

BACHELOR OF COMPUTER APPLICATIONS (HONOURS) (CBGS) (BATCH 2026-30)

SEMESTER-I

BCA01005T: Computer Fundamentals & PC Software

M. Marks: 75
Time: 3 Hours

Credits
L-T-P
3-0-0
(60 Hrs)

Instructions for the Paper Setters: -

Eight questions of equal marks (Specified in the syllabus) are to be set, two in each of the four Sections (A-D). Questions may be subdivided into parts (not exceeding four). Candidates are required to attempt five questions, selecting at least one question from each Section. The fifth question may be attempted from any Section.

Course outcomes:

- learn the functioning of various components of a computer system.
- identify input and output devices and storage devices.
- getting familiar with software.
- create documents, spreadsheets, and presentations

SECTION–A (15 Hrs.)

Introduction to Computer, Generations of Computers, Classification of Computers, Computer Applications: Computer as a system, basic concepts – hardware and software, functional units, and their interrelation. Block diagram showing Central Processing Unit, Memory, and Input/Output Devices. Communication devices.

SECTION–B (15 Hrs.)

Software: System software and Application software. Programming languages.

Hardware: Input Devices- Keyboard, mouse, pens, touch screens, Bar Code reader, joystick, source data automation, (MICR, OMR, OCR), screen assisted data entry: portable/handheld terminals for data collection, voice recognition systems

Output Devices: Display Monitors, Printers, Impact Printers, Non-impact Printers, Plotters, Voice Output Systems, Projectors, Terminals.

Storage Devices: Concept of storage units(bit, byte, KB, MB etc.), Primary storage, Secondary storage, Magnetic storage devices, and Optical Storage Devices.

SECTION–C (15 Hrs.)

Operating System: meaning, purpose, Windows GUI, Command-line, Powershell overview. File Explorer.

Microsoft (MS) Office: download and install; different components

Word Processing using Microsoft (MS) Word: Overview, creating, saving, opening, importing, exporting and inserting files, formatting pages, paragraphs and sections, indents and outdents, creating lists and numbering. headings, styles, fonts and font size; editing, positioning, and viewing texts; finding and replacing text; inserting page breaks, page numbers, bookmarks, symbols, and dates; using tables, header, footer, macros, mail-merge; printing setup

SECTION–D (15 Hrs.)

Presentations using MS Powerpoint: Presentation overview, entering information, presentation creation, opening and saving presentation; inserting audio and video, shapes, different views, formatting; playing slides. Spreadsheets using MS Excel: Spreadsheet overview, Editing, Formatting, freeze panes, using formulas and functions, sorting and filtering, pivot tables, charts and Graphs.

Recommended Books:

1. P.K. Sinha, Computer Fundamentals : concepts,systems and applications, BPB Publications
2. E Balagurusamy, FUNDAMENTALS OF COMPUTERS Tata McGraw Hill Education Private Limited NEW DELHI
3. Peter Norton, Introduction to Computers, McGraw Hill Education
4. MS–Office _ BPB Publications.
5. Gurvinder Singh & Rachpal Singh, Windows-Based Computer Courses.
6. Ebooks at OpenOffice.org
7. A Conceptual Guide to OpenOffice.org3, 2nd Edition, R. Gabriel Gurley

**BACHELOR OF COMPUTER APPLICATIONS (HONOURS) (CBGS)
(BATCH 2026-30)**

SEMESTER-I

BCA01006L: Lab-1 based on Computer Fundamentals & PC Software

M. Marks: 25
Time: 3 Hours

Credits
L-T-P
0-0-1
(30Hrs)

Instructions for the examiners: -

Two questions of equal marks strictly as per the syllabus and based on the practical exercises covered in the semester. Questions may be subdivided into parts (not exceeding four). Candidates will attempt ONE question, explain their answer by writing on the answer sheet, and then implement the same on the computer. Examiner will evaluate both the answers (theory as well as practical). The viva should also be conducted alongside, and the student is asked viva questions related to the question and the solution he/she is working on during the exam.

Students will prepare a report after analyzing print and social media advertisements along with the local market survey to understand the desktop/laptop vendors and prices. Arrange the options available as per price/performance preferences

Lab exercises based on:

- Practice the Windows Operating System command-line and the GUI for user interaction, personalization, and file management
- Document preparation with Word using the features mentioned in the syllabus
- Spreadsheet processing with Excel using the features mentioned in the syllabus
- Presentation preparation with PowerPoint using the features mentioned in the syllabus

BACHELOR OF COMPUTER APPLICATIONS (HONOURS) (CBGS) (BATCH 2026-30)

SEMESTER -I

INTRODUCTION TO PYTHON PROGRAMMING

M. Marks: 100

Time: 3 Hours

Credits

L-T-P

4-0-0

(60 Hrs)

Instructions for the Paper Setters: -

Eight questions of equal marks (Specified in the syllabus) are to be set, two in each of the four Sections (A-D). Questions may be subdivided into parts (not exceeding four). Candidates are required to attempt five questions, selecting at least one question from each Section. The fifth question may be attempted from any Section.

Course Outcomes:

- Understand the strengths of the Python language.
- Gain proficiency in string handling, functions, and n control flow statements.
- Create and manipulate Python programs by using different data structures and object-oriented concepts.
- Understand the operations involved in creating and manipulating file systems and databases.

SECTION–A (15 Hrs.)

Introduction to Python: Python's features, Story behind the name, Python versions, Execution environments: the Python Interpreter and IDEs; Python program structure; comments, Indentation.

Data and Expressions: Literal Constants, numbers, strings – immutable strings, quotes, the escape sequence, the format methods; Variables and Identifiers, data types, Operators & Expressions – short cuts, evaluation order, Boolean Expressions (Conditions), Logical Operators. User Input/output.

SECTION–B (15 Hrs.)

Control Flow: Selection Control, Nested conditions, Loops, break and Continue Statements,
Data Structures: list, dictionary basic operations

SECTION–C (15 Hrs.)

Functions: defining and calling functions, passing and returning values, local and global variables, recursive functions, Iteration vs. Recursion

Modules: purpose and usage, the import statement, from – import statement, the __main__ attribute,

Handling Exceptions – try..catch and with statements, errors, debugging

SECTION–D (15 Hrs.)

Files and Strings : Opening Files, Using Text Files, Reading files, writing files, Understanding read functions, Understanding write functions

Introduction to numpy and pandas for data processing

Recommended Books and Materials:

1. Yashavant Kanetkar, Aditya Kanetkar, Let Us Python-6Th Edition, BPB Publications.
2. Charles Dierbach, Introduction to Computer Science Using Python: A Computational Problem-Solving Focus, Wiley Publications.
3. Martin C. Brown, Python: The Complete Reference, Indian Edition, McGraw Hill Education (India) Private Limited
4. Mark J. Guzdial, Introduction to Computing and Programming in Python, Pearson Education.
5. <https://www.python.org/about/>
6. Swaroop C.H., A Byte of Python available at <https://python.swaroopch.com/>
7. <https://checkio.org/>
8. <https://www.jetbrains.com/pycharm-edu/>

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BACHELOR OF COMPUTER APPLICATIONS (HONOURS) (CBGS)
(BATCH 2026-30)
SEMESTER -I

: Lab-2 based on Introduction to Python Programming.

M. Marks: 25

Credits

L-T-P

0-0-1

(30Hrs)

Time: 3 Hours

Instructions for the examiners: -

Two questions of equal marks strictly as per the syllabus and based on the practical exercises covered in the semester. Questions may be subdivided into parts (not exceeding four). Candidates will attempt ONE question, explain their answer by writing on the answer sheet, and then implement the same on the computer. Examiner will evaluate both the answers (theory as well as practical). The viva will also be conducted one-on-one alongside, and the student asked viva questions related to the question and the solution he/she is working on during the exam.

Programming exercises based on:

- Use the Python interactive interpreter
- Getting familiar with a Python IDE
- Python fundamentals, data types, operators
- Operators, flow control using if, else and elif, While statement, loops using For, Loop Patterns,
- Implementation of different collections like list, tuple and dictionary and their various functions,
- Demonstrating creation of functions, passing parameters and return values,
- Working with modules
- Handling Exceptions
- Implementation of reading, writing and organizing files
- Basic numpy and pandas functions

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BACHELOR OF COMPUTER APPLICATIONS (HONOURS) (CBGS)
(BATCH 2026-30)

SEMESTER-I

BCA01003T: Applied and Discrete Mathematics

M. Marks: 100
Time: 3 Hours

Credits
L-T-P
4-0-0

(60Hrs)

Instructions for the Paper Setters: -

Eight questions of equal marks (Specified in the syllabus) are to be set, two in each of the four Sections (A-D). Questions may be subdivided into parts (not exceeding four). Candidates are required to attempt five questions, selecting at least one question from each Section. The fifth question may be attempted from any Section.

SECTION–A

Sets and Relations: Definition of sets, subsets, complement of a set, universal set, intersection and union of sets, De-Morgan's laws, Cartesian products, Equivalent sets, Countable and uncountable sets, minset, Partitions of sets, Relations: Basic definitions, graphs of relations, properties of relations

SECTION–B

Logic and Propositional Calculus: Proposition and Compound Propositions, basic Logical Operations, Propositions and Truth Tables, Tautologies and Contradictions, Logical Equivalence, Duality law, Algebra of propositions, Conditional and Bi conditional Statements, Arguments, Logical Implication, Propositional Functions, Predicates and Quantifiers, Negation of Quantified Statements, Inference theory of the predicates calculus.

SECTION–C

Boolean Algebra: Boolean algebra and its duality, Duality, Boolean Algebra as Lattices, Boolean identities, sub-algebra, Representation Theorem, Sum-of-Products Form for Sets, Sum of-Products Form for Boolean Algebra, Minimal Boolean Expressions, Prime Implicants, Boolean Functions, Karnaugh Maps.

SECTION–D

Matrices: Introduction of a Matrix, its different kinds, matrix addition and scalar multiplication, multiplication of matrices, transpose etc. Square matrices, inverse of a square matrix, Matrix Inversion method, characteristics polynomial, eigen values, eigen vectors, Cayley–Hamilton theorem.

References:

1. Lipschutz, S. and Lipson, M.: Discrete Mathematics (Schaum's outlines Series).
2. Kolman and Busby "Discrete Mathematical structures for Computer Sciences" PHI.
3. Alan Doerr, "Applied Discrete Structures for Computer Science", Galgotia Publications.
4. Trambley, J.P. and Manohar, R: Discrete Mathematical Structures with Applications to Computer Science.

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BACHELOR OF COMPUTER APPLICATIONS (HONOURS) (CBGS)
(BATCH 2026-30)
SEMESTER-I

BCA01008T: Introduction to the Internet

(Theory)

(SEC-1)

M. Marks: 50
Time: 3 Hours

Credits
L-T-P
2-0-0
(30 Hrs)

Instructions for the Paper Setters: -

Eight questions of equal marks (Specified in the syllabus) are to be set, two in each of the four Sections (A-D). Questions may be subdivided into parts (not exceeding four). Candidates are required to attempt five questions, selecting at least one question from each Section. The fifth question may be attempted from any Section.

Course Outcomes:

To give hands-on experience and provide a comprehensive, non-technical, hands-on overview of the Internet based services.

SECTION–A (7.5 Hrs)

Origin, growth and evolution of the Internet; the impact of the Internet; terminology: web pages, website, web browser, web server, bandwidth; Connect to the Internet: hardware and software, types of Internet connections, Internet Service Providers; Navigating different types of websites and online resources.

Student should explore the local market to understand the internet service providers, rates, bandwidth etc.

SECTION – B (7.5 Hrs)

Email Communication: Email Etiquette and Best Practices, Managing and Organizing Emails Email Tools and Features, identifying spam and phishing emails;

Searching on the Internet: Overview of internet resources and search engines, Basics of Using Search Engines -How search engines work, Basic search techniques and tips, Understanding search engine results pages (SERPs), Using search operators (e.g., AND, OR, NOT), Utilizing advanced search features (e.g., Google Advanced Search),

SECTION – C (7.5 Hrs)

Online Tools for Productivity: Introduction to productivity tools (e.g., Google Workspace, Microsoft Office 365), Cloud storage and file management (e.g., Google Drive, Dropbox),

Collaboration and Communication Tools: Online communication etiquette and best practices, using collaboration tools (e.g., Google Docs, Slack, Microsoft Teams), Effective virtual meeting strategies (e.g., Zoom, Google Meet),

SECTION – D (7.5 Hrs)

Building Online Presence: Creating and maintaining a professional online profile (e.g., LinkedIn), Personal branding and digital portfolios, Networking strategies for academic and career growth, Understanding digital footprints and online reputation.

Digital citizenship and respectful online behaviour, balancing screen time and managing digital distractions

Recommended Books and Materials:

1. Douglas E Comer, The Internet Book: Everything You Need to Know About Computer Networking and How the Internet Works, CRC Press
2. Faithe Wempen, Digital Literacy For Dummies 1st Edition

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BACHELOR OF COMPUTER APPLICATIONS (HONOURS) (CBGS)
(BATCH 2026-30)

SEMESTER-I

BCA01009L: Lab-3 based on Introduction to the Internet

(Practical)

(SEC-1)

M. Marks: 25

Time: 3 Hours

Credits

L-T-P

0-0-1

(30 Hrs)

Instructions for the examiners: -

Two questions of equal marks strictly as per the syllabus and based on the practical exercises covered in the semester. Questions may be subdivided into parts (not exceeding four). Candidates will attempt ONE question, explain their answer by writing on the answer sheet, and then implement the same on the computer. Examiner will evaluate both the answers (theory as well as practical). The viva should also be conducted alongside, and the student is asked viva questions related to the question and the solution he/she is working on during the exam.

Lab exercises based on:

- Identifying internet connections and Configuring internet connection on PC/Laptop
- Email Tools and features
- Using the Google search engine and explore Bing
- Using Google Docs, Google Drive for document preparation and storage
- Collaboration using Slack
- Analyzing LinkedIn profiles
- Creating your own LinkedIn profile
- Virtual meeting platforms: Microsoft Teams, Zoom, Google Meet

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BACHELOR OF COMPUTER APPLICATIONS (HONOURS) (CBGS)
(BATCH 2026-30)
SEMESTER-I

ENL121: COMMUNICATION SKILLS IN ENGLISH-I
(THEORY)

Time: 3 Hours

Credits: 4-0-0
(6 periods per week)
Max. Marks: 100

Instructions for the Paper Setters:-

Eight questions of equal marks (Specified in the syllabus) are to be set, two in each of the four Sections (A-D). Questions may be subdivided into parts (not exceeding four). Candidates are required to attempt five questions, selecting at least one question from each Section. The fifth question may be attempted from any Section.

The syllabus is divided in four sections as mentioned below:

SECTION-A

Reading Skills: Reading Tactics and strategies; Reading purposes–kinds of purposes and associated comprehension; Reading for direct meanings.

SECTION-B

Reading for understanding concepts, details, coherence, logical progression and meanings of phrases/ expressions.

Activities:

- Comprehension questions in multiple choice format
- Short comprehension questions based on content and development of ideas

SECTION-C

Writing Skills: Guidelines for effective writing; writing styles for application, personal letter, official/ business letter.

Activities:

- Formatting personal and business letters.
- Organising the details in a sequential order

SECTION-D

Resume, memo, notices etc.; outline and revision.

Activities:

- Converting a biographical note into a sequenced resume or vice-versa
- Ordering and sub-dividing the contents while making notes.
- Writing notices for circulation/ boards

Recommended Books:

- *Oxford Guide to Effective Writing and Speaking* by John Seely.
- *English Grammar in Use* (Fourth Edition) by Raymond Murphy, CUP

**BACHELOR OF COMPUTER APPLICATIONS (HONOURS) (CBGS)
(BATCH 2026-30)**

**SEMESTER-I
PBL601: Punjabi Compulsory-1
ਪੰਜਾਬੀ (ਲਾਜ਼ਮੀ)-1**

**ਕਰੈਡਿਟ 4-0-0
Max. Marks: 100
(6 ਪੀਰੀਅਡ ਪ੍ਰਤੀ ਹਫ਼ਤਾ)**

Time: 03 Hours

ਅੰਕ-ਵੰਡ ਅਤੇ ਪਰੀਖਿਅਕ ਲਈ ਹਦਾਇਤਾਂ

1. ਪ੍ਰਸ਼ਨ ਪੱਤਰ ਦੇ ਚਾਰ ਭਾਗ ਹੋਣਗੇ। ਹਰ ਭਾਗ ਵਿੱਚੋਂ ਦੋ ਪ੍ਰਸ਼ਨ ਪੁੱਛੇ ਜਾਣਗੇ।
2. ਵਿਦਿਆਰਥੀ ਨੇ ਕੁੱਲ ਪੰਜ ਪ੍ਰਸ਼ਨ ਕਰਨੇ ਹਨ। ਹਰ ਭਾਗ ਵਿੱਚੋਂ ਇੱਕ ਪ੍ਰਸ਼ਨ ਲਾਜ਼ਮੀ ਹੈ। ਪੰਜਵਾਂ ਪ੍ਰਸ਼ਨ ਕਿਸੇ ਵੀ ਭਾਗ ਵਿੱਚੋਂ ਕੀਤਾ ਜਾ ਸਕਦਾ ਹੈ।
3. ਹਰੇਕ ਪ੍ਰਸ਼ਨ ਦੇ ਅੰਕ ਬਰਾਬਰ ਹਨ।
4. ਪੇਪਰ ਸੈੱਟ ਕਰਨ ਵਾਲਾ ਜੇਕਰ ਚਾਹੇ ਤਾਂ ਪ੍ਰਸ਼ਨਾਂ ਦੀ ਵੰਡ ਅੱਗੋਂ ਵੱਧ ਤੋਂ ਵੱਧ ਚਾਰ ਉਪ-ਪ੍ਰਸ਼ਨਾਂ ਵਿੱਚ ਕਰ ਸਕਦਾ ਹੈ।

ਪਾਠ-ਕ੍ਰਮ

ਸੈਕਸ਼ਨ-ਏ

ਕਾਵਿ-ਰੰਗ (ਸੰਪਾ. ਡਾ. ਦਰਿਆ, ਡਾ. ਮਨਜਿੰਦਰ ਸਿੰਘ)
(ਪ੍ਰਸੰਗ ਸਹਿਤ ਵਿਆਖਿਆ/ਵਿਸ਼ਾ-ਵਸਤੂ/ਸਾਰ)

ਸੈਕਸ਼ਨ-ਬੀ

ਮੰਚ ਘਰ

ਡਾ. ਕੁਲਦੀਪ ਸਿੰਘ ਧੀਰ, ਡਾ. ਹਿਰਦੇਜੀਤ ਸਿੰਘ ਭੋਗਲ (ਸੰਪਾ.), ਗੁਰੂ ਨਾਨਕ ਦੇਵ ਯੂਨੀਵਰਸਿਟੀ, ਅੰਮ੍ਰਿਤਸਰ।
(ਵਿਸ਼ਾ-ਵਸਤੂ, ਪਾਤਰ ਚਿਤਰਨ)

ਸੈਕਸ਼ਨ-ਸੀ

(ੳ) ਪੈਰਾ ਰਚਨਾ

(ਅ) ਪੈਰਾ ਪੜ੍ਹ ਕੇ ਪ੍ਰਸ਼ਨਾਂ ਦੇ ਉੱਤਰ

ਸੈਕਸ਼ਨ-ਡੀ

ਭਾਸ਼ਾ ਵੰਨਗੀਆਂ:

ਭਾਸ਼ਾ ਦਾ ਟਕਸਾਲੀ ਰੂਪ, ਭਾਸ਼ਾ ਅਤੇ ਉਪਭਾਸ਼ਾ ਵਿਚਲਾ ਅੰਤਰ, ਪੰਜਾਬੀ ਉਪਭਾਸ਼ਾਵਾਂ ਦੇ ਪਛਾਣ ਚਿੰਨ੍ਹ, ਪੰਜਾਬੀ ਭਾਸ਼ਾ-ਨਿਕਾਸ ਤੇ ਵਿਕਾਸ

ਸਹਾਇਕ ਪੁਸਤਕਾਂ

1. ਰਾਜਿੰਦਰਪਾਲ ਸਿੰਘ ਬਰਾੜ, ਪੰਜਾਬੀ ਕਵਿਤਾ ਦਾ ਇਤਿਹਾਸ, ਪੰਜਾਬੀ ਅਕਾਦਮੀ, ਦਿੱਲੀ।
2. ਬ੍ਰਹਮਜਗਦੀਸ਼ ਸਿੰਘ, ਆਧੁਨਿਕ ਪੰਜਾਬੀ ਕਾਵਿ ਸਿਧਾਂਤ, ਇਤਿਹਾਸ ਅਤੇ ਪ੍ਰਵਿਰਤੀਆਂ, ਵਾਰਿਸ ਸ਼ਾਹ ਫਾਊਂਡੇਸ਼ਨ, ਅੰਮ੍ਰਿਤਸਰ।
3. ਸਤਿੰਦਰ ਸਿੰਘ, ਆਧੁਨਿਕ ਪੰਜਾਬੀ ਵਾਰਤਕ ਦਾ ਇਤਿਹਾਸ, ਪੰਜਾਬੀ ਅਕਾਦਮੀ, ਦਿੱਲੀ।
4. ਹਰਕੀਰਤ ਸਿੰਘ, ਭਾਸ਼ਾ ਤੇ ਭਾਸ਼ਾ ਵਿਗਿਆਨ, ਲਾਹੌਰ ਬੁੱਕ ਸ਼ਾਪ, ਲੁਧਿਆਣਾ।
5. ਹਰਕੀਰਤ ਸਿੰਘ ਤੇ ਗਿਆਨੀ ਲਾਲ ਸਿੰਘ, ਕਾਲਜ ਪੰਜਾਬੀ ਵਿਆਕਰਣ, ਪੰਜਾਬ ਯੂਨੀਵਰਸਿਟੀ, ਚੰਡੀਗੜ੍ਹ।
6. ਬੂਟਾ ਸਿੰਘ ਬਰਾੜ, ਪੰਜਾਬੀ ਵਿਆਕਰਣ : ਸਿਧਾਂਤ ਤੇ ਵਿਹਾਰ, ਚੇਤਨਾ ਪ੍ਰਕਾਸ਼ਨ, ਲੁਧਿਆਣਾ।
7. ਮਿੰਨੀ ਸਲਵਾਨ, ਪੰਜਾਬੀ ਵਿਆਕਰਣ : ਮੁੱਢਲੇ ਸੰਕਲਪ, ਰਵੀ ਸਾਹਿਤ ਪ੍ਰਕਾਸ਼ਨ, ਅੰਮ੍ਰਿਤਸਰ।
8. ਪੰਜਾਬੀ ਭਾਸ਼ਾ ਬੋਧ, ਕਸਤੂਰੀ ਲਾਲ ਐਂਡ ਸੰਨਜ਼, ਅੰਮ੍ਰਿਤਸਰ।

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BACHELOR OF COMPUTER APPLICATIONS (HONOURS) (CBGS)
(BATCH 2026-30)
SEMESTER-I

PBL611: ਮੁੱਢਲੀ ਪੰਜਾਬੀ-1
(In lieu of Compulsory Punjabi)

ਕਰੈਡਿਟ 4-0-0
Max. Marks: 100
(6 ਪੀਰੀਅਡ ਪ੍ਰਤੀ ਹਫ਼ਤਾ)

Time: 03 Hours

ਅੰਕ-ਵੰਡ ਅਤੇ ਪਰੀਖਿਅਕ ਲਈ ਹਦਾਇਤਾਂ

1. ਪ੍ਰਸ਼ਨ ਪੱਤਰ ਦੇ ਚਾਰ ਭਾਗ ਹੋਣਗੇ। ਹਰ ਭਾਗ ਵਿਚ ਦੋ ਪ੍ਰਸ਼ਨ ਪੁੱਛੇ ਜਾਣਗੇ।
2. ਵਿਦਿਆਰਥੀ ਨੇ ਕੁੱਲ ਪੰਜ ਪ੍ਰਸ਼ਨ ਕਰਨੇ ਹਨ। ਹਰ ਭਾਗ ਵਿਚੋਂ ਇਕ ਪ੍ਰਸ਼ਨ ਲਾਜ਼ਮੀ ਹੈ। ਪੰਜਵਾਂ ਪ੍ਰਸ਼ਨ ਕਿਸੇ ਵੀ ਭਾਗ ਵਿਚੋਂ ਕੀਤਾ ਜਾ ਸਕਦਾ ਹੈ।
3. ਹਰੇਕ ਪ੍ਰਸ਼ਨ ਦੇ ਬਰਾਬਰ ਅੰਕ ਹਨ।
4. ਪੇਪਰ ਸੈੱਟ ਕਰਨ ਵਾਲਾ ਜੇਕਰ ਚਾਹੇ ਤਾਂ ਪ੍ਰਸ਼ਨਾਂ ਦੀ ਵੰਡ ਅੱਗੋਂ ਵੱਧ ਤੋਂ ਵੱਧ ਚਾਰ ਉਪ-ਪ੍ਰਸ਼ਨਾਂ ਵਿੱਚ ਕਰ ਸਕਦਾ ਹੈ।

ਪਠ-ਕ੍ਰਮ

ਸੈਕਸ਼ਨ-ਏ

ਪੰਜਾਬੀ ਭਾਸ਼ਾ ਤੇ ਗੁਰਮੁਖੀ ਲਿਪੀ

- (ੳ) ਨਾਮਕਰਣ ਤੇ ਸੰਖਿਪ ਜਾਣ-ਪਛਾਣ : ਗੁਰਮੁਖੀ ਵਰਣਮਾਲਾ, ਅਖਰ ਕ੍ਰਮ, ਸਵਰ ਵਾਹਕ (ੳ ਅ ਏ),
ਲਗਾਂ-ਮਾਤਰਾਂ, ਪੈਰ ਵਿਚ ਬਿੰਦੀ ਵਾਲੇ ਵਰਣ, ਪੈਰ ਵਿਚ ਪੈਣ ਵਾਲੇ ਵਰਣ, ਬਿੰਦੀ, ਟਿਪੀ, ਅਧਕ।
- (ਅ) ਸਿਖਲਾਈ ਤੇ ਅਭਿਆਸ

ਸੈਕਸ਼ਨ-ਬੀ

ਗੁਰਮੁਖੀ ਆਰਥੋਗ੍ਰਾਫੀ ਅਤੇ ਉਚਾਰਨ : ਸਵਰ, ਵਿਅੰਜਨ : ਮੁਢਲੀ ਜਾਣ-ਪਛਾਣ ਅਤੇ ਉਚਾਰਣ, ਮੁਹਾਰਨੀ, ਲਗਾਂ-ਮਾਤਰਾਂ ਦੀ ਪਛਾਣ।

ਸੈਕਸ਼ਨ-ਸੀ

ਪੰਜਾਬੀ ਸ਼ਬਦ ਜੋੜ : ਮੁਕਤਾ (ਦੋ ਅਖਰਾਂ ਵਾਲੇ ਸ਼ਬਦ, ਤਿੰਨ ਅਖਰਾਂ ਵਾਲੇ ਸ਼ਬਦ), ਸਿਹਾਰੀ ਵਾਲੇ ਸ਼ਬਦ, ਬਿਹਾਰੀ ਵਾਲੇ ਸ਼ਬਦ, ਔਕੜ ਵਾਲੇ ਸ਼ਬਦ, ਦੁਲੈਂਕੜ ਵਾਲੇ ਸ਼ਬਦ, ਲਾਂ ਵਾਲੇ ਸ਼ਬਦ, ਦੁਲਾਵਾਂ ਵਾਲੇ ਸ਼ਬਦ, ਹੋੜੇ ਵਾਲੇ ਸ਼ਬਦ, ਕਨੋੜੇ ਵਾਲੇ ਸ਼ਬਦ।

ਸੈਕਸ਼ਨ-ਡੀ

ਲਗਾਬਰ (ਬਿੰਦੀ, ਟਿਪੀ, ਅਧਕ ਵਾਲੇ ਸ਼ਬਦ)
ਸ਼ੁਧ, ਅਸ਼ੁਧ (ਪੈਰੇ ਵਿਚ ਲਿਖੇ ਅਸ਼ੁਧ ਸ਼ਬਦਾਂ ਨੂੰ ਸ਼ੁਧ ਕਰਨਾ)

ਸਹਾਇਕ ਪੁਸਤਕਾਂ

1. ਬ੍ਰਹਮਜਗਦੀਸ ਸਿੰਘ, ਪੰਜਾਬੀ ਭਾਸ਼ਾ ਅਤੇ ਗੁਰਮੁਖੀ ਲਿਪੀ, ਵਾਰਿਸ ਸ਼ਾਹ ਫਾਊਂਡੇਸ਼ਨ, ਅੰਮ੍ਰਿਤਸਰ।
2. ਪ੍ਰੋ. ਸ਼ੇਰੀ ਸਿੰਘ, ਪ੍ਰੋ. ਬ੍ਰਹਮਜਗਦੀਸ ਸਿੰਘ, ਭਾਸ਼ਾ ਵਿਗਿਆਨ : ਪੰਜਾਬੀ ਭਾਸ਼ਾ ਤੇ ਗੁਰਮੁਖੀ ਲਿਪੀ, ਵਾਰਿਸ ਸ਼ਾਹ ਫਾਊਂਡੇਸ਼ਨ, ਅੰਮ੍ਰਿਤਸਰ।
3. ਪੰਜਾਬੀ ਭਾਸ਼ਾ ਬੋਧ, ਕਸਤੂਰੀ ਲਾਲ ਐਂਡ ਸੰਨਜ਼, ਅੰਮ੍ਰਿਤਸਰ।
4. ਮਿੰਨੀ ਸਲਵਾਨ, ਪੰਜਾਬੀ ਵਿਆਕਰਨ : ਮੁਢਲੇ ਸੰਕਲਪ, ਰਵੀ ਸਾਹਿਤ ਪ੍ਰਕਾਸ਼ਨ, ਅੰਮ੍ਰਿਤਸਰ।

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BACHELOR OF COMPUTER APPLICATIONS (HONOURS) (CBGS)
(BATCH 2026-30)

SEMESTER – I

PHC110-Punjab History & Culture (From Earliest Times to C 320)
(Special Paper in lieu of Punjabi Compulsory)
(For those students who are not domicile of Punjab)

Credits
L T P
4 00

Time: 3 Hours
Max. Marks: 100

Instructions for the Paper Setters

Eight questions of equal marks (Specified in the syllabus) are to be set, two in each of the four Sections (A-D). Questions may be subdivided into parts (not exceeding four). Candidates are required to attempt five questions, selecting at least one question from each Section. The fifth question may be attempted from any Section.

SECTION-A

1. Physical features of the Punjab and its impact on history.
2. Sources of the ancient history of Punjab

SECTION-B

3. Harappan Civilization: Origin and extent Town planning; social, economic and religious life of the Indus Valley People.
4. The Indo-Aryans: Original home and settlements in Punjab.

SECTION-C

5. Social, Religious and Economic life during Rig Vedic Age.
6. Social, Religious and Economic life during Later Vedic Age.

SECTION-D

7. Teachings and impact of Buddhism
8. Jainism in the Punjab

Suggested Readings:

1. L. M Joshi (ed.), *History and Culture of the Punjab*, Art-I, Patiala, 1989 (3rd edition)
2. L.M. Joshi and Fauja Singh (ed.), *History of Punjab*, Vol.I, Patiala 1977.
3. BudhaParkash, *Glimpses of Ancient Punjab*, Patiala, 1983.
4. B.N. Sharma, *Life in Northern India*, Delhi. 1966.
5. Chopra, P.N., Puri, B.N., & Das, M.N.(1974). *A Social, Cultural & Economic History of India*, Vol. I, New Delhi: Macmillan India.

BACHELOR OF COMPUTER APPLICATIONS (HONOURS) (CBGS)
(BATCH 2026-30)
SEMESTER – I
USE-0011: ENTREPRENEURSHIP MINDSET-I (CBGS)
(Mandatory Skill Enhancement Course)

Credits: 0+0+2
Total Marks: 50

Introduction: This course provides students with a holistic framework to develop entrepreneurial skills across the student's journey. The curriculum covers core principles of entrepreneurship, including identifying business opportunities, setting up operations, marketing, scaling, and financial management.

The aim of this course is to ensure that, by the end, learners acquire essential entrepreneurial competencies such as **strategic thinking, practical application, founders & growth mindset, operational skills, and foundational financial literacy.**

Learning Objectives

By the end of this course, students will be able to:

- Understand and apply entrepreneurial principles to real-world business situations.
- Develop and implement business strategies across different industries.
- Use digital tools, including AI, to enhance and automate business operations.
- Build sustainable business models, manage financials, and scale operations.

Entrepreneurial Specialization Tracks: Skill Development and Business Implementation:

Throughout the program, students will select **one of the following five specialized tracks** using the **“Punjab Entrepreneurship Mindset Programme”** App, designed to provide a structured pathway for developing entrepreneurial skills and implementing business ventures.

1. **E-commerce:** In this track, students will learn how to build, manage, and scale an online business. From setting up an e-commerce platform to managing digital marketing strategies, inventory, and customer experience, this specialization provides the tools needed to succeed in the rapidly growing digital marketplace.
2. **Content Creation:** This track focuses on empowering students to create, curate, and market digital content across various platforms. Students will learn how to build a personal or brand identity, develop engaging content, and monetize their platforms, whether through social media, video production, blogging, or influencer marketing.
3. **Professional Services:** In this track, students will learn how to capitalize on freelance and contract-based opportunities. They will explore strategies for building a sustainable service-based business, manage client relationships, and maximize the flexibility that comes with this track.

**BACHELOR OF COMPUTER APPLICATIONS (HONOURS) (CBGS)
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- 4. Retail Business:** This track introduces students to the fundamentals of starting and managing small scale retail ventures. Learners will discover how to identify in-demand products, source suppliers, setup shop (physical or home-based), and attract local customers. Emphasis will be placed on practical steps like pricing, promotion, customer service, and building repeat sales to establish as steady income stream.

Miscellaneous: This track gives students the freedom to explore unique and diverse business ideas that don't fit into one category. Learners can identify opportunities around them, test simple solutions, and creates mall ventures based on local needs or personal interests. The focus is on creativity, problem- solving, and learning how to turn everyday ideas into earning opportunities.

The focus is on practical application, with students engaging in real-world projects that culminate in the creation and scaling of a business.

Registration on the APP:

For Android Users:

Step1: Click the following link to download and install the App:

https://drive.google.com/file/d/1zgfoFWN0Y1zWJNf_gMpbGvlyeQl0WPM2/view?usp=drivesdk

Step2: Register by providing your details and generate OTP.(If the OTP is not generated, use the last six digits of your mobile number as the OTP).

Step3: Open the tasks and complete it by giving your feedback and handling the AI based Quiz.

For I-Phone Users:

Step1: Click on this link <https://punjabstartup.com/>

Step2: Signup to create an account and generate OTP

Step3: Filliny our personal and educational details. After your account is created, open the tasks and complete it by giving your feedback and handling the AI based Quiz.

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BACHELOR OF COMPUTER APPLICATIONS (HONOURS) (CBGS)
(BATCH 2026-30)

Content Creation		
Week/ Milestone	Milestone	Description
1	Start your journey as a content creator	Learn how to reach thousands of followers online by creating content
2	Decide your content topic	Explore different topics and finalize one topic on which you will create content
3	Start your own content channel	Launch your official channel on YouTube or Instagram and start building your audience
4	Plan your first week content calendar	Learn how to create a simple weekly content calendar that would keep your audience engaged and make them follow you
5	Plan and record your first video	Learn how to create a clear and catchy script for your first video and shoot it using your phone
6	Edit and launch your first video	Learn how to edit your video with trendy music And cool effects and launch your channel with first video
7	Reach first 100 followers	Use WhatsApp and personal Instagram account to tell people about your channel and reach first 100 followers/subscribers
8	Master the skill of engaging people with your content	Learn how to connect with your audience so they stay engaged and feel involved
9	Follow latest trends and famous influencers to grow your channel	Learn how to use trending to pics and tag well-known channels or creators to boost your reach and attract more followers
10	Learn how you can make money from your content	Discover how to do brand deals and promote brands or products your followers truly care about
11	Make your first partnership	Reach out to 10 brands for partnership and turn one into your first paid deal
12	Plan your business growth	Create a 1-month plan on what to post on a weekly basis to grow your followers and earn money

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BACHELOR OF COMPUTER APPLICATIONS (HONOURS) (CBGS)
(BATCH 2026-30)

E-commerce		
Week/ Milestone	Milestone	Description
1	Learn how to start selling online	Learn what an E-commerce business is and how you can start selling online in less than 30 days
2	Choose your product	Explore different products and finalize what you want to sell online
3	Find a supplier who will deliver the product for you	Identify suppliers who can send your product directly to the customer and help you launch your E-commerce business
4	Create your E-commerce store	Make a simple online store using Instamojo and learn how to upload product images and description on the store
5	Activate payments on your store	Learn how to link your bank account to a payment gateway and integrate that with your Instamojo store to Start receiving payments
6	Launch your online store	Connect your domain name to your Instamojo account, create your launch poster, and officially launch your E-commerce store
7	Get first 100 people visit your online store	Learn how to write simple and catchy messages to promote your store and send it to 100 people
8	Make your first sale	Convert one paying customer and learn how to process the order from beginning to delivery
9	Create and post your first ad	Learn how to design a simple promotional ad and post it to bring in more people and sales
10	Take feedback from customers	Engage with your paid customers, take product feedback, and upload success stories or reviews on your website
11	Get a repeat customer or referral	Build trust with your paid customers to get either a repeat order or a referral
12	Plan your business growth	Make a 1-month plan to promote and grow your E-commerce store and earn more money

BACHELOR OF COMPUTER APPLICATIONS (HONOURS) (CBGS)
(BATCH 2026-30)

Professional Service		
Week/ Milestone	Milestone	Description
1	Start your journey in professional services	Learn what is a service and how you can earn money by offering your skill as a service
2	Choose your service skill	Choose one skill you are good at and turn it into a service that people will pay for
3	Find your ideal customer	Talk to people directly or through social media apps, understand who is willing to pay for your service and "WHY"
4	Build your online profile and show what you offer	Explore apps or websites such as WhatsApp Business, Upwork, or Urban Company, and learn how to create an online profile
5	Write your service description	Learn how to write your service in a simple and powerful way that gets people excited to try it
6	Finalize your pricing and launch your service	Learn how to set the right price that your customer finds fair and launch your service
7	Get first 100 leads for your service	Learn how to write catchy messages to promote your service in the market and get first 100 leads
8	Offer a free service and learn from feedback	Give your service for free to real users and use their feedback to make it better
9	Make your first sale	Get one paying customer for your service and work really hard to get a 5 star rating and a video testimonial
10	Build trust with customers and get repeat orders	Use your trust and good relationship with existing customers to get your first repeat customer
11	Earn your first referral	Start offering bonus or other additional services to your existing customers and get your first referral
12	Plan your business growth	Make a 1 month plan on how to get more customers and earn more money

**BACHELOR OF COMPUTER APPLICATIONS (HONOURS) (CBGS)
(BATCH 2026-30)**

Retail Business		
Week/ Milestone	Milestone	Description
1	Learn how to start retail business	Understand how retail works, the types of business you can start, and talking to local shops
2	Choose your product and ideal customer	Look at products in demand in your area and choose what you'll focus on based on Your customer needs
3	Find a supplier for your product	Identify suppliers or wholesalers who can give you quality products/raw materials at good prices
4	Setup your business	Arrange your shop/home or prepare your product stocked with shopkeepers
5	Decide product prices and prepare stock	Decide the right selling price, maintain a simple record of sales, and get ready to handle cash or digital payments
6	Launch your business	Put up posters near your shop, and share the announcement with friends, family, and local Community groups
7	Promote your business in your area	Learn how to use simple ways to promote your business locally
8	Make your first sale	Ensure the buying process is smooth and the customer is happy
9	Take feedback from customers	Engage with your paid customers and take product feedback
10	Discover other platforms to grow your sales	Learn how to setup a free WhatsApp Business account for your shop and collect Orders there
11	Get a repeat customer or referral	Build trust with your paid customers to get either a repeat order or a referral
12	Plan your business growth	Make a 1-month plan to promote and grow your retail business and earn more money

BACHELOR OF COMPUTER APPLICATIONS (HONOURS) (CBGS)
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Miscellaneous		
Week/ Milestone	Milestone	Description
1	Start your journey as an entrepreneur	Learn what entrepreneurship means and how you can start earning by solving problems around you
2	Identify and valid a tea problem to solve	Look around yourself, talk to people, and pick one real problem that many people face
3	Define your customer and their pain points	Find out who will buy from you, what difficulties they face, and why they need your solution
4	Generate business ideas and finalize one idea	Think of different ways to solve the problem, compare options, and choose one idea to move ahead with
5	Define your product or service	Decide clearly what product or service you will Provide and how it will solve the customer's problem
6	Finalize your pricing and launch your business	Set a fair price for your product or service and take the first step to launch your business
7	Promote your business and get first 100 leads	Tell people about your business using word of mouth, posters, or social media, and collect interest from 100 people
8	Make your first sale	Get your first paying customer and deliver your product or service with full effort
9	Take feedback from customers and improve	Listen to what customers say after using your product/service and make it better step by step
10	Build trust with customers and get your first repeat order	Keep your promise, give good quality, and motivate your customer to buy from you again
11	Earn your first referral and expand your sales	Ask happy customer store commend you to friends and family so that you can grow your sales
12	Plan your business growth	Make a simple plan for the next month to get more customers, increase sales, and grow your business

**BACHELOR OF COMPUTER APPLICATIONS (HONOURS) (CBGS)
(BATCH 2026-30)**

Evaluation Criteria

The evaluation will be conducted by a committee consisting of the class mentor, nodal officer and the principal HOD or his/her nominee.

Evaluation Component	Description	Weightage
Weekly Task Completion	Timely submission of weekly tasks, including activities, reflection prompts, graded quizzes etc	60%
Target Completion	Performance-based evaluation on hitting revenue or Profit targets (e.g., generating L 10,000 revenue)	20%
Final Project	A comprehensive project depending the theme of the semester	20%

Evaluation mechanism: The score generated by the app will be final.

Weekly Component:

Each week of the course follows a structured format designed to guide students from learning to doing, using simple, mobile-accessible components:

Component	Duration	Description
Action Lab	~4hrs	- Hands-on task on the weekly concept - Includes step-by-step guidance, templates, and worksheets - Ends with a submission(e.g., video, reflection, or proof of action)
Learning Resources	Self-paced	-Videos, short readings, real-life stories, and tools to deepen understanding at their own pace
Check-in	Self-paced	-Quizzes & Reflection prompts

**BACHELOR OF COMPUTER APPLICATIONS (HONOURS) (CBGS)
(BATCH 2026-30)**

Syllabus Overview for Semester 1-5

Semester	Learning Focus	Learner's demonstration	Revenue Target
1	Setup & Launch	Understand. Create. Start.	L 10,000
2	Marketing Basics	Engage. Share. Grow.	L 40,000
3	Operations & Scale	Earn. Deliver. Expand.	L 80,000
4	Organic Growth	Attract. Retain. Build.	L 160,000
5	AI Automation & Finance mastery	Simplify. Track. Sustain	L 400,000

Semester 1: Setup & Launch

In Term 1, students will explore what entrepreneurship means and how it connects to their daily lives. They will learn to identify problems, shape simple business ideas, and test the minimal settings. This semester builds the foundation—mindset, observation, value creation, and action.

Semester 2: Marketing Basics

In Term 2, students will learn how to attract customers and grow their visibility using digital platforms and community-based marketing strategies. Students will also begin to run paid advertising campaigns and learn how to optimize their marketing efforts.

Semester 3: Operations & Scale

This semester focuses on the day-to-day operations of running a business, including order fulfillment, customer service, and logistics. Students will also focus on scaling operations as demand grows, with an emphasis on managing resources effectively.

Semester 4: Organic Growth

Students will learn how to grow their businesses organically, using referrals, partnerships, and community engagement. This semester focuses on building a loyal customer base and using word-of-mouth marketing to increase reach and credibility.

BACHELOR OF COMPUTER APPLICATIONS (HONOURS) (CBGS) (BATCH 2026-30)

Semester 5: AI Automation & Financial Mastery

The final semester prepares students for long-term sustainability. Students integrate AI to improve productivity, automate routine tasks, and enhance decision-making. They also dive deep into financial planning, learning to set income goals, track expenses, understand profit margins, and create simple financial forecasts. This semester helps students solidify their entrepreneurial identity design systems for financial stability and scalability.

Course Outcomes

After studying this course, students will be able to:

- Launch and manage a business within their chosen track.
- Identify profitable opportunities and develop innovative solutions.
- Implement marketing and sales strategies using both digital and traditional methods.
- Use financial metrics to track performance and make informed business decisions.
- Scale a business using operational systems and automation tools.

Suggested Readings

- Simon Sinek, *Start with Why: How Great Leaders Inspire Everyone to Take Action*, Portfolio/Penguin
- Eric Ries, *The Lean Startup: How Today's Entrepreneurs Use Continuous Innovation to Create Radically Successful Businesses*, Crown Business
- Jonah Berger, *Contagious: How to Build Word of Mouth in the Digital Age*, Simon & Schuster
- Phil Knight, *Shoe Dog: A Memoir by the Creator of Nike*, Scribner
- Jason Fried and David Heinemeier Hansson, *Rework: Change the Way You Work Forever*, Crown Business
- Héctor García and Francesc Miralles, *Ikigai: The Japanese Secret to a Long and Happy Life*, Penguin Books
- Tim Ferriss, *Tools of Titans (Selected Chapters)*, Houghton Mifflin Harcourt
- Peter Thiel and Blake Masters, *Zero to One: Notes on Startups, or How to Build the Future*, Crown Business
- Anil Lamba, *Romancing the Balance Sheet*, Anil Lamba Publications
- The Better India/Your Story, *Young Entrepreneurs Series* (Collection of Articles) Real Indian stories
Of youth starting businesses, snackable reads that show what's possible.

**Bachelor of Computer Applications (Honours) (CBGS)
Syllabus for the Batch from Year 2025 to Year 2029**

SEMESTER–III

SEMESTER–III

Data Structures & File Processing

M. Marks: 75
Time: 3 Hours

Credits
L-T-P
3-0-0

Instructions for the Paper Setters: -

Eight questions of equal marks (Specified in the syllabus) are to be set, two in each of the four Sections (A-D). Questions may be subdivided into parts (not exceeding four). Candidates are required to attempt five questions, selecting at least one question from each Section. The fifth question may be attempted from any Section.

Course outcome:

- To understand the abstract data types stack, queue, and list.
- To understand the performance of the implementation of basic linear data structures.
- To understand prefix, infix, and postfix expression formats
- To be able to implement the abstract data type list as a linked list using the node and reference pattern.
- To understand and implement trees and graph data structures

SECTION–A

Basic Data Structures: Introduction to elementary Data Organization and its operations, complexity of Algorithms – Big O-Notation, and Time space trade off, Sparse Matrix, Arrays and its applications,

Searching Techniques: Linear and Binary Search

Stack and its applications – postfix notation, expression evaluation, recursion

SECTION–B

Linked Lists: Implementation of linked list, singly and doubly linked list, linked list operations with algorithms

Queues: Description of queue structure, implementation of queue using arrays and linked lists, description of priorities queue, Applications of queues.

SECTION–C

Trees: Description of tree structure and its terminology, binary search tree, AVL Trees, Threaded Binary Trees, B-Trees, B+trees.

Graphs: Description of graph structure, implementing graphs in memory using adjacency matrix or adjacency lists, various graphs traversing algorithms, finding shortest path between two nodes.

SECTION–D

Sorting Technique: Bubble Sort, selection sort, insertion sort, quick sort, merge sort, heapsort

File Organization: Concept of field, record, file, blocking and compaction.

File Organization Techniques: Sequential indexed, indexed sequential, Direct, Hashing, Concept of master and transaction files.

Reference Books:

1. Seymour Lipschutz, Data Structure–Schaum Outline Series.
2. E Balaguruswamy, Data Structures using C, McGraw Hill Education
3. Yashwant Kanetkar, Data Structures through C, BPB Publications
4. Trambley & Sorenson, Data Structures
5. Thomas H. Cormen, Charles E. Leiserson, Ronald L. Rivest, and Clifford Stein, Introduction to Algorithms
6. Mark Allen Weiss, Data Structures and Algorithm Analysis in C
7. Robert Sedgewick, Algorithms in C, Parts 1-4: Fundamentals, Data Structures, Sorting, Searching

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Bachelor of Computer Applications (Honours) (CBGS)
Syllabus for the Batch from Year 2025 to Year 2029

SEMESTER-III
Lab-1 based on Data Structures & File Processing

M. Marks: 25
Time: 3 Hours

Credits
L-T-P
0-0-1
(2h/week)

Instructions for the examiners: -

Two questions of equal marks strictly as per the syllabus and based on the practical exercises covered in the semester. Questions may be subdivided into parts (not exceeding four). Candidates will attempt ONE question, explain their answer by writing on the answer sheet, and then implement the same on the computer. Examiner will evaluate both the answers (theory as well as practical). The viva will also be conducted one-on-one alongside, and the student asked viva questions related to the question and the solution he/she is working on during the exam.

Lab Exercises based on Implementation of Data Structures using the C language:

1. Arrays,
2. Searching(binary search, linear search)
3. Strings,
4. Linked list
5. Stacks (Using Arrays, linked lists)
6. Queues (Using Arrays, linked lists)
7. Trees – Traverse the BST, AVL Trees and B tree.
8. Sorting(selection sort, insertion sort, quick sort, merge sort, heap sort, bubble sort) ,
9. Graph-transversal, finding the shortest path
10. Handling the File structure

**Bachelor of Computer Applications (Honours) (CBGS)
Syllabus for the Batch from Year 2025 to Year 2029**

SEMESTER -II

Computer Architecture

M. Marks: 100
Time: 3 Hours

Credits
L-T-P
4-0-0
(60Hrs)

Instructions for the Paper Setters: -

Eight questions of equal marks (Specified in the syllabus) are to be set, two in each of the four Sections (A-D). Questions may be subdivided into parts (not exceeding four). Candidates are required to attempt five questions, selecting at least one question from each Section. The fifth question may be attempted from any Section.

SECTION–A

Information Representation : Register Transfer Language, Various Registers, Implementing Common Bus Using Multiplexers: Logical; Arithmetic & Shift Micro – operations.

Basic Computer Design Instruction Codes, Computer Instructions, Timing Signals, Instruction Cycle, Design of a Basic Computer.

SECTION–B

CPU Design General Register Organization, Stack Organized CPU, Instruction Formats, Addressing Modes, Program Control, Hardwired & Micro programmed (Wilhe’s Design) Control Unit, RISC and CISC Characteristics.

SECTION–C

Memory Organization Memory Hierarchy, Designs & Concepts of Main Memory, Auxiliary Memory, Associative Memory, Cache and Virtual Memory.

SECTION–D

I/O Organization I/O Interface, Modes of Transfer, Program Interrupt, DMA & I/O Processor.

Pipeline & Vector Processing Introduction to Parallel Processing and Pipelining, SISD, SIMD & MISD, MIMD Machines.

References:

M.M. Mano Computer System Architecture: (PHI)
J.P. Hayes.Computer Architecture
Patterson & Hemessy Computer Architecture

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Bachelor of Computer Applications (Honours) (CBGS)
Syllabus for the Batch from Year 2025 to Year 2029

SEMESTER–III

Operating Systems

M. Marks: 100

Time: 3 Hours

Credits

L-T-P

4-0-0

Instructions for the Paper Setters: -

Eight questions of equal marks (Specified in the syllabus) are to be set, two in each of the four Sections (A-D). Questions may be subdivided into parts (not exceeding four). Candidates are required to attempt five questions, selecting at least one question from each Section. The fifth question may be attempted from any Section.

Course Outcomes:

1. To understand the services provided by and the design of an operating system.
2. To understand what a process is and how processes are synchronized and scheduled.
3. To understand the structure and organization of the file system.
4. To understand different approaches to memory management.
5. Students should be able to use system calls for managing processes, memory and the file system.

SECTION-A

Introduction: Definition, Early Systems, Simple Batch system, Multi-programming/Multi-Tasking, Time Sharing Systems, Personal Computer System, Parallel Systems, Distributed Systems, Real-time Systems.

Processes: Process concept, Inter Process communication, Process Scheduling, Threads.

CPU–Scheduling: Basic concepts, Scheduling Criteria, Scheduling Algorithms, Algorithm Evaluation.

SECTION-B

Process Synchronization: Critical – section problem, semaphores, classical problem of synchronization. Semaphores, **Threads:** Multicore Programming, Multithreading Models, Thread Libraries, Implicit Threading, Threading Issues.

Memory Management: Background, Logical v/s Physical address space, swapping, continuous allocation, paging, segmentation.

SECTION-C

Virtual Memory: Background, demand paging, performance of demand paging, page replacement, page replacement algorithms, thrashing.

Deadlocks: System Model, Deadlock characterization, methods for handling deadlocks, Deadlocks Prevention, Deadlock avoidance, Deadlock detection, Recovery from deadlock, combined approach to deadlock handling.

SECTION-D

Operating System Security – authentication & authorization, file ownership and user groups, Access Control, password vulnerabilities, strong passwords, Operating System protection from security breaches, such as runaway processes (denial of service), memory-access violations, stack overflow violations, the launching of programs with excessive privileges. Protecting against viruses and worms

CASE STUDY – Windows Operating System, Linux

Recommended Books & Materials:

1. Silberschatz, Galvin, and Gagne, Operating System Concepts, Global Edition, Wiley India 2023
2. Crowley, Operating Systems, A Design Oriented Approach, Tata McGraw Hill.
3. Dietel, Operating Systems, Second Edition by Addison Wesley.
4. William Stallings, Operating Systems –Internals and Design Principles, Pearson Publications
5. Andrew S. Tanenbaum, Modern Operating Systems, Pearson Publications
6. Remzi H. Arpaci-Dusseau and Andrea C. Arpaci-Dusseau, Operating Systems: Three Easy Pieces,
<https://pages.cs.wisc.edu/~remzi/OSTEP/>

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Bachelor of Computer Applications (Honours) (CBGS)
Syllabus for the Batch from Year 2025 to Year 2029

SEMESTER-III
Cybersecurity Fundamentals
(SEC-2 Theory)

M. Marks: 50
Time: 3 Hours

Credits
L-T-P
2-0-0

Instructions for the Paper Setters: -

Eight questions of equal marks (Specified in the syllabus) are to be set, two in each of the four Sections (A-D). Questions may be subdivided into parts (not exceeding four). Candidates are required to attempt five questions, selecting at least one question from each Section. The fifth question may be attempted from any Section.

Courseoutcome:

1. To teach fundamentals of Cyber Space, Cyber Threats and defense strategies,
2. understand the ethical, legal, and regulatory environment in the cyberspace.

SECTION- A

Introduction to the Internet, IP address, MAC address; Client-Server/P2P Architecture, Cloud Computing; Computation/ Storage as a service; confidentiality, Integrity, availability of information; desktop and mobile apps; Authentication & authorization; Data trails of an Internet user; cookies; Why security matters?

SECTION- B

Threats: Malicious software, Cyber threats, hackers, trackers, types of hackers, hacker motives; Types of Attacks: virus, worms, Trojan horse, spam, spoofing, phishing, spear-phishing, whaling, social engineering, ransomware, spyware, adware, malvertising, supply-chain attacks, zero-day viruses - software/hardware vulnerabilities, exploits; denial of service attacks; bots, botnets; Data breaches; risks of using public Wi-Fi; Cyber bullying;

SECTION- C

How to Safeguard: Using http/https; Anti-virus software, analysis of the tools available in the market; strong passwords/passphrases, password managers, changing passwords regularly; Cryptography: Encryption, Decryption, public/private cryptography, Digital signatures; Virtual private networks; Setting up private and secure Wi-Fi; Data backup and recovery – full/incremental/differential backup, backup vs archive; software updates/patches; URL filtering;

SECTION- D

privacy vs security vs anonymity, privacy settings in apps/browsers and popular social networking sites such as Facebook, Instagram, Snapchat; using web browser incognito mode, the tor browser; Laws, regulations, and compliance; cybercrimes, Intellectual Property, Licensing, Compliance, Provisions in the IT act.

Reference Books:

1. Kenneth Einar Himma and Herman T. Tavani, Handbook of Information and Computer Ethics, Wiley.
2. Douglas E Comer, The Internet Book: Everything You Need to Know About Computer Networking and How the Internet Works, CRC Press
3. Introduction to cyber security: stay safe online, The Open University
4. Justice Yatindra Singh, Cyber Laws, Universal Law Publishing Co. (ULPC)
5. Anirudh Rastogi, Cyber Law-Law Of Information Technology And Internet, Lexis Nexis
6. James Graham, Ryan Olson Rick Howard, Cyber Security Essentials By, CRC PRESS
7. R. K. Dhamija, Cybersecurity: An Introduction, BPB Publications
8. Charles J. Brooks, Christopher Grow, and Philip Craig, Cybersecurity Fundamentals by McGraw-Hill

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Bachelor of Computer Applications (Honours) (CBGS)
Syllabus for the Batch from Year 2025 to Year 2029

SEMESTER–III
Lab-2 based on Cybersecurity Fundamentals
(SEC-2 Practical)

M. Marks: 25
Time: 3 Hours

Credits
L-T-P
0-0-1
(2h/week)

Instructions for the examiners: -

Two questions of equal marks strictly as per the syllabus and based on the practical exercises covered in the semester. Questions may be subdivided into parts (not exceeding four). Candidates will attempt ONE question, explain their answer by writing on the answer sheet, and then implement the same on the computer. Examiner will evaluate both the answers (theory as well as practical). The viva will also be conducted one-on-one alongside, and the student asked viva questions related to the question and the solution he/she is working on during the exam.

Lab Exercises based on

- Find IP/MAC addresses on personal devices
- Set up a simple cloud service (e.g., Google Drive)
- Check browser cookies and understand privacy settings
- Conduct a phishing simulation to identify red flags
- Analyze secure connections, creation of strong passwords
- Configure a VPN on personal devices
- Data backup routine using a cloud service or external drive
- Adjust privacy settings on popular platforms like Facebook and Instagram
- Understand anonymity using Tor network
- Install and configure antivirus and anti-malware software
- Configure a firewall rule using pfSense or similar tools
- Use OpenSSL to encrypt and decrypt messages.

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Bachelor of Computer Applications (Honours) (CBGS)
Syllabus for the Batch from Year 2025 to Year 2029

SEMESTER–III

Information Systems
(MDC-5)

Total Marks: 100
Time: 3 hours

Credits
L T P
4 0 0

Instructions for the Paper Setters:

Eight questions of equal marks (Specified in the syllabus) are to be set, two in each of the four Sections (A-D). Questions may be subdivided into parts (not exceeding four). Candidates are required to attempt five questions, selecting at least one question from each Section. The fifth question may be attempted from any Section.

Course Outcome:

- It gives detailed knowledge about Information Systems (IS).
- This course makes the students aware about various organization levels and the information systems used at these levels like MIS, DSS, TPS and various other systems.
- It gives information about the career opportunities in the field of IS

SECTION–A

An Introduction to Information System: Information Concepts, System Concepts, Business Information Systems, Information Systems in society, business and Industry, Ethical and Social issues, Global Challenges in Information Systems

Information Systems in Organizations: organizations and Information systems, competitive Advantage, careers in Information System

SECTION–B

Management Information System: Fundamental types of Management, Information Systems, Management Decision, Pitfalls in MIS Development Making Process
Building and Maintaining Information Systems, Information System Security and Control

SECTION–C

Decision Support Systems (DSS): Conceptual Foundations of DSS, Concepts of DSS, DSS Software, Strategies for DSS, Group Support Systems, Executive Support System (ESS); Expert systems, Expert System & its integration with DSS.

SECTION–D

Knowledge Management systems: Fundamentals of Knowledge Management; importance; The Knowledge Management Process; knowledge spiral; Knowledge Repositories and Databases; Knowledge Sharing Practices; Collaboration Tools: Email, Social Media, Enterprise Social Networks (e.g., Slack, Microsoft Teams).
Other Information Systems like Supply chain management, Customer Relationship Management (CRM), Electronic Commerce and Mobile Commerce.

References:

1. Principles of Information Systems: A Managerial Approach, Ralph Stair and George Reynolds, Cenage Learning, 2008
2. Management Information Systems, Laudon C. Kenneth & Laudon P. Janes, Pearson Education, 2002.

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Bachelor of Computer Applications (Honours) (CBGS)
Syllabus for the Batch from Year 2025 to Year 2029

SEMESTER-III

Internship with local public/private industry/ business /organization Field Practice – 3

M. Marks: 50
Time: 3 Hours

Credits
L-T-P
0-0-2
Field Practice (4h) /week

Course Outcomes:

- To put theory into practice
- To expand thinking and broaden the knowledge and skills acquired through course work in the field.
- To relate to, interact with, and learn from current professionals in the field.
- To understand and adhere to professional standards in the field
- To gain insight to professional communication
- To identify personal strengths and weaknesses
- To develop the initiative and motivation to be a self-starter and work independently

Internship/Professional practice: Internship/Professional practice can provide students the opportunity to enhance skills acquired in the curriculum so far. Students under the guidance of internal guide/s and external guide shall take part in all the activities regularly to implement as much knowledge as possible. The students shall take part in discussions to foster friendly and stimulating environment in which they are motivated to reach high standards and become self-confident.

Assessment: Each student, is required to

- Submit a report.
- Present the seminar on the internship orally through power point slides.
- Answer the queries.

Instructions for the Assessment:

- Candidates will undergo training and prepare an internship report. As End-Semester Examination, evaluation of the student will be based on the quality of report submitted, presentation skills and their response in the Q/A session by the examiners. The internship report carries 30 marks, seminar of 10 marks, and Q/A 10 marks.

BCA (Bachelor of Computer Applications) (Honours)
Syllabus for the Batch from Year 2024 to Year 2028

SEMESTER-V

BCA05007T : COMPUTER GRAPHICS

M. Marks: 75

Time: 3 Hours

Credits

L-T-P

3-0-0

Instructions for the Paper Setters: -

Eight questions of equal marks (Specified in the syllabus) are to be set, two in each of the four Sections (A-D). Questions may be subdivided into parts (not exceeding four). Candidates are required to attempt five questions, selecting at least one question from each Section. The fifth question may be attempted from any Section.

Course Outcomes:

1. Understand the basic concepts and algorithms in computer graphics.
2. Develop 2D and 3D graphics applications using appropriate programming languages and libraries.
3. Apply transformations and projections in 3D graphics.
4. Implement basic rendering techniques, including shading and texturing.
5. Explore advanced topics like animation and interactive graphics.
- 6.

SECTION-A

Overview of Graphics system: Computer Graphics and their applications. • Overview of Computer Graphics: History and applications of computer graphics, Types of graphics: 2D vs. 3D; Graphics Basic Concepts: Pixel, coordinates, color models, resolution, aspect ratio; Coordinate systems: Cartesian and homogeneous coordinates; **Display Devices:** LED, LCD, and other contemporary Monitors.

SECTION-B

Elementary Drawing: Points and various line drawing Algorithms and their comparisons. Circle generating algorithms, Algorithms for ellipse, arc and spiral

SECTION-C

Two Dimensional Transformations: Basic Transformations, Scaling, Translation, Rotation, Reflection, Shear, Matrix representation of Basic transformations and homogenous coordinates.

Composite Transformations: Windowing and clipping. Windowing concepts, clipping and its algorithms. Window-to-view port transformations.

SECTION-D

Three Dimensional concepts. 3 D Coordinate Systems. 3D transformations. translation, scaling, rotation, projections, parallel projections. Perspective projection.

Rendering Techniques: Introduction to rendering pipelines, Hidden surface removal techniques (Z-buffering), Ray tracing basics.

References:

1. Donal Hearn M. Pardive Baker, Computer Graphics by (PHI) Easter Economy Edition.
2. Roy A. Plastock and Gordon Kalley, Computer Graphics by- Schaum's Series.
3. Marc Berger, Computer Graphics
4. V. S. K. Reddy, Fundamentals of Computer Graphics by BPB Publications
5. John F. Hughes et al., Computer Graphics: Principles and Practice by Pearson

BCA (Bachelor of Computer Applications) (Honours)
Syllabus for the Batch from Year 2024 to Year 2028

SEMESTER-V

BCA05008L : LAB-1 BASED ON COMPUTER GRAPHICS USING C++

M. Marks: 25

Time: 3 Hours

Credits

L-T-P

0-0-1

One lab (2h) /week

Instructions for the examiners: -

Two questions of equal marks strictly as per the syllabus and based on the practical exercises covered in the semester. Questions may be subdivided into parts (not exceeding four). Candidates will attempt ONE question, explain their answer by writing on the answer sheet, and then implement the same on the computer. Examiner will evaluate both the answers (theory as well as practical). The viva will also be conducted one-on-one alongside, and the student asked viva questions related to the question and the solution he/she is working on during the exam.

Lab Exercises based on:

- Implement the DDA (Digital Differential Analyzer) algorithm for line drawing.
- Implement Bresenham's line drawing algorithm. Compare both algorithms based on accuracy and performance.
- Implement circle and ellipse drawing algorithms.
- Use the midpoint circle drawing algorithm to draw circles.
- Implement ellipse drawing using the midpoint ellipse algorithm.
- Draw arcs and spirals using a modified circle algorithm or trigonometric functions.
- Implement scaling, translation, rotation, reflection, and shearing on simple shapes (e.g., square, triangle).
- Implement the Cohen-Sutherland algorithm for line clipping.

**BCA (Bachelor of Computer Applications) (Honours)
Syllabus for the Batch from Year 2024 to Year 2028**

SEMESTER-V

BCA05009T : WEB DESIGNING & DEVELOPMENT

M. Marks: 75

Time: 3 Hours

Credits

L-T-P

3-0-0

Instructions for the Paper Setters: -

Eight questions of equal marks (Specified in the syllabus) are to be set, two in each of the four Sections (A-D). Questions may be subdivided into parts (not exceeding four). Candidates are required to attempt five questions, selecting at least one question from each Section. The fifth question may be attempted from any Section.

Course Outcomes:

SECTION A

Introduction to Web Design and Development: Overview of web technologies and the web development process, Understanding the difference between web design and development, Introduction to HTML, CSS, and JavaScript

HTML Basics: Structure of an HTML document, Common HTML elements (headings, paragraphs, lists, links, images, Tables, Linking, Frames, Forms), Semantic HTML and its importance, Introduction to DOM.

SECTION B

CSS Fundamentals: Introduction to CSS and its role in web design, CSS selectors, properties, and values, Box model, layout techniques (flexbox, grid)

Responsive Design: Principles of responsive web design, Media queries and breakpoints, Using frameworks like Bootstrap for responsive layouts

SECTION C

JavaScript Basics: Introduction to JavaScript and its role in web development, Basic Programming Techniques & Constructs: Variables, data types, functions, and control structures, Operators, Functions, GET/POST Methods, DOM Manipulation & Event handling,

SECTION D

Forms Validation, Cookies, Inter-page communication and form data handling using JavaScript

Web Performance Optimization: Techniques for optimizing website performance, Using tools to analyze website performance, Importance and usage of SEO (Search Engine Optimization).

Recommended Textbooks:

1. Jon Duckett, HTML and CSS: Design and Build Websites
2. Jon Duckett, JavaScript and JQuery: Interactive Front-End Web Development"
3. Jennifer Niederst Robbins, Learning Web Design: A Beginner's Guide to HTML, CSS, JavaScript, and Web Graphics
4. Ben Frain, Responsive Web Design with HTML5 and CSS
5. Ethan Brown, Web Development with Node and Express
6. Terry Felke-Morris, Web Development and Design Foundations with HTML5, McGraw Hill
7. Jon Duckett, Beginning HTML, XHTML, CSS, and JavaScript, Cengage
8. Luke Welling and Laura Thomson, PHP and MySQL Web Development, Pearson Education

BCA (Bachelor of Computer Applications) (Honours)
Syllabus for the Batch from Year 2024 to Year 2028

SEMESTER-V
BCA05010L : LAB-2 BASED ON WEB DESIGNING & DEVELOPMENT

M. Marks: 25
Time: 3 Hours

Credits
L-T-P
0-0-1

One lab (2h)/week

Instructions for the examiners: -

Two questions of equal marks strictly as per the syllabus and based on the practical exercises covered in the semester. Questions may be subdivided into parts (not exceeding four). Candidates will attempt ONE question, explain their answer by writing on the answer sheet, and then implement the same on the computer. Examiner will evaluate both the answers (theory as well as practical). The viva will also be conducted one-on-one alongside, and the student asked viva questions related to the question and the solution he/she is working on during the exam.

Lab Exercises based on:

- Exploring Web Technologies and Setting up the Development Environment (e.g. Visual Studio Code)
- Creating HTML Documents using headings, paragraphs, lists, links, and images
- Advanced HTML Elements (create forms), applying CSS styles, understanding Box model, Layout techniques
- Integrate Bootstrap into the project and use its grid system to create a responsive layout
- Basic JavaScript programming: GET/POST methods, DOM Manipulation, Event handling, Form validation, working with cookies
- Analyze the performance of the developed webpage using tools like Google Page Speed Insights and Understanding basic SEO

BCA (Bachelor of Computer Applications) (Honours)
Syllabus for the Batch from Year 2024 to Year 2028

SEMESTER-V

BCA05001T : SOFTWARE ENGINEERING

M. Marks: 100

Time: 3 Hours

Credits

L-T-P

4-0-0

Instructions for the Paper Setters: -

Eight questions of equal marks (Specified in the syllabus) are to be set, two in each of the four Sections (A-D). Questions may be subdivided into parts (not exceeding four). Candidates are required to attempt five questions, selecting at least one question from each Section. The fifth question may be attempted from any Section.

Course Outcomes:

SECTION-A

Introduction to Software: Definition, Software characteristics, the evolving role of software, changing nature of software, Software components, Software Applications.

Introduction to Software Engineering: Definition, Software Engineering Paradigms, product vs project vs process, a process oriented framework, process patterns, waterfall method, prototyping, incremental process models, evolutionary process models, the unified process, the Spiral model, the agile process. Process assessment, the capability maturity model integration (CMMI)

SECTION-B

Software Requirement Specification (SRS): Problem analysis, structuring information, Data flow diagram and data dictionary, structured analysis, Characteristics and component of SRS.

Planning a Software Project: Cost estimation, uncertainties in cost estimation, Singlevariable model, COCOMO model, on software size estimation, Project scheduling and milestones, Software & Personal Planning, Rayleigh curve, Personal Plan, Quality Assurance Plan, Verification & Validation (V & V), inspection & review

SECTION-C

System Design: Design Objectives, Design Principles, problem, Partitioning, Abstraction, Top Down and Bottom-up techniques.

Coding: Coding by Top-down and Bottom-up, Structured Programming, Object Oriented Programming, Information Hiding, Programming style, Internal Documentation

Software Metrics: Role of Metrics and measurement, Metrics for software productivity and quality, Measurement software, size-oriented metrics, function oriented metrics, Object-oriented metrics, Metrics for software quality.

SECTION-D

Testing: Level of testing, Test cases and test criteria, Testing levels, Testing types: White box v/s black box testing: Functional Testing, Structural Testing.

Software Maintenance: Types of Maintenance, Corrective and Preventive Maintenance; Software Evolution, Change management

References:

1. Roger S. Pressman, Software Engineering
2. Pankaj Jalote, An Integrated Approach to Software Engineering

BCA (Bachelor of Computer Applications) (Honours)
Syllabus for the Batch from Year 2024 to Year 2028

SEMESTER-V

BCA05011T : SERVER-SIDE PROGRAMMING
(SEC-3 Theory)

M. Marks: 50
Time: 3 Hours

Credits
L-T-P
2-0-0

Instructions for the Paper Setters: -

Eight questions of equal marks (Specified in the syllabus) are to be set, two in each of the four Sections (A-D). Questions may be subdivided into parts (not exceeding four). Candidates are required to attempt five questions, selecting at least one question from each Section. The fifth question may be attempted from any Section.

Course Outcomes:

SECTION A

Introduction: Overview of web application architecture (client-server model), Difference between client-side and server-side programming, server-side programming and its role in web applications, Introduction to HTTP and web protocols

Setting Up the Development Environment: Installing and configuring a web server (e.g., Apache, Nginx),

Introduction to Programming Languages: Overview of server-side programming languages (e.g., Python, Node.js, Java, PHP), Choosing the right language for specific applications, Basics of syntax and structure of Python

Building a Simple Web Application: Setting up a basic web server (using Node.js/Express or similar), Handling HTTP requests and responses, Rendering dynamic content

SECTION B

Working with Frameworks: Introduction to popular frameworks (Express for Node.js, Flask for Python, Spring for Java), Setting up a project using Flask for Python framework, Understanding the MVC (Model-View-Controller) architecture

RESTful API Development: Principles of REST architecture, Designing and implementing RESTful APIs, Handling CRUD operations with API endpoints

SECTION C

Database Interaction: Connecting to databases (SQL and NoSQL), Performing CRUD operations with a database (using an ORM), Managing database migrations

Authentication and Authorization: Understanding user authentication and session management, Implementing authentication strategies (JWT, OAuth), Protecting routes and resources

Error Handling and Debugging: Common error types in server-side applications, Best practices for error handling, Debugging techniques and tools

SECTION D

Web Security: Overview of common security vulnerabilities (SQL injection, XSS, CSRF), Implementing security measures (input validation, output encoding), Using HTTPS and securing APIs

Deployment and Hosting: Overview of cloud platforms (AWS, Heroku, Digital Ocean), Setting up and deploying a server-side application, Managing server resources and scaling applications

Recommended Textbooks:

1. David I. Schneider "Server-Side Programming with Java: A Comprehensive Guide" by
2. Miguel Grinberg "Flask Web Development" by
3. Leonard Richardson and Sam Ruby, RESTful Web APIs
4. "WEB TECHNOLOGIES A Computer Science Perspective" by Jeffrey C. Jackson
5. "Learning PHP, MySQL & JavaScript: A Step-By-Step Guide to Creating Dynamic Websites" by Robin Nixon (BPB Publications)

BCA (Bachelor of Computer Applications) (Honours)
Syllabus for the Batch from Year 2024 to Year 2028

SEMESTER-V

BCA05012L: LAB-3 BASED ON SERVER-SIDE PROGRAMMING
(SEC-3 Practical)

M. Marks: 25
Time: 3 Hours

Credits
L-T-P
0-0-1

One lab (2h) /week

Instructions for the examiners: -

Two questions of equal marks strictly as per the syllabus and based on the practical exercises covered in the semester. Questions may be subdivided into parts (not exceeding four). Candidates will attempt ONE question, explain their answer by writing on the answer sheet, and then implement the same on the computer. Examiner will evaluate both the answers (theory as well as practical). The viva will also be conducted one-on-one alongside, and the student asked viva questions related to the question and the solution he/she is working on during the exam.

Lab Exercises based on:

- Setting Up a Flask Project and Implementing MVC Architecture in Flask
- Designing and Testing RESTful APIs
- Connecting to a SQLite or NoSQL Database and performing CRUD operations
- Implement user registration and login features using Flask-Login
- Use JWT for user authentication and Secure certain routes in the Flask application
- Best practices for error handling, Debugging techniques and tools
- Implementing security measures (input validation, output encoding), Using HTTPS and securing APIs
- Setting up and deploying a server-side application,
- Managing server resources and scaling applications

BCA (Bachelor of Computer Applications) (Honours)
Syllabus for the Batch from Year 2024 to Year 2028

SEMESTER-V
MULTIDISCIPLINARY COURSE (MDC-6)

BCA05013T : ETHICAL HACKING

Total Marks: 75	Credits	L	T	P
Time: 3 hours		3	0	0

Instructions for the Paper Setters:

Eight questions of equal marks (Specified in the syllabus) are to be set, two in each of the four Sections (A-D). Questions may be subdivided into parts (not exceeding four). Candidates are required to attempt five questions, selecting at least one question from each Section. The fifth question may be attempted from any Section.

SECTION-A

Basics of ethical hacking, Understanding the ethical hacker's role; The hacking lifecycle (reconnaissance, exploitation, post-exploitation); Introduction to legal and ethical considerations, hacker types (White, Black, Gray Hat), penetration testing methodology, reconnaissance techniques, password cracking methods, social engineering techniques (Phishing, Vishing (voice phishing), Smishing (SMS phishing), Baiting, Impersonation), and real-world cyber threats.

SECTION-B

Kali Linux and Penetration Testing Tools: Installation and setup of Kali Linux, process management, and scripting (Bash), Network Penetration Testing, Detection, and Security-pre-connection, post connection, network scanning, vulnerability assessment, wireless security testing, and exploitation techniques using Metasploit.

SECTION-C

Web application testing (Burp Suite, SQLmap), Server-side attacks, Metasploit remote code execution, Scanning Vulnerabilities Using Tools; Client-Side Attacks - Social Engineering, Twitter, emails; Attack and Detect Trojans with BeEF

SECTION-D

Real-World Applications, Case Studies, and Career Pathways; Case studies on real-world cyberattacks, introduction to bug bounty programs, red teaming vs. blue teaming, role of cybersecurity analysts, legal and ethical aspects of hacking, and career opportunities

References:

1. Kali Linux Revealed – Raphael Hertzog, Jim O’Gorman, MatiAharoni
2. The Basics of Hacking and Penetration Testing – Patrick Engebretson
3. Metasploit: The Penetration Tester’s Guide – David Kennedy
4. CEH Certified Ethical Hacker Study Guide – Kimberly Graves

BCA (Bachelor of Computer Applications) (Honours)
Syllabus for the Batch from Year 2024 to Year 2028

SEMESTER-V

BCA05014L : Lab-4 based on Ethical Hacking

Total Marks: 25
Time: 3 hours

Credits
L T P
0 0 1

Instructions for the examiners: -

Examiners will set TWO or more from the common subjects strictly as per the syllabus and based on the practical exercises covered in the semester. Questions may be subdivided into parts (not exceeding four). Candidates will attempt TWO questions, explain their answers by writing on the answer sheet, and then implement the same on the computer. Examiner will evaluate both the answers (theory as well as practical). The viva will also be conducted one-on-one alongside, and the student asked viva questions related to the question and the solutions he/she is working on during the exam.

Assessment: Logic and Code Structure in written: 20%, Implementation & Output: 40%,

Viva: 30%, File (mandatory):10%.

Lab Exercises based on

1. Using Kali Linux - Installing and configuring Kali Linux;
2. Basic Kali Linux commands for security testing;
3. Practicing vulnerability scanning and network analysis
4. Kali's tools Nmap, Metasploit, and Burp Suite;
5. Performing basic penetration testing on a virtual machine;
6. Reporting findings in a simulated penetration test;
7. Network reconnaissance and analysis

BCA (Bachelor of Computer Applications) (Honours)
Syllabus for the Batch from Year 2024 to Year 2028

SEMESTER-V

BCA05015L : Internship with local public/private industry/business/organization Field – Practice-4

M. Marks: 50

Time: 3 Hours

Credits

L-T-P

0-0-2

Field Practice (4h) /week

Course Outcomes:

- To put theory into practice
- To expand thinking and broaden the knowledge and skills acquired through course work in the field.
- To relate to, interact with, and learn from current professionals in the field.
- To understand and adhere to professional standards in the field
- To gain insight to professional communication
- To identify personal strengths and weaknesses
- To develop the initiative and motivation to be a self-starter and work independently

Internship/Professional practice: Internship/Professional practice can provide students the opportunity to enhance skills acquired in the curriculum so far. Students under the guidance of internal guide/s and external guide shall take part in all the activities regularly to implement as much knowledge as possible. The students shall take part in discussions to foster friendly and stimulating environment in which they are motivated to reach high standards and become self-confident.

Assessment: Each student, is required to

- Submit a report.
- Present the seminar on the internship orally through power point slides.
- Answer the queries.

Instructions for the Assessment:

- Candidates will undergo training and prepare an internship report. As End-Semester Examination, evaluation of the student will be based on the quality of report submitted, presentation skills and their response in the Q/A session by the examiners. The internship report carries 30 marks, seminar of 10 marks, and Q/A 10 marks.