ORDINANCES
AND OUTLINES OF TESTS, SYLLABI AND COURSES OF READING

FOR

BACHELOR OF COMPUTER APPLICATIONS (B.C.A)

(SEMESTER SYSTEM)

PART-III

(Semester 5th and 6th)

For 2024-25 Existing Students

Programme Code: BCAB3PUP

(This Scheme is for Regular Students of Affiliated Colleges, Constituent Colleges and Center for Distance & Online Education)

PUNJABI UNIVERSITY
PATIALA

OUTLINE OF PAPERS AND TESTS
for
B.C.A. Third Year (5th Semester)

Code	Title of Paper	Hours per Week	University Examination	Internal Assessment	Max. Marks	Exam. Duration Hours
BCAB3101T	English Literary Skills – I	4	70	30	100	3
BCAB3102T	System Analysis and Design	4	70	30	100	3
BCAB3103T	Java Programming	4	70	30	100	3
BCAB3104T	Web Designing using ASP.Net	4	70	30	100	3
BCAB3105L	Software Lab – IX (based on paper BCAB3103T: Java Programming)	4	70	30	100	3
BCAB3106L	Software Lab – X (based on paper BCAB3104T: Web Designing using ASP.Net)	4	70	30	100	3
	Total	**24**	**420**	**180**	**600**	3

Note:

1. The break up of marks for the internal assessment for Theory/Practical except BCAB3101T will be as under:
   - i. One or two tests out of which minimum one best will be considered for assessment. — 20 Marks
   - ii. Attendance — 5 Marks
   - iii Class participation and behaviour — 5 Marks

2. The break up of marks for the internal assessment BCAB3101T: English Literary Skills – I will be as under:
   - i. Formal assessment through Interview/Self Introduction/Recitation etc. — 15 Marks
   - ii. Conversation Skills (particularly listening and speaking to be evaluated through oral examination) — 5 Marks
   - iii. Attendance — 5 Marks
   - iv. Class participation and behaviour — 5 Marks

OUTLINE OF PAPERS AND TESTS
for

B.C.A. Third Year (6th Semester)

Code	Title of Paper	Hours per Week	University Examination	Internal Assessment	Max. Marks	Exam. Duration Hours
BCAB3201T	English Literary Skills – II	4	70	30	100	3
BCAB3202T	Software Engineering	4	70	30	100	3
BCAB3203T	Operating Systems	4	70	30	100	3
BCAB3204T	Python Programming	4	70	30	100	3
BCAB3205L	Software Lab – XI (Minor Project)	4	70	30	100	3
BCAB3206L	Software Lab – XII (based on BCAB3204T: Python Programming)	4	70	30	100	3
	Total	**24**	**420**	**180**	**600**	3

Note:

1. The break up of marks for the internal assessment for Theory/Practical except BCAB3201T will be as under:
   - i. One or two tests out of which minimum one best will be considered for assessment. — 20 Marks
   - ii. Attendance — 5 Marks
   - iii Class participation and behaviour — 5 Marks

2. The break up of marks for the internal assessment BCAB3201T: English Literary Skills – I will be as under:
   - i. Formal assessment through Interview/Self Introduction/Recitation etc. — 15 Marks
   - ii. Conversation Skills (particularly listening and speaking to be evaluated through oral examination) — 5 Marks
   - iii. Attendance — 5 Marks
   - iv. Class participation and behaviour — 5 Marks

COMMON SYLLABUS OF ENGLISH WILL BE AS PER UG (BOARD OF STUDIES) IN FACULTY OF LANGUAGE, PUNJABI UNIVERSITY, PATIALA

BCAB3102T: System Analysis and Design

Total Marks: 100
University Examination: 70
Internal Assessment: 30

Maximum Time: 3 Hrs.
Minimum Pass Marks: 35%
Lectures to be delivered: 45-55 Hrs.

A) Instructions for paper-setter

The question paper will consist of three sections A, B & C. Sections A & B will have four questions from the respective sections of the syllabus and will carry 30% marks each. Section C will have 6-12 short answer type questions which will cover the entire syllabus uniformly and will carry 40% marks in all.

B) Instructions for candidates

1. Candidates are required to attempt two questions each from sections A & B of the question paper and the entire section C .
2. Use of non-programmable scientific calculator is allowed.

SECTION A

Systems concepts: Definition and characteristics of a system, Elements of a system, Types of systems.
The system development life cycle: Introduction to various phases.
The role of the Systems Analyst: Qualifications of a systems analyst, various roles of the systems analyst.
Systems analysis: Initial investigation, needs identification, determining the user's information requirements, Information-gathering tools.

SECTION B

Structured analysis tools: Data flow diagram, Data dictionary, Decision tree, Structured English, Decision tables. **Feasibility study:** Feasibility considerations, Steps in Feasibility analysis. **Systems Design:** The process and stages of systems design, Input/output and forms design, Database design.
Implementation and software maintenance: Conversion, Post-implementation review. Software maintenance: maintenance or enhancement, Primary activities of a maintenance procedure.
Hardware and software selection: Procedure and major phases in selection.

Text/ Reference Books :

1. E. M. Awad: Systems Analysis and Design, Galgotia Publications (P) Ltd.
2. Systems Analysis and Design: Techniques, Methodologies, Approaches, And Architectures1st Edition **Author:** Hardgrave Bill C. , Siau Keng , Chiang Roger H. L. **Publisher:** M.E. Sharpe

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BCAB3103T: Java Programming

Total Marks: 100
University Examination: 70
Internal Assessment: 30

Maximum Time: 3 Hrs.
Minimum Pass Marks: 35%
Lectures to be delivered: 45-55 Hrs.

A) Instructions for paper-setter

The question paper will consist of three sections A, B & C. Sections A & B will have four questions from the respective sections of the syllabus and will carry 30% marks each. Section C will have 6-12 short answer type questions which will cover the entire syllabus uniformly and will carry 40% marks in all.

B) Instructions for candidates

1. Candidates are required to attempt two questions each from sections A & B of the question paper and the entire section C .
2. Use of non-programmable scientific calculator is allowed.

SECTION A

Introduction to java: evolution, features, comparison with C and C++; Java program structure; tokens, keywords, constants, variables, data types, type casting, statements.
Operators and expressions: arithmetic, relational, logical, assignment, increment, decrement, conditional, bitwise and special operators. Operator precedence & associativity rules.
Control statements: if else, switch case, for, while, do while, break, continue, labeled loops.
Class: syntax, instance variable, class variables, methods, constructors, overloading of constructors and methods.

SECTION B

Inheritance: types of inheritance, use of super, method overriding, final class, abstract class, wrapper classes. Arrays, Strings and Vectors, Packages and Interfaces, visibility controls
Errors and Exceptions: Types of errors, Exception classes, Exception handling in java, use of try, catch, finally, throw and throws. Taking user input, Command line arguments.
Multithreaded Programming: Creating Threads, Life cycle of thread, Thread priority, Thread synchronization, Inter-thread communication.

Text/ Reference Books:

1. Patrick Naughton and Herbert Schildt, "*The Complete Reference Java 2*", TMH
2. Horstmann, Cay S. and Gary Cornell, "*Core Java 2: Fundamentals Vol. I*", Pearson Education.
3. E. Balagurusamy "*Programming with Java*", TMH

BCAB3104T: Web designing using ASP.NET

Total Marks: 100
University Examination: 70
Internal Assessment: 30

Maximum Time: 3 Hrs.
Minimum Pass Marks: 35%
Lectures to be delivered: 45-55 Hrs.

A) Instructions for paper-setter

The question paper will consist of three sections A, B & C. Sections A & B will have four questions from the respective sections of the syllabus and will carry 30% marks each. Section C will have 6-12 short answer type questions which will cover the entire syllabus uniformly and will carry 40% marks in all.

B) Instructions for candidates

1. Candidates are required to attempt two questions each from sections A & B of the question paper and the entire section C .
2. Use of non-programmable scientific calculator is allowed.

SECTION A

Introduction to .net framework: - Genesis of.NET, Features, Advantages and disadvantages of .net framework. Common Language Runtime:-Common Type System, Common Language Specification, .Net binaries, Microsoft Intermediate Language, Meta Data, .Net types and .net namespaces.

Basics of ASP. NET: - Introducing ASP .NET– Creating ASP .NET applications using command line compiler and visual studio .net IDE.

Introduction to c#:- variables, Constants, Data Types, Operators, Control Structures and loops, Arrays, events.

Introduction to Classes and objects

Web forms, Standard Controls: - Display information, Accepting user input, Submitting form data, displaying images, using the panel control, using the hyperlink control.

Validation Controls: required field validation control, range validator Control, compare validator control, regular expression validator control, custom validator control, validation summary controls.

SECTION B

Rich Web Controls: -Accepting file uploads, displaying a calendar, Displaying advertisement, displaying different page views, displaying a wizard. List Controls: Dropdown list control, Radio button, list controls. Grid View Controls: Grid view control fundamentals, using field with the grid view control, working with grid view control events extending the grid view control. Debugging, caching and deploying ASP .NET pages.

Master pages: - Designing Website with Master Pages: Creating master pages, Modifying master page content, Loading master page dynamically. ASP.NET security, localizing ASP .NET applications.

ADO.NET:- Changes from ADO to ADO.NET, ADO .NET Managed Providers – OleDb and SQL Managed Providers – OleDb Data Adapter Type. SQL Data Source Control: Creating database connections, executing database commands, Using ASP.NET parameters with the SQL data source controls, programmatically executing SQL data source commands, Caching database data with the SQL data Source controls.

Text/Reference Books:

1. ASP.NET 3.5: Stephen Walther, Pearson Education, 2005
2. Andrew Troelsen – "C# and the .Net Platform" – Apress – 2001.(Unit I and II)
3. David S. Platt – "Introducing .Net" – Microsoft Press - 2002
4. ASP.NET Bible" – MridulaParihar – Wiley-Dreamtech India Pvt. Ltd
5. Visual Basic .net Comprehensive Concepts and Techniques' Shelly, cashman, QuasneyCengage learning, 2012
6. Murach's Beginning Visual Basic .NET Anne Prince Murach

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BCAB3105L: Software Lab – IX
(Based on paper BCAB3103T: Java Programming)

Total Marks: 100*
University Examination: 70
Internal Assessment: 30

Maximum Time: 3 Hrs.
Minimum Pass Marks: 35%
Practical sessions : 45-55 Hrs.

***The breakup of marks for the practical will be as under:**

i.	**Internal Assessment**	**30 Marks**
ii.	**Viva Voce (External Evaluation)**	**30 Marks**
iii.	**Lab Record, Program Development and Execution (External Evaluation)**	**40 Marks**

This laboratory course will comprise as exercises to supplement what is learnt under paper BCAB31034: Java Programming. Students are required to develop the following type of programs in Java language with internal documentation:

1. Write a ***Class Date*** that takes day, month, and year while creating an object of this class. Find a new date when the number of days is given.
2. Write a program to implement Boolean AND, OR, XOR, and NOT operations.
3. Write a program to Add, Subtract, Multiply two matrices using switch statement. The program must also validate the sizes of two matrices before performing any operation and should raise exception in case the operation cannot be performed.
4. Write a program to store and then prints sorted names of students according to their length of name using arrays with variable sized rows.
5. Write a program to find the ***area of all types of triangles*** using the principle of ***constructor overloading and Inheritance*** depending on the number of dimensions given in the input parameter list using ***super*** to call the super class constructor.
6. Write a program to find the ***area of rectangle*** using an ***abstract super*** class figure and also ***override*** method use to compute the area of the rectangle.
7. Write a program to implement grow able and shrinkable ***Stack*** that can support operations like- push, pop, and view the top item with concept of dynamic allocation using ***finalize()*** method. The program should also incorporate the concepts of ***private and public*** access methods to avoid accidental manipulations of stack.
8. Write a program to demonstrate ***static variables, methods and blocks***.
9. Write a program to swap two items belonging to an object using ***returning of object*** by a function.
10. Write a program to count the frequency of each vowel in a given string.
11. Demonstrate the use of ***static and non static nested*** classes.
12. Create a package containing a class to print your (name, roll no, marks) and use this package in another program using ***import*** statement.

BCAB3106L: Software Lab – X
(Based on paper BCAB3104T: Web designing using ASP.NET)

Total Marks: 100*
University Examination: 70
Internal Assessment: 30

Maximum Time: 3 Hrs.
Minimum Pass Marks: 35%
Practical sessions : 45-55 Hrs.

***The breakup of marks for the practical will be as under:**

i.	**Internal Assessment**	**30 Marks**
ii.	**Viva Voce (External Evaluation)**	**30 Marks**
iii.	**Lab Record, Program Development and Execution (External Evaluation)**	**40 Marks**

This laboratory course will comprise as exercises to supplement what is learnt under paper BCAB3104T: Web designing using ASP.NET. Students are required to do at least 10 assignments based on the paper.

PRACTICAL ASSIGNMENTS:-

a. 1.Write a program to show the use of standard controls in a web form.
2. Write a program containing the list controls and its functions:
3. Write a program to show the use of file upload and calendar control.
4. Write a program to display advertisement on a web page.
5. Write a program to create an admission form for a college.
6. Write a program to demonstrate the master page.
7. Write a program to create login page which accepts user name and password, then check for authentication of the user.
8. Write a program that demonstrates a textbox for a user input name and validate it with required field validation.
9. Write a program that demonstrates different validation controls.
10. Create a user control that displays the current date and time. Include it in a Web Form and refresh it each time a button is clicked.
11. Write a program to demonstrate ADO.NET controls and connectivity with database.
12. Write a program to demonstrate submits data in database by using the ado.net controls.

COMMON SYLLABUS OF ENGLISH WILL BE AS PER UG (BOARD OF STUDIES) IN FACULTY OF LANGUAGE, PUNJABI UNIVERSITY, PATIALA

BCAB3202T: Software Engineering

Total Marks: 100
University Examination: 70
Internal Assessment: 30

Maximum Time: 3 Hrs.
Minimum Pass Marks: 35%
Lectures to be delivered: 45-55 Hrs.

A) Instructions for paper-setter

The question paper will consist of three sections A, B & C. Sections A & B will have four questions from the respective sections of the syllabus and will carry 30% marks each. Section C will have 6-12 short answer type questions which will cover the entire syllabus uniformly and will carry 40% marks in all.

B) Instructions for candidates

1. Candidates are required to attempt two questions each from sections A & B of the question paper and the entire section C .
2. Use of non-programmable scientific calculator is allowed.

SECTION A

Introduction: The Problem Domain, Software Engineering Challenges, Software Engineering Approach. Software development life cycle, its phases

Software development process models: Waterfall, Prototyping, Iterative;

Software Process: Characteristics of software process, Project management process, Software configuration management process.

Project Planning: activities, COCOMO model.

Software Metrics: Definition, Importance, Categories of metrics. **Software Quality** – Attributes, Cyclomatic complexity metric.

Software Requirements Analysis: Need for SRS, Data flow diagrams, Data Dictionary, entity relationship diagram, Characteristics and components of SRS, validation, metrics

SECTION B

Software Design: Design principles, Module-level concepts, Structure Chart and Structured Design methodology., verification, metrics : network metrics, information flow metrics.

Coding: Programming Principles and Guidelines, Verification- code inspections, static analysis.

Software Testing: testing fundamentals, Black Box Testing : Equivalence class partitioning, Boundary value analysis, cause-effect graphing; White Box Testing : Control flow and Data flow based testing, mutation testing; levels of testing, test plan, test case specification, test case execution and analysis.

Software maintenance: Categories of maintenance.

Software Reliability: Definition, uses of reliability studies

Text/References Book:

1. An Integrated approach to Software Engineering, Third Edition 2005, Pankaj Jalote, Narosa Publications.
2. Software Engineering , Revised Second Edition , K.K. Aggarwal, Yogesh Singh, New Age International Publishers.
3. Software Engineering – A Practitioner's Approach, Fifth Edition, Roger. S. Pressman, McGraw Hill

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BCAB3203T: Operating System

Total Marks: 100
University Examination: 70
Internal Assessment: 30

Maximum Time: 3 Hrs.
Minimum Pass Marks: 35%
Lectures to be delivered: 45-55 Hrs.

A) Instructions for paper-setter

The question paper will consist of three sections A, B & C. Sections A & B will have four questions from the respective sections of the syllabus and will carry 30% marks each. Section C will have 6-12 short answer type questions which will cover the entire syllabus uniformly and will carry 40% marks in all.

B) Instructions for candidates

1. Candidates are required to attempt two questions each from sections A & B of the question paper and the entire section C .
2. Use of non-programmable scientific calculator is allowed.

SECTION A

Operating System – Definition, Need, Services, Types of operating systems: simple batch system, multi programmed batch system, time sharing system, parallel system, distributed system, real time system, personal computer system. Operating system components, operating system services, system calls.

Process Management – process definition, process state, process scheduling, operations on processes, Basic concepts of thread, Difference between process and thread.

CPU Scheduling – Basic concepts, scheduling criteria, scheduling algorithms – FCFS, SJF, Round Robin and Multilevel queue scheduling.

SECTION B

Deadlocks – Characteristics of deadlocks, methods for handling deadlocks, deadlock prevention, deadlock avoidance

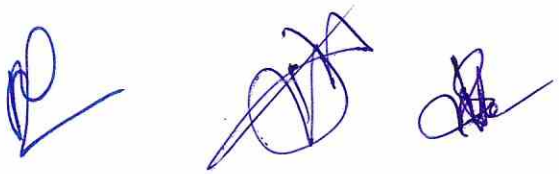
Memory Management – Logical versus Physical address space, swapping, contiguous allocation, Paging, Concept of Virtual memory, Implementation by Demand Paging, Page replacement algorithms – FIFO, Optimal, LRU, Concept of thrashing .

File Management – Allocation methods: contiguous allocation, linked allocation and indexed allocation;

Device Management – Disk Scheduling: FCFS, SSTF, SCAN, C-SCAN, LOOK.

Text/Reference Books:

1. Abraham Silberschatz, Peter B. Galvin, Operating Sytem Concepts, Addison –Wesley Publishing Co. Engineering, Third Edition 2005 ,Pankaj Jalote, Narosa Publications, 5th Edition



BCAB3204T: Python Programming

Total Marks: 100
University Examination: 70
Internal Assessment: 30

Maximum Time: 3 Hrs.
Minimum Pass Marks: 35%
Lectures to be delivered: 45-55 Hrs.

A) Instructions for paper-setter
The question paper will consist of three sections A, B & C. Sections A & B will have four questions from the respective sections of the syllabus and will carry 30% marks each. Section C will have 6-12 short answer type questions which will cover the entire syllabus uniformly and will carry 40% marks in all.

B) Instructions for candidates
1. Candidates are required to attempt two questions each from sections A & B of the question paper and the entire section C .
2. Use of non-programmable scientific calculator is allowed.

Course Objective: This course is designed to explore computing and to show students the art of computer programming. Students will be able to learn and Understand programming using python concepts for writing good programs. On completion of this course, the students will be able to

- Understand the basics of Python programming language
- Use different data types and control structures
- Explore the use of Python functions
- Create programs to access files in Python

SECTION A

Introduction to Python: History of Python, Strength and Weakness, Different Versions, Installing Python , Setting up in local environment, IDLE, Executing from file, command line from interactive mode, Python Identifiers and reserved key words.
Python syntax: Variables and Variables type, Data types, Data Types Conversion, Operators (Arithmetic, Comparison, Assignment, Bitwise, Logical, Membership, Identity), Operators Precedence, Python Decision making (if, el if, else, nested if), Python loops (while, for, nested loops), Break and continue statements.
Python Collections or Sequence: Sequence introduction, Number operations, String Operations, List, Tuple, Dictionary, Set.
Python Functions: Function introduction, User defined functions, Functions with parameters, Keywords and optional parameters, Scope of variables (Global and Local), Anonymous function – Lambda, In-build function, List comprehension.

SECTION B

Python Modules: Modules, Standard Modules (Sys, Math, Time), Import Statement, from statement, Dir() functions.
Python File handling: Sending Output to STDOUT Using the print() Method, Reading Input with the input() Method, Creating File Objects with the open() Method, Controlling File Access Modes, Working with File Object Attributes, Closing File Objects with the close() Method, Reading and Writing to File Objects with read() and write(). Using File Processing Functions from the OS Module.

Text/Reference Books:

- Paul Gries, Jennifer Campbell, Jason Montojo, Practical Programming- An Introduction to Computer Science Using Python 3.6, Shroff Publications and Distributors
- John V Guttag, Introduction to Computation and Programming Using Python'', Revised and expanded Edition, MIT Press , 2013
- Robert Sedgewick, Kevin Wayne, Robert Dondero, —Introduction to Programming in Python: An Inter-disciplinary Approach, Pearson India Education Services Pvt. Ltd., 2016.
- Timothy A. Budd, Exploring Python, Mc-Graw Hill Education (India) Private Ltd., 2015.
- Rossum, Introduction To Python .Shroff Publications and Distributors
- Downey,Think Python 2/ED, Shroff Publications and Distributors
- Lutz, Learning Python, 5/ED, Shroff Publications and Distributors

BoS: 01.04.2024

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BCAB3205L: Software Lab – XI
(Based on paper BCAB3204T: Python Programming)

Total Marks: 100*
University Examination: 70
Internal Assessment: 30

Maximum Time: 3 Hrs.
Minimum Pass Marks: 35%
Practical sessions : 45-55 Hrs.

***The breakup of marks for the practical will be as under:**

i.	**Internal Assessment**	**30 Marks**
ii.	**Viva Voce (External Evaluation)**	**30 Marks**
iii.	**Lab Record, Program Development and Execution (External Evaluation)**	**40 Marks**

This laboratory course will comprise as exercises to supplement what is learnt under paper BCAB3204: Python Programming. Students are required to develop programs in Python language with internal documentation:

BCAB3206L: Software Lab – XII (Minor Project)

Total Marks: 100*
University Examination: 70
Internal Assessment: 30

Maximum Time: 3 Hrs.
Minimum Pass Marks: 35%
Practical sessions : 45-55 Hrs.

***The breakup of marks for the practical will be as under:**

i.	**Internal Assessment**	**30 Marks**
ii.	**Viva Voce (External Evaluation)**	**30 Marks**
iii.	**Lab Record, Program Development and Execution (External Evaluation)**	**40 Marks**

This laboratory course will comprise as advance exercises to what is learnt in the previous semesters. Students are required to perform following activities

Activity 1: Select any one basic project idea for implementation that involves GUI forms, data to be stored at back end, Retrieval of data from database, generating reports i.e. involving the requirement of database connectivity. (1-2 page overview about this in your assignment)

Activity 2: Plan and Design GUI forms for interaction with user and templates for displaying the reports generated from data stored requested by end users. (Snapshots of all Forms to be attached along with their code)

Activity 3: Write code for event handling, database connectivity and report generation. (Full working to be explained as algorithm and then implementation in suitable programming language based on events)