(P.G. DEPARTMENT OF COMPUTER SCIENCE)

OUTLINES OF TESTS,
SYLLABI AND COURSES OF READING

FOR

BACHELOR OF COMPUTER APPLICATIONS (B.C.A)

(SEMESTER SYSTEM)
THIRD YEAR (Semester V & VI)
(2021-22, 2022-23 & 2023-24 Sessions)

FACULTY OF COMPUTING SCIENCES

SRI GURU TEG BAHADUR KHALSA COLLEGE

Sri Anandpur Sahib
An Autonomous College
Affiliated to Punjabi University, Patiala

APPROVED
Board of Studies Meeting held on 19th June, 2021

SYLLABI, OUTLINES OF PAPERS AND TESTS FOR
BACHELOR OF COMPUTER APPLICATIONS (B.C.A)
Third Year - Fifth Semester Examinations
For Sessions 2021-22, 2022-23& 2023-24

PAPER CODE	NAME OF SUBJECT	HOURS PER WEEK				EXAMINATION SCHEME MARKS				
		L	T	P	TOTAL	Internal	External	Practical	Total	Credits
BCA-301	Web Development using ASP.NET	4	--	--	4	30	70	--	100	4
BCA-302	Computer Graphics	4	--	--	4	30	70	--	100	4
BCA-303	Linux Administration	4	--	--	4	30	70	--	100	4
BCA-304	DSE-I*	5	1	--	6	30	70	--	100	6
BCA-305	Software Lab-IX (Based on paper BCA-301)	--	--	4	4	30	--	70	100	2
BCA-306	Software Lab-X (Based on Paper BCA-302)	--	--	4	4	30	--	70	100	2
BCA-307	Software Lab-XI (Based on Paper BCA-303)	--	--	4	4	30	--	70	100	2
PBCA-501A/ 501B	Punjabi Compulsory or Punjabi Compulsory (Mudhla Gyan)	2	--	--	2	15	35	--	50	2
TOTAL		19	1	12	32	225	315	210	750	26

DSE-I*: Students can opt any one of the following papers:

BCA-304 (E1)	Enterprise Resource Planning
BCA-304 (E2)	Management Information System

1. **The breakup of marks for the practical will be as under:**
   i. Internal Assessment 30 Marks
   ii. Viva Voce (External Evaluation) 40 Marks
   iii. Practical Performance & write up (External Evaluation) 30 Marks

2. The breakup of marks for the internal assessment for theory Subjects will be as under:

Mid semester test – I	10 Marks
Mid semester test – II	10 Marks
Attendance	5 Marks
Assignment	5 Marks

SYLLABI, OUTLINES OF PAPERS AND TESTS FOR
BACHELOR OF COMPUTER APPLICATIONS (B.C.A)
Third Year - Sixth Semester Examinations
For Session 2021-22, 2022-23& 2023-24

PAPER CODE	NAME OF SUBJECT	HOURS PER WEEK				EXAMINATION SCHEME MARKS				
		L	T	P	TOTAL	Internal	External	Practical	Total	Credits
BCA-311	Web Development using PHP and MYSQL	4	--	--	4	30	70	--	100	4
BCA-312	Artificial Intelligence	5	1	--	6	30	70	--	100	6
BCA-313	DSE-II*	4	--	--	4	30	70	--	100	4
BCA-314	Software Lab-XII (Based on Paper BCA-311)	--	--	4	4	30	--	70	100	2
BCA-315	Software Lab-XIII (Based on paper BCA-313)	--	--	4	4	30	--	70	100	2
BCA-316	Major Project	--	--	--	--	30	--	70	100	6
PBCA-601A/ 601B	Punjabi Compulsory or Punjabi Compulsory (Mudhla Gyan)	2	--	--	2	15	35	--	50	2
TOTAL		15	1	8	24	195	245	210	650	26

DSE-II*: Students can opt any one of the following papers:

BCA-313 (E1)	Programming Using Python
BCA-313 (E2)	Digital Image Processing

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

i. Internal Assessment 30 Marks
ii. Viva Voce (External Evaluation) 40 Marks
iii. Practical Performance & write up (External Evaluation) 30 Marks

The breakup of marks for the internal assessment for theory Subjects will be as under:

Mid semester test – I	10 Marks
Mid semester test – II	10 Marks
Attendance	5 Marks
Assignment	5 Marks

BCA-301 Web Designing using ASP.NET

Maximum Marks: 100 **Time Allowed: 3 Hours**
External Examination: 70 Marks **Pass Percentage: 35%**
Internal Assessment: 30 Marks **Teaching Hours per week: 4**
Credits: 4 (4L)

A) Instruction For The Paper Setter

The question paper will consist of three sections A, B and C. Section A and B will have four questions from the respective section of the syllabus carrying 10.5 marks for each question. Section C will consist of 5-10 short answer type questions carrying a total of 28 marks, which will cover the entire syllabus uniformly. Candidates are required to attempt five questions in all by selecting at least two questions each from the section A and B. Section C is compulsory.

B) Instructions For The Candidates

Candidates are required to attempt five questions in all by selecting at least two questions each from the section A and B. Section C is compulsory.

Course Objectives: The primary objectives of this course are:

i. To give an introduction to the .net framework.
ii. Explain how to create dynamic Web pages by using ASP.NET.
iii. Create a user interface on an ASP.NET page by using standard Web server controls.
iv. Create a user control and a custom server control and add them to an ASP.NET page.
v. Able to create your own Website, enhanced by using Master pages and Themes.
vi. Display dynamic data from a data source by using ADO.Net and data binding.

SECTION-A

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

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

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

Introduction to Classes and objects

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

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

SECTION-B

Rich Web Controls: -Accepting file uploads, displaying a calendar, Displaying advertisement, displaying different page views, displaying a wizard. List Controls: Dropdown list control, Radio button, list controls. Grid View Controls: Grid view control fundamentals, using field with the grid view control,

working with grid view control events extending the grid view control. Debugging, caching and deploying ASP .NET pages.

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

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

Course Learning Outcomes: At the end of this course, students will be able to:

i. Understand the Microsoft .NET Framework and ASP.NET page structure
ii. Design web application with variety of controls
iii. Access the data using inbuilt data access tools
iv. Use Microsoft ADO.NET to access data in web Application
v. Configure and deploy Web Application
vi. Develop secured web application

References:

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

BCA-302 Computer Graphics

Maximum Marks: 100 **Time Allowed: 3 Hours**
External Examination: 70 Marks **Pass Percentage: 35%**
Internal Assessment: 30 Marks **Teaching Hours per week: 4**
Credits: 4 (4L)

A) Instruction For The Paper Setter

The question paper will consist of three sections A, B and C. Section A and B will have four questions from the respective section of the syllabus carrying 10.5 marks for each question. Section C will consist of 5-10 short answer type questions carrying a total of 28 marks, which will cover the entire syllabus uniformly. Candidates are required to attempt five questions in all by selecting at least two questions each from the section A and B. Section C is compulsory.

B) Instructions For The Candidates

Candidates are required to attempt five questions in all by selecting at least two questions each from the section A and B. Section C is compulsory.

Course Objectives: The main objectives of this course are:

i. To introduce students with fundamental concepts and theory of computer graphics.
ii. To understand the working of drawing algorithms.
iii. To introduce 2-Dimensional transformations and Clipping.
iv. To introduce 3-Dimensional transformations and Clipping

SECTION-A

Introduction: Active and Passive Graphics, Applications of Computer Graphics.

Input devices: Light pens, Graphic tablets, Joysticks, Trackball, Data Glove, Digitizers, Image scanner, Graphs and Types of Graphs.

Video Display Devices: Refresh Cathode Ray Tube, Raster Scan displays, Random Scan displays, Architecture of Raster and Random Scan Monitors, Color CRT-monitors and Color generating techniques (Shadow Mask, Beam Penetration), Direct View Storage Tube, Flat-Panel Displays.

3-D Viewing Devices: Raster Scan Systems, Random Scan Systems, Graphics monitors and workstations, Color Models (RGB and CMY), Lookup Table.

SECTION-B

Scan Conversion: Process and need of Scan Conversion, Scan conversion algorithms for Line, Circle and Ellipse, Effect of Scan Conversion, Bresenham's Algorithms for line and circle along with their derivations, Midpoint Circle Algorithm, Area filling techniques, Flood fill techniques, Character Generation.

2-Dimensional Graphics: Cartesian and Homogeneous co-ordinate system, Matrix Representation, Geometric transformations (Translation, Scaling, Rotation, Reflection, Shearing), Two-dimensional viewing transformation and clipping (line, polygon and text), Cohen Sutherland, Sutherland Hodgeman and Liang Barsky algorithm for clipping.

3-dimensional Graphics: Geometric Transformations (Translation, Scaling, Rotation, Reflection, Shearing), Introduction to 3-D viewing Transformations and Clipping.

Course Learning Outcomes: At the end of this course, students will be able to have:

i. Knowledge and understanding of the structure of an interactive computer graphics system and the separation of system components.
ii. Knowledge and understanding of geometrical transformations and 3D viewing.
iii. Knowledge and understanding of techniques for representing 3D geometrical objects

Suggested Books:

1. D. Hearn and M.P. Baker, "Computer Graphics", PHI New Delhi; Second Edition, 1995.
2. J.D. Foley, A.V. Dam, S.K. Feiner, J.F. Hughes,. R.L Phillips, "Introduction to Computer Graphics", Addison-Wesley Publishing company, N.Y.; Second Edition,1994.
3. R.A. Plastock and G. Kalley, "Computer Graphics", McGraw Hill, 1986.

BCA-303 Linux Administration

Maximum Marks: 100 **Time Allowed: 3 Hours**
External Examination: 70 Marks **Pass Percentage: 35%**
Internal Assessment: 30 Marks **Teaching Hours per week: 4**
Credits: 4 (4L)

A) Instruction For The Paper Setter

The question paper will consist of three sections A, B and C. Section A and B will have four questions from the respective section of the syllabus carrying 10.5 marks for each question. Section C will consist of 5-10 short answer type questions carrying a total of 28 marks, which will cover the entire syllabus uniformly. Candidates are required to attempt five questions in all by selecting at least two questions each from the section A and B. Section C is compulsory.

B) Instructions For The Candidates

Candidates are required to attempt five questions in all by selecting at least two questions each from the section A and B. Section C is compulsory.

Course Objectives: The main objectives of this course are to:

i. Explain the fundamental concepts of Linux Operating System.
ii. Understand the basic set of commands and editors in Linux.
iii. Understand the Linux File System in detail.
iv. Introduce Shells in brief.
v. Demonstrate the role and responsibilities of a Linux system administrator.

SECTION-A

Introduction: Overview of Linux, Linux's History, Advantages of Linux, Minimum System Requirements;

Installing Linux: Choosing Text or Graphics Installation, Setting up your Hard Drive, Understanding the Swap Space, Creating the Linux File-system partition, Setting up the mouse, root password and Ethernet, Configuration X, Selecting packages to Install, Creating the BootDisk.

Using LILO boot manager: Installing LILO, LILO make-file, Updating LILO, Removing or Disabling LILO, Troubleshooting LILO. The Boot Process, Startup Scripts, Shutdown, Halt and reboot, Creating a New Login, Virtual Terminals, Running as root.

Basic Linux Commands: How Linux Commands Work, Command Options & Parameters, Input and Output Redirection, Mian pages, Wildcards: * and ?, Environment Variables, The process status Commands : ps, termination command : kill, the su command, the grep command.

SECTION-B

Linux File System: Common types of files, filenames, Inodes, The root directory, How directories are named, Navigating the Linux file System: pwd command, Absolute and relative filenames; cd command, Creating and Deleting files : Cat, Creating Directories, Moving and Copying files, Moving Directories, Removing files and directories, Important directories in the Linux file System, /home, /bin, /usr, /usr/bin, /var/spool, /dev, /sbin, /etc. File and Directory ownership, Groups, Changing group ownership, File Permissions, UMASK Setting, Changing

File Permission, Changing directory permissions; Bash: What is Shell? How the Shell gets Started, The most common Shells;

Linux for System Administrators: System Administration Basics, The root Account, Starting and Stopping the System, Booting from a Floppy, Using LILO to Boot, Shutting Down Linux; Mounting File Systems: Mounting a Floppy, CD-ROM, Creating a New file System, Un-mounting file Systems, Backup and restore: Compressing files with gzip, Using tar and cpio; Setting up your System: Setting the System Name, Using a Maintenance Disk, Forgetting the root Password, Setting the Login Message.

Course Learning Outcomes: At the end of this course, students will be able to learn:

i. Basic Concepts of Linux.
ii. How to install Linux on your System.
iii. To use basic Linux Commands.
iv. To create file systems and directories and operate them.
v. To perform System Administration Tasks.

References:

1. Tim Parker: Linux Unleashed Third Edition, Techmedia,1999.
2. Tackett, J: Special Edition using LINUX,PHI.
3. Norton, P. : Complete guide to LINUX,Techmedia.
4. Komarinski, M: LINUX System Administration Handbook,AW.
5. SUMITABHA DAS : UNIX Concepts & Application 2nd Edition, TataMcGraw-Hill

BCA-304 (E1) Enterprise Resource Planning

Maximum Marks: 100 **Time Allowed: 3 Hours**
External Examination: 70 Marks **Pass Percentage: 35%**
Internal Assessment: 30 Marks **Teaching Hours per week: 6**
Credits: 6 (5L+1T)

A) Instruction For The Paper Setter

The question paper will consist of three sections A, B and C. Section A and B will have four questions from the respective section of the syllabus carrying 10.5 marks for each question. Section C will consist of 5-10 short answer type questions carrying a total of 28 marks, which will cover the entire syllabus uniformly. Candidates are required to attempt five questions in all by selecting at least two questions each from the section A and B. Section C is compulsory.

B) Instructions For The Candidates

Candidates are required to attempt five questions in all by selecting at least two questions each from the section A and B. Section C is compulsory.

Course Objectives: The main objectives of this course are:

i. To provide a contemporary and forward-looking on the theory and practice of Enterprise Resource Planning Technology.
ii. To focus on a strong emphasis upon practice of theory in Applications and Practical oriented approach.
iii. To train the students to develop the basic understanding of how ERP enriches the business organizations in achieving a multidimensional growth.
iv. To aim at preparing the students technological competitive and make them ready to self-upgrade with the higher technical skills.

SECTION-A

Overview of Enterprise Systems: Evolution - Risks and benefits - Fundamental technology - Issues to be considered in planning design and implementation of cross functional integrated ERP systems.

ERP Solutions and Functional Modules: Overview of ERP software solutions- Small, medium and large enterprise vendor solutions, BPR, and best business practices - Business process Management, Functional modules.

SECTION-B

ERP Implementation: Planning Evaluation and selection of ERP systems - Implementation life cycle – ERP implementation, Methodology and Frame work- Training – Data Migration, People Organization in implementation, Consultants, Vendors and Employees.

Post Implementation: Maintenance of ERP- Organizational and Industrial impact; Success and Failure factors of ERP Implementation.

Emerging Trends on ERP: Extended ERP systems and ERP add-ons -CRM, SCM.

Course Learning Outcomes: At the end of this course, students will be able to:

i. Make basic use of Enterprise software, and its role in integrating business functions
ii. Analyze the strategic options for ERP identification and adoption.

iii. Design the ERP implementation strategies.
iv. Create reengineered business processes for successful ERP implementation.

Text Book:

1. Enterprise Resource Planning – Alexis Leon – Second Edition – TMH

Reference Books:

1. ERP in practice – Vaman – TMH
2. Daniel E.O'Leary, Enterprise Resource Planning Systems, Cambridge University Press, 2002.
3. Ellen Monk, Bret Wagner, Concepts in Enterprise resource planning, Cengage learning, Third edition, 2009.

BCA-304 (E2) Management Information System

Maximum Marks: 100 **Time Allowed: 3 Hours**
External Examination: 70 Marks **Pass Percentage: 35%**
Internal Assessment: 30 Marks **Teaching Hours per week: 6**
Credits: 6 (5L+1T)

A) Instruction For The Paper Setter

The question paper will consist of three sections A, B and C. Section A and B will have four questions from the respective section of the syllabus carrying 10.5 marks for each question. Section C will consist of 5-10 short answer type questions carrying a total of 28 marks, which will cover the entire syllabus uniformly. Candidates are required to attempt five questions in all by selecting at least two questions each from the section A and B. Section C is compulsory.

B) Instructions For The Candidates

Candidates are required to attempt five questions in all by selecting at least two questions each from the section A and B. Section C is compulsory.

Course Objectives: The main objectives of this course are:

i. To understand the basic concepts and role of information systems.
ii. To describe information and system in a Business Environment.
iii. To learn developing MIS with different Models.
iv. To learn how MIS and DSS are related to each other.

SECTION-A

Management Information system: Meaning and definition, Role of information system, Nature and scope of MIS.

Information and system concepts: Definition and types of information, Information quality, dimensions of information, value of information, general model of human as an information processor. System related concepts, elements of a system, and types of system.

Role and importance of Management: Introduction, levels and functions of management. Structure and classification of MIS, Components of MIS, Framework for understanding MIS: Robert Anthony's hierarchy of management activity, Information requirements.

SECTION-B

Decision Making & MIS: Decision making concept, types of decisions, methods of choosing among alternatives, Role of MIS in decision making. Simon's model of decision making, Structured and unstructured decisions.

Development of MIS: Stages in the development of MIS, System development approaches: Waterfall model, Prototyping, Iterative enhancement model, Spiral model.

Applications of information systems in Functional areas: Sales &Marketing MIS, Financial MIS, Production MIS, Personnel MIS.

Decision Support Systems: Definition and Characteristics, Types, Components, Functions, Tools and Models for decision support, MIS versus DSS.

Course Learning Outcomes: At the end of this course, students will be able to:

i. Understand the role of Information Systems in contemporary organizations.
ii. Understand the role of information systems in process of decision making.
iii. Understand the leadership role of Management Information Systems in achieving business competitive advantage through informed decision making.

Text Book:

1. D.P. Goyal, Management Information Systems: Managerial Perspectives, Macmillan India Ltd.

Reference Books:

1. Robert G. Murdick, Joel E. Ross, James R. Claggett, Information Systems for Modern Management, Prentice Hall of India Pvt. Ltd.
2. Gordon B. Davis, M.H. Olson, Management Information Systems: Conceptual Foundations, Structure & Development, McGraw-Hill Book Co.
3. W.S. Jawadekar, Management Information Systems, Tata McGraw-Hill Publishing Co.

BCA-305 Software Lab-IX
(Based on BCA-301: Web Designing using ASP.NET)

Maximum Marks: 100 **Time Allowed: 3 Hours**
External Examination: 70 Marks **Pass Percentage: 35%**
Internal Assessment: 30 Marks **Teaching Hours per week: 4**
Credits: 2 (2P)

This laboratory course will comprise of exercises to supplement what is learnt under paper BCA-301: Web Designing using ASP.NET.
The breakup of marks for the practical will be as under: -

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

Students are required to develop the following programs with internal documentation:

1. Write a program to show the use of standard controls in a web form.
2. Write a program containing the list controls and its functions.
3. Write a program to show the use of file upload and calendar control.
4. Write a program to display advertisement on a web page.
5. Write a program to create an admission form for a college.
6. Write a program to demonstrate the master page.
7. Write a program to create login page which accepts user name and password, then check for authenticationof the user.
8. Write a program that demonstrate a textbox for a user input name and validate it forRequiredField Validation.
9. Create a user control that displays the current date and time. Include it in a Web Form and refresh it each time a button is clicked.
10. Create a user control that receives the user name and password from the user and validates them. If the user name is “Radiant” and the password is “asp.net” then the user is authorized, otherwise not.
11. Write a program to demonstrate ADO.NET controls.
12. Write a program to demonstrate submits data in database by using the ado.net controls.

BCA-306 Software Lab-X
(Based on BCA-302: Computer Graphics)

Maximum Marks: 100 **Time Allowed: 3 Hours**
External Examination: 70 Marks **Pass Percentage: 35%**
Internal Assessment: 30 Marks **Teaching Hours per week: 4**
Credits: 2 (2P)

This laboratory course will comprise of exercises to supplement what is learnt under paper BCA-302: Computer Graphics.

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

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

Students are required to develop the following programs in C/C++ with internal documentation:

1. Write a program to draw pixel.
2. Write a program to draw a vertical line and horizontal line.
3. Write a program to draw a line using Bresenham's algorithm.
4. Write a program to draw a line using DDA algorithm.
5. Write a program to draw a 2d-bar and 3d-bar.
6. Write a program to draw 3D-bar graph using graphics.
7. Write a program to draw an arc, circle, rectangle.
8. Draw a circle using trigonometry method and Bresenham'salogorithm.
9. Write a Program to draw animation using increasing circles filled with different colors and patterns.
10. Program to show 2-D scaling.
11. Write a Program to implement Digital Clock.

BCA-307 Software Lab-XI
(Based on BCA-303: Linux Administration)

Maximum Marks: 100 **Time Allowed: 3 Hours**
External Examination: 70 Marks **Pass Percentage: 35%**
Internal Assessment: 30 Marks **Teaching Hours per week: 4**
Credits: 2 (2P)

This laboratory course will comprise of exercises to supplement what is learnt under paper BCA-303: Linux Administration.

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

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

Students are required to develop the following practical with internal documentation:

1. Commands wd, cd, mkdir, cat,more,less,head,tail,ls,date, cal, rmdir, mv,rm,cp
2. Demonstration of chmod command
3. How to list hidden files/directories
4. How to skip current (.) and previous directory (..) entries in the output
5. How to display files/directories in reverse order
6. How to sort ls command output based on file extensions
7. How to sort files based on modification time
8. How to list subdirectories recursively
9. How to list filenames along with their inode numbers
10. How to display detailed information about files and directories
11. How to display author information
12. Setting the System Name
13. Forgetting the root Password
14. Shutting Down Linux

ਬੀ.ਸੀ.ਏ. ਭਾਗ ਤੀਜਾ ,ਸਮੈਸਟਰ ਪੰਜਵਾਂ

ਵਿਸ਼ਾ:ਪੰਜਾਬੀ ਲਾਜ਼ਮੀ

ਸੈਸ਼ਨ :2021-22,2022-23,2023-24,ਪੇਪਰ ਕੋਡ:PBCA- 501A

ਕੁੱਲ ਅੰਕ :50 ਸਮਾਂ:3 ਘੰਟੇ

ਬਾਹਰੀ ਪਰੀਖਿਆ:35 ਅੰਕ ਪਾਸ ਅੰਕ:35%

ਅੰਦਰੂਨੀ ਮੁਲਾਂਕਣ :15 ਅੰਕ ਕੁੱਲ ਲੈਕਚਰ:30

ਕ੍ਰੈਡਿਟ-02

ਪਾਠਕ੍ਰਮ ਅਤੇ ਪ੍ਰਸ਼ਨ-ਪੱਤਰ ਦੀ ਰੂਪ-ਰੇਖਾ :

ਭਾਗ-ਓ

ਓ 1- ਏਹੁ ਹਮਾਰਾ ਜੀਵਣਾ (ਨਾਵਲ): ਦਲੀਪ ਕੌਰ ਟਿਵਾਣਾ,ਲੋਕਗੀਤ ਪ੍ਰਕਾਸ਼ਨ,ਚੰਡੀਗੜ੍ਹ

ਭਾਗ-ਅ

ਅ-1:ਕੋਸ਼ਕਾਰੀ:ਵਿਸ਼ਵਕੋਸ਼,ਤਕਨੀਕੀ ਸ਼ਬਦਾਵਲੀ ਕੋਸ਼,ਵਿਕੀਪੀਡੀਆ(ਸਰੂਪ ਅਤੇ ਨਿਖੇੜਾ)

ਅ-2: ਵਿਆਕਰਨ

(i) ਨਾਂਵ ਵਾਕੰਸ਼:ਪਰਿਭਾਸ਼ਾ,ਬਣਤਰ ਅਤੇ ਕਾਰਜ

(ii) ਕਿਰਿਆ ਵਾਕੰਸ਼:ਪਰਿਭਾਸ਼ਾ,ਬਣਤਰ ਅਤੇ ਕਾਰਜ

ਭਾਗ-ਏ

ਨਾਵਲ ਅਤੇ ਵਿਆਕਰਨ ਵਿਚੋਂ ਸੰਖੇਪ ਉੱਤਰਾਂ ਵਾਲੇ 15 ਲਾਜ਼ਮੀ ਪ੍ਰਸ਼ਨ

ਪੇਪਰ ਸੈਟਰ ਅਤੇ ਵਿਦਿਆਰਥੀਆਂ ਲਈ ਹਦਾਇਤਾਂ:

1.ਭਾਗ-ਓ:1 ਵਿਚੋਂ ਨਾਵਲ ਦਾ ਵਿਸ਼ਾ-ਵਸਤੂ/ਸਾਰ/ਕਲਾ ਪੱਖ/ਲੇਖਕ ਦਾ ਯੋਗਦਾਨ (ਦੋ ਵਿਚੋਂ ਇੱਕ) 08 ਅੰਕ

2.ਭਾਗ-ਅ:1 ਵਿਚੋਂ ਕੋਸ਼ਕਾਰੀ ਨਾਲ ਸੰਬੰਧਿਤ ਪ੍ਰਸ਼ਨ (ਤਿੰਨ ਵਿਚੋਂ ਇੱਕ) 04ਅੰਕ

3.ਭਾਗ-ਅ:2 ਵਿਚੋਂ ਵਿਆਕਰਨ ਨਾਲ ਸੰਬੰਧਿਤ ਵਰਣਾਤਮਕ ਪ੍ਰਸ਼ਨ (ਦੋ ਵਿਚੋਂ ਇੱਕ) 08 ਅੰਕ

4. ਭਾਗ-ਏ ਵਿਚ ਨਾਵਲ ਦੀ ਪਾਠ-ਪੁਸਤਕ ਅਤੇ ਵਿਆਕਰਨ ਵਿੱਚੋਂ ਕੁੱਲ 15(8+7) ਸੰਖੇਪ ਉੱਤਰਾਂ ਵਾਲੇ ਲਾਜ਼ਮੀ ਪ੍ਰਸ਼ਨ। ਹਰੇਕ ਪ੍ਰਸ਼ਨ 01 ਅੰਕ ਦਾ ਹੋਵੇਗਾ ।(15X1=15ਅੰਕ)

ਪਾਠਕ੍ਰਮ ਦਾ ਉਦੇਸ਼:

1.ਵਿਦਿਆਰਥੀਆਂ ਵਿਚ ਸਾਹਿਤ ਪੜ੍ਹਨ ਦੀ ਰੁਚੀ ਪੈਦਾ ਕਰਨਾ।

2.ਮਾਤ ਭਾਸ਼ਾ ਪੰਜਾਬੀ ਵਿੱਚ ਉਚੇਰੀ ਸਿੱਖਿਆ ਗ੍ਰਹਿਣ ਕਰਨ ਦੀ ਜਾਗ ਲਾਉਣਾ।

3.ਵਿਦਿਆਰਥੀਆਂ ਨੂੰ ਵਿਆਕਰਨ ਅਤੇ ਕੋਸ਼ਕਾਰੀ ਬਾਰੇ ਜਾਣਕਾਰੀ ਦੇਣਾ।

ਪਾਠਕ੍ਰਮ ਨਤੀਜੇ:

1.ਵਿਦਿਆਰਥੀਆਂ ਅੰਦਰ ਨਾਵਲ ਰਾਹੀਂ ਪਾਠਗਤ ਅਤੇ ਵਿਹਾਰਕ ਅਧਿਐਨ ਮੁਹਾਰਤ ਪੈਦਾ ਹੁੰਦੀ ਹੈ।

2. ਵਿਦਿਆਰਥੀ ਵਿਆਕਰਨਕ ਨੇਮ-ਵਿਧਾਨ ਅਤੇ ਕੋਸ਼ਕਾਰੀ ਤੋਂ ਜਾਣੂ ਹੁੰਦਾ ਹੈ।

ਸਹਾਇਕ ਪੁਸਤਕਾਂ

1. ਜੋਗਿੰਦਰ ਸਿੰਘ ਰਾਹੀ,ਪੰਜਾਬੀ ਨਾਵਲ,ਨਾਨਕ ਸਿੰਘ ਪੁਸਤਕਮਾਲਾ,ਅੰਮ੍ਰਿਤਸਰ,1978

2. ਟੀ.ਆਰ.ਵਿਨੋਦ,ਪੰਜਾਬੀ ਨਾਵਲ ਅਧਿਐਨ, ਲਾਹੌਰ ਬੁੱਕ ਸ਼ਾਪ,ਲੁਧਿਆਣਾ,1988

3. ਨਰਿੰਦਰਜੀਤ ਕੌਰ,ਦਲੀਪ ਕੌਰ ਟਿਵਾਣਾ ਭਾਸ਼ਾਈ ਅਧਿਐਨ,ਲਾਹੌਰ ਬੁੱਕ ਸ਼ਾਪ,ਲੁਧਿਆਣਾ।

4. ਬੂਟਾ ਸਿੰਘ ਬਰਾੜ, ਪੰਜਾਬੀ ਵਿਆਕਰਨ ਸਿਧਾਂਤ ਅਤੇ ਵਿਹਾਰ,ਚੇਤਨਾ ਪ੍ਰਕਾਸ਼ਨ ,ਲੁਧਿਆਣਾ,2008

APPROVED

5.ਬਲਦੇਵ ਸਿੰਘ ਚੀਮਾ, ਪੰਜਾਬੀ ਵਿਆਕਰਨ ਤੇ ਭਾਸ਼ਾ ਵਿਗਿਆਨ,ਤਕਨੀਕੀ ਸ਼ਬਦਾਵਲੀ ਦਾ ਵਿਸ਼ਾ ਕੋਸ਼,ਪਬਲੀਕੇਸ਼ਨ ਬਿਊਰੋ

ਪੰਜਾਬੀ ਯੂਨੀਵਰਸਿਟੀ,ਪਟਿਆਲਾ,2009

6.ਡਾ.ਜੋਗਿੰਦਰ ਸਿੰਘ ਪੁਆਰ ਸੰਪਾ.ਭਾਸ਼ਾ ਵਿਗਿਆਨ,ਪੰਜਾਬੀ ਭਾਸ਼ਾ ਅਕਾਦਮੀ,ਜਲੰਧਰ,2001

7.ਸੁਖਵਿੰਦਰ ਸਿੰਘ ਸੰਘਾ,ਪੰਜਾਬੀ ਭਾਸ਼ਾ ਵਿਗਿਆਨ,ਪੰਜਾਬੀ ਭਾਸ਼ਾ ਅਕਾਦਮੀ,ਜਲੰਧਰ,1999

8.ਹਰਕੀਰਤ ਸਿੰਘ,ਰੂਪਾਂਤਰੀ ਵਿਆਕਰਣ,ਪੰਜਾਬ ਸਟੇਟ ਯੂਨੀਵਰਸਿਟੀ ਟੈਕਸਟ ਬੁੱਕ ਬੋਰਡ,ਚੰਡੀਗੜ੍ਹ।

ਬੀ.ਸੀ.ਏ. ਭਾਗ ਤੀਜਾ,ਸਮੈਸਟਰ ਪੰਜਵਾਂ

ਵਿਸ਼ਾ:ਪੰਜਾਬੀ ਮੁੱਢਲਾ ਗਿਆਨ

ਸੈਸ਼ਨ : 2021-22,2022-23,2023-24,ਪੇਪਰ ਕੋਡ:PBCA-501B

ਕੁੱਲ ਅੰਕ :50 **ਸਮਾਂ:3 ਘੰਟੇ**

ਬਾਹਰੀ ਪਰੀਖਿਆ:35ਅੰਕ **ਪਾਸ ਅੰਕ:35%**

ਅੰਦਰੂਨੀ ਮੁਲਾਂਕਣ :15 ਅੰਕ **ਕੁੱਲ ਲੈਕਚਰ:30**

ਕ੍ਰੈਡਿਟ-04

ਪਾਠਕ੍ਰਮ ਅਤੇ ਪ੍ਰਸ਼ਨ-ਪੱਤਰ ਦੀ ਰੂਪ-ਰੇਖਾ

ਭਾਗ-ਓ

ਓ -ਅੱਖਰ ਗਿਆਨ(ਭਾਗ-ਤੀਜਾ),ਮੁੱਖ ਸੰਪਾ. ਡਾ.ਜਸਵੀਰ ਸਿੰਘ,ਸ੍ਰੀ ਗੁਰੂ ਤੇਗ਼ ਬਹਾਦਰ ਖ਼ਾਲਸਾ ਕਾਲਜ,ਸ੍ਰੀ ਅਨੰਦਪੁਰ ਸਾਹਿਬ,ਪਬਲੀਕੇਸ਼ਨ ਬਿਊਰੋ,ਪੁਸਤਕ ਵਿੱਚੋਂ ਨਿਬੰਧ ਵਾਲਾ ਭਾਗ

ਭਾਗ-ਅ

ਅ-1.ਅਖਾਣ (ਅਰਥ ਦੱਸ ਕੇ ਵਾਕਾਂ ਵਿਚ ਵਰਤਣਾ)

ਅ-2 .ਦਫ਼ਤਰੀ ਚਿੱਠੀ-ਪੱਤਰ

ਭਾਗ-ਏ

ਨਿਬੰਧਾਂ ਵਿਚੋਂ 15 ਅਬਜੈਕਟਿਵ ਪ੍ਰਸ਼ਨ

ਪੇਪਰ ਸੈੱਟਰ/ਵਿਦਿਆਰਥੀਆਂ ਲਈ ਹਦਾਇਤਾਂ:

1.ਸਾਰਾ ਸਿਲੇਬਸ 'ਅੱਖਰ ਗਿਆਨ (ਭਾਗ-ਤੀਜਾ)'ਵਿਚੋਂ ਹੀ ਪਾਇਆ ਜਾਵੇ।

2.ਭਾਗ-ਓ: ਵਿਚ ਨਿਬੰਧ ਦਾ ਵਿਸ਼ਾ-ਵਸਤੂ /ਸਾਰ (ਤਿੰਨ ਵਿਚੋਂ ਇੱਕ) 06ਅੰਕ

3.ਭਾਗ-ਅ:1 ਵਿਚੋਂ ਅਖਾਣ(ਅਰਥ ਦੱਸ ਕੇ ਵਾਕਾਂ ਵਿਚ ਵਰਤਣੇ) (ਪੰਦਰਾਂ ਵਿਚੋਂ ਦਸ) 10X1=10 ਅੰਕ

4.ਭਾਗ-ਅ:2 ਵਿਚੋਂ ਦਫ਼ਤਰੀ ਚਿੱਠੀ-ਪੱਤਰ (ਤਿੰਨ ਵਿਚੋਂ ਇਕ) 04 ਅੰਕ

5.ਭਾਗ-ਏ ਵਿਚ ਨਿਬੰਧਾਂ ਵਿਚੋਂ ਲਾਜ਼ਮੀ ਕੁੱਲ 15 ਅਬਜੈਕਟਿਵ ਪ੍ਰਸ਼ਨ।ਹਰੇਕ ਪ੍ਰਸ਼ਨ 01 ਅੰਕ ਦਾ ਹੋਵੇਗਾ।(15X1=15 ਅੰਕ)

ਪਾਠਕ੍ਰਮ ਦਾ ਉਦੇਸ਼:

1.ਵਿਦਿਆਰਥੀਆਂ ਨੂੰ ਸ਼ੁੱਧ ਪੰਜਾਬੀ ਪੜ੍ਹਨਾ,ਲਿਖਣਾ ਅਤੇ ਬੋਲਣਾ ਸਿਖਾਉਣਾ।

2.ਵਿਦਿਆਰਥੀਆਂ ਨੂੰ ਨਿਬੰਧਾਂ ਅਤੇ ਅਖਾਣਾਂ ਰਾਹੀਂ ਪੰਜਾਬੀ ਸਾਹਿਤ ਅਤੇ ਸਭਿਆਚਾਰ ਨਾਲ ਜੋੜ੍ਹਨਾ।

ਪਾਠਕ੍ਰਮ ਨਤੀਜੇ:

1. ਵਿਦਿਆਰਥੀ ਗੁਰਮੁਖੀ ਸਿੱਖ ਕੇ ਪੰਜਾਬੀ ਭਾਸ਼ਾ ਵਿਚ ਸੰਵਾਦ ਰਚਾਉਣ ਦੇ ਯੋਗ ਹੁੰਦਾ ਹੈ।

2. ਵਿਦਿਆਰਥੀ ਪੰਜਾਬੀ ਭਾਸ਼ਾ ਦਾ ਅਮੀਰ ਸਾਹਿਤ ਪੜ੍ਹਦਾ ਹੈ।

ਸਹਾਇਕ ਪੁਸਤਕਾਂ:

1.ਡਾ.ਸੋਹਿੰਦਰ ਸਿੰਘ ਵਣਜਾਰਾ ਬੇਦੀ,ਲੋਕ ਆਖਦੇ ਹਨ,ਪੰਜਾਬੀ ਸਾਹਿਤ ਅਕਾਦਮੀ,ਲੁਧਿਆਣਾ।

2.ਪ੍ਰੋ.ਬਿਕਰਮ ਸਿੰਘ ਘੁੰਮਣ ਸੰਪਾ.ਪੰਜਾਬੀ ਮੁਹਾਵਰਾ ਅਤੇ ਅਖਾਣ ਕੋਸ਼,ਵਾਰਿਸ ਸ਼ਾਹ ਫਾਉਂਡੇਸ਼ਨ,ਅੰਮ੍ਰਿਤਸਰ।

3.ਡਾ.ਹਰਕੀਰਤ ਸਿੰਘ,ਪੰਜਾਬੀ ਸ਼ਬਦ ਰੂਪ ਤੇ ਸ਼ਬਦ ਜੋੜ ਕੋਸ਼,ਪੰਜਾਬੀ ਯੂਨੀਵਰਸਿਟੀ,ਪਟਿਆਲਾ।

BCA-311 Web Development using PHP and MYSQL

Maximum Marks: 100 **Time Allowed: 3 Hours**
External Examination: 70 Marks **Pass Percentage: 35%**
Internal Assessment: 30 Marks **Teaching Hours per week: 4**
Credits: 4 (4L)

A) Instruction For The Paper Setter

The question paper will consist of three sections A, B and C. Section A and B will have four questions from the respective section of the syllabus carrying 10.5 marks for each question. Section C will consist of 5-10 short answer type questions carrying a total of 28 marks, which will cover the entire syllabus uniformly. Candidates are required to attempt five questions in all by selecting at least two questions each from the section A and B. Section C is compulsory.

B) Instructions For The Candidates

Candidates are required to attempt five questions in all by selecting at least two questions each from the section A and B. Section C is compulsory.

Course Objectives: The main objectives of this course are:

i. To provide the necessary knowledge to design and develop dynamic, database-driven web applications using PHP.
ii. To make students learn how to connect to any ODBC-compliant database and perform hands on practice with a MySQL database to create database-driven HTML forms and reports etc.
iii. To make students learn how to configure PHP and Apache Web Server.
iv. Outline the principles behind using MySQL as a backend DBMS with PHP.

SECTION-A

PHP: A Brief History of PHP, Introduction to PHP, Syntax, Scope of Variables: Global and Local Variables, Data types, Control Statements, Operators- Arithmetic, Logical, Relational and Bit-Wise operators. Functions, JavaScript functions Local and Global scope, Calling Functions, Defining a Function, Built-in functions. Installing and Configuring PHP on Windows.Installing web site on web server-Apache, WAMP.Creating Arrays, Multidimensional Arrays, Cookies.Document Object Model and Finding Elements.Basic Events, Standard Event Model.

String: Quoting String Constants - Printing Strings - Accessing Individual Characters -Cleaning Strings - Encoding and Escaping -Comparing Strings - Manipulating and Searching Strings – Regular Expressions.

SECTION -B

Connecting to MySQL from PHP: Server side programming, Client Side Scripting, WAMP tool, HTML Form Fields (Controls), PHP Form Handling, Form Validations.

Objects: Terminology - Creating an Object - Accessing Properties and Methods - Declaring a Class - Introspection – Serialization Extending PHP.

AJAX: Introduction, Identifiers, Variables, Defined Constants, Operators and Expressions.HTML Form Fields (Controls).

Architectural Overview: The pval/zval Data Type, Parameter Handling, Returning Values, References, Global Variables.

Introduction to MySql: Data Types, Sql Queries:Creating Database, Creating Table, Inserting, Updating, Deleting Data. Searching, Sorting, Altering table.

Course Learning Outcomes: At the end of this course, students will be able to:

i. List the major elements of the PHP & MySQL work and explain why PHP is good for web development.
ii. Analyze the basic structure of a PHP web application and be able to install and maintain the web server, compile, and run a simple web application.
iii. Create PHP programs that use various PHP library functions and that manipulate files and directories.
iv. Get hands-on experience on various techniques of web development and will be able to design and develop a complete website.

Reference Books:

1. Robin Nixon, Learning PHP, MySQL, and JavaScript, Shroff/O'Reilly.
2. Raj Kamal, Internet and Web Technologies, Tata McGraw-Hill.
3. Matt Zandstra, Sams Teach Yourself PHP in 24 Hours, Sams Publishing.
4. Steven M. Schafer, HTML, CSS, JavaScript, Perl, Python and PHP, Wiley India

BCA-312 Artificial Intelligence

Maximum Marks: 100 **Time Allowed: 3 Hours**
External Examination: 70 Marks **Pass Percentage: 35%**
Internal Assessment: 30 Marks **Teaching Hours per week: 6**
Credits:6 (5L+1T)

A) Instruction For The Paper Setter

The question paper will consist of three sections A, B and C. Section A and B will have four questions from the respective section of the syllabus carrying 10.5 marks for each question. Section C will consist of 5-10 short answer type questions carrying a total of 28 marks, which will cover the entire syllabus uniformly. Candidates are required to attempt five questions in all by selecting at least two questions each from the section A and B. Section C is compulsory.

B) Instructions For The Candidates

Candidates are required to attempt five questions in all by selecting at least two questions each from the section A and B. Section C is compulsory.

Course Objectives: The main objectives of this course are:

i. To give a historical perspective of AI and its applications.
ii. To make the students familiar with basic principles of AI toward Problem Solving, Inference, Knowledge representation and Learning.
iii. To understand the applications of AI techniques in intelligent agents and expert systems.
iv. To have an introduction with Natural Language Processing.

SECTION-A

Introduction: Introduction to Artificial Intelligence, History and Applications, Intelligent agents: Reactive, Deliberative, Goal-driven, Utility-driven and Learning agents.

Problem Solving: Defining problem as state space search, problem characteristics, Blind search, Heuristic search, Hill Climbing, Best-first, Constraint Satisfaction, AI Problems: Water-Jug Problem, 8-Puzzle problem, 8-Queens problem.

Logical Reasoning: Introduction to Prepositional Logic: Syntax, Semantics, Inference methods in Prepositional Logic. Introduction to Predicate Logic: Syntax, Semantics of Predicate Logic, Clausal form, Resolution, Unification, Inference Mechanisms.

SECTION-B

Knowledge: Introduction and Importance of Knowledge, Knowledge based systems, Knowledge Representation: Approaches to Knowledge representation, Issues in Knowledge representation, Knowledge representation using rules, Semantic Nets, Frames, Conceptual Dependencies, Scripts, CYC, Knowledge Organization and Manipulation.

Learning: Introduction, Role of Learning, Types of Learning, General Learning Model, Performance Measures.

Expert Systems: Introduction, Rule-Based Architectures, Nonproduction system architectures, Expert System Shells, Knowledge Acquisition and Validation.

Introduction to Natural Language Processing (NLP).

Course Learning Outcomes: At the end of this course, students will be able:

i. Understand the various searching techniques, constraint satisfaction problem and example problems- game playing techniques.
ii. To understand concept of Knowledge Representation and Predicate Logic and transform the real life information in different representation.
iii. To understand State-Space and it's searching strategies.
iv. Explain the role of agents and how it is related to environment and the way of evaluating it and how agents can act by establishing goals.

Text Books:

1. DAN.W. Patterson, Introduction to A.I and Expert Systems – PHI, 2007.
2. Russell & Norvig, Artificial Intelligence-A Modern Approach, LPE, Pearson Prentice Hall, 2nd edition, 2005.
3. Rich & Knight, Artificial Intelligence – Tata McGraw Hill, 2nd edition, 1991.

BCA-313 (E1) Programming using Python

Maximum Marks: 100 **Time Allowed: 3 Hours**
External Examination: 70 Marks **Pass Percentage: 35%**
Internal Assessment: 30 Marks **Teaching Hours per week: 4**
Credits: 4 (4L)

A) Instruction For The Paper Setter

The question paper will consist of three sections A, B and C. Section A and B will have four questions from the respective section of the syllabus carrying 10.5 marks for each question. Section C will consist of 5-10 short answer type questions carrying a total of 28 marks, which will cover the entire syllabus uniformly. Candidates are required to attempt five questions in all by selecting at least two questions each from the section A and B. Section C is compulsory.

B) Instructions For The Candidates

Candidates are required to attempt five questions in all by selecting at least two questions each from the section A and B. Section C is compulsory.

Course Objectives: The main objectives of this course are:

i. To learn and understand Python programming basics and paradigm.
ii. To learn and understand Python looping, control statements and string manipulations.
iii. To write simple Python programs for solving problems.
iv. Decompose a Python program into functions, lists etc.

SECTION-A

Basics of Python: History, Features,Strength and Weakness, Different Versions, Working with Python, Basic Syntax, indentation; keywords, identifiers, assignment statements, expressions, Variable and Data Types,Data Types Conversion, Printing on screen, Reading data from keyboard.

Operators: Arithmetic, Comparison, Assignment, Bitwise, Logical, Membership, Identity, Operators Precedence,

Conditional Statements: if, if- else, Nested if-else.

Looping: for, while, Nested loops, break and continue statements.

Lists: Introduction, Accessing list, Operations, Working with lists, Function and Methods.

Tuple: Introduction, Accessing tuples, Operations, Working Functions and Methods.

Dictionaries: Introduction, Accessing values in dictionaries, Working with dictionaries, Properties.

Python Functions: Function introduction, Types of functions, Functions with parameters, Keywords and optional parameters, Scope of variables (Global and Local), Anonymous function – Lambda, In-build function, List Comprehension.

SECTION-B

String Manipulation: Accessing Strings, len, min, max functions, indexing, slicing, concatenation, in / not in operator, comparing strings. Substring search and split functions.

Formatting: the format() method, arguments- format field names. Formatting numbers and strings: rounding, precision, scientific notation, percentage, width and justify.

Python Modules: Modules, Standard Modules (Math, Sys module), Import Statement, from statement, Dir() functions.

OOPs concepts in Python- Class and object, Encapsulation, Data Abstraction, Inheritance, Polymorphism; Creating and accessing objects attributes and methods, Python Constructors, Python Inheritance- multiple and multilevel.

Course Learning Outcomes: At the end of this course, students will be able:

i. Define and demonstrate the use of built-in data structures lists, tuples and dictionary.
ii. Design and implement a program to solve a real world problem.
iii. To learn how to build and package Python modules for reusability.
iv. To learn how to design object-oriented programs with Python classes.

Text Books:

1. Paul Gries, Jennifer Campbell, Jason Montojo, Practical Programming- An Introduction to Computer Science Using Python 3.6, Shroff Publications and Distributors.

Reference Books:

1. John V Guttag, Introduction to Computation and Programming Using Python‘‘, Revised and expanded Edition, MIT Press.
2. Robert Sedgewick, Kevin Wayne, Robert Dondero, ―Introduction to Programming in Python: An Inter-disciplinary Approach, Pearson India Education Services Pvt. Ltd.
3. Timothy A. Budd, Exploring Python, Mc-Graw Hill Education (India) Private Ltd.
4. Paul Gries, Jennifer Campbell and Jason Montojo, Practical Programming: An Introduction to Computer Science using Python 3, Second edition, Pragmatic Programmers, LLC.
5. Rossum, Introduction To Python ,Shroff Publications and Distributors
6. Downey,Think Python 2/ED, Shroff Publications and Distributors
7. Lutz, Learning Python, 5/ED, Shroff Publications and Distributors
8. Campbell, Practical Programming: An Introduction to Computer Science Using Python, Shroff Publications and Distributors.

BCA-313 (E2) Digital Image Processing

Maximum Marks: 100 **Time Allowed: 3 Hours**
External Examination: 70 Marks **Pass Percentage: 35%**
Internal Assessment: 30 Marks **Teaching Hours per week: 4**
Credits: 4 (4L)

A) Instruction For The Paper Setter

The question paper will consist of three sections A, B and C. Section A and B will have four questions from the respective section of the syllabus carrying 10.5 marks for each question. Section C will consist of 5-10 short answer type questions carrying a total of 28 marks, which will cover the entire syllabus uniformly. Candidates are required to attempt five questions in all by selecting at least two questions each from the section A and B. Section C is compulsory.

B) Instructions For The Candidates

Candidates are required to attempt five questions in all by selecting at least two questions each from the section A and B. Section C is compulsory.

Course Objectives: The main objectives of this course are:

i. To introduce the concepts of image processing and basic analytical methods to be used in image processing.
ii. To familiarize students with image enhancement and restoration techniques.
iii. To explain different image compression techniques.
iv. To introduce segmentation and morphological processing techniques.

SECTION-A

Introduction: Fundamentals of Image formation, components of image processing system, image sampling and quantization.

Image Enhancement in the spatial domain: Basic gray-level transformation, histogram processing, arithmetic and logic operators, basic spatial filtering, smoothing and sharpening spatial filters.

Image Restoration: A model of the image degradation/restoration process, noise models, restoration in the presence of noise–only spatial filtering, Weiner filtering, constrained least squares filtering, geometric transforms; Introduction to the image enhance in frequency domain.

SECTION-B

Image Compression: Need of image compression, image compression models, error-free compression, lossy predictive coding, image compression standards.

Morphological Image Processing: Preliminaries, dilation, erosion, open and closing, basic morphologic algorithms, The Hit-or-Miss Transformation

Image Segmentation: Detection of discontinuous, edge linking and boundary detection, thresholding, Hough Transform Line Detection and Linking, region–based segmentation.

Object Recognition: Patterns and patterns classes, matching, classifiers.

Course Learning Outcomes: After the successful completion of the course the students will be able to:

1. Explain the fundamentals of digital image and its processing.

2. Perform image enhancement techniques in spatial and frequency domain.
3. Elucidate the mathematical modelling of image restoration and compression.
4. Apply the concept of image segmentation.
5. Describe object detection and recognition techniques.

Text Books:

1. Digital Image Processing, RafealC.Gonzalez, Richard E.Woods, Second Edition, Pearson Education/PHI.

Reference Books:

1. Image Processing, Analysis, and Machine Vision, Milan Sonka, Vaclav Hlavac and Roger Boyle, Second Edition, Thomson Learning.
2. Introduction to Digital Image Processing with Matlab, Alasdair McAndrew, Thomson Course Technology.
3. Computer Vision and Image Processing, Adrian Low, Second Edition, B. S. Publications.
4. Digital Image Processing using Matlab, RafealC.Gonzalez, Richard E.Woods, Steven L. Eddins, Pearson Education.

BCA-314 Software Lab-XII
(Based on BCA-311: Web Development using PHP & MYSQL)

Maximum Marks: 100 **Time Allowed: 3 Hours**
External Examination: 70 Marks **Pass Percentage: 35%**
Internal Assessment: 30 Marks **Teaching Hours per week: 4**
Credits: 2 (2P)

This laboratory course will comprise of exercises to supplement what is learnt under paper BCA-311: Web Development using PHP & MYSQL.
The breakup of marks for the practical will be as under: -

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

Students are required to develop the following practical with internal documentation:

1. Write a program to print any text in PHP.
2. Write a program to print the data types of PHP i.e. using String, Integer, Floating point numbers, Boolean, Array, Object, NULL.
3. Write a program of arithmetic operators.
4. Write any program of using conditional Statements.
5. Write a program to implement switch case in PHP.
6. Write a program to add two numbers using functions.
7. Write a program to implement while loop .
8. Print different values using for each loop.
9. Create a Date From a String With PHP strtotime() function
10. Write a program to open, read and close file in PHP.
11. Write a function to connect and create database using PHP.
12. Write a program to implement mail function.
13. Write a program to implement WHERE clause in php MySQL?
14. Write a program to implement file upload using PHP.
15. Write a program to start, store and delete session variable.

BCA-315 Software Lab-XIII
(Based on BCA-313 (E1): Programming using Python)

Maximum Marks: 100 **Time Allowed: 3 Hours**
External Examination: 70 Marks **Pass Percentage: 35%**
Internal Assessment: 30 Marks **Teaching Hours per week: 4**
Credits: 2 (2P)

This laboratory course will comprise of exercises to supplement what is learnt under paper BCA-321 (E1): Programming using Python.
The breakup of marks for the practical will be as under: -

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

Students are required to develop the following practical with internal documentation:

1. Write a program to perform arithmetic operations.
2. Write a program to display various types and their values.
3. Write a program to display string operations.
4. Write a program to find area of rectangle.
5. Write a program to find cube.
6. Write a program to compare two numbers is greater, smaller and equal.
7. Write a program to find greater of three numbers.
8. Write a program to find grade of a student.
9. Write a program to implement for loop.
10. Write a program print the even numbers up to a given range.
11. Write a program to find sum of first n numbers.
12. Write a program to find factorial of first numbers.
13. Write a program to display the pyramid.
14. Write a program to display matrix addition.
15. Write a program to display matrix multiplication.
16. Write a program to create a list of 10 numbers and multiply each element by 2 and display the list.
17. Write a program to create dictionary and display it.
18. Write a program to add, delete and iterating the dictionary.
19. Write a program to find the cube of number using function.
20. Write a program to find area of rectangle using function.
21. Write a program to make a class.
22. Write a program to show the concept of overriding.

BCA-315 Software Lab-XIII
(Based on BCA-313 (E2): Digital Image Processing)

Maximum Marks: 100 **Time Allowed: 3 Hours**
External Examination: 70 Marks **Pass Percentage: 35%**
Internal Assessment: 30 Marks **Teaching Hours per week: 4**
Credits: 2 (2P)

This laboratory course will comprise of exercises to supplement what is learnt under paper BCA-313 (E2): Digital Image Processing.
The breakup of marks for the practical will be as under: -

iv.	Internal Assessment	30Marks
v.	Viva Voce (External Evaluation)	40Marks
vi.	Lab Record, Program Development and Execution (External Evaluation)	30Marks

Students are required to develop the following practical with internal documentation:

1. Program to extract different Attributes of an Image.
2. Program for Image Negation.
3. Program for Power Law Transformation.
4. Program for Histogram Mapping and Equalization.
5. Program for Image Smoothening and Sharpening.
6. Program for Edge Detection.
7. Program for Morphological Operations on Binary Images.
8. Program for Pseudo Coloring.
9. Program for Chain Coding.
10. Program for DCT/IDCT Computation.

BCA-316 Major Project

Maximum Marks: 100 **Pass Percentage: 35%**
External Examination: 70 Marks **Internal Assessment: 30 Marks**
Credits: 6

In this course, Students are required to make a Major Project based on any of the technologies learnt so far (ASP.NET/PHP). Students have to submit a Project Report to their Internal Supervisor. The marks distribution of the External Examination will be as follow:

Project Report & Presentation:	**45 Marks**
Viva-Voce:	**25 Marks**

ਬੀ.ਸੀ.ਏ ਭਾਗ ਤੀਜਾ ,ਸਮੈਸਟਰ ਛੇਵਾਂ

ਸੈਸ਼ਨ:2021–22,2022–23,2023–24 ,ਪੇਪਰ ਕੋਡ:PBCA-601A

ਵਿਸ਼ਾ:ਪੰਜਾਬੀ ਲਾਜ਼ਮੀ

ਕੁੱਲ ਅੰਕ :50 **ਸਮਾਂ:3 ਘੰਟੇ**

ਬਾਹਰੀ ਪਰੀਖਿਆ:35 ਅੰਕ **ਪਾਸ ਅੰਕ:35%**

ਅੰਦਰੂਨੀ ਮੁਲਾਂਕਣ :15 ਅੰਕ **ਕੁੱਲ ਲੈਕਚਰ:30**

ਕ੍ਰੈਡਿਟ–02

ਪਾਠਕ੍ਰਮ ਅਤੇ ਪ੍ਰਸ਼ਨ–ਪੱਤਰ ਦੀ ਰੂਪ–ਰੇਖਾ

ਭਾਗ–ਓ

ਓ 1–ਝਨਾਂ ਦੇ ਪਾਣੀ (ਨਾਟਕ–ਸੰਗ੍ਰਹਿ):ਅਜਮੇਰ ਸਿੰਘ ਔਲਖ

ਭਾਗ–ਅ

ਅ–1:ਸਭਿਆਚਾਰ ਅਤੇ ਚਲੰਤ ਮਸਲਿਆਂ ਨਾਲ ਸੰਬੰਧਿਤ ਨਿਬੰਧ ਰਚਨਾ

ਅ-2 ਵਿਆਕਰਨ**:**

i.ਕਾਰਕ ਅਤੇ ਕਾਰਕੀ ਸੰਬੰਧ

ii.ਵਾਕਾਤਮਕ ਜੁਗਤਾਂ:ਮੇਲ ਅਤੇ ਅਧਿਕਾਰ

ਭਾਗ–ਏ

ਝਨਾਂ ਦੇ ਪਾਣੀ ਅਤੇ ਵਿਆਕਰਨ ਵਾਲੇ ਭਾਗ ਵਿਚੋਂ ਸੰਖੇਪ ਉੱਤਰਾਂ ਵਾਲੇ 15 ਪ੍ਰਸ਼ਨ

ਪੇਪਰ ਸੈੱਟਰ ਅਤੇ ਵਿਦਿਆਰਥੀਆਂ ਲਈ ਹਦਾਇਤਾਂ:

1.ਭਾਗ–ਓ: ਵਿਚੋਂ ਨਾਟਕ ਦਾ ਵਿਸ਼ਾ–ਵਸਤੂ /ਸਾਰ/ਕਲਾ ਪੱਖ/ਲੇਖਕ ਦਾ ਯੋਗਦਾਨ (ਤਿੰਨ ਵਿਚੋਂ ਇੱਕ)10 ਅੰਕ

2.ਭਾਗ–ਅ:1 ਵਿਚੋਂ ਨਿਬੰਧ ਰਚਨਾ (ਤਿੰਨ ਵਿਚੋਂ ਇੱਕ) 05 ਅੰਕ

3.ਭਾਗ–ਅ:2 ਵਿਚੋਂ ਵਿਆਕਰਨ ਨਾਲ ਸੰਬੰਧਿਤ ਵਰਣਾਤਮਕ ਪ੍ਰਸ਼ਨ (ਦੋ ਵਿਚੋਂ ਇੱਕ) 10 ਅੰਕ

4.ਭਾਗ–ਏ ਵਿਚ ਨਾਟਕ ਵਿਚੋਂ 08ਅਤੇ ਵਿਆਕਰਨ ਵਿੱਚੋਂ 07(ਕੁੱਲ 15) ਲਾਜ਼ਮੀ ਸੰਖੇਪ ਪ੍ਰਸ਼ਨ। ਹਰੇਕ ਪ੍ਰਸ਼ਨ 01 ਅੰਕ ਦਾ ਹੋਵੇਗਾ।

15X1=15 ਅੰਕ

ਪਾਠਕ੍ਰਮ ਦਾ ਉਦੇਸ਼:

1.ਵਿਦਿਆਰਥੀਆਂ ਅੰਦਰ ਸਾਹਿਤਕ ਰੁਚੀਆਂ ਪੈਦਾ ਕਰਨਾ।

2.ਮਾਤ ਭਾਸ਼ਾ ਵਿੱਚ ਉਚੇਰੀ ਸਿੱਖਿਆ ਗ੍ਰਹਿਣ ਕਰਨ ਦੀ ਜਾਗ ਲਾਉਣਾ।

3.ਵਿਆਕਰਨਕ ਪੱਖਾਂ ਨਾਲ ਰਾਬਤਾ ਕਾਇਮ ਕਰਵਾਉਣਾ।

4.ਵਿਸ਼ੇ ਦੀ ਮੁਹਾਰਤ ਹਾਸਿਲ ਕਰਨ ਦੇ ਕਾਬਿਲ ਬਣਾਉਣਾ।

ਪਾਠਕ੍ਰਮ ਨਤੀਜੇ:

1. ਵਿਦਿਆਰਥੀਆਂ ਅੰਦਰ ਨਾਟਕ ਨਾਲ ਸੰਬੰਧਿਤ ਪਰਤਾਂ ਨੂੰ ਉਜਾਗਰ ਕਰਨ ਦਾ ਹੁਨਰ ਪੈਦਾ ਹੋਵੇਗਾ।

2. ਵਿਦਿਆਰਥੀ ਵਿਆਕਰਨਕ ਨੇਮ–ਵਿਧਾਨ ਅਤੇ ਸਮਕਾਲੀ ਸਮਾਜ ਵਿਚਲੇ ਮਸਲਿਆਂ ਤੋਂ ਜਾਣੂ ਹੋਣਗੇ।

ਸਹਾਇਕ ਪੁਸਤਕਾਂ:

1. ਕਰਮਜੀਤ ਸਿੰਘ, ਆਧੁਨਿਕ ਪੰਜਾਬੀ ਕਾਵਿ ਧਰਾਵਾਂ ਦੇ ਵਿਚਾਰਧਾਰਾਈ ਆਧਾਰ, ਗੁਰੂ ਨਾਨਕ ਦੇਵ ਯੂਨੀਵਰਸਿਟੀ, ਅੰਮ੍ਰਿਤਸਰ।
2. ਸਤਿੰਦਰ ਸਿੰਘ, ਆਧੁਨਿਕ ਪੰਜਾਬੀ ਕਾਵਿ ਰੂਪ ਅਧਿਐਨ, ਗੁਰੂ ਨਾਨਕ ਦੇਵ ਯੂਨੀਵਰਸਿਟੀ,ਅੰਮ੍ਰਿਤਸਰ, 1980
3. ਸਤਨਾਮ ਸਿੰਘ ਸੰਧੂ, ਕਾਵਿ-ਯਥਾਰਥ, ਮਦਾਨ ਪਬਿਲਸ਼ਰਜ ,ਪਟਿਆਲਾ, 1994
4. ਬੂਟਾ ਸਿੰਘ ਬਰਾੜ, ਪੰਜਾਬੀ ਵਿਆਕਰਨ ਸਿਧਾਂਤ ਅਤੇ ਵਿਹਾਰ,ਚੇਤਨਾ ਪ੍ਰਕਾਸ਼ਨ ,ਲੁਧਿਆਣਾ,2008
5. ਬਲਦੇਵ ਸਿੰਘ ਚੀਮਾ, ਪੰਜਾਬੀ ਵਿਆਕਰਨ ਤੇ ਭਾਸ਼ਾ ਵਿਗਿਆਨ,ਤਕਨੀਕੀ ਸ਼ਬਦਾਵਲੀ ਦਾ ਵਿਸ਼ਾ ਕੋਸ਼,
6. ਪਬਲੀਕੇਸ਼ਨ ਬਿਊਰੋ ਪੰਜਾਬੀ ਯੂਨੀਵਰਸਿਟੀ,ਪਟਿਆਲਾ,2009
7. ਡਾ.ਜੋਗਿੰਦਰ ਸਿੰਘ ਪੁਆਰ ਸੰਪਾ.ਭਾਸ਼ਾ ਵਿਗਿਆਨ,ਪੰਜਾਬੀ ਭਾਸ਼ਾ ਅਕਾਦਮੀ,ਜਲੰਧਰ,2001
8. ਸੁਖਵਿੰਦਰ ਸਿੰਘ ਸੰਘਾ,ਪੰਜਾਬੀ ਭਾਸ਼ਾ ਵਿਗਿਆਨ,ਪੰਜਾਬੀ ਭਾਸ਼ਾ ਅਕਾਦਮੀ,ਜਲੰਧਰ,19998.
9. ਹਰਕੀਰਤ ਸਿੰਘ,ਰੂਪਾਂਤਰੀ ਵਿਆਕਰਣ,ਪੰਜਾਬ ਸਟੇਟ ਯੂਨੀਵਰਸਿਟੀ ਟੈਕਸਟ ਬੁੱਕ ਬੋਰਡ,ਚੰਡੀਗੜ੍ਹ।

ਬੀ.ਸੀ.ਏ. ਭਾਗ ਤੀਜਾ ,ਸਮੈਸਟਰ ਛੇਵਾਂ

ਸੈਸ਼ਨ:2021-22,2022-23,2023-24,ਪੇਪਰ ਕੋਡ:PBCA- 601B

ਵਿਸ਼ਾ:ਪੰਜਾਬੀ ਮੁੱਢਲਾ ਗਿਆਨ

ਕੁੱਲ ਅੰਕ :50 **ਸਮਾਂ:**3 ਘੰਟੇ

ਬਾਹਰੀ ਪਰੀਖਿਆ:35 ਅੰਕ **ਪਾਸ ਅੰਕ:**35%

ਅੰਦਰੂਨੀ ਮੁਲਾਂਕਣ :15 ਅੰਕ **ਕੁੱਲ ਲੈਕਚਰ:**30

ਕ੍ਰੈਡਿਟ-02

ਪਾਠਕ੍ਰਮ ਅਤੇ ਪ੍ਰਸ਼ਨ-ਪੱਤਰ ਦੀ ਰੂਪ-ਰੇਖਾ

ਭਾਗ-ਓ

ਓ -ਅੱਖਰ ਗਿਆਨ (ਭਾਗ-ਤੀਜਾ),ਮੁੱਖ ਸੰਪਾ. ਡਾ.ਜਸਵੀਰ ਸਿੰਘ , ਸ੍ਰੀ ਗੁਰੂ ਤੇਗ਼ ਬਹਾਦਰ ਖ਼ਾਲਸਾ ਕਾਲਜ,ਸ੍ਰੀ ਅਨੰਦਪੁਰ ਸਾਹਿਬ,ਪਬਲੀਕੇਸ਼ਨ ਬਿਊਰੋ,ਪੁਸਤਕ ਵਿੱਚੋਂ ਇਕਾਂਗੀਆਂ ਵਾਲਾ ਭਾਗ

ਭਾਗ-ਅ

ਅ-1.ਬਹੁਤੇ ਸ਼ਬਦਾਂ ਦੀ ਥਾਂ ਇੱਕ ਸ਼ਬਦ

ਅ-2 .ਮੁਹਾਵਰੇ

ਭਾਗ-ਏ

ਇਕਾਂਗੀਆਂ ਵਿਚੋਂ 10 ਅਬਜੈਕਟਿਵ ਪ੍ਰਸ਼ਨ

ਪੇਪਰ ਸੈੱਟਰ ਅਤੇ ਵਿਦਿਆਰਥੀਆਂ ਲਈ ਹਦਾਇਤਾਂ:

1.ਸਾਰਾ ਸਿਲੇਬਸ 'ਅੱਖਰ ਗਿਆਨ (ਭਾਗ-ਤੀਜਾ)'ਵਿਚੋਂ ਹੀ ਪਾਇਆ ਜਾਵੇ।

2.ਭਾਗ-ਓ: ਵਿਚ ਇਕਾਂਗੀ ਦਾ ਵਿਸ਼ਾ-ਵਸਤੂ /ਸਾਰ (ਤਿੰਨ ਵਿਚੋਂ ਇੱਕ) 5 ਅੰਕ

3.ਭਾਗ-ਅ:1 ਵਿਚ ਬਹੁਤੇ ਸ਼ਬਦਾਂ ਦੀ ਥਾਂ ਇੱਕ ਸ਼ਬਦ (ਪੰਦਰਾਂ ਵਿਚੋਂ ਦਸ) 10 X 1=10 ਅੰਕ

4. ਭਾਗ-ਅ:2 ਵਿਚ ਮੁਹਾਵਰੇ(ਅਰਥ ਦੱਸ ਕੇ ਵਾਕਾਂ ਵਿਚ ਵਰਤਣੇ) (ਪੰਦਰਾਂ ਵਿਚੋਂ ਦਸ) 10 X 1=10 ਅੰਕ

5.ਭਾਗ-ਏ ਵਿਚ ਇਕਾਂਗੀਆਂ ਵਿਚੋਂ ਕੁੱਲ 10 ਅਬਜੈਕਟਿਵ ਪ੍ਰਸ਼ਨ। ਇੱਕ ਪ੍ਰਸ਼ਨ 01ਅੰਕ ਦਾ ਹੋਵੇਗਾ ।
(10X1=10 ਅੰਕ)

ਪਾਠਕ੍ਰਮ ਦਾ ਉਦੇਸ਼:

1.ਵਿਦਿਆਰਥੀਆਂ ਨੂੰ ਸ਼ੁੱਧ ਪੰਜਾਬੀ ਪੜ੍ਹਨਾ,ਲਿਖਣਾ ਅਤੇ ਬੋਲਣਾ ਸਿਖਾਉਣਾ।

2.ਵਿਦਿਆਰਥੀਆਂ ਨੂੰ ਇਕਾਂਗੀਆਂ ਅਤੇ ਮੁਹਾਵਰਿਆਂ ਰਾਹੀਂ ਪੰਜਾਬੀ ਸਾਹਿਤ ਅਤੇ ਸਭਿਆਚਾਰ ਨਾਲ ਜੋੜ੍ਹਨਾ।

ਪਾਠਕ੍ਰਮ ਨਤੀਜੇ:

1. ਵਿਦਿਆਰਥੀ ਗੁਰਮੁਖੀ ਸਿੱਖ ਕੇ ਪੰਜਾਬੀ ਭਾਸ਼ਾ ਵਿਚ ਸੰਵਾਦ ਰਚਾਉਣ ਦੇ ਯੋਗ ਹੁੰਦਾ ਹੈ।

2. ਵਿਦਿਆਰਥੀ ਪੰਜਾਬੀ ਭਾਸ਼ਾ ਦਾ ਅਮੀਰ ਸਾਹਿਤ ਪੜ੍ਹਦਾ ਹੈ।

ਸਹਾਇਕ ਪੁਸਤਕਾਂ:

1.ਡਾ.ਸੋਹਿੰਦਰ ਸਿੰਘ ਵਣਜਾਰਾ ਬੇਦੀ,ਲੋਕ ਆਖਦੇ ਹਨ,ਪੰਜਾਬੀ ਸਾਹਿਤ ਅਕਾਦਮੀ,ਲੁਧਿਆਣਾ।

2.ਪ੍ਰੋ.ਬਿਕਰਮ ਸਿੰਘ ਘੁੰਮਣ ਸੰਪਾ.ਪੰਜਾਬੀ ਮੁਹਾਵਰਾ ਅਤੇ ਅਖਾਣ ਕੋਸ਼,ਵਾਰਿਸ ਸ਼ਾਹ ਫਾਉਂਡੇਸ਼ਨ,ਅੰਮ੍ਰਿਤਸਰ।

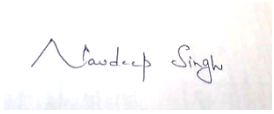
3.ਡਾ.ਹਰਕੀਰਤ ਸਿੰਘ,ਪੰਜਾਬੀ ਸ਼ਬਦ ਰੂਪ ਤੇ ਸ਼ਬਦ ਜੋੜ ਕੋਸ਼,ਪੰਜਾਬੀ ਯੂਨੀਵਰਸਿਟੀ,ਪਟਿਆਲਾ।

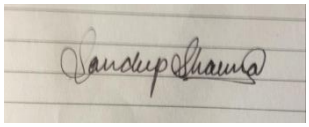
Note:

1. **Credits are exceeded due to Credits given to Course work of Punjabi Compulsory as per Punjab State Policy.**

Members of Board of Studies

1. Dr. Surender Kumar **2. Dr. Dharamveer Sharma** **3. Dr. Major Singh Goraya**





4. Dr. Navdeep Singh **5. Mr. Sandeep Sharma** **6. Mr. Rakesh Kumar**

7. Prof. Tajinder Kaur **8. Prof. Paramjit Kaur** **9. Prof. Amandeep Kaur**

APPROVED