**PUNJABI UNIVERSITY, PATIALA**

**SYLLABI**

**OUTLINES OF TESTS AND**

**COURSES OF READINGS**

**FOR**

**MASTER OF COMPUTER APPLICATIONS (MCA) 2 Yrs**

**BRIDGE COURSE (SEMESTER I & II)**

**(Sessions 2020-21 & 2021-2022)**

**CHOICE-BASED CREDIT SYSTEM**

**(As per RUSA Guidelines)**

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**PUNJABI UNIVERSITY,**

**PATIALA 147002**

**M.C.A. (MASTER OF COMPUTER APPLICATIONS)**

**BRIDGE COURSE -FIRST SEMESTER EXAMINATIONS**

**Sessions 2020-21 & 2021-2022**

|  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Paper Code** | **Title of Paper** | **L** | **T** | **P** | **C** | **Internal**  **Marks** | | **External**  **Marks** | |
| **Max** | **Pass** | **Max** | **Pass** |
| MCABC-111 | Discrete Mathematical Structures | 4 | 0 | 0 | 4 | 50 | 20 | 50 | 20 |
| MCABC-112 | Problem Solving and Program Design using C | 4 | 0 | 0 | 4 | 50 | 20 | 50 | 20 |
| MCABC-113 | Fundamentals of Computer Science | 4 | 0 | 0 | 4 | 50 | 20 | 50 | 20 |
| MCABC-114 | Web Technologies | 4 | 0 | 0 | 4 | 50 | 20 | 50 | 20 |
| MCABC-115 | Programming Lab-I (C Programming) | 0 | 0 | 4 | 2 | 60 | 24 | 40 | 16 |
| MCABC-116 | Programming Lab-II (Web Technologies) | 0 | 0 | 4 | 2 | 60 | 24 | 40 | 16 |
|  | Total | 16 | 0 | 8 | 20 | 320 |  | 280 |  |

**CONTINUOUS ASSESSMENT (THEORY PAPERS)**

|  |  |  |  |
| --- | --- | --- | --- |
| **1.** | Two tests will be conducted during the semester. Both the tests will be counted for assessment. | : | 60% of the total marks allotted for continuous assessment. |
| **2.** | Assignment/Quizzes | : | 20% of the total marks allotted for continuous assessment. |
| **3.** | Attendance | : | 10% of the total marks allotted for continuous assessment. |
| **4.** | Class Participation and behaviour | : | 10% of the total marks allotted for continuous assessment. |

**CONTINUOUS ASSESSMENT (PRACTICAL LAB)**

|  |  |  |  |
| --- | --- | --- | --- |
| **1.** | Two tests will be conducted during the semester. Both the tests will be counted for assessment. | : | 60% of the total marks allotted for continuous assessment. |
| **2.** | Lab Assignments | : | 30% of the total marks allotted for continuous assessment. |
| **3.** | Attendance | : | 10% of the total marks allotted for continuous assessment. |

**M.C.A. (MASTER OF COMPUTER APPLICATIONS)**

**BRIDGE COURSE - SECOND SEMESTER EXAMINATIONS**

**Sessions 2020-21 & 2021-2022**

|  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Paper Code** | **Title of Paper** | **L** | **T** | **P** | **C** | **Internal**  **Marks** | | **External**  **Marks** | |
| **Max** | **Pass** | **Max** | **Pass** |
| MCABC-121 | Statistics and Probability | 4 | 0 | 0 | 4 | 50 | 20 | 50 | 20 |
| MCABC-122 | Software Engineering | 4 | 0 | 0 | 4 | 50 | 20 | 50 | 20 |
| MCABC-123 | Business Management | 4 | 0 | 0 | 4 | 50 | 20 | 50 | 20 |
| MCABC-124 | Programming using Python | 4 | 0 | 0 | 4 | 50 | 20 | 50 | 20 |
| MCABC-125 | Programming Lab-III (Python) | 0 | 0 | 4 | 2 | 60 | 24 | 40 | 16 |
| MCABC-126 | Minor Project | 0 | 0 | 0 | 2 | 0 | 0 | 100 | 40 |
|  | Total | 16 | 0 | 4 | 20 | 260 |  | 340 |  |

**CONTINUOUS ASSESSMENT (THEORY PAPERS)**

|  |  |  |  |
| --- | --- | --- | --- |
| **1.** | Two tests will be conducted during the semester. Both the tests will be counted for assessment. | : | 60% of the total marks allotted for continuous assessment. |
| **2.** | Assignment/Quizzes | : | 20% of the total marks allotted for continuous assessment. |
| **3.** | Attendance | : | 10% of the total marks allotted for continuous assessment. |
| **4.** | Class Participation and behaviour | : | 10% of the total marks allotted for continuous assessment. |

**CONTINUOUS ASSESSMENT (PRACTICAL LAB)**

|  |  |  |  |
| --- | --- | --- | --- |
| **1.** | Two tests will be conducted during the semester. Both the tests will be counted for assessment. | : | 60% of the total marks allotted for continuous assessment. |
| **2.** | Lab Assignments | : | 30% of the total marks allotted for continuous assessment. |
| **3.** | Attendance | : | 10% of the total marks allotted for continuous assessment. |

**L 4 T 0 P 0 per week Credit 4**

**Master of Computer Applications (Bridge Course)**

**Semester-I**

**Discrete Mathematical Structures (Subject Code: MCABC-111)**

**Maximum Marks: 50 Maximum Time: 3 Hrs.**

**Minimum Pass Marks: 40% Lectures to be delivered: 45-55**

This course introduces the applications of discrete mathematics inthe field of computer science. It covers sets, logic, provingtechniques, combinatorics, functions, relations, graph theory and algebraic structures. These basic concepts of sets, logic functions and graph theory are applied to Boolean Algebra and logicnetworks, while the advanced concepts of functions and algebraicstructures are applied to finite state machines and coding theory. Students completing this course will be able

* to express a logic sentence in terms of predicates, quantifiers, and logical connectives.
* to apply the rules of inference and methods of proof including direct and indirect proof forms, proof by contradiction, and mathematical induction.
* to use tree and graph algorithms to solve problems
* to evaluate Boolean functions and simplify expressions using the properties of Boolean algebra.

**Course content**

**SECTION A**

Logic: Propositions, Implications, Precedence of Logical Operators, translating English Sentences, System Specifications. Propositional Equivalences, Predicates and Quantifiers, Nested Quantifiers, Order of Quantifiers, Sets, Power Set, Set Operations, Functions, One-to-One Functions and Onto Functions, Inverse and Composition of Functions, Floor Function, Ceiling Function.

Algorithms, Searching Algorithms, Sorting, Growth of Functions, Big-O Notation, Big-Omega and Big-Theta Notation, Complexity of Algorithms, Mathematical Induction, The Basic of counting, The Pigeonhole Principle.

**SECTION B**

Recurrence Relations, solving recurrence relations, Divide and Conquer Algorithms and Recurrence Relations, Generating functions for sorting recurrence relations, Inclusion-Exclusion.

Relations and their properties, n-any relations and their applications, representing relations, closure of relation, equivalence relations, partial ordering.

Graphs: Introduction, terminology, Representing Graphs and Graph Isomorphism, Connectivity, Euler and Hamiltonian Paths, Shortest Path Problems, Planar Graphs.

**Pedagogy:**

The Instructor is expected to use leading pedagogical approaches in the class room situation, research-based methodology, innovative instructional methods, extensive use of technology in the class room, online modules of MOOCS, and comprehensive assessment practices to strengthen teaching efforts and improve student learning outcomes.

The Instructor of class will engage in a combination of academic reading, analyzing case studies, preparing the weekly assigned readings and exercises, encouraging in class discussions, and live project based learning.

**Case/Class Discussion Assignments:**

Students will work in groups of up to four to prepare a brief write-up due before the start of each class covering the case study or class material to be discussed in the next session. Questions may include a quantitative analysis of the problem facing the decision-maker in the case.

**Class Participation:**

Attendance will be taken at each class. Class participation is scored for each student for each class.

**Text and Readings:** Students should focus on material presented in lectures. The text should be used to provide further explanation and examples of concepts and techniques discussed in the course:

1. Discrete Mathematics and its Applications, K.H. Rosen,TMH Publications.
2. Discrete and Combinatorial Mathematics, Ralph P. Grimaldi, Pearson Education.
3. Elements of Discrete Mathematics, C.L. Liu, D.P. Mohapatra, TMH Publications.
4. Discrete Mathematics, Richard Johnsonbaugh,Pearson Education.
5. Discrete Mathematical Structures with Applications to Computer Science, J. P. Tremblay & R. P. Manohar, MGH Publications.
6. Discrete Mathematical Structures, Bernard Kolman, Robert C. Busby, Sharon Cutler Ross, PHI.

**Scheme of Examination**

* English will be the medium of instruction and examination.
* Written Examinations will be conducted at the end of each Semester as per the Academic Calendar notified in advance
* Each course will carry 100 marks of which 50 marks shall be reserved for internal assessment and the remaining 50 marks for written examination to be held at the end of each semester.
* The duration of written examination for each paper shall be three hours’.
* The minimum marks for passing the examination for each semester shall be 40% in aggregate as well as a minimum of 40% marks in the semester-end examination in each paper.
* A minimum of 75% of classroom attendance is required in each subject.

**Instructions to the External Paper Setter**

The external paper will carry 50 marks and would be of three hours’ duration. The question paper will consist of three sections A, B and C. Sections A and B will have four questions each from the respective sections of the syllabus and each question will carry 7.5 marks. Section C will consist of 10 short answer type questions of 2 marks each covering the entire syllabus uniformly and will carry 20 marks in all. Candidates will be required to attempt four questions in all from section A and B selecting not more than two questions from each of these groups. Section C shall be compulsory.

**Instructions for candidates**

* Candidates are required to attempt five questions in all, selecting two questions each from section A and B and compulsory question of section C.
* Use of non-programmable scientific calculator is allowed.

**L 4 T 0 P 0 per week Credit 4**

**Master of Computer Applications (Bridge Course)**

**Semester-I**

**Problem Solving and Program Design using C (Subject Code: MCABC-112)**

**Maximum Marks: 50 Maximum Time: 3 Hrs.**

**Minimum Pass Marks: 40% Lectures to be delivered: 45-55**

This is an introductory course designed for any student interested in using computation to enhance their problem solving abilities using C language. It explores standard programming structures used to introduce fundamental algorithmic/programming concepts including variables, assignments, conditionals, loops, functions, and arrays and their role in problem solving. The course also provides complete knowledge of C language. Students will be able to develop logics which will help them to create programs, applications in C. Also by learning the basic programming constructs they can easily switch over to any other language in future.Upon successful completion of this course, the student will be able to

* Develop algorithms from user problem statements.
* Express the solutions to computer oriented problems using pseudocode.
* Determining specifications for a problem
* Designing a solution
* Write a maintainable C program for a given algorithm.
* Trace the given C program manually.
* Write C program for simple applications of real life using structures and files.
* to evaluate Boolean functions and simplify expressions using the properties of Boolean algebra.

**Course content**

**SECTION A**

An Overview of Computers and Logic: Understanding computer systems, simple program logic, program development cycle, Pseudo code statements, Flowcharts Symbols, Sentinel Values to end a program, Understanding programming and user environments, Evolution of programming models.

Understanding Structure: Understanding unstructured spaghetti code, three basic structures, Input to a structure a program, Reasons for structuring a program, recognizing structure, Structuring and modularizing unstructured logic.

Making Decisions: Evaluating Boolean expressions to make comparisons, relational comparison operators, Logical operators: AND, OR, NOT, Making selections with ranges, Precedence Rules.

Looping: Advantages, Loop Control variables, Nested Loops, Common mistakes using loops, FOR Loop, Common Loop Applications.

C Character set, Identifiers and keywords, Constant and Variables, Data types, Declarations, Statements and Symbolic Constants. C Program structure.Operators and Expressions: Arithmetic, relational, logical, unary operators, others operators.Bitwise operators: AND, OR, complement precedence and Associating bitwise shift operators,Input-Output: standard, consoleand string functions

Control statements in C: Branching, looping using for, while and do-while Statements, Nested control structures, switch, break, continue statements.

Coding Standards: Inline documentation, indentation of code.Naming conventions: Variables, global variables, functions, structures.Debugging: Tracking defects, debugging by code inspection, debugging by logs, debugging using step-by-step execution, using break points.

**SECTION B**

Arrays: Understanding arrays and their memory occupancy, Manipulating arrays to replace nested decisions, using constants with arrays, Searching, Parallel Arrays, FOR Loop with arrays. Sorting (Bubble), Swapping Values, Multi-dimensional arrays.

Working with Data, Creating Modules, and Designing Quality Programs: Declaring and using variables and constants, assigning values to variables, advantages of modularization, Modularizing a program, Creating hierarchy charts, Features of good program design.

File Handling: Understanding computer files, Data hierarchy, Performing file operations on Sequential Files, Introduction to Random Access Files.

Arrays in C: Definition, Access of Elements, initialization; Multidimensional arrays, character arrays.

Pointers: address and dereferencing operators, declaration, assignment, initialization, arithmetic, precedence of address and dereferencing operators, pointer comparison, conversion, pointer arrays and pointers to pointers. Pointers and strings, void pointers, Dynamic memory management.

Functions: Definition, Call, prototypes, formal and actual parameters, passing arguments to functions, call by value and call by address, passing array elements as arguments and passing arrays as arguments, recursion, Recursion v/s Iteration.

Program structure:Storage classes, automatic, external and static variables.

Pre-processor directives: #include, #define, #undef, #if, #ifdef, #ifndef, #else, #elif, #endif, #error, #pragma.Predefine macros.

Structure:Variable, initialization, accessing members, assignment, size of structure, scope of a structure, nested structures, pointer to structures, scope of a structure type definition, structure as function arguments, Arrays of structures, structures containing arrays, self-referential structures. Bit fields. Union, Enumerated data type

File processing in C: opening and closing, data files, creation, processing & unformatted data files, random file access.Command line arguments.

**Pedagogy:**

The Instructor is expected to use leading pedagogical approaches in the class room situation, research-based methodology, innovative instructional methods, extensive use of technology in the class room, online modules of MOOCS, and comprehensive assessment practices to strengthen teaching efforts and improve student learning outcomes.

The Instructor of class will engage in a combination of academic reading, analyzing case studies, preparing the weekly assigned readings and exercises, encouraging in class discussions, and live project based learning.

**Case/Class Discussion Assignments:**

Students will work in groups of up to four to prepare a brief write-up due before the start of each class covering the case study or class material to be discussed in the next session. Questions may include a quantitative analysis of the problem facing the decision-maker in the case.

**Class Participation:**

Attendance will be taken at each class. Class participation is scored for each student for each class.

**Text and Readings:** Students should focus on material presented in lectures. The text should be used to provide further explanation and examples of concepts and techniques discussed in the course:

1. Programming Logic and Design Comprehensive, Joyce Farrell, Cengage Learning.
2. Programming with ANSI and Turbo C, Ashok N. Kamthane, Pearson Education.
3. Programming in ANSI C, E. Balagurusamy, Tata McGraw Hill Publications.
4. Fundamental of Computers, V. Rajaraman and N. Adabala**,** [Prentice-Hall India Pvt., Limited](http://www.google.co.in/search?tbo=p&tbm=bks&q=inauthor:%22Prentice+Hall+India+Pvt.,+Limited%22).
5. Programming with C, Byron S. Gottfried, Schaum’s Outlines, Tata McGraw Hill Publications.
6. Problem Solving and Program Design in C, Jeri R. Hanly, [Pearson Education India](http://pearson.vrvbookshop.com/book/problem-solving-program-design-c-jeri-r-hanly/9788131724453).
7. Programming Vol:1, Infosys Campus Connect Foundation Program, Infosys.

**Scheme of Examination**

* English will be the medium of instruction and examination.
* Written Examinations will be conducted at the end of each Semester as per the Academic Calendar notified in advance
* Each course will carry 100 marks of which 50 marks shall be reserved for internal assessment and the remaining 50 marks for written examination to be held at the end of each semester.
* The duration of written examination for each paper shall be three hours’.
* The minimum marks for passing the examination for each semester shall be 40% in aggregate as well as a minimum of 40% marks in the semester-end examination in each paper.
* A minimum of 75% of classroom attendance is required in each subject.

**Instructions to the External Paper Setter**

The external paper will carry 50 marks and would be of three hours’ duration. The question paper will consist of three sections A, B and C. Sections A and B will have four questions each from the respective sections of the syllabus and each question will carry 7.5 marks. Section C will consist of 10 short answer type questions of 2 marks each covering the entire syllabus uniformly and will carry 20 marks in all. Candidates will be required to attempt four questions in all from section A and B selecting not more than two questions from each of these groups. Section C shall be compulsory.

**Instructions for candidates**

* Candidates are required to attempt five questions in all, selecting two questions each from section A and B and compulsory question of section C.
* Use of non-programmable scientific calculator is allowed.

**L 4 T 0 P 0 per week Credit 4**

**Master of Computer Applications (Bridge Course)**

**Semester-I**

**Fundamentals of Computer Science (Subject Code: MCABC-113)**

**Maximum Marks: 50 Maximum Time: 3 Hrs.**

**Minimum Pass Marks: 40% Lectures to be delivered: 45-55**

Making the students understand and learn the basics of computer how to operate it, to make familiar with the part and function of computer, its types, how to use computer in our day to day life, its characteristics, its usage, Limitations and benefits etc. After completing the subject, student should be able to:

* understand the meaning and basic components of a computer system,
* define and distinguish Hardware and Software components of computer system,
* explain the functions of a computer,
* identify and discuss the functional units of a computer system,
* identify the various input and output units and explain their purposes
* understand the concept and need of primary and secondary memory,

**Course content**

**SECTION A**

Computer Fundamentals: Block structure of a computer, characteristics of computers, problem solving with computers, generations of computers, classification of computers on the basis of capacity, purpose, generation, Introduction to Number System. Memory types: Magnetic core, RAM, ROM, Secondary, Cache, Bubble Memory.Input and Output Units: functional characteristics; Overview of storage devices: floppy disk, hard disk, compact disk, tape; Printers: Impact, non-impact. Graphical I/O devices: Light pen, joystick, Mouse, Touch screen; OCR, OMR, MICR

**SECTION B**

Computer languages: Machine language, assembly language, higher level language, 4GL. Introduction to Compiler, Interpreter, Assembler, Assembling, System Software, Application Software.

Operating system: Batch, multi-programming, time sharing, network operating system, on-line and real time operating system, Distributed operating system, multi-processor, Multi-tasking.

Computer Network and Communication: Network types, network topologies, network communication devices, physical communication media.

Internet and its Applications: E-mail, TELNET, FTP, World Wide Web, Internet chatting; Intranet, Extranet. Introduction to E-Commerce: Meaning, its advantages & limitations, Types of E-Commerce Applications

**Pedagogy:**

The Instructor is expected to use leading pedagogical approaches in the class room situation, research-based methodology, innovative instructional methods, extensive use of technology in the class room, online modules of MOOCS, and comprehensive assessment practices to strengthen teaching efforts and improve student learning outcomes.

The Instructor of class will engage in a combination of academic reading, analyzing case studies, preparing the weekly assigned readings and exercises, encouraging in class discussions, and live project based learning.

**Case/Class Discussion Assignments:**

Students will work in groups of up to four to prepare a brief write-up due before the start of each class covering the case study or class material to be discussed in the next session. Questions may include a quantitative analysis of the problem facing the decision-maker in the case.

**Class Participation:**

Attendance will be taken at each class. Class participation is scored for each student for each class.

**Text and Readings:** Students should focus on material presented in lectures. The text should be used to provide further explanation and examples of concepts and techniques discussed in the course:

1. Computer Fundamentals, P.K. Sinha, BPB Publications.
2. Computers Today, D. H. Sanders, McGraw Hill.
3. Information Technology: Inside and Outside, David Cyganski, John A. Orr, Richard F. Vaz, Prentice Hall.
4. Fundamentals of Computers, V. Rajaraman and N. Adabala, Prentice-Hall of India.
5. Computer Fundamentals Architecture and Organization, B. Ram, New Age International Publishers.

**Scheme of Examination**

* English will be the medium of instruction and examination.
* Written Examinations will be conducted at the end of each Semester as per the Academic Calendar notified in advance
* Each course will carry 100 marks of which 50 marks shall be reserved for internal assessment and the remaining 50 marks for written examination to be held at the end of each semester.
* The duration of written examination for each paper shall be three hours’.
* The minimum marks for passing the examination for each semester shall be 40% in aggregate as well as a minimum of 40% marks in the semester-end examination in each paper.
* A minimum of 75% of classroom attendance is required in each subject.

**Instructions to the External Paper Setter**

The external paper will carry 50 marks and would be of three hours’ duration. The question paper will consist of three sections A, B and C. Sections A and B will have four questions each from the respective sections of the syllabus and each question will carry 7.5 marks. Section C will consist of 10 short answer type questions of 2 marks each covering the entire syllabus uniformly and will carry 20 marks in all. Candidates will be required to attempt four questions in all from section A and B selecting not more than two questions from each of these groups. Section C shall be compulsory.

**Instructions for candidates**

* Candidates are required to attempt five questions in all, selecting two questions each from section A and B and compulsory question of section C.
* Use of non-programmable scientific calculator is allowed.

**L 4 T 0 P 0 per week Credit 4**

**Master of Computer Applications (Bridge Course)**

**Semester-I**

**Web Technologies (Subject Code: MCABC-114)**

**Maximum Marks: 50 Maximum Time: 3 Hrs.**

**Minimum Pass Marks: 40% Lectures to be delivered: 45-55**

The objective of this course is to develop an ability to design and implement static and dynamic website.A student will be familiar with client server architecture and able to develop a web application. At the end of the course, students should be able to:

* Design and implement dynamic websites with good aesthetic sense of designing and latest technical know-how's.
* Have a Good grounding of Web Application Terminologies, Internet Tools, E – Commerce and other web services.
* Write a well formed / valid XML document.
* To write server side programs using PHP.

**Course content**

**SECTION A**

Internet Basics: Networks, Protocols, TCP/IP, Internet Addresses, Ports, Sockets, Name Resolution, Firewalls, Protocol Tunneling, Proxy Servers, Internet Standards, governing the web HTTP, MIME, Inside URLs, Web applications, Overview of clients/servers web communication, comparison of web servers, Common Gateway Interface CGI.

Web Page Designing:Introduction to markup languages;

HTML: list, table, images, frames, forms, pages style sheets CSS;

XML: DTD, XML Namespaces, XML schemes, Presenting XML with CSS and XSLT, XML-DOM, What is XHTML?

**SECTION B**

Client Side Scripting:Java script: Introduction, documents, forms, statements, functions, objects;

Event and event handling; Browsers and the DOM, JQuery: Syntax, Selectors, Events and AJAX methods.

Server Side Programming:PHP: Introduction, requirements, PHP syntax, data type, variables, strings, operators, if-else, control structure, switch, array, function, file handling, form, sending email, file upload, session/state management, error and exception, PHP Database for dynamic Web pages.

Introduction to Servlets: Servlet Basic Servlet Structure, Servlet Lifecycle, Servlet APIs. Writing thread safe Servlets. Setting Cookies and Session Management with Servlet API.

**Pedagogy:**

The Instructor is expected to use leading pedagogical approaches in the class room situation, research-based methodology, innovative instructional methods, extensive use of technology in the class room, online modules of MOOCS, and comprehensive assessment practices to strengthen teaching efforts and improve student learning outcomes.

The Instructor of class will engage in a combination of academic reading, analyzing case studies, preparing the weekly assigned readings and exercises, encouraging in class discussions, and live project based learning.

**Case/Class Discussion Assignments:**

Students will work in groups of up to four to prepare a brief write-up due before the start of each class covering the case study or class material to be discussed in the next session. Questions may include a quantitative analysis of the problem facing the decision-maker in the case.

**Class Participation:**

Attendance will be taken at each class. Class participation is scored for each student for each class.

**Text and Readings:** Students should focus on material presented in lectures. The text should be used to provide further explanation and examples of concepts and techniques discussed in the course:

* Jeffrey C. Jackson, Web Technology – A computer Science perspective, Pearson Education.
* Chris Bates, Web Programming – Building Internet Application, Wiley India.
* Xavier C., Web Technology and Design, New Age International.
* Ivan Bayross, HTML, DHTML, Java Script, Perl & CGI, BPB Publication.
* Ramesh Bangia, Internet and Web Design, New Age International.
* Mahesh Bhave and S.A. Patekar, Programming with Java, Pearson Education.
* Ullman, PHP for the Web: Visual Quick Start Guide, Pearson Education.
* Paul J. Deitel, Java for Programmers, Pearson Education.
* Dustin R. Callaway, Inside Servlets, Pearson Education.

**Scheme of Examination**

* English will be the medium of instruction and examination.
* Written Examinations will be conducted at the end of each Semester as per the Academic Calendar notified in advance
* Each course will carry 100 marks of which 50 marks shall be reserved for internal assessment and the remaining 50 marks for written examination to be held at the end of each semester.
* The duration of written examination for each paper shall be three hours’.
* The minimum marks for passing the examination for each semester shall be 40% in aggregate as well as a minimum of 40% marks in the semester-end examination in each paper.
* A minimum of 75% of classroom attendance is required in each subject.

**Instructions to the External Paper Setter**

The external paper will carry 50 marks and would be of three hours’ duration. The question paper will consist of three sections A, B and C. Sections A and B will have four questions each from the respective sections of the syllabus and each question will carry 7.5 marks. Section C will consist of 10 short answer type questions of 2 marks each covering the entire syllabus uniformly and will carry 20 marks in all. Candidates will be required to attempt four questions in all from section A and B selecting not more than two questions from each of these groups. Section C shall be compulsory.

**Instructions for candidates**

* Candidates are required to attempt five questions in all, selecting two questions each from section A and B and compulsory question of section C.
* Use of non-programmable scientific calculator is allowed.

**L 0 T 0 P 4 per week Credit 2**

**Master of Computer Applications (Bridge Course)**

**Semester-I**

**Programming Lab-I (C Programming)(Subject Code: MCABC-115)**

**Maximum Marks: 100\* Maximum Time: 3 Hrs.**

**Minimum Pass Marks: 40% Practical units to be conducted: 55-65**

This course will mainly comprise of exercises on the basis of the theory paper: MCA-112: Problem Solving and Program Design using C.

\*The splitting of marks is as under:

* + Maximum Marks for Continuous Assessment: 60
  + Maximum Marks for University Examination: 40

**CONTINUOUS ASSESSMENT (PRACTICAL LAB)**

|  |  |  |  |
| --- | --- | --- | --- |
| **1.** | Two tests will be conducted during the semester. Both the tests will be counted for assessment. | : | 60% of the total marks allotted for continuous assessment. |
| **2.** | Lab Assignments | : | 30% of the total marks allotted for continuous assessment. |
| **3.** | Attendance | : | 10% of the total marks allotted for continuous assessment. |

**NOTE:** The examiner will give due weightage to Logic development/ Program execution, Lab records and viva-voce of the student while awarding marks to the student during end-semester final practical examination.

**L 0 T 0 P 4 per week Credit 2**

**Master of Computer Applications (Bridge Course)**

**Semester-I**

**Programming Lab-II (Web Technologies)(Subject Code: MCABC-116)**

**Maximum Marks: 100\* Maximum Time: 3 Hrs.**

**Minimum Pass Marks: 40% Practical units to be conducted: 55-65**

This course will mainly comprise of exercises on the basis of the theory paper: MCA-114: Web Technologies.

\*The splitting of marks is as under:

* + Maximum Marks for Continuous Assessment: 60
  + Maximum Marks for University Examination: 40

**CONTINUOUS ASSESSMENT (PRACTICAL LAB)**

|  |  |  |  |
| --- | --- | --- | --- |
| **1.** | Two tests will be conducted during the semester. Both the tests will be counted for assessment. | : | 60% of the total marks allotted for continuous assessment. |
| **2.** | Lab Assignments | : | 30% of the total marks allotted for continuous assessment. |
| **3.** | Attendance | : | 10% of the total marks allotted for continuous assessment. |

**NOTE:** The examiner will give due weightage to Logic development/ Program execution, Lab records and viva-voce of the student while awarding marks to the student during end-semester final practical examination.

**L 4 T 0 P 0 per week Credit 4**

**Master of Computer Applications (Bridge Course)**

**Semester-II**

**Statistics and Probability (Subject Code: MCABC-121)**

**Maximum Marks: 50 Maximum Time: 3 Hrs.**

**Minimum Pass Marks: 40% Lectures to be delivered: 45-55**

This Course will help students gain deep understanding of the concepts of basic statistics and probability theory used to make numerical conjectures about problems. The main objective is to provide students with pragmatic tools for assessing statistical claims and conducting their own analyses through various tools of descriptive statistics and probability. On completion of this course, the students will be able:

* Learn the nature of statistics and how it plays an important role in our daily lives.
* Organize and summarize data, and represent graphically the important information contained in a data set.
* Compute numerical quantities that measure the central tendency and dispersion of a set of data.
* Understand the elementary properties of probability.
* Compute the correlation among variables using different methods.
* Find the least squares regression line.
* Learn the concepts of mathematical expectation, random variable and probability distribution.

**Course content**

**Section A**

**Introduction:** Definition, importance and scope of statistics, Limitations of statistics, Concepts of statistical population and a sample - quantitative and qualitative data - collection of primary and secondary data, Sources of data, Techniques of data collection. Designing a questionnaire and a schedule. Sampling: Theoretical basis of sampling, Methods of sampling. Classification and tabulation of data. Diagrammatic and graphical representation of data. Construction of univariate and bivariate frequency distributions.

**Univariate data:** Concepts of Central Tendency, Mean, Median, Mode and Quartiles, Partition values and Measures ofDispersion, Range, Quartile Deviation, Mean Deviation and Standard Deviation, Box plot. Skewness and kurtosis. Their measures based on quartiles and moments.

**Section B**

**Bivariate data:** Definition, Scatter diagram. Principle of least squares.

**Correlation Analysis**: Introduction, Types of Correlation, Correlation versus causation. Measurement of Correlation: Karl Pearson’s Product Moment Coefficient of Correlation, Spearman’s Rank Correlation.

**Regression Analysis**: Introduction, Utility, Method of Least Squares, Regression equations, Coefficient ofRegression, Properties of regression coefficients, Standard Error of Estimate.

**Probability and Expected Value:** Probability: Introduction, random experiments, sample space, events and algebra of events. Approaches to probability - classical, empirical, subjective and axiomatic. Theorems on probabilities of events, laws of addition and multiplication. Conditional probability, independence of events. Bayes’ theorem and its applications. Concepts of Mathematical expectation, random variable and probability distribution.

**Pedagogy:**

The Instructor is expected to use leading pedagogical approaches in the class room situation, research-based methodology, innovative instructional methods, extensive use of technology in the class room, online modules of MOOCS, and comprehensive assessment practices to strengthen teaching efforts and improve student learning outcomes.

The Instructor of class will engage in a combination of academic reading, analyzing case studies, preparing the weekly assigned readings and exercises, encouraging in class discussions, and live project based learning.

**Case/Class Discussion Assignments:**

Students will work in groups of up to four to prepare a brief write-up due before the start of each class covering the case study or class material to be discussed in the next session. Questions may include a quantitative analysis of the problem facing the decision-maker in the case.

**Class Participation:**

Attendance will be taken at each class. Class participation is scored for each student for each class.

**Text and Readings:** Students should focus on material presented in lectures. The text should be used to provide further explanation and examples of concepts and techniques discussed in the course:

1. Miller & Freund’s Probability and Statistics for Engineers, R.A. Johnson, Irwin Miller and John Freund, Pearson Education India.

**Reference Books:**

1. Fundamentals of Statistics, A.M. Gun, M.K. Gupta and B. Dasgupta, World Press Pvt. Ltd.
2. Applied Statistics and Probability for Engineers, Douglas C. Montgomery and George C. Runger, Wiley.
3. Introduction to Theory of Statistics, A.M. Mood, F.A. Graybill and D.C. Boes, McGraw-Hill.
4. Statistical Methods, S.P. Gupta, Sultan Chand and Sons.

**Scheme of Examination**

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* Written Examinations will be conducted at the end of each Semester as per the Academic Calendar notified in advance
* Each course will carry 100 marks of which 50 marks shall be reserved for internal assessment and the remaining 50 marks for written examination to be held at the end of each semester.
* The duration of written examination for each paper shall be three hours.
* The minimum marks for passing the examination for each semester shall be 40% in aggregate as well as a minimum of 40% marks in the semester-end examination in each paper.
* A minimum of 75% of classroom attendance is required in each subject.

**Instructions to the External Paper Setter**

The external paper will carry 50 marks and would be of three hours duration. The question paper will consist of three sections A, B and C. Sections A and B will have four questions each from the respective sections of the syllabus and each question will carry 7.5 marks. Section C will consist of 10 short answer type questions of 2 marks each covering the entire syllabus uniformly and will carry 20 marks in all. Candidates will be required to attempt four questions in all from section A and B selecting not more than two questions from each of these groups. Section C shall be compulsory.

**Instructions for candidates**

* Candidates are required to attempt five questions in all, selecting two questions each from section A and B and compulsory question of section C.
* Use of non-programmable scientific calculator is allowed.

**L 4 T 0 P 0 per week Credit 4**

**Master of Computer Applications (Bridge Course)**

**Semester-II**

**Software Engineering (Subject Code: MCABC-122)**

**Maximum Marks: 50 Maximum Time: 3 Hrs.**

**Minimum Pass Marks: 40% Lectures to be delivered: 45-55**

In this course, students will gain a broad understanding of the discipline of software engineering and its application to the development of and management of software systems. After completing this course, students will have

* knowledge of basic SW engineering methods and practices, and their appropriate application;
* A general understanding of software process models such as the waterfall and evolutionary models.
* An understanding of the role of project management including planning, scheduling, risk management, etc.
* An understanding of software requirements and the SRS document.
* An understanding of implementation issues such as modularity and coding standards.
* An understanding of approaches to verification and validation including static analysis, and reviews.
* An understanding of software testing approaches such as unit testing and integration testing.

**Course content**

**SECTION A**

Introduction to Software Engineering: Problem Domain, Challenges, Software Engineering Approach; Software Development process: Process Characteristics, Process Models: Waterfall, Prototype, Spiral, Iterative Enhancement; Project Management Process, The Inspection process, Software Configuration Management Process, Requirements Change management

Software Metrics: Software Measurement and Metrics, Designing Software Metrics, Classification of Software Metrics, Issues in Software metrics, Risk Management

Software Process Planning, Effort Estimation, Cost estimation models, Project Scheduling and Staffing,

Software Requirements Analysis and Specification: Requirements Anticipation, Requirements Investigation, Requirements Specifications, Analysis Approaches, Characteristics and Components of SRS, Fundamental problems in defining requirements, requirements validation.

Decision Analysis Tools: Decision Tree, Decision Table, Structured English.

Entity Relationship Diagram: Identify entity and relationship, Data Dictionary

**SECTION B**

Software Design: Design Principles, Module level concepts, Design Notation and Specification, Structured Design Methodology, Verification, Metrics, OO Analysis and OO Design

User-Interface Design: Introduction to User-Interface Design, Elements, Design Principles, Design Tips and Techniques, Good v/s Bad Interface.

Coding: Programming practice, Verification: code reading, reviews, static analysis, symbolic execution.

Software Maintenance: Types of Maintenance, Maintenance Cost, Introduction to legacy systems, Role of documentation in maintenance and types of documentation

Software Testing: Objectives, Principles, Test case design, White-Box testing and Black-Box testing techniques. Reverse Engineering: Basics of Software Re-engineering, Re-engineering Process Model.

**Pedagogy:**

The Instructor is expected to use leading pedagogical approaches in the class room situation, research-based methodology, innovative instructional methods, extensive use of technology in the class room, online modules of MOOCS, and comprehensive assessment practices to strengthen teaching efforts and improve student learning outcomes.

The Instructor of class will engage in a combination of academic reading, analyzing case studies, preparing the weekly assigned readings and exercises, encouraging in class discussions, and live project based learning.

**Case/Class Discussion Assignments:**

Students will work in groups of up to four to prepare a brief write-up due before the start of each class covering the case study or class material to be discussed in the next session. Questions may include a quantitative analysis of the problem facing the decision-maker in the case.

**Class Participation:**

Attendance will be taken at each class. Class participation is scored for each student for each class.

**Text and Readings:** Students should focus on material presented in lectures. The text should be used to provide further explanation and examples of concepts and techniques discussed in the course:

1. PankajJalote, An Integrated Approach to Software Engineering, Narosa Publications.
2. E. Fairley, "Software Engineering Concepts", McGraw-Hill.
3. RohitKhurana, “Software Engineering: Principles and Practices”, Vikas Publishing House.
4. Ian Sommerville, “Software Engineering “, Pearson Education
5. Roger. S. Pressman, “Software Engineering - A Practitioner’s Approach”, McGraw Hill,
6. Designing User Interface, James E Powell, Galgotia Publications.

**Scheme of Examination**

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* A minimum of 75% of classroom attendance is required in each subject.

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**L 4 T 0 P 0 per week Credit 4**

**Master of Computer Applications (Bridge Course)**

**Semester-II**

**Business Management (Subject Code: MCABC-123)**

**Maximum Marks: 50 Maximum Time: 3 Hrs.**

**Minimum Pass Marks: 40% Lectures to be delivered: 45-55**

This competency-based course trains students in business administration & management. This course will provide students with an understanding of the basic theories and principles by which businesses are organized and managed in modern society. They will demonstrate competency by analyzing management functions, principles, and processes that contribute to the achievement of organizational goals. On completion of course, students will:

* Define and explain the major management functions.
* Compare and contrast a variety of organizational structures.
* Explain how economic and social changes affect businesses.
* Compare and contrast management styles.
* Describe the planning and problem-solving process.
* Demonstrate competency by preparing, describing and representing a business plan.

**Course content**

**SECTION A**

Introduction to Economic and non-economic activities, Distinction between Business, Profession and Employment.Concepts of Factors of production, resources, goals, Effectiveness versus Efficiency.

Introduction to Management: Definition and Nature of Management, Management as Science or art, Levels of management, Functions of management, Fayol’s general principles of management.

Planning: Nature and purpose of planning, Planning versus forecasting, Planning process - steps in planning.

Organizing: Concept and purpose of organization, Process of organization, Elements of organization process: Depart mentation, Delegation, Decentralization. Formal and informal organizations.Concept of Span of management.

**SECTIONB**

Staffing: Definition and importance, Staffing process, Components of Staffing: Recruitment, Selection and Training (Brief introduction).

Motivation and motivators: Need and role of motivation, Types of motivation. Theories of motivation:Maslow’s hierarchy of needs theory, the carrot and the stick approach.

Leadership: Definition and characteristics, Leadership styles: Autocratic style, Democratic style, Laissez faire.

Communication: Meaning, characteristics and importance, Elements of communication, the communication process, Types of communication, Formal and informal communication, Barriers and breakdowns in communication.

Controlling: Nature and significance of controlling, the basic control process.

**Pedagogy:**

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**Class Participation:**

Attendance will be taken at each class. Class participation is scored for each student for each class.

**Text and Readings:** Students should focus on material presented in lectures. The text should be used to provide further explanation and examples of concepts and techniques discussed in the course:

1. Principles & Practice of Management, L. M. Prasad. Sultan Chand & Sons.
2. Essentials of Management, Harold Koontz and Heinz Weihrich, Tata McGraw-Hill Publishing.
3. Principles of Management, M. Govindarajan, S. Natarajan, Prentice-Hall of India Ltd.

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**Instructions for candidates**

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**L 4 T 0 P 0 per week Credit 4**

**Master of Computer Applications (Bridge Course)**

**Semester-II**

**Programming using Python (Subject Code: MCABC-124)**

**Maximum Marks: 50 Maximum Time: 3 Hrs.**

**Minimum Pass Marks: 40% Lectures to be delivered: 45-55**

This Course will help students gain proficiency in programming skills by learning-by-doing approach using Python programming language and also enables them to master programming constructs like data input/ output, looping and various file management techniques. On completion of this course, the students will be able:

* To develop proficiency in creating applications using the Python Programming Language.
* To be able to understand the various data structures available in Python programming language and apply them in solving computational problems.
* To be able to do testing and debugging of code written in Python.
* To understand exception handling in Python.
* To be proficient in handling files in Python.

**Course content**

**Section A**

**Introduction to Python Programming Language:** History and Origin of Python Language, Features of Python, Limitations, Major Applications of Python, Getting, Installing Python, Setting up Path and Environment Variables, Running Python, First Python Program, Python Interactive Help Feature, Python differences from other languages.

**Python Data Types & Input/Output:** Keywords, Identifiers, Python Statement, Indentation, Documentation, Variables, Multiple Assignment, Understanding Data Type, Data Type Conversion, Python Input and Output Functions, Import command, Comments in Python.

**Operators and Expressions:** Operators in Python, Expressions, Precedence, Associativity of Operators, Non Associative Operators.

**Control Structures:** Decision making statements: if - else statement and nested if – else, Python looping constructs: while, for,Nested loops, Python loop control statements.

**Python Native Data Types:** Numbers, Strings: Creating, initializing and accessing the elements; String operators: +, \*, in, not in, range, slice [n:m]; String built in functions and methods.Lists: concept, creating and accessing elements, updating and deleting lists, basic list operations,built-in list functions. Tuples: Creating & deleting tuples, Accessing values in a tuple, Updating tuples, deleting tuple elements, Basic tuple operations, Built-in tuple functions, Dictionary:Creating and accessing values in a dictionary, Updating dictionary, deleting dictionary elements, Functions and Methods of Dictionary.

**Section B**

**Python Functions:** Functions, Advantages of Functions, Built-in Functions, User defined functions, Anonymous functions, Pass by value Vs. Pass by reference, Recursion, Scope and Lifetime of Variables.

**Python Modules:** Module definition, Need of modules, Creating a module, Importing module, Path Searching of a Module, Module Reloading, Standard Modules, Python Packages.

**Exception Handling:** Exceptions, Built-in exceptions, User-defined exceptions, Exception handlingin Python.

**File Management in Python:**Creating files, Operations on files (open, close, read, write), File Positions, Renaming and Deleting Files, Creating, removing, and changingDirectories in Python.

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**Class Participation:**

Attendance will be taken at each class. Class participation is scored for each student for each class.

**Text and Readings:** Students should focus on material presented in lectures. The text should be used to provide further explanation and examples of concepts and techniques discussed in the course:

1. Core Python Programming, R. Nageswara Rao, Dreamtech.

**Reference Books:**

1. Python in a Nutshell, A. Martelli, A. Ravenscroft, S. Holden, O’ Reilly.
2. Python, The complete Reference, Martin C. Brown, McGraw Hill Education.
3. Programming Python, Mark Lutz, O’ Reilly.
4. Introduction to Computer Science using Python, Charles Dierbach, Wiley.

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**L 0 T 0 P 4 per week Credit 2**

**Master of Computer Applications (Bridge Course)**

**Semester-II**

**Programming Lab-III (Python)(Subject Code: MCABC-125)**

**Maximum Marks: 100\* Maximum Time: 3 Hrs.**

**Minimum Pass Marks: 40% Practical units to be conducted: 55-65**

This course will mainly comprise of exercises on the basis of the theory paper: MCA-124: Programming using Python.

\*The splitting of marks is as under:

* + Maximum Marks for Continuous Assessment: 60
  + Maximum Marks for University Examination: 40

**CONTINUOUS ASSESSMENT (PRACTICAL LAB)**

|  |  |  |  |
| --- | --- | --- | --- |
| **1.** | Two tests will be conducted during the semester. Both the tests will be counted for assessment. | : | 60% of the total marks allotted for continuous assessment. |
| **2.** | Lab Assignments | : | 30% of the total marks allotted for continuous assessment. |
| **3.** | Attendance | : | 10% of the total marks allotted for continuous assessment. |

**NOTE:** The examiner will give due weightage to Logic development/ Program execution, Lab records and viva-voce of the student while awarding marks to the student during end-semester final practical examination.

**L 0 T 0 P 0 per week Credit 2**

**Master of Computer Applications (Bridge Course)**

**Semester-II**

**Minor Project (Subject Code: MCABC-126)**

**Maximum Marks: 100\* Maximum Time: 3 Hrs.**

**Minimum Pass Marks: 40% Practical units to be conducted: 0**

This course will mainly comprise of developing a minor project using any of the different technologies learnt during the bridge course.

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **CODE** | **TITLE OF PAPER** | **MAXIMUM MARKS\*** | **MINIMUM PASS MARKS** | **TOTAL CREDITS** |
| MCABC-126 | Minor Project | 100 | 40 | 2 |

**\* There will not be any marks for internal assessment of the student.**

**Guidelines for the Minor Project:**

1. The students are required to undertake a minor software development project during the Second semester of MCA Bridge Course along with the regular classes. The project should be done preferably using the programming languages taught in the two semesters of the MCA Bridge course.
2. The students will complete systems analysis, design, coding and testing of the software project assigned to them by the teacher of Programming Lab III. The students are required to complete the minor project in the Department given by the concerned teacher of the Department. No outside training/ project work will be allowed.
3. Joint projects may be allowed and joint project reports will also be accepted, with the permission of the teacher concerned. However, the students should highlight their individual contributions in a joint project. The quantum of individual contribution of particular students in joint projects should be such which can be accepted as equivalent to individual minor project. The same must also be reflected in joint reports.
4. Each student should submit one project report of his/her project to the teacher concerned, as per the format decided by the Department.
5. The students are required to give live demo of the software developed by them and there will be viva-voce of the students during the end-semester practical examination.
6. There will not be any marks for internal assessment of the student. The external teacher along with the internal teacher will evaluate the student and marks out of 100 will be awarded to each student.