PUNJAB TECHNICAL UNIVERSITY KAPURTHALA

Scheme and Syllabus
of
Masters in Computer Applications (MCA)

Batch 2012 onwards

By
Board of Studies Computer Applications

Punjab Technical University

Scheme of MCA
Batch 2012 Onwards

First Semester   Contact Hours: 33 Hrs.

Course Code	Course Title	Load Allocation			Marks Distribution		Total Marks	Credits
		L	T	P	Internal	External		
MCA 101	Information Management	4	1	-	50	100	150	5
MCA 102	Object Oriented Programming in C++	3	1	-	50	100	150	4
MCA 103	Computer Organization and Assembly Language	4	1	-	50	100	150	5
MCA 104	Accounting & Financial Management	4	1	-	50	100	150	5
MCA105	Technical Communication	3	1	-	50	100	150	4
MCA 106	Software Lab- I (Information Management)	-	-	4	100	50	150	2
MCA 107	Software Lab –II (Object Oriented Programming in and C++)	-	-	4	100	50	150	2
BTHU102	Communicative English Lab	-	-	2	50		50	1
	Total	**18**	**5**	**10**	**500**	**600**	**1100**	**28**

Second Semester   Contact Hours: 33 Hrs.

Course Code	Course Title	Load Allocation			Marks Distribution		Total Marks	Credits
		L	T	P	Internal	External		
MCA 201	Mathematical Foundations of Computer Science	4	1	-	50	100	150	4
MCA 202	Relational Database Management System	4	1	-	50	100	150	5
MCA 203	Data Structures	4	1	-	50	100	150	5
MCA 204	Data Communication and Networks	4	1	-	50	100	150	5
MCA XXX	Elective-I	3	-	-	50	100	150	5
MCA 205	Software Lab –III (Relational Database Management System)	-	-	4	100	50	150	2
MCA 206	Software Lab –IV (Data Structures)	-	-	4	100	50	150	2
MCA 207	Software Lab –V (Based on Elective –I)	-	-	2	100	50	150	1
	Total	**19**	**4**	**10**	**550**	**650**	**1200**	**28**

Third Semester   Contact Hours: 32 Hrs.

Course Code	Course Title	Load Allocation			Marks Distribution		Total Marks	Credits
		L	T	P	Internal	External		
MCA 301	Database Administration	4	1	-	50	100	150	5
MCA 302	Analysis & Design of Algorithms	4	1	-	50	100	150	5
MCA 303	Software Engineering	3	1	-	50	100	150	4
MCA 304	Java Programming	4	1	-	50	100	150	5
MCA YYY	Elective –II	4	1	-	50	100	150	5
MCA 305	Software Lab-VI [Database Administration]	-	-	4	100	50	150	2
MCA 306	Software Lab-VII [Java Programming]	-	-	4	100	50	150	2
	Total	**19**	**5**	**8**	**450**	**600**	**1050**	**28**

Scheme of MCA
Batch 2012 Onwards

Fourth Semester   **Contact Hours: 32 Hrs.**

Course Code	Course Title	Load Allocation			Marks Distribution		Total Marks	Credits
		L	T	P	Internal	External		
MCA 401	Data Warehousing & Mining	4	1	-	50	100	150	5
MCA 402	E- Commerce & Web Application Development	4	1	-	50	100	150	5
MCA 403	Interactive Computer Graphics	4	1	-	50	100	150	5
MCA 404	Advanced Operating Systems	4	1	-	50	100	150	5
MCA 405	Software Lab- VIII (E- Commerce & Web Application Development)	-	-	4	100	50	150	2
MCA 406	Software Lab- IX (Interactive Computer Graphics)	-	-	4	100	50	150	2
MCA 407	Software Lab X (Advanced Operating Systems)	-	-	4	100	50	150	2
	Total	**16**	**4**	**12**	**500**	**550**	**1050**	**26**

Fifth Semester   **Contact Hours: 31 Hrs.**

Course Code	Course Title	Load Allocation			Marks Distribution		Total Marks	Credits
		L	T	P	Internal	External		
MCA 501	Embedded Systems	4	1	-	50	100	150	5
MCA 502	Network Security &Administration	4	1	-	50	100	150	5
MCA 503	Web Technologies	4	1	-	50	100	150	5
MCA 504	Object Oriented Analysis & Design with UML	3	1	-	50	100	150	4
MCA 505	Hardware Lab – I (Embedded Systems)	-	-	4	100	50	150	2
MCA 506	Software Lab –XI (Web Technologies)	-	-	4	100	50	150	2
MCA 507	Software Lab –XII (Object Oriented Analysis and Design with UML)	-	-	4	100	50	150	2
	Total	**15**	**4**	**12**	**500**	**550**	**1050**	**25**

Sixth Semester

Course Code	Course Title	Load Allocation	Marks Distribution		Total Marks	Credits
			Internal	External		
MCA 601	**Industrial Training**	Four Months	80	320	400	28

List of Electives:

Course Code	(MCA XXX) Elective –I	Course Code	(MCA YYY) Elective –II
MCA991	Linux Operating System	MCA993	Optimization Techniques
MCA992	System Programming	MCA994	Theory of Computation
		MCA995	Computer Oriented Numerical and Statistical Methods

MCA-101 Information Management

Unit –I

Introduction to Information Technology - Definition, Applications in various sectors, Different types of software, Generations of Computers, Input and output Devices, Various storage devices like HDD, Optical Disks, Flash Drives. Different Types of data file formats: Types and Applications.

Unit –II

IT Infrastructure in India – Telecommunication, Internet research and Broadband

Unit –III

Data Collection and Data Management, Data Models, Information vs. Knowledge, Various techniques to derive information, Information Management.

Unit –IV

Management Information System – Definition, Strategic Management of Information, Decision Making, Development Process of MIS, Strategic Design of MIS, Business Process Reengineering.

Unit –V

Understanding Knowledge Management, Designing a Knowledge Management System, Nature and Scope of Business Intelligence, Information Security- Meaning and Importance, Organizational Security Policy and Planning, Access Control and Operations Security.

Unit –VI

Office Automation (Word processing, Spreadsheet, Presentation, E-Mail Clients),Content Management System and Architecture.

Suggested Readings / Books:

- **Introduction to Information Technology, Second Edition,** *Turban, Rainer, Potter,* WSE, Wiley India.
- **Data Warehousing Fundamentals: A Comprehensive Study For IT Professionals,** *Paulraj Ponnian BWSTN,* Wiley India.
- **Information Assurance For The Enterprise: A Roadmap To Information Security**- *Corey Schou, Daniel Shoemaker,* Mc-Graw Hill Publications.
- **Management Information System: Text And Cases,** *Waman Jawadekar,* Mc-Graw Hill Publications.

MCA-102 Object Oriented Programming in C++

Unit –I

Evolution of OOP, OOP Paradigm, advantages of OOP, Comparison between functional programming and OOP Approach, characteristics of object oriented language – objects, classes, inheritance, reusability, user defined data types, polymorphism, overloading. Introduction to C++, Identifier and keywords, constants,C++ operators, type conversion, Variable declaration, statements, expressions, features of iostream.h and iomanip.h input and output, conditional expression loop statements, breaking control statements.

Unit –II

Defining function, types of functions, storage class specifiers, recursion, pre-processor, header files and standard functions, Arrays, pointer arithmetic's, structures, pointers and structures, unions, bit fields typed, enumerations.Passing array as an argument to function.

Unit –III

Classes, member functions, objects, arrays of class objects, pointers and classes, nested classes, constructors,destructors, inline member functions, static class member, friend functions, dynamic memory allocation.Inheritance, single inheritance, types of base classes, types of derivations, multiple inheritance, container classes, member access control

Unit –IV

Function overloading, operator overloading, polymorphism, early binding, polymorphism with pointers,virtual functions,virtual destructors, late binding, pure virtual functions, opening and closing of files, stream state member functions, binary file operations, structures and file operations, classes and file operations, random access file processing.Exception Handling.

Suggested Readings / Books:

- **Object Oriented Programming in Turbo C++,** *Robert Lafore,* Galgotia Publications, 1994.
- **The C++ Programming Language**, *Bjarne* Wesley Publications, 1994.
- **Object Oriented Programming with C++**, *E.Balagurusamy,* Tata McGraw Hill
- **Object Oriented Software Engineering**, *S.Halladay and M. Wiebel*, BPB Publications, 1995.

MCA-103Computer Organization and Assembly Language

Objectives: The objective of the course is to provide students with a solid foundation in computer design. Examine the operation of the major building blocks of a computer system. To introduce students to the design and organization of modern digital computers & basic assembly language.

Unit –I

Computer Organization: Basic Computer Organization, Bus & Memory Transfer, Stored Program Organization, Computer Registers, Computer Instructions, Timing and Control, Hardwired based design of Control Unit, Instruction Cycle, Formats of Various types of Instructions- Memory Reference Instructions, Register Reference Instructions & I/O Instructions , General Register Organization-Control word, Design of Adder & Logic Unit, Stack Organization-Register Stack, Memory Stack, Reverse Polish Notation, Addressing Modes, RISC vs CISC Architectures, Interrupts & types.

Unit –II

Pipeline & Vector Processing: Parallel Processing, Pipelining-Arithmetic & Instruction Pipeline, Vector Processing-Vector operations, Memory Interleaving, Array Processors.

Unit –III

Input – Output Organization: Input-Output Interface- I/O vs Memory Bus, Isolated vs Memory mapped I/O, Synchronous Data Transfer , Asynchronous Data Transfer-Strobe Control, Handshaking, Asynchronous Communication Interface, Modes of Transfer-Programmed I/O, Interrupt Initiated I/O, Interrupt Cycle, Priority Interrupt Controller, DMA Controller & DMA Transfer.

Unit –IV

 Memory Organization: Main Memory-Memory Address Map, Memory connection to CPU, Associative Memory-Hardware organization, Match Logic, Cache Memory-Levels of Cache, Associative Mapping, Direct Mapping, Set-Associative Mapping, writing into Cache, Cache coherence, Virtual Memory-Address space & Memory space, Address mapping using pages, Associative memory page table, Page replacement . Memory Management Hardware – Segmented page mapping, Multiport memory, Memory protection.

Unit –V

Multiprocessors: Characteristics of Multiprocessors, Interconnection structures-Time shared common bus, Crossbar switch, Multistage switching Network, Hypercube interconnection, Interprocessor communication & synchronization.

Unit –VI

Assembly Language Programming: Example of a typical 8 bit processor (8085 microprocessor)—Registers, Addressing modes, Instruction set-Data transfer Instructions, Arithmetic Instructions, Logical Instructions, Program Control Instructions, Machine Control Instructions, Use of an Assembly Language for specific programmes : Simple numeric manipulations, Sorting of a list and use of I/O instructions.

<u>**Suggested Readings / Books**</u>:
- **Computer Organization**- *Car Hamacher, Zvonks Vranesic, Safwat Zaky,* V Edition, McGraw Hill.
- **Computer System Architecture,** *Mano, M.M.,* 1986: Prentice Hall of India.
- **Computer Architecture and Organization,** *John Paul Hayes:* McGraw-Hill International Edition
- **Structured Computer Organization,** *Tannenbaum, A.S.*: Prentice Hall of India.

MCA-104Accounting And Financial Management

Unit –I

Accounting: Principles, concepts and conventions, double entry system of accounting, introduction to basic books of accounts of sole proprietary concern, partnership, organization & company, closing of books of accounts and preparation of trial balance.

Final Accounts: Trading, Profit and Loss accounts and Balance sheet (without adjustment)

Unit –II

Financial Management: Meaning, scope and role, a brief study of functional areas of financial management. Introduction to various FM tools: Ratio Analysis, Fund Flow statement and cash flow statement (without adjustments)

Unit –III

Costing: Nature, importance and basic principles, Marginal costing: Nature scope and importance, Break even analysis, its uses and limitations, construction of break even chart, Standard costing: Nature, scope and variances, Budgetary Control (only introduction)

Unit –IV

Computerized Accounting: Advantages, Computer Programs for accounting, Computer based Auditing.

<u>Suggested Readings / Books:</u>
- **Principles: A Book-Keeping** *by J.C.Katyal*
- **Principles of Accounting** by *Jain and Narang*,.
- **Financial Management** *by I.M.Pandey,* Vikas Publications.
- **Management Accounting,** *by Sharma, Gupta & Bhall,*.
- **Cost Accounting** *by Jain and Narang*
- **Cost Accounting** *by Katyal,*.
- **Basic Accounting, Second Edition** *by Rajni Sofat, Preeti Hiro,* PHI.

MCA-105 Technical Communication

Unit –I

Basics of Technical Communication- Functions of Communication-Internal & External Functions, Models-Shannon & Weaver's model of communication, Flow, Networks and importance, Barriers to Communication, Essential of effective communication (7 C's and other principles), Non-verbal Communication.

Unit –II

Basic Technical Writing: Paragraph writing (descriptive, Imaginative etc.), Precise writing, reading and comprehension, Letters – Format & various types.

Unit –III

Advanced Technical Writing: Memos, Reports, E-Mails & Net etiquettes, Circulars, Press Release, Newsletters, Notices. Resume Writing, Technical Proposals, Research Papers, Dissertation and Thesis, Technical Reports, Instruction Manuals and Technical Descriptions, Creating Indexes, List of References and Bibliography.

Unit –IV

Verbal Communication- Presentation Techniques, Interviews, Group Discussions, Extempore, Meetings and Conferences.

Unit –V

Technical Communication- MS-Word, Adobe Frame maker and ROBO Help

Suggested Readings/ Books
- Vandana R Singh, The Written Word, Oxford University Press, New Delhi
- KK Ramchandran, et al Business Communication, Macmillan, New Delhi
- Swati Samantaray, Busines Commnication and Commnicative English, Sultan Chand, New Delhi.
- S.P. Dhanavel English and Communication Skills for Students of Science and Engineering (with audio CD)

MCA-106 Software Lab-I (Information Management)

This laboratory course will mainly comprise of exercises on Section D of the Course MCA-101

[**Information Management**]

Note: The breakup of marks for the practical university examination will be as under

- Lab record 10 marks
- Viva Voce   20 marks
- Execution of commands 20 marks

MCA-107 Software Lab- II (Object Oriented Programming in C++)

This laboratory course will mainly comprise of exercises on what is learnt under paper: MCA 102

[**Object Oriented Programming in C++ **]

Note: Program should be fully documented with simple I/O data. Flow charts should be developed wherever necessary.

Write program in 'C++' language

- Using input and output statements
- Using control statements.
- Using functions.
- Using array
- Using Classes and implementation of Constructor and Destructor.
- Using files.
- Using OOP's Concepts (Inheritance, Polymorphism, Encapsulation, Friend and Static Functions)

The breakup of marks for the practical university examination will be as under

- Lab record 10 marks
- Viva Voce   20 marks
- Program Development and execution 20 marks.

BTHU 102 Communication Skills Laboratory

Lab Exercises

Listening and Speaking

The audio CD accompanying S.P. Dhanavel's book shall be played in the lab to get the students familiar with the standard spoken English. The students must develop a high degree of understanding of spoken material as used in academic and professional environment. The teacher shall help them in the following:

a) With the accent of the speaker if it is unfamiliar to them.

b) The Standard English sounds and pronunciation of words.

c) With the topical vocabulary and the idiomatic expressions which are generally part of colloquial speech.

d) With the implied relationships in larger texts, if they are not stated explicitly.

In addition to the above, extended listening sessions shall be arranged to promote speaking activities among students. For this purpose, a set of twin books *K. Sadanand and S. Punitha Spoken English Part I and II, A Foundation Course (with audio CD), Orient Blackswan,* is prescribed for use. The teachers shall play the CDs selectively in the lab and involve the students in the practice work based on them. While taking up lessons, the teacher must promote the use of dictionaries for correct pronunciation and give ample practice on word stress and weak forms.

The students are also supposed to supplement their listening practice by regularly viewing news/knowledge channels on the TV or lecture videos on the internet.

At the end of a session, a good speaker must:

a) Be able to produce long turns without much hesitation in an accent that is understood all around.

b) Have ready access to a large lexis and conventional expressions to speak fluently on a variety of topics.

c) Have a knack for structured conversation or talk to make his transitions clear and natural to his listeners.

The teacher may use following different classroom techniques to give practice and monitor the progress of the students:

- role play
- question-answer
- discussion
- presentation of papers
- seminars