English.

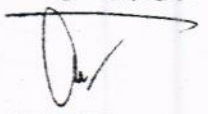
**Decision:** The Board approved the request and allowed that the students of affiliated colleges may attempt Islamic Studies and Pakistan Studies papers either in Urdu or English. This decision will be implemented in all the examinations of BS in Computer Science conducted in 2011 and onwards.

**Item No. 9 Inclusion of Final Projects in the Transcripts of BS in Computer Science Program for Affiliated Colleges**

With reference to Item No. 10 of the BOS meeting held on December 16, 2009, decision regarding inclusion of Final Projects in the transcript of BS in Computer Science Program for Affiliated Colleges will be effective starting with the Fall 2011 batch.

The meeting ended with a vote of thanks by the chair.

  
08-03-11  
Dr. Syed Mansoor Sarwar  
Convener  
Board of Studies in IT & CS

Mr. Salamat  
  
10/3/11



**Minutes of meeting of Board of Studies in Computer Science and Information  
Technology held on August 9, 2010**

The meeting was held in Syndicate Room at 10:00 am on August 9, 2010. Following were present:

- |  |                   |
|--|-------------------|
| a. Dr Syed Mansoor Sarwar  | Convener          |
| Principal, PUCIT   |                   |
| b. Prof Dr Muhammad Ali Maud,                                      | Member            |
| Chairman, Dept of Computer Science and Engineering,<br>UET, Lahore |                   |
| c. Prof Dr Haroon A Babri  | Member            |
| Professor, Department of Electrical Engineering, UET, Lahore       |                   |
| d. Ms Mahreen Nasir Butt   | Nominee of Member |
| Lecturer, Computer Science, Queen Mary College                     |                   |
| e. Mr Tariq Mahmood Butt   | Member            |
| Assistant Professor, PUCIT   |                   |
| f. Ms Amina Mustansir  | Member            |
| Lecturer, PUCIT  |                   |

The meeting started with the recitation of verses from the Holy Quran. The Convener welcomed the members and then agenda items were presented, discussed, and decisions taken.

**Item 1 Approval of MPhil Computer Science Thesis Topics and External Supervisors**

Principal PUCIT presented to Board of Studies the list of MPhil Computer Science thesis topics and names of external supervisors shown in Annexure A and requested approval of the board for the same.

**Decision:** The Board approved the list of MPhil Computer Science thesis topics and names of external supervisors shown in Annexure A.

**Item 2 Changes in the Curricula for BS Computer Science, BS Information Technology, and BS Software Engineering Based on New HEC Recommended Curricula for Fall 2010 Batches**

Principal PUCIT presented to Board of Studies the changes to be made in the existing curricula for BS Computer Science, BS Information Technology, and BS Software Engineering degree programs based on the newly recommended curricula for these degree programs by the HEC (published in 2010), shown in Annexure B. The principal requested approval of the board for the same for the batches starting with Fall 2010.

*me* 08.10.10

**Decision:** The Board approved the changes in the existing curricula for BS Computer Science, BS Information Technology, and BS Software Engineering degree programs based on the newly recommended curricula for these degree programs by the HEC (published in 2010) shown in Annexure B, along with course outlines of the new courses. The changes will be effective starting with the Fall 2010 batches of these degree programs.

**Item 3 PhD Computer Science Course Work**

The Convener informed the Board that PU Academic Council had approved 18 credit hour coursework for PhD students in its October 26, 2009 meeting. He requested the Board to approve 18 credit hour coursework for the PhD Computer Science students, with a strong recommendation that students take at least one course in the area of Computer Science Theory.

**Decision:** The Board approved 18 credit hour coursework for the PhD Computer Science students, with a strong recommendation that students take at least one course in the area of Computer Science Theory. Further, the Board approved that the Convener may update (add or delete courses) the current list of PhD Computer Science courses, previously approved by the Board and relevant university bodies, through approval of the PUCIT Departmental Doctoral Program Committee (DDPC).

**Item 4 Correction in the Minutes of Board of Studies Meeting Held on July 21, 2009**

The Convener requested the Board approve the following correction in **Item No 4 Current Work (e)** of the minutes of the Board meeting held on July 21, 2009.

**For**

- e. Award of Degrees to Spring 2001, Fall 2001, and Spring 2002 Students Who Passed All Semesters

Principal PUCIT informed the Board that for some BS Computer Science batches, 2.0 or above CGPA was required for promotion to the next semester and 2.75 or above CGPA was required to be eligible for award of degree. ...

**Decision:** The Board unanimously approved that the students of those batches in which promotion criteria was CGPA 2.0 or above and degree was awarded to students with CGPA 2.75 or above was unjust and that all students of these batches who had cleared eight semesters with CGPA 2.0 or above in the 8<sup>th</sup> semester should be awarded degrees.

*ma*  
08.10.10



## Punjab University College of Information Technology (PUCIT)

## University of the Punjab

## MPhil Computer Science

Fall-2008

Thesis Titles for Approval by Board of Studies

Sr. No.	Student ID	Student Name	Internal Supervisor	External Supervisor	Thesis Title
1	MSCSF08M003	Asif Ahmed	Dr Muhammad Murtaza Yousaf PUCIT, University of the Punjab, Lahore	Dr Farrukh Nadeem NU-FAST, Lahore	Flexible and Optimized Scheduling for Distributed Computing Environment
2	MSCSF08M004	Farrah Farooq	Dr Syed Mansoor Sarwar PUCIT, University of the Punjab, Lahore	Dr Asim Karim LUMS, Lahore	Real-Time Data Warehousing for Operational Business Intelligence
3	MSCSF08M005	Kamran Ahmed	Dr Muhammad Murtaza Yousaf PUCIT, University of the Punjab, Lahore	Dr Farrukh Nadeem NU-FAST, Lahore	An Intelligent and Efficient Resource Manager for Distributed Computing Environment
4	MSCSF08M007	Sidra Aslam	Dr Syed Mansoor Sarwar PUCIT, University of the Punjab, Lahore	Dr Asim Karim LUMS, Lahore	Temporal Issues in Data Warehouses
5	MSCSF08M008	Muhammad Hassan Khan	Mr Arif Mehmood PUCIT, University of the Punjab, Lahore	Dr Sohaib Khan LUMS, Lahore	Some New Approaches to Image Inpainting
6	MSCSF08M009	Jhanger Gul	Dr Zawar Qayyum PUCIT, University of the Punjab, Lahore	Dr Mian Muhammad Awais LUMS, Lahore	A DSL for Liquid State Machines Based on ADL.NET
7	MSCSF07M003	Muhammad Adeel Nisar	Dr Syed Mansoor Sarwar PUCIT, University of the Punjab, Lahore	Prof Dr Stefani Constantini	Integration of Answer Set Programming Modules into Logical Agents

me 08.10.10