PUNJABI UNIVERSITY, PATIALA

(Established Under Punjab Act No. 35 of 1961)

UNDERGRADUATE CURRICULUM BASED ON NATIONAL EDUCATION POLICY (NEP-2020)

OUTLINE OF COURSES
FOR
FOUR YEAR MULTIDISCIPLINARY UG PROGRAMME
in
COMPUTER SCIENCE
B. Sc. (Honors)

(FOR REGULAR STUDENTS OF AFFILIATED COLLEGES, CONSTITUENT COLLEGES AND CENTER FOR DISTANCE & ONLINE EDUCATION)

FOR 2024 BATCH ONWARDS

APPLICABILITY OF REGULATIONS FOR THE TIME BEING IN FORCE

Notwithstanding the integrated nature of the academic programs spread over four academic years, the regulations in force at the time a student joins a program / course shall hold good only for the examinations held during or at the end of the academic year. Nothing in these regulations shall be deemed to debar the University from amending the regulations subsequently and the amended regulations, if any, shall apply to all students whether old or new.

PUNJABI UNIVERSITY, PATIALA

MULTIDISCIPLINARY UG PROGRAMME TO BE OFFERED BY COLLEGES

B.SC. (COMPUTER SCIENCE) (HONOURS)

OUTLINE OF COURSES FOR B.SC. (COMPUTER SCIENCE) (HONOURS)

Sem	Code/Title of the Paper	Credit	Marks
I	BCSB1101T: Fundamentals of Computer Science BCSB1101P: Software Lab - I	3 (L3 T0 P0 C3) 1 (L0 T0 P2 C1)	100 50
II	BCSB1201T: Office Automation Tools BCSB1201P: Software Lab - II	3 (L3 T0 P0 C3) 1 (L0 T0 P2 C1)	100 50
III	BCSB2101T: Programming with C BCSB2101P: Software Lab - III	3 (L3 T0 P0 C3) 1 (L0 T0 P2 C1)	100 50
IV	BCSB2201T: Data Structures BCSB2201P: Software Lab – IV	3 (L3 T0 P0 C3) 1 (L0 T0 P2 C1)	100 50
V	BCSB3101T: Database Management Systems BCSB3101P: Software Lab – V	3 (L3 T0 P0 C3) 1 (L0 T0 P2 C1)	100 50
VI	BCSB3201T: Object Oriented Programming with C++ BCSB3201P: Software Lab - VI	3 (L3 T0 P0 C3) 1 (L0 T0 P2 C1)	100 50
VII	BCSBH4101T: Programming with Python BCSBH4101P: Software Lab - VII	3 (L3 T0 P0 C3) 1 (L0 T0 P2 C1)	100 50
VIII	BCSBH4201T: Data Handling with Python BCSBH4201P: Software Lab – VIII BCSBH4202T: Computer Networks and Internet BCSBH4201P: Software Lab - IX	3 (L3 T0 P0 C3) 1 (L0 T0 P2 C1) 3 (L3 T0 P0 C3) 1 (L0 T0 P2 C1)	100 50 100 50

Note:

- For a 4 credit courses requiring practical or laboratory component, the division of credits for theory and practical/ laboratory shall be 3 credits & 100 marks (Theory) and 1 credit & 50 marks (Practical). For a 3 credit subjects the same shall be 2 credits & 50 marks (Theory) and 1 credit & 50 marks (Practical).
- In order to be eligible for the award of a UG Certificate / UG Diploma / UG Degree/ UG Degree with Honours, the students will be required to fulfill minimum credit requirements as stipulated in Ordinances.
- All the UG students (irrespective of their allotted Major) will be allowed to opt courses pertaining to SEC/VAC/AEC/IDC/MDC from a pool of papers under each category as notified.
- *IT/CS – Summer Internship (IT)/ Community Service (CS)/ Field Based Learning (FBL)/ Minor Project/ Vocational Course or any form of apprenticeship with opportunity for internship with various organizations and industry as approved by the college/ university as per the availability of their resources. (30 hours per credits x 4 credits= 120 hours) to be undertaken during the summer vacations.
- **All the students enrolled for UG Programme at Colleges affiliated to Punjabi University will be required to complete one compulsory course (4 credits) of "Punjabi Language" per Semester as indicated in the template. Punjabi Language Courses (Option I and II): Courses under option-I will be given to students who have already qualified Punjabi in 10th / 12th Class; Courses under Option-II will be given to students who are from other states & did not study Punjabi at any level.

PAPER BCSB1101T: FUNDAMENTALS OF COMPUTER SCIENCE (L3 T1 P0 C4)

Internal Assessment: 30*
University Examination: 70
Min Pass Marks: 35%

Maximum Marks: 100
Maximum Time: 3 Hrs
Lectures to be delivered: 45-55 Hrs

* Division of marks for Internal Assessment is as follows

Performance in Mid-Semester Test	12
Assignment/Project/Seminar	12
Attendance	6

(A) INSTRUCTION FOR THE PAPER SETTER

The question paper will consist of three section A, B & C Section A & B will have four question from the respective section of the syllabus and will carry 12 marks each. Section C will have 11 short answer type questions of 2 mark each which will cover the entire syllabus and will carry 22 marks in all.

(B) INSTRUCTON FOR THE CANDIDATES

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

SECTION A

Computer Fundamentals: Block diagram of a computer, characteristics of computers and generations of computers. Categories of Computers - Supercomputer, mainframe computer, network server, Workstation, Desktop computers, notebook computer, Tablet PC, handheld PC, smart phone.
Input Devices: Keyboard, Mouse, Joy tick, Track Ball, Touch Screen, Light Pen, Digitizer, Scanners, Speech Recognition Devices, Optical Recognition devices – OMR, OBR, OCR
Output Devices: Monitors, Impact Printers - Dot matrix, Character and Line printer, Non-Impact Printers – DeskJet and Laser printers, Plotter.
Memories: Memory Hierarchy, Primary Memory – RAM, ROM, Cache memory. Secondary Storage Devices - Hard Disk, Compact Disk, DVD, Flash memory.
Software: Types of Software- System Software, Application Software, Firmware. Type of System Software: Operating Systems, Language Translators, Utility Programs, Communications Software. Commonly Used Application Software: Word Processor, Spreadsheet, Database, Education, Entertainment Software.
Computer Languages: Machine language, assembly language, high level language, 4GL.

SECTION B

Number System: Non-positional and positional number systems, Base conversion, Concept of Bit and Byte, binary, decimal, hexadecimal, and octal systems, conversion from one system to the other. Binary Arithmetic: Addition, subtraction and multiplication, 1's complement, 2's complement, subtraction using 1's complement and 2's complement.
Computer Codes: weighted and non-weighted code, BCD, EBCDIC, ASCII, Unicode.
Computer Network: Network types, network topologies.
Internet Related Concepts: Internet, World Wide Web, Hypertext, Uniform Resource Locator, Web Browsers, IP Address, Domain Name, Internet Services Providers, Internet Security, Web Search Engine, Net Surfing, web portal, Wiki, Blog.

Advanced Trends in IT : Mobile Internet, GPS, 3G, 4G, Wi-Fi, Bluetooth, Cloud Technology, Virtual LAN Technology, Firewall, E-Commerce, M-Commerce, Nanotechnology, Virtual Reality, BPO and KPO, Online shopping, Social Media - YouTube, FaceBook, Linkedin, Twitter, Google+.

Applications of IT: IT in Business and Industry, IT in Education & training, IT in Science and Technology, IT and Entertainment, Current Trends in IT Application - AI, Virtual Reports, voice recognition, Robots, Multimedia Technology.

Reference Books:

1. Peter Nortorn, Introduction to Computers, Seventh Edition
2. V. Rajaraman, Fundamentals of Computers, PHI.
3. Larry E. Long and Nancy Long, Computers: Information Technology in Perspective, PHI.
4. N. Subramanian, Introduction to Computers, Tata McGraw-Hill.
5. D.H. Sanders, Computers Today, McGraw- Hill.

BCSB1101P: SOFTWARE LAB – I (FUNDAMENTALS OF COMPUTER SCIENCE) (L0 T0 P4 C2)

Internal Assessment: 15*
University Examination: 35
Min Pass Marks: 35%

Maximum Marks: 50
Maximum Time: 3 Hrs
Lectures to be delivered: 45-55 Hrs

*** Division of marks for Internal Assessment is as follows:**

Practical Work	10
Attendance	5

Division of marks for University Examination:

Lab Record	5
Viva-voce	10
Practical Work	20

The laboratory course will comprise of Activities related to GUI based operating system and exercise to what is learnt under Paper **BITB1101T: FUNDAMENTALS OF COMPUTER SCIENCE** such as:

GUI based Operating System

Activity 1: Operating system Installation and Software & Drivers installation.
Activity 2: Basic components of GUI - Desktop, Icons, Taskbar, Status Bar, Wallpapers, Screen Saver
Activity 3: Start Menu: Accessories- Notepad, Calculator, Clock, Date and Time, Disk Defragmentation, Working with Control Panel.
Activity 4: Taskbar properties - Maximize Minimize, Restore, and Close.
Activity 5: Creating Files, Folders, Shortcuts, Moving folders (right click options)

Internet

Activity 1: Connecting through Wi-fi, Blue tooth and Hot Spot.
Activity 2: Web Surfing, searching contents through Search Engines.
Activity 3: Creating and maintaining Web Blogs and Web portals

Social Media

Activity 1: Creating account, linking accounts, setting profiles and preferences.
Activity 2: Posting messages, replying, forwarding, tagging contents.
Activity 3: Online shopping, comparing prices etc.
Activity 4: Creating and maintaining social profiles at Linkedin, FaceBook, Twitter etc.

BCSB1201T: OFFICE AUTOMATION TOOLS (L3 T1 P0 C4)

Internal Assessment: 30*
University Examination: 70
Min Pass Marks: 35%

Maximum Marks: 100
Maximum Time: 3 Hrs
Lectures to be delivered: 45-55 Hrs

* Division of marks for Internal Assessment is as follows

Performance in Mid-Semester Test	12
Assignment/Project/Seminar	12
Attendance	6

(A) INSTRUCTION FOR THE PAPER SETTER

The question paper will consist of three section A, B & C Section A & B will have four question from the respective section of the syllabus and will carry 12 marks each. Section C will have 11 short answer type questions of 2 mark each which will cover the entire syllabus and will carry 22 marks in all.

(B) INSTRUCTON FOR THE CANDIDATES

Candidates are required to attempt two questions each from the section A & B of the question paper and the entire section C.

SECTION A

OFFICE: Basic layout, components, Office Characteristics, Common Office Controls and shortcuts for Home, Insert, Page Layout, Mailing, Review and View

Word: Introduction to Word Processing, Toolbars, Ruler, Menus, Keyboard Shortcut. Previewing documents, Printing documents, Formatting documents, Checking the grammar and spelling, Formatting via find and replace, Using the Thesaurus, using Auto Correct, word count, Hyphenating, Mail merge, mailing Labels Wizards and Templates, Handling Graphics, tables as Converting a word document into various formats.

PowerPoint Introduction, Elements of Power Point Package, Starting and exploring Power Point menus (Insert, Format, Tools, Slide Show, Window, Help options and all of their features, Options and sub options etc.), Creating, inserting, deleting and formatting slides, Formatting and enhancing text, Slides with graphs, Giving Animation to slides, Transfer of files between Power Point and other word processors and software packages.

SECTION B

EXCEL: Creating worksheet, entering data into worksheet, entering data into worksheet, Entering, data, dates, alphanumeric, values, saving & quitting worksheet, Opening and moving and existing worksheet, Toolbars and Menus, keyboard shortcut. Working with single and multiple workbooks, working with formulation & cell referencing, formatting of worksheet.

ACCESS: Introduction to ACCESS working with databases and tables, queries in Access. Introduction to forms, sorting and filtering, controls. Creating reports, Using Macro

Reference Books

1. Rob Tindrow, Jim Boyce, Jeffrey R. Shapiro, Windows 10 Bible, Wiley.
2. LibreOffice 6.0 Writer Guide, LibreOffice Documentation Team

BCSB1201P: SOFTWARE LAB – II (OFFICE AUTOMATION TOOLS) (L0 T0 P4 C2)

Internal Assessment: 15*
University Examination: 35
Min Pass Marks: 35%

Maximum Marks: 50
Maximum Time: 3 Hrs
Lectures to be delivered: 45-55 Hrs

*** Division of marks for Internal Assessment is as follows:**

Practical Work	10
Attendance	5

Division of marks for University Examination:

Lab Record	5
Viva-voce	10
Practical Work	20

The laboratory course will comprise of Activities related to GUI based operating system and exercise to what is learnt under Paper **BCSB1201T: OFFICE AUTOMATION TOOLS** such as:

Word

Activity 1:

i. Create, open, save and close a document.
ii. Typing, copying, moving and deleting data in word document.
iii. Perform Save and Save as, Cut and Copy, Paste and Paste Special.

Activity 2:

Formatting of data in word Document: -

i. Text formatting (font size, font style, font color, subscript, superscript, upper/lower case etc.)
ii. Text Alignment and character spacing
iii. Indention and line spacing
iv. Border and shading
v. Bullets and Numbering

Activity 3:

i. Find and replace and data sorting in a document.
ii. Protect your document.
iii. Add chart in word document. Create different types of Charts in word.
iv. Set a size, margin, orientation of page, Hyphenation, Columns and Line Numbers in Word.

Activity 4:

i. Set Page Color, Page Border, Themes, and Watermarks in Word
ii. Adding Tables, header/footers, pictures, page numbers and special symbols, Text Box in your word document.
iii. Showing Ruler, Gridlines, Document Map, Thumbnails, Inserting Word Art, Drop Cap, Hyperlink, Equation etc. in word document

Activity 5:

i. Arranging, splitting windows in word
ii. Perform Mail-merge in word
iii. Create and run Macros in Word
iv. Set the print properties of a word document

PowerPoint

Activity 1:

i. Create, open, save and close a Presentation
ii. Typing, copying, moving and deleting data in presentation.
iii. New Slide, understanding Slide Layout, adding and deleting slides.

Activity 2:

Formatting of data in slides:-

i. Text formatting (font size, font style, font color, subscript, superscript, upper/lower case etc.)
ii. Text Alignment and character spacing
iii. Indention and line spacing
iv. Border and shading
v. Bullets and Numbering

Activity 3:

i. Set a size, margin, orientation of slides in PowerPoint.
ii. Adding Tables, header/footers, pictures, page numbers and special symbols, Text Box etc. in your presentation

Activity 4:

i. Adding Animation and Transition Effects in Slides, Understanding Slide Show
ii. Presentation Views, Understanding Formatting commands in PowerPoint

Activity 5:

i. Create and run Macros in PowerPoint
ii. Arranging, splitting windows in PowerPoint.

Excel

Activity 1:

i. Create, open, save and close workbook?
ii. Create a new worksheet, renaming and moving sheet.
iii. Entering, copying, moving and deleting data in cells and worksheets.
iv. Insert and delete cells, columns and rows in Excel.

Activity 2:

i. Formatting of data in cells:-
ii. Text formatting (font size, font style, font color, Cell border etc.)
iii. Text Alignment
iv. Text Orientation, Text Direction, Text Control.

Activity 3:

i. Find and replace data in a sheet
ii. Perform data sorting and data filtering in Excel
iii. Protect your Worksheet and Workbook?
iv. Enter and perform some basic formulas in Excel.

Activity 4:

i. Perform some basic Functions in Excel.
ii. Create a chart in Excel.
iii. Create different types of Charts in Excel.
iv. Set a size, margin, orientation of page in Excel.
v. The print properties of worksheet in Excel.

Activity 5:

i. Hide and unhide row and column in Excel

ii. Set column width and row height in Excel.
iii. Adding text Box, header/footers, pictures and special symbols in your worksheet.
iv. Arranging, splitting and hiding windows in Excel. And also freezing panes.
v. Create and run Macros in Excel.

Access

Activity 1:

i. Creating with databases and tables
ii. Linking various Tables
iii. Queries in Access

Activity 2:

i. Creating forms
ii. Filling information in forms
iii. Saving forms

Activity 3:

i. Sorting data
ii. Filtering Data

Activity 4:

i. Creating reports,
ii. Using Macro