SYLLABUS FOR THE BATCH FROM THE YEAR 2024 TO YEAR 2028

Programme Code: BAIDS

Programme Name: B.Sc. (Artificial Intelligence & Data Science)

(Semester I-II)

Examinations: 2024-2028

P.G. Department of Computer Science & Applications

Khalsa College, Amritsar

Programme name: B.Sc. (Artificial Intelligence & Data Science)
Programme code: BAIDS
Programme Duration :3 years/4 years (as per NEP 2020)

Programme Objectives

1.	The main objective of this Programme is to enable the students to get a very good exposure to the field of artificial intelligence and data science.
2.	This Programme aims to equip the students with statistical and mathematical reasoning, machine learning to develop their own customized data science algorithms needed for deriving insights from very large data sets.
3.	To prepare students with the skills to perform intelligent data analysis that is a key component in numerous real-world applications.
4.	Expertized with the principles of Artificial Intelligence and problem solving, inference, perception, knowledge representation, and machine learning.
5.	To exhibit high standards with regard to application of AI techniques in intelligent agents, expert systems, artificial neural networks and other machine learning models.

Programme Specific Outcomes (PSOs):

PSO-1.	Students gain knowledge in the areas like Soft Computing, Artificial Intelligence, Data Science, Paradigm of Programming language, Design and Analysis of Algorithms, Database Technologies core computing subjects.
PSO-2.	Students understand all dimensions of the concepts of software application and projects.
PSO-3.	To make students employable according to current demand of Data Science & Artificial Intelligence Industry.
PSO-4.	Work in a collaborative manner with others on a team, contributing to the management, planning and implementation of a computer system.

B.Sc. (Artificial Intelligence & Data Science)

Semester–I

SN	Course Code	Course Name	Distribution of The Marks				Lectures Per week			Credit Distribution			Total Credit L+T+P	Page No.
			Theory	Internal Assessment	Practical	Total	L	T	P	L	T	P		
Discipline Specific Course(DSC)														
1	BAIDS-111	Basics of AI & Data Science	75	25	-	100	5	1	0	3	1	0	4	4-5
2	BAIDS-112	Computational Problem-Solving Using Python	75	25	-	100	5	1	0	3	1	0	4	6-7
3	BAIDS-113	Big Data Analytics	75	25	-	100	5	1	0	3	1	0	4	8-9
4	BAIDS-114P	LAB I: Computational Problem-Solving Using Python	-	13	37	50	0	0	6	0	0	2	2	16
5	BAIDS-115P	Lab II: MS Office 2010/Open Office	-	13	37	50	0	0	6	0	0	2	2	17-18
Ability Enhancement Course (AEC)														
4	BCSE-1122	Communication Skills in English	60	25	15	100	4	0	2	3	0	1	4	10-11
5	BHPB-1101/ BPBI-1102 /BPHC-1104	Punjabi/ Basic Punjabi (Mudhli Punjabi) (Compulsory)/ Punjab History & Culture	75	25	-	100	6	0	0	4	0	0	4	12-15
Skill Enhancement Course(SEC)														
6	SEC-114	Creative Writing in Punjabi	37	13	-	50	0	0	3	0	0	2	2	19
Value Added Course(VAC)														
8	ZDA111	*Drug Abuse: Problem, Management and Prevention(Compulsory paper)	-	-	-	25	2	0	0	1	0	0	1	20-21
											Total Credits=27			

Note: * This paper marks will not be included in the total marks.

B.Sc. (Artificial Intelligence & Data Science)
Semester – I
BAIDS-111: Basics of AI & Data Science
Discipline Specific Course (DSC)

Time: 3 Hrs. **Total Marks: 100**

Credits		
L	**T**	**P**
3	**1**	**0**

Theory Marks: 75

Theory Internal Assessment Marks:25

Note for paper setter and students:

1. **Medium of Examination is English Language.**
2. **There will be five sections.**
3. **Section A is compulsory and will be of 15 marks consisting of 8 short answer type questions carrying 2.5 mark each covering the whole syllabus. The answer should not exceed 50 words. The students will have to attempt any 6 questions in this section.**
4. **Sections B, C, D and E will be set from units I, II, III & IV respectively and will consist of two questions of 15 marks each from the respective unit. The students are required to attempt one question from each of these sections.**

Course Objectives:

The main objective of this course is to help the students to understand the basic concepts of artificial intelligence and data science.

UNIT-I

Introduction to Artificial Intelligence: Definition of AI, History of AI, Intelligent Agents, Different types of agents, Problem solving.

Uninformed Search: Breadth First Search, Depth First Search, Depth-Limited Search, Iterative Deepening search.

Heuristic Search technologies: Introduction to heuristic search, Generate and test, Hill Climbing, Best First search, A*, Problem reduction, AO*, Constraint satisfaction.

UNIT-II

Knowledge, Reasoning and Planning: Logical Agents, Classical Planning, A brief introduction to Knowledge representation and Reasoning.

Learning: Learning from examples, Knowledge in learning.

Communicating, perceiving, and Acting: Communication, Natural Language Processing, Perception, Robotics.

Introduction to Data Science: Need for Data Science, Benefits of Data Science, Foundation of Data Science, Data Science process.

UNIT-III

Data Exploration and Preparation: Messy data, Anomalies and artefacts in datasets, Cleaning data.

Data Representation and Transformation: Forms of data- tabular, text data, graph-based data, Modern databases- text files, spreadsheets, SQL databases, NoSQL databases, distributed databases, live data streams.

UNIT-IV

Data modelling: Basics of Generative Modelling and Predictive Modelling.

Data Visualization and Presentation: Charts-histograms, scatter plots, time series plots etc, Graphs, 3D Visualization, and Presentation.

References:

1. S.J. Russell and P. Norvig, "Artificial Intelligence: A Modern Approach", Pearson.
2. Rich Elaine, Knight Kevin, and Shankar B. Nair, "Artificial Intelligence, Third Edition, Tata-McGraw Hill.
3. Sinan Ozdemir: "Principles of Data Science", Pack Publishing.
4. Foster Provost and Tom Fawcett, "Data Science for Business" O'Reilly.
5. Roger D. Peng & Elizabeth Matsui: "The Art of Data Science" Lean Publishing.

Course Outcomes (Cos):

On the completion of this course, the students will be able:

CO-1.	To familiarize with the concept of artificial intelligence, intelligent agents and different searching techniques.
CO-2.	To understand the basic areas of artificial intelligence including knowledge representation, reasoning, learning, natural language processing, and robotics.
CO-3.	To understand the different needs and benefits of data science.
CO-4.	To acquire the knowledge of preprocessing techniques which are required for the conversion of raw data to the form helpful for further analysis.
CO-5.	To acquire in-depth knowledge about the different methods of data representation and data visualization.

B.Sc. (Artificial Intelligence & Data Science)

Semester – I

BAIDS-112: Computational Problem-Solving Using Python

Discipline Specific Course (DSC)

Time: 3 Hrs. **Total Marks: 100**

Credits		
L	**T**	**P**
3	**1**	**0**

Theory Marks: 75

Theory Internal Assessment Marks:25

Note for paper setter and students:

1. **Medium of Examination is English Language.**
2. **There will be five sections.**
3. **Section A is compulsory and will be of 15 marks consisting of 8 short answer type questions carrying 2.5 mark each covering the whole syllabus. The answer should not exceed 50 words. The students will have to attempt any 6 questions in this section.**
4. **Sections B, C, D and E will be set from units I, II, III & IV respectively and will consist of two questions of 15 marks each from the respective unit. The students are required to attempt one question from each of these sections.**

Course Objectives:

1.	Demonstrate the ability to solve problems using system approaches, critical and innovative thinking, and technology to create solutions.
2.	Understand the purpose and technology to create solutions.
3.	Create scripts in Python.
4.	Design and develop applications using Python.

UNIT I

Python Introduction: Installing and setting Python environment in Windows and Linux, basics of Python interpreter, Execution of python program, Editor for Python code, syntax, variable, types.

Flow control: if, if-else, for, while, range function, continue, pass, break. Strings: Sequence operations, String Methods, Pattern Matching.

Lists: Basic Operations, Iteration, Indexing, Slicing and Matrixes; Dictionaries: Basic dictionary operations; Tuples and Files.

UNIT II

Functions: Definition, Call, Arguments, Scope rules and Name resolution; Modules: Module Coding Basics, Importing Programs as Modules, Executing Modules as Scripts, Compiled Python files(.pyc).

Standard Modules: OS and SYS, The dir() Function, Packages.

Input output and file handling, Object Oriented Programming features in Python: Classes, Objects, Inheritance, Operator Overloading.

UNIT III

Errors and Exceptions: try, except and else statements, Exception Objects, Regular expressions, Multithreading, Modules to handle multidimensional data: Numpy, Panadas.

Networking: Socket module, Port Scanning, Packet Sniffing, Traffic Analysis, TCP Packet Injection, Log analysis. HTTP Communications with Python built in Libraries, Web communications with the Requests module.

UNIT-IV

Forensic Investigations with Python: geo-locating, recovering deleted items, examining metadata and windows registry.

References:

1 . Lutz Mark, (2009). Learning Python, Latest Edition., O'REILLY Media, Inc.

2. TJ. O'Connor, Violent Python A Cookbook for Hackers, Forensic Analysts, Penetration Testers and Security Engineers(2013), Elsevier.

3. Seitz Justin , (2009). Gray Hat Python: Python Programming with Hackers and Reverse Engineers, Latest Edition, No Starch Press, Inc.

4. Seitz Justin , (2015). Black Hat Python: Python Programming for Hackers and Pentesters, Latest Edition, No Starch Press, Inc

5. Berry Paul, (2011). Head First Python. Latest Edition, O'REILLY Media, Inc.

Course Outcomes:

At the end of this course student will be able to:

CO-1.	Describe the core syntax and semantics of Python programming language.
CO-2.	Discover the need for working with the strings and functions.
CO-3.	Illustrate the process of structuring the data using lists and dictionaries.
CO-4.	Infer the Object-oriented Programming concepts in Python.
CO-5.	To develop the ability to write database applications in Python.

B.Sc. (Artificial Intelligence & Data Science)
Semester – I
BAIDS-113:Big Data Analytics
Discipline Specific Course (DSC)

Time: 3 Hrs. **Total Marks: 100**

Credits		
L	T	P
3	1	0

Theory Marks: 75

Theory Internal Assessment Marks:25

Note for paper setter and students:

1. **Medium of Examination is English Language.**
2. **There will be five sections.**
3. **Section A is compulsory and will be of 15 marks consisting of 8 short answer type questions carrying 2.5 mark each covering the whole syllabus. The answer should not exceed 50 words. The students will have to attempt any 6 questions in this section.**
4. **Sections B, C, D and E will be set from units I, II, III & IV respectively and will consist of two questions of 15 marks each from the respective unit. The students are required to attempt one question from each of these sections.**

Course Objectives:

1.	The Major objective is to optimize business decisions and create competitive advantage with Big Data analytics.
2.	This course provides an overview of Big Data, i.e. storage, retrieval and processing of big data.
3.	It also helps to use various techniques for mining data stream in with reference to big data.
4.	Provide an overview of Apache Hadoop along with understanding of Map Reduce Job.
5.	Exposure to Data Analytics with R Programming Language.

UNIT-I

INTRODUCTION TO BIG DATA: Data Storage and Analysis, Characteristics of Big Data, Evolution of Big Data, Definition of Big Data, Challenges with Big Data,3Vs of Big Data, Business Intelligence vs. Big Data. Big Data Analytics: Classification of analytics, Data Science Terminologies in Big Data, CAP Theorem, BASE Concept.

UNIT-II

BASICS OF HDFS (Hadoop Distributed File System): History of Hadoop, Requirement of Hadoop Framework, Design principles of Hadoop, Comparison with other system, Hadoop Distributed File System, Components of Hadoop, Analysing the Data with Hadoop, Command Line Interface, Hadoop file system interfaces, Data flow, Data Ingest with Flume.

Map Reduce: Introduction to Map Reduce, Anatomy of a Map Reduce Job Run, Job Failures, Job Scheduling, Shuffle and Sort, Task Execution, Map Reduce Types and Formats, Map Reduce Features.

UNIT-III

Hadoop Ecosystems: Hive Architecture, Data type, File format, Hive Shell, Hive Services, Hive Meta store, Comparison with Traditional Databases, HiveQL, Tables, Querying Data and User Defined Functions.

UNIT-IV

Introduction to R Language: Exploratory Data Analytics-Statistical methods for evaluation Hadoop & Map Reduce framework for R, R with Relational Database Management Systems, R with Non-Relational (NoSQL) DBs.

References:

1. Tom White " Hadoop: The Definitive Guide" Third Edition, O'reily Media, 2012.
2. Seema Acharya, Subhasini Chellappan, "Big Data Analytics" Wiley 2015.
3. Tom White, "Hadoop: The Definitive Guide",O'Reilly,4th Edition,2015.
4. Donald Miner, Adam Shook, "Map Reduce Design Pattern", O'Reilly, 2012
5. Simon Walkowiak, "Big Data Analytics with R" Packet Publishers, 2016

Course Outcomes:

After successful completion of this course, the students will be able to:

CO-1	Understand Big Data and its analytics in the real world.
CO-2	Access and Process Data on Distributed File System using various jobs in Hadoop.
CO-3	Design of Algorithms to solve Data Intensive Problems using Map Reduce Paradigm.
C0-4	Implement Big Data Activities using Hive.
CO-5	Use of R programming language for implementing Machine Learning Techniques.

B.Sc. (Artificial Intelligence & Data Science)

Semester – I

COMMUNICATION SKILLS IN ENGLISH

Code:BCSE-1122

L	T	P	Credits
3	0	1	4

Time: 3 Hours

Max. Marks: 100
Theory: 60
Practical: 15
Internal Assessment: 25

Suggested Pattern of Question Paper:
The question paper will be divided into two sections. Section A will consist of Twelve(12) questions of One(1) mark each. Section B will consist of Six questions of Eight(8) marks each. There will be internal choice wherever possible.

Section A

1. Do as directed
   Articles, Conjunctions and Prepositions
   (12X1=12 Marks)

Section B

1. Reading Skills: Reading Tactics and strategies; Reading purposes–kinds of purposes; Reading for direct meanings.
2. Comprehension questions of an unseen passage
3. Personal letter and Official/Business letters
4. Writing notices/agenda/minutes for public circulation on topics of professional interest.
5. Writing resume or converting a biographical note into resume

6. Translation from English to Vernacular (Punjabi/ Hindi) (Isolated Sentences)
   (6X8=48 Marks)

Course Objectives:

I: To develop competence in written communication.
II: To inculcate innovative and critical thinking among the students.
III: To enable them to grasp the application of communication theories.
IV: To acquire knowledge of the latest technology related to communication skills.
V: To provide knowledge of multifarious opportunities in the field of this programme.

Course Contents:

1. Reading Skills: Reading tactics and strategies; Reading purposes–kinds of purposes and associated comprehension; Reading for direct meanings; Reading for understanding concepts, details, coherence, logical progression and meanings of phrases/ expressions.

Activities:

a. Active reading of passages on general topics
b. Reading newspaper, articles, editorials etc.
c. Short questions based on content and development of ideas of a given paragraph.

2. Writing Skills: Guidelines for effective writing; writing styles for application, resume, personal letter, official/ business letter, memo, notices etc.

Activities:

a) Personal and business letters.
b) Converting a biographical note into a sequenced resume.
c) Writing notices for circulation/ boards.
d) Making notes of given passage with headings and sub-headings
e) Writing newspaper reports based on given heading.

Recommended Books:

1. *Oxford Guide to Effective Writing and Speaking* by John Seely.
2. *The Written Word* by Vandana R Singh, Oxford University Press.
3. *Murphy's English Grammar* (by Raymond Murphy) CUP.

Course Outcomes:

The completion of this course enables students to:

1. Identify common errors in language and rectify them.
2. Develop and expand writing skills through controlled and guided activities.
3. Develop coherence, cohesion and competence in written discourse through intelligible pronunciation.
4. Develop the ability to handle the interview process confidently and learn the subtle nuances of an effective group discourse.
5. Communicate contextually in specific and professional situations with courtesy.

PRACTICAL (Marks: 15)

Course Contents:-

1. Reading dialogues (5 Marks)
2. Rapid reading (5 Marks)
3. Project File (5 Marks)

B.Sc. (Artificial Intelligence & Data Science)

Semester – I

Punjabi (Compulsory)-1

ਪੰਜਾਬੀ(ਲਾਜ਼ਮੀ)–1

Credit& Marks Distribution, Eligibility and Pre-Requisites of the Course

Course title & Code	Total Teaching Hours	Total Credits/ Hours per week	Credit distribution			Total Marks 100		Time Allowed in Exam	Eligibility criteria	Pre- requisite of the course (if any)
			L	T	P	Theory	IA			
ਪੰਜਾਬੀ (ਲਾਜ਼ਮੀ)–1 BHPB-1101	60	4	4	0	0	75	25	3 Hours	Class 12th pass in any stream	Studied Punjabi up to 10th Standard

ਕੋਰਸ ਦਾ ਉਦੇਸ਼ Course Objective	**ਪਾਠ–ਕ੍ਰਮ ਨਤੀਜੇ Course Outcomes (COs)**
▪ ਵਿਦਿਆਰਥੀਆਂ ਵਿਚ ਸਾਹਿਤਕ ਰੁਚੀਆਂ ਪੈਦਾ ਕਰਨਾ। ▪ ਆਲੋਚਨਾਤਮਕ ਰੁਚੀਆਂ ਵਿਕਸਤ ਕਰਨਾ। ▪ ਮਾਤ ਭਾਸ਼ਾ ਦੀ ਸਮਝ ਨੂੰ ਵਿਕਸਤ ਕਰਨਾ।	▪ ਉਸ ਵਿਚ ਸਾਹਿਤ ਰੁਚੀਆਂ ਵਿਕਸਤ ਹੋਣਗੀਆਂ। ▪ ਉਸ ਵਿਚ ਸਾਹਿਤ ਸਿਰਜਣਾ ਦੀ ਸੰਭਾਵਨਾ ਵਧੇਗੀ। ▪ ਉਸ ਵਿਚ ਕਿਸੇ ਵੀ ਵਿਸ਼ੇ ਦਾ ਗਹਿਨ ਅਧਿਐਨ ਕਰਨ ਦਾ ਬੋਧ ਹੋਵੇਗਾ। ▪ ਉਹ ਪੰਜਾਬੀ ਭਾਸ਼ਾ ਦੇ ਨਿਕਾਸ ਤੇ ਵਿਕਾਸ ਬਾਰੇ ਗਿਆਨ ਹਾਸਲ ਕਰਨਗੇ

ਅੰਕ–ਵੰਡ ਅਤੇ ਪ੍ਰੀਖਿਅਕ ਲਈ ਹਦਾਇਤਾਂ

ਸਿਲੇਬਸ ਦੇ ਚਾਰ ਭਾਗ ਹਨ ਪਰ ਪ੍ਰਸ਼ਨ–ਪੱਤਰ ਦੇ ਪੰਜ ਭਾਗ ਹੋਣਗੇ। ਪਹਿਲੇ ਭਾਗ ਵਿਚ 1.5–1.5 (ਡੇਢ–ਡੇਢ) ਅੰਕ ਦੇ ਅਤਿ–ਸੰਖੇਪ (Objective Type) 10 ਪ੍ਰਸ਼ਨ ਪੁੱਛੇ ਜਾਣਗੇ ਜੋ ਕਿ ਸਾਰੇ ਸਿਲੇਬਸ ਵਿਚੋਂ ਹੋਣਗੇ ਅਤੇ ਸਾਰੇ ਪ੍ਰਸ਼ਨ ਹੱਲ ਕਰਨੇ ਲਾਜ਼ਮੀ ਹੋਣਗੇ। ਸਿਲੇਬਸ ਦੇ ਬਾਕੀ ਚਾਰ ਭਾਗਾਂ ਵਿਚ 02–02 ਲੇਖ ਨੁਮਾ ਪ੍ਰਸ਼ਨ ਪੁੱਛੇ ਜਾਣਗੇ। ਹਰੇਕ ਭਾਗ ਵਿਚੋਂ 01–01 ਪ੍ਰਸ਼ਨ ਕਰਨਾ ਲਾਜ਼ਮੀ ਹੋਵੇਗਾ। ਹਰੇਕ ਪ੍ਰਸ਼ਨ ਦੇ ਬਰਾਬਰ 15 ਅੰਕ ਹੋਣਗੇ। ਪੇਪਰ ਸੈੱਟਰ ਜੇਕਰ ਚਾਹੇ ਤਾਂ ਪ੍ਰਸ਼ਨਾਂ ਦੀ ਵੰਡ ਅੱਗੋਂ ਵੱਧ ਤੋਂ ਵੱਧ ਚਾਰ ਉਪ–ਪ੍ਰਸ਼ਨਾਂ ਵਿਚ ਕਰ ਸਕਦਾ ਹੈ।

ਪਾਠ–ਕ੍ਰਮ

ਭਾਗ–ਪਹਿਲਾ

ਕਾਵਿ ਕਥਾ, (ਕਵਿਤਾ ਅਤੇ ਕਹਾਣੀ) ਡਾ. ਮਹਿਲ ਸਿੰਘ (ਮੁੱਖ ਸੰਪਾਦਕ) ਅਤੇ ਡਾ. ਆਤਮ ਸਿੰਘ ਰੰਧਾਵਾ (ਸੰਪਾਦਕ), ਕਸਤੂਰੀ ਲਾਲ ਐਂਡ ਸਨਜ਼, ਅੰਮ੍ਰਿਤਸਰ।
(ਕਵਿਤਾ ਭਾਗ ਵਿਚੋਂ ਪ੍ਰਸੰਗ ਸਹਿਤ ਵਿਆਖਿਆ/ਕਵਿਤਾ ਦਾ ਵਿਸ਼ਾ–ਵਸਤੂ। ਕਹਾਣੀ ਭਾਗ ਵਿਚੋਂ ਸਾਰ/ਵਿਸ਼ਾ–ਵਸਤੂ)

ਭਾਗ–ਦੂਜਾ

ਪੰਜਾਬ ਦੇ ਮਹਾਨ ਕਲਾਕਾਰ (ਬਲਵੰਤ ਗਾਰਗੀ)
ਗੁਰੂ ਨਾਨਕ ਦੇਵ ਯੂਨੀਵਰਸਿਟੀ, ਅੰਮ੍ਰਿਤਸਰ।
(ਅੰਮ੍ਰਿਤਾ ਸ਼ੇਰਗਿੱਲ ਤੋਂ ਭਾਈ ਸਮੁੰਦ ਸਿੰਘ ਤਕ)
(ਵਿਸ਼ਾ–ਵਸਤੂ/ਸਾਰ/ਨਾਇਕ ਬਿੰਬ)

ਭਾਗ–ਤੀਜਾ

(ੳ) ਪੈਰ੍ਹਾ ਰਚਨਾ (ਤਿੰਨਾਂ ਵਿਚੋਂ ਇਕ)
(ਅ) ਪੈਰ੍ਹਾ ਪੜ੍ਹ ਕੇ ਪ੍ਰਸ਼ਨਾਂ ਦੇ ਉੱਤਰ

ਭਾਗ–ਚੌਥਾ

(ੳ) ਭਾਸ਼ਾ ਵੰਨਗੀਆਂ: ਭਾਸ਼ਾ ਦਾ ਟਕਸਾਲੀ ਰੂਪ, ਭਾਸ਼ਾ ਅਤੇ ਉਪ–ਭਾਸ਼ਾ ਵਿਚਲਾ ਅੰਤਰ, ਪੰਜਾਬੀ ਉਪ–ਭਾਸ਼ਾਵਾਂ ਦੇ ਪਛਾਣ–ਚਿੰਨ੍ਹ।
(ਅ) ਪੰਜਾਬੀ ਭਾਸ਼ਾ: ਨਿਕਾਸ ਤੇ ਵਿਕਾਸ।

B.Sc. (Artificial Intelligence & Data Science) Semester – I

Basic Punjabi-1

ਮੁਢਲੀ ਪੰਜਾਬੀ–1

(In Lieu of Compulsory Punjabi)

Credit & Marks Distribution, Eligibility and Pre-Requisites of the Course

Course title &Code	Total Teaching Hours	Total Credits/ Hours per week	Credit distribution			Total Marks 100		Time Allowed in Exam	Eligibility criteria	Pre- requisite of the course (if any)
			L	T	P	Theory	IA			
ਮੁਢਲੀ ਪੰਜਾਬੀ–1 BPBI-1102	60	4	4	0	0	75	25	3 Hours	Class 12th pass in any stream	NOT Studied Punjabi up to 10th Standard

ਕੋਰਸ ਦਾ ਉਦੇਸ਼ Course Objective	**ਪਾਠ–ਕ੍ਰਮ ਨਤੀਜੇ Course Outcomes (COs)**
• ਵਿਦਿਆਰਥੀ ਨੂੰ ਗੁਰਮੁਖੀ ਲਿਪੀ ਤੋਂ ਜਾਣੂ ਕਰਾਉਣਾ। • ਵਿਦਿਆਰਥੀ ਨੂੰ ਸ਼ੁੱਧ ਪੰਜਾਬੀ ਪੜ੍ਹਨਾ–ਲਿਖਣਾ ਸਿਖਾਉਣਾ। • ਵਿਦਿਆਰਥੀ ਪੰਜਾਬੀ ਭਾਸ਼ਾ ਦੀਆਂ ਵਿਆਕਰਨਕ ਬਾਰੀਕੀਆਂ ਤੋਂ ਜਾਣੂ ਕਰਾਉਣਾ। • ਵਿਦਿਆਰਥੀ ਅੰਦਰ ਸ਼ੁੱਧ ਸੰਚਾਰ ਨੂੰ ਵਿਕਸਤ ਕਰਨਾ।	• ਵਿਦਿਆਰਥੀ ਪੰਜਾਬੀ ਭਾਸ਼ਾ ਅਤੇ ਗੁਰਮੁਖੀ ਲਿਪੀ ਦੀ ਸਿਖਲਾਈ ਵਿਚ ਮੁਹਾਰਤ ਹਾਸਲ ਕਰਨਗੇ। • ਵਿਦਿਆਰਥੀ ਪੰਜਾਬੀ ਭਾਸ਼ਾ ਵਿਚ ਮੁਹਾਰਨੀ, ਲਗਾਂ–ਮਾਤਰਾਂ, ਸਵਰ ਅਤੇ ਵਿਅੰਜਨ ਅੱਖਰਾਂ ਦੀ ਪਛਾਣ ਅਤੇ ਵਰਤੋਂ ਸਬੰਧੀ ਸਮਝ ਵਿਕਸਿਤ ਹੋਵੇਗੀ। • ਵਿਦਿਆਰਥੀ ਸ਼ੁੱਧ ਪੰਜਾਬੀ ਲਿਖਣ–ਪੜ੍ਹਨ ਦੇ ਸਮਰੱਥ ਹੋਣਗੇ। • ਵਿਦਿਆਰਥੀ ਪੰਜਾਬੀ ਭਾਸ਼ਾ ਦੇ ਸ਼ੁੱਧ ਰੂਪਾਂ ਦੀ ਜਾਣਕਾਰੀ ਹਾਸਲ ਕਰਨਗੇ।

ਅੰਕ–ਵੰਡ ਅਤੇ ਪ੍ਰੀਖਿਅਕ ਲਈ ਹਦਾਇਤਾਂ

ਸਿਲੇਬਸ ਦੇ ਚਾਰ ਭਾਗ ਹਨ ਪਰ ਪ੍ਰਸ਼ਨ–ਪੱਤਰ ਦੇ ਪੰਜ ਭਾਗ ਹੋਣਗੇ। ਪਹਿਲੇ ਭਾਗ ਵਿਚ 01–01 ਅੰਕ ਦੇ ਅਤਿ–ਸੰਖੇਪ ਉੱਤਰ ਵਾਲੇ (Objective Type) 11 ਪ੍ਰਸ਼ਨ ਪੁੱਛੇ ਜਾਣਗੇ ਜੋ ਕਿ ਸਾਰੇ ਸਿਲੇਬਸ ਵਿਚੋਂ ਹੋਣਗੇ ਅਤੇ ਸਾਰੇ ਪ੍ਰਸ਼ਨ ਹੱਲ ਕਰਨੇ ਲਾਜ਼ਮੀ ਹੋਣਗੇ।ਪ੍ਰਸ਼ਨ ਪੱਤਰ ਦੇ ਦੂਸਰੇ ਅਤੇ ਤੀਸਰੇ ਭਾਗ ਵਿਚ, ਸਿਲੇਬਸ ਦੇ ਪਹਿਲੇ ਅਤੇ ਦੂਸਰੇ ਭਾਗ ਵਿਚੋਂ 8–8 ਅੰਕਾਂ ਦੇ 3–3 ਪ੍ਰਸ਼ਨ ਪੁੱਛੇ ਜਾਣਗੇ। ਜਿੰਨ੍ਹਾਂ ਵਿਚੋਂ ਵਿਦਿਆਰਥੀ ਨੇ ਕੋਈ 2–2 ਪ੍ਰਸ਼ਨ ਹੱਲ ਕਰਨੇ ਹੋਣਗੇ। ਇਸੇ ਤਰ੍ਹਾਂ ਪ੍ਰਸ਼ਨ ਪੱਤਰ ਦੇ ਚੌਥੇ ਭਾਗ ਵਿਚ 4–4 ਅੰਕਾਂ ਦੇ 5 ਪ੍ਰਸ਼ਨ ਪੁੱਛੇ ਜਾਣਗੇ। ਜਿੰਨ੍ਹਾਂ ਵਿਚੋਂ ਵਿਦਿਆਰਥੀ ਨੇ 4 ਪ੍ਰਸ਼ਨ ਹੱਲ ਕਰਨੇ ਹੋਣਗੇ।ਭਾਗ ਪੰਜਵੇਂ ਵਿਚ 2–2 ਅੰਕਾਂ ਦੇ 10 ਪ੍ਰਸ਼ਨ ਪੁੱਛੇ ਜਾਣਗੇ। ਜਿੰਨ੍ਹਾਂ ਵਿਚੋਂ ਵਿਦਿਆਰਥੀ ਨੇ 8 ਪ੍ਰਸ਼ਨ ਕਰਨੇ ਲਾਜ਼ਮੀ ਹੋਣਗੇ।

ਪਾਠ–ਕ੍ਰਮ

ਭਾਗ–ਪਹਿਲਾ

(ੳ) ਪੰਜਾਬੀ ਭਾਸ਼ਾ ਤੇ ਗੁਰਮੁਖੀ ਲਿਪੀ:

ਨਾਮਕਰਣ ਤੇ ਸੰਖੇਪ ਜਾਣ–ਪਛਾਣ: ਗੁਰਮੁਖੀ ਵਰਣਮਾਲਾ, ਅੱਖਰ ਕ੍ਰਮ, ਸਵਰ ਵਾਹਕ (ੳ, ਅ, ੲ), ਲਗਾਂ–ਮਾਤਰਾਂ, ਪੈਰ ਵਿਚ ਬਿੰਦੀ ਵਾਲੇ ਵਰਨ, ਪੈਰ ਵਿਚ ਪੈਣ ਵਾਲੇ ਵਰਨ, ਬਿੰਦੀ, ਟਿੱਪੀ, ਅੱਧਕ

(ਅ) ਸਿਖਲਾਈ ਤੇ ਅਭਿਆਸ

ਭਾਗ–ਦੂਜਾ

ਗੁਰਮੁਖੀ ਆਰਥੋਗਰਾਫੀ ਅਤੇ ਉਚਾਰਨ:

ਸਵਰ, ਵਿਅੰਜਨ: ਮੁਢਲੀ ਜਾਣ–ਪਛਾਣ ਅਤੇ ਉਚਾਰਨ, ਮੁਹਾਰਨੀ, ਲਗਾਂ–ਮਾਤਰਾਂ ਦੀ ਪਛਾਣ

ਭਾਗ–ਤੀਜਾ

ਪੰਜਾਬੀ ਸ਼ਬਦ–ਜੋੜ: ਮੁਕਤਾ (ਦੋ ਅੱਖਰਾਂ ਵਾਲੇ ਸ਼ਬਦ, ਤਿੰਨ ਅੱਖਰਾਂ ਵਾਲੇ ਸ਼ਬਦ), ਸਿਹਾਰੀ ਵਾਲੇ ਸ਼ਬਦ, ਬਿਹਾਰੀ ਵਾਲੇ ਸ਼ਬਦ, ਔਂਕੜ ਵਾਲੇ ਸ਼ਬਦ, ਦੁਲੈਂਕੜ ਵਾਲੇ ਸ਼ਬਦ, ਲਾਂ ਵਾਲੇ ਸ਼ਬਦ, ਦੁਲਾਵਾਂ ਵਾਲੇ ਸ਼ਬਦ, ਹੋੜੇ ਵਾਲੇ ਸ਼ਬਦ, ਕਨੌੜੇ ਵਾਲੇ ਸ਼ਬਦ, ਲਗਾਖਰ (ਬਿੰਦੀ, ਟਿੱਪੀ, ਅੱਧਕ) ਵਾਲੇ ਸ਼ਬਦ

ਭਾਗ–ਚੌਥਾ

ਸ਼ੁੱਧ–ਅਸ਼ੁੱਧ ਸ਼ਬਦ

B.Sc. (Artificial Intelligence & Data Science)
Semester – I
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)
Course Code: BPHC-1104

Credit Hours(per week):04
L- T- P
04-0-0
Time:3Hours
Total Marks:100
Theory:75
InternalAssessment:25

Instructions for the Paper Setters:
Question paper should consist of two sections—Section A and Section B. The paper setter must ensure that questions in Section–A do not cover more than one point, and questions in Section–B should cover atleast 50 percent of the theme.

Section–A: The examiner will set 15 objective type questions out of which the candidate shall attempt any 10 questions, each carrying 1½ marks. Thetotalweightageofthissectionwillbe15marks. Answer to each question should be in approximately one to two sentences.

Section–B: Theexaminerwillset8questions,two from each Unit. The candidate will attempt 4 questions selecting one from each Unit in about 1000 words. Each question willcarry15marks.Thetotalweightageofthissectionwillbe60marks.
Note: **The examiner is to set the question paper in two languages: English & Hindi.**

Course Objectives: The main objective of this course is to educate the history and culture of the Ancient Punjab to the students who are not domicile of the Punjab. It aims to familiarize these students with the physical features of ancient Punjab and its impact on its history andculture. It also provides them information about the different sources to construct the history and culture of the ancient Punjab. The course in tends to provide knowledge of social, economic, religious life of the Harappan civilization, Indo-Aryans, teachings and impact of Jainismand Buddhism in the Punjab.

Unit-I

1. Physical features of the Punjab and impact on history.

2. Sources of the ancient history of Punjab.

Unit-II

3. Harappan Civilization: Town planning; social, economic and

religious life of the Indus Valley People.

4. The Indo-Aryans: Original home and settlement in Punjab.

Unit-III

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

6. Social, Religious and Economic life during later Vedic Age.

Unit-IV

7. Teachings and impact of Buddhism.

8. Jainism in the Punjab.

Suggested Readings:-

L.Joshi(ed), *HistoryandCultureofthePunjab*,Art-I,Patiala,1989(3rdedition)

L.M.JoshiandFaujaSingh(ed*), HistoryofPunjab*, Vol. I, Patiala1977.

Budha Parkash,*GlimpsesofAncientPunjab*, Patiala, 1983.

B.N.Sharma,*LifeinNorthern India*,Delhi.1966.

Course Outcomes:

On Completing the Course, the Students will be able to :

CO-1 Learn the history and culture of the Ancient Punjab.
CO-2 Study the physical features of ancient Punjab.
CO-3 Understand about the sources of the history of the Punjab.
CO-4 Analyse the social, economic, religious life of the Harappan civilization and Vedic-Aryans.
CO-5 Learn the teachings and impact of Jainism and Buddhism in the Punjab

B.Sc. (Artificial Intelligence & Data Science)

Semester – I

BAIDS-114P (Practical)

LAB I: Computational Problem-Solving Using Python

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

Credits		
L	**T**	**P**
0	**0**	**2**

Practical Marks: 37

Internal Assessment Marks:13

Course Objectives:

Enable the student to

1.	Understand the basics of python programming concepts.
2.	Develop programs using object-oriented features, graphical user interfaces and image processing
3.	Understand the high-performance programs designed to build up the real proficiency.

Practical Based on Computational Problem-Solving Using Python

Course Outcomes:

Students will be able to

CO-1.	Describe the Control statement, String, List, and Dictionaries in Python.
CO-2.	Understand the different types of function and File handling operations.
CO-3.	Interpret Object oriented programming in Python
CO-4.	Build the interactive python application using GUI.
CO-5.	Develop a multithreading and network application.

B.Sc. (Artificial Intelligence & Data Science) Semester – I

BAIDS-115P (Practical)
Lab II: MS Office 2010/Open Office

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

Credits		
L	**T**	**P**
0	**0**	**2**

Practical Marks: 37

Internal Assessment Marks:13

Course Objectives:

Enable the student to

1.	To be proficient in office automation applications.
2.	Handle the word processing software.
3.	Understand that in In Today's commercial world, automation helps the users with a sophisticated set of commands to format, edit, and print text documents.
4.	Use it as valuable and important tools in the creation of applications such as newsletters, brochures, charts, presentation, documents, drawings and graphic images.

MS Office 2010/Open Office

MS–Word 2010:

1. Introduction to Parts of Word Window

2. Creating New Documents, Saving Documents, Opening an Existing documents, insert a second document into an open document, Editing and formatting in document.

3. Page Setup

4. Headers and Footers

5. Creating a Table Using the Table Menu and table formatting

6. Borders and Shading

7. Spell Checking

8. Mail Merge.

MS Power Point 2010:

1. Power point elements Templates, Wizards, Views, Exploring Power Point Menu

2. Working with Dialog Boxes, Adding Text, Adding Title, Moving Text Area, Resizing Text Boxes

3. Adding Art, Starting a New Slide, Starting Slide Show, Saving presentation.

4. Printing Slides

5. Views (View slide sorter view, notes view, outlines view)

6. Formatting and enhancing text formatting

7. Creating Graphs (Displaying slide show and adding multi–media)

MS Excel 2010:

1. Spreadsheet Components: The Excel Environment Excel Window Components Enhanced ScreenTips , Examining Excel Window Components
2. Getting Help The Excel Help Window , Getting Help with Using Excel
3. Navigating a Worksheet Navigation Methods , Navigating a Worksheet
4. Entering and Editing Data, Editing Cell Contents Using AutoFill
5. Entering and Editing Formulas, Creating a Basic Formula
6. Working with Pictures Add an Image to a Worksheet
7. Saving and Updating Workbooks
8. Entering a SUM Function , AutoSum , AVERAGE Function , MIN MAX Function COUNT and COUNTA.

Course Outcomes:

The student will be able to

CO-1.	Use word processors, spreadsheets, presentation software.
CO-2.	Describe the features and functions of the categories of application software.
CO-3.	Understand the dynamics of an office environment.
CO-4.	Demonstrate the ability to apply application software in an office environment.

B.Sc. (Artificial Intelligence & Data Science) Semester – I

Skill Enhancement Course

ਪੰਜਾਬੀ ਵਿਚ ਸਿਰਜਨਾਤਮਕ ਲੇਖਣ

Creative Writing in Punjabi

SEC-114

Credit & Marks Distribution, Eligibility and Pre-Requisites of the Course

Course title & Code	Total Teaching Hours	Total Credits/ Hours per week	Credit distribution			Total Marks 50		Duration of Course	Time Allowed in Exam
			L	T	P	Theory	I A		
ਪੰਜਾਬੀ ਵਿਚ ਸਿਰਜਨਾਤਮਕ ਲੇਖਣ SEC-114	30	2	2	0	0	37	13	30 Hours	3 Hours

ਕੋਰਸ ਦਾ ਉਦੇਸ਼ Course Objectives (Cos)	**ਪਾਠ-ਕ੍ਰਮ ਨਤੀਜੇ Course Outcomes (COs)**
• ਵਿਦਿਆਰਥੀਆਂ ਨੂੰ ਸਿਰਜਨਾਤਮਕ ਲੇਖਣ ਦਾ ਅਰਥ ਤੇ ਮਹੱਤਵ ਦੱਸਦੇ ਹੋਏ ਕਵਿਤਾ, ਗਲਪ, ਵਾਰਤਕ ਤੇ ਨਾਟਕ ਤੋਂ ਜਾਣੂ ਕਰਵਾਉਣਾ। • ਵਿਦਿਆਰਥੀਆਂ ਨੂੰ ਸਾਹਿਤ ਦੇ ਪ੍ਰਮੁੱਖ ਰੂਪ ਕਵਿਤਾ ਦਾ ਸਿਰਜਨਾਤਮਕ ਹੁਨਰ ਪੈਦਾ ਕਰਨਾ।	• ਵਿਦਿਆਰਥੀ ਸਿਰਜਨਾਤਮਕ ਲੇਖਣ ਦਾ ਅਰਥ ਤੇ ਮਹੱਤਵ ਬਾਰੇ ਜਾਣਕਾਰੀ ਹਾਸਲ ਕਰਦੇ ਹੋਏ ਕਵਿਤਾ, ਗਲਪ, ਵਾਰਤਕ ਤੇ ਨਾਟਕ ਤੋਂ ਜਾਣੂ ਹੋਣਗੇ। • ਵਿਦਿਆਰਥੀਆਂ ਅੰਦਰ ਸਾਹਿਤ ਦੇ ਪ੍ਰਮੁੱਖ ਰੂਪ ਕਵਿਤਾ ਦਾ ਸਿਰਜਨਾਤਮਕ ਹੁਨਰ ਪੈਦਾ ਹੋਵੇਗਾ।

ਅੰਕ-ਵੰਡ ਅਤੇ ਪ੍ਰੀਖਿਅਕ ਲਈ ਹਦਾਇਤਾਂ

ਸਮੁੱਚੇ ਸਿਲੇਬਸ ਦੇ ਆਧਾਰ 'ਤੇ ਪ੍ਰਸ਼ਨ-ਪੱਤਰ ਦੇ ਦੋ ਭਾਗ ਬਣਾਏ ਜਾਣਗੇ। ਪਹਿਲੇ ਭਾਗ ਵਿੱਚ 01-01 ਅੰਕ ਦੇ 07 ਬਹੁ-ਵਿਕਲਪੀ ਪ੍ਰਸ਼ਨ ਪੁੱਛੇ ਜਾਣਗੇ। ਦੂਸਰੇ ਭਾਗ ਵਿਚ 5-5 ਅੰਕਾਂ ਦੇ ਅੱਠ ਪ੍ਰਸ਼ਨ ਪੁੱਛੇ ਜਾਣਗੇ, ਜਿਨ੍ਹਾਂ ਵਿੱਚੋਂ ਕੋਈ 06 ਪ੍ਰਸ਼ਨ ਕਰਨੇ ਲਾਜ਼ਮੀ ਹੋਣਗੇ।

ਪਾਠ-ਕ੍ਰਮ

ਭਾਗ–ਪਹਿਲਾ

ਸਿਰਜਣਾਤਮਕ ਲੇਖਣ

(ੳ) ਸਿਰਜਣਾਤਮਕ ਲੇਖਣ : ਅਰਥ ਅਤੇ ਮਹੱਤਤਾ

(ਅ) ਸਿਰਜਣਾਤਮਕ ਲੇਖਣ ਦੇ ਵਰਗ: ਕਵਿਤਾ, ਗਲਪ, ਵਾਰਤਕ ਤੇ ਨਾਟਕ

(ੲ) ਆਮ ਭਾਸ਼ਾ ਅਤੇ ਸਿਰਜਣਾਤਮਕ ਲੇਖਣ ਦੀ ਭਾਸ਼ਾ

ਭਾਗ-ਦੂਜਾ

ਕਵਿਤਾ : ਪਰਿਭਾਸ਼ਾ ਤੇ ਪ੍ਰਕਿਰਤੀ

(ੳ) ਕਵਿਤਾ ਦੇ ਰੂਪ : ਛੰਦ ਬੱਧ ਕਵਿਤਾ, ਖੁਲ੍ਹੀ ਕਵਿਤਾ, ਗੀਤ ਅਤੇ ਗਜ਼ਲ।

(ਅ) ਕਵਿਤਾ ਕਿਵੇਂ ਸਮਝੀਏ ਤੇ ਲਿਖੀਏ ?

B.Sc. (Artificial Intelligence & Data Science)
Semester – I
Course Code: ZDA111
Course Title-DRUGABUSE:PROBLEM,MANAGEMENT AND PREVENTION-I

Credit hrs./wk.:1
Time: 3 Hours Max. Marks: 25

Instructions for the Paper Setters:

1) There will be two sections A and B.
2) Section A is compulsory and will be of 5 marks consisting of 8 short answer type questions carrying 1marks each covering the whole syllabus. The candidates are required to attempt 5 questions out of 8 short answer type questions. The answer should notexceed50 words.
3) Candidates shall be required to attempt 4 questions from Section B, selecting one question from each unit and each question carries 5 marks. Preferably, the question should not be split into more than two sub-parts.

Course Objectives-The course aims to-

CO-1.	Generate the awareness against drug abuse.
CO-2.	Describe a variety of models and theories of addiction and other problems related to substance abuse.
CO-3.	Describe the behavioral, psychological, physical health and social impact of psycho active substances.
CO-4.	Provide culturally relevant formal and informal education programs that raise awareness and support for substance abuse prevention and there cover process.
CO-5.	Describe factors that increase likelihood for an individual, community or group to beat risk of substance used is orders.

UNIT–I

- **Meaning of Drug Abuse**

  Meaning of drug abuse

  Nature and Extent of Drug Abuse: State and National Scenario

UNIT-II

- **Consequences of Drug Abuse for**

  Individual: Education, Employment, Income.

  Family : Violence.

  Society: Crime.

Nation : Law and Order problem.

UNIT-III

- **Management of Drug Abuse**

  Medical Management: Medication for treatment of different types of drug abuses.

  Medication to reduce withdrawal effects.

UNIT-IV

- **Psychiatric Management:** Counseling, Behavioral and Cognitive therapy.
- **Social Management:** Family, Group therapy and Environmental Intervention.

References:

1. Ahuja,Ram(2003),SocialProblemsin India, RawatPublication,Jaipur.
2. Extent,PatternandTrendofDrugUseinIndia, MinistryofSocialJusticeand Empowerment, Government of India, 2004.
3. Inciardi,J.A.1981. TheDrugCrimeConnection.BeverlyHills: SagePublications. 23
4. JasjitKaurRandhawa&SamreetRandhawa,"DrugAbuseProblem,Management& Prevention", KLS, ISBN No. 978-81-936570-8-9, (2019).
5. Kapoor.T.(1985)DrugepidemicamongIndian Youth,NewDelhi:Mittal Pub.
6. Modi,IshwarandModi,Shalini(1997)Drugs:AddictionandPrevention,Jaipur:RawatPublication.
7. Sain,Bhim1991,DrugAddictionAlcoholism,SmokingobscenityNewDelhi:Mittal Publications.
8. Sandhu,RanvinderSingh,2009,DrugAddictioninPunjab:ASociologicalStudy. Amritsar. Guru Nanak Dev University.
9. Singh,C.P. 2000.Alcoholand DependenceamongIndustrial Workers:Delhi: Shipra.
10. Sussman,SandAmes,S.L.(2008).DrugAbuse:Concepts,PreventionandCessation, Cambridge University Press.
11. WorldDrugReport2011, UnitedNations officeof Drugand Crime.

Course Outcomes: The students will be able-

CO-1.	To describe issues of cultural identity, ethnic background, age and gender in prevention, treatment and recovery.
CO-2.	To describe warning sign, symptoms, and the course of substance used is orders.
CO-3.	To describe principles and philosophy of prevention, treatment and recovery.
CO-4.	Todescribecurrentandevidenced-basedapproachespracticedinthefieldofdrug addiction.

B.Sc. (Artificial Intelligence & Data Science) Semester–II

SN	Course Code	Course Name	Distribution of The Marks				Lectures Per week			Credit Distribution			Total Credit L+T+P	Page No.
			Theory	Internal Assessment	Practical	Total	L	T	P	L	T	P		
Discipline Specific Course(DSC)														
1	BAIDS-121	AI & Machine Learning	75	25	0	100	5	1	0	3	1	0	4	23-24
2	BAIDS-122	Data Warehousing & Data Mining	75	25	0	100	5	1	0	3	1	0	4	25-26
3	BAIDS-123	Data Structures	75	25	0	100	5	1	0	3	1	0	4	27-28
4	BAIDS-124P	LAB I: Data Structures Implementation using Python	-	13	37	50	0	0	6	0	0	2	2	35-36
5	BAIDS-125P	Lab II: Data Mining Algorithm implementation	-	13	37	50	0	0	6	0	0	2	2	37
Ability Enhancement Course (AEC)														
6	BCSE-1222	Communication Skills in English	60	25	15	100	4	0	2	3	0	1	4	29-30
7	BHPB-1201/ BPBI-1202/ BPHC-1204	Punjabi/ Basic Punjabi (Mudhli Punjabi) (Compulsory)/ Punjab History & Culture	75	25	0	100	6	0	0	4	0	0	4	31-34
Skill Enhancement Course(SEC)														
8	SEC-124	Creative Writing in Punjabi	19	06	-	25	2	0	0	1	0	0	1	38
Value Added Course(VAC)														
9	ZDA121	*Drug Abuse: Problem, Management and Prevention(Compulsory paper)	-	-	-	25	2	0	0	1	0	0	1	39-40
													Total Credit=26	

B.Sc. (Artificial Intelligence & Data Science)
Semester – II
BAIDS-121: AI & Machine Learning
Discipline Specific Course (DSC)

Time: 3 Hrs. **Total Marks: 100**

Credits		
L	T	P
3	1	0

Theory Marks: 75

Theory Internal Assessment Marks:25

Note for paper setter and students:

1. **Medium of Examination is English Language.**
2. **There will be five sections.**
3. **Section A is compulsory and will be of 15 marks consisting of 8 short answer type questions carrying 2.5 mark each covering the whole syllabus. The answer should not exceed 50 words. The students will have to attempt any 6 questions in this section.**
4. **Sections B, C, D and E will be set from units I, II, III & IV respectively and will consist of two questions of 15 marks each from the respective unit. The students are required to attempt one question from each of these sections.**

Course Objectives:

1.	The main objective of this course is to introduce the field of artificial intelligence and machine learning.
2.	This course covers in detail the topics of knowledge representation, game playing and expert systems.
3.	Besides this, it also incorporated the state of art techniques of machine learning, i.e. supervised and non- supervised techniques w hitch are quite useful nowadays for the classification and regression purposes.

UNIT-I

Introduction to Artificial Intelligence: Applications of AI and its importance.

Knowledge representation: Definition & importance of Knowledge, Knowledge acquisition and manipulation, Issues in knowledge representation, Knowledge representation methods - propositional logic and first order predicate logic, resolution principle, Horn's clauses, semantic networks, partitioned semantic nets, frames, scripts and conceptual dependencies.

Game playing: Mini Max search procedure, Reducing alternatives using Alpha-Beta pruning method examples.

UNIT-II

Expert systems: Introduction, Examples, Characteristics architecture, People involved and their role in building an expert systems, Case studies of expert systems, MYCIN and DENDRAL; features of knowledge acquisition systems : MOLE and SALT.

Introduction to Machine Learning: Introduction to Machine learning, Types: supervised learning and unsupervised learning, Applications of machine learning.

Basic Concepts of Learning Models and its performance Evaluation: Dimensionality reduction using Principal component analysis, a general view of feature extraction, Feature ranking, Validation techniques, Confusion matrix and its related performance parameters.

UNIT-III

Supervised Learning algorithms: Back propagation neural network, Radial basis function neural network, Bayesian Network, Naive Bayes classifiers, Decision tree, Linear regression, Logistic regression.

Unsupervised Learning Algorithms: K-means Clustering, Hierarchical clustering

UNIT-IV

SVM& Ensemble Machine Learning models: Support Vector Machine (SVM), Fundamental concept of Ensemble Machine Learning techniques such as Bagging, Boosting.

Reinforcement Learning: Introduction to Reinforcement learning and its types.

References:

1. Rich Elaine and Knight Kevin Shiva Shankar B Nair, "Artificial Intelligence", Third Edition, Tata-McGraw Hill.
2. Stuart Russell and Peter Norvig, "Artificial intelligence a modern approach", Pearson.
3. Dan W. Patterson: Introduction to Artificial Intelligence and Expert Systems, Pearson Education.
4. E. Alpaydin, "Introduction to Machine Learning" Edition 2nd, MIT Press , 2009.

Course Outcomes (COs):

On the completion of this course, the students will

CO-1.	Obtain the knowledge of different areas where artificial intelligence has acquired an important place.
CO-2.	Understand the different methods involved in knowledge representation and game playing.
CO-3.	Understand the concept of expert system which are capable of emulating the decision-making ability of a human expert.
CO-4.	Understand the various supervised and non-supervised techniques helpful in the construction of learning models.
CO-5.	Understand the different performance evaluation measures helpful in appraising the developed learning models.

B.Sc. (Artificial Intelligence & Data Science)
Semester – II
BAIDS-122: Data Warehousing & Data Mining
Discipline Specific Course (DSC)

Time: 3 Hrs. **Total Marks: 100**

Credits		
L	T	P
3	1	0

Theory Marks: 75

Theory Internal Assessment Marks:25

Note for paper setter and students:

1. **Medium of Examination is English Language.**
2. **There will be five sections.**
3. **Section A is compulsory and will be of 15 marks consisting of 8 short answer type questions carrying 2.5 mark each covering the whole syllabus. The answer should not exceed 50 words. The students will have to attempt any 6 questions in this section.**
4. **Sections B, C, D and E will be set from units I, II, III & IV respectively and will consist of two questions of 15 marks each from the respective unit. The students are required to attempt one question from each of these sections.**

COURSEOBJECTIVES:

1.	Be familiar with mathematical foundations of data mining tools.
2.	Understand and implement classical models and algorithms in data warehouses and data mining
3.	Characterize the kinds of patterns that can be discovered by association rule mining, classification and clustering.
4.	Master data mining techniques in various applications like social, scientific and environmental context.
5.	Develop skills in selecting the appropriate data mining algorithm for solving practical problems

UNIT-I

Data Warehousing: Concepts of Data Warehousing, Difference between operational database systems and Data warehousing, Need of a separate Data Warehouse. Multidimensional Data Model.

Data Warehousing Architecture: Steps for Design and Construction of Data-Warehouses, Three-Tier Data Warehouse Architecture, Characteristics of Data Warehousing Data, Data Marts,

UNIT-II

Types of OLAP Servers: ROLAP, MOLAP, HOLAP; Difference between Online Transaction Processing and Online Analytical Processing

UNIT-III

Data Warehouse Implementation: Efficient Computation of Data Cubes, Indexing OLAP Data, Efficient Processing of OLAP Queries, Metadata Repository, Data Warehouse Back-End Tools and Utilities

UNIT-IV

Data Mining Basic Concepts; Data Mining Techniques: Predictive Modelling, Database Segmentation. Data Mining Query Languages, Applications and Trends in Data Mining.

References:

1. Han, Kamber*"Data Mining: Concepts and Techniques"* Morgan Kaufmann.
2. RomezElmasri, ShamkantB.Navathe, *"Fundamentals of Database Systems"* Pearson Education.
3. Silberschatz, Korth, Sudershan*"Database System Concepts"* 4th Ed. McGraw Hill
4. Connolly &Begg*"Database Systems – A Practical Approach to Design, Implementation and Management*", 3rd Ed., Pearson Education.

Course Outcomes:

C0-1	Understand the functionality of the various data mining and data warehousing component Knowledge.
C0-2	Understand and Appreciate the strengths and limitations of various data mining and data warehousing models
C0-3	Apply, Create and Explain the analysing techniques of various data
C0-4	Analyse and Describe different methodologies used in data mining and data ware housing.
C0-5	Evaluate and Analyse and Compare different approaches of data ware housing and data mining with various technologies.

B.Sc. (Artificial Intelligence & Data Science)
Semester – II
BAIDS-123: Data Structures
Discipline Specific Course (DSC)

Time: 3 Hrs. **Total Marks: 100**

Credits		
L	**T**	**P**
3	**1**	**0**

Theory Marks: 75

Theory Internal Assessment Marks:25

Note for paper setter and students:

1. **Medium of Examination is English Language.**
2. **There will be five sections.**
3. **Section A is compulsory and will be of 15 marks consisting of 8 short answer type questions carrying 2.5 mark each covering the whole syllabus. The answer should not exceed 50 words. The students will have to attempt any 6 questions in this section.**
4. **Sections B, C, D and E will be set from units I, II, III & IV respectively and will consist of two questions of 15 marks each from the respective unit. The students are required to attempt one question from each of these sections.**

Course Objectives:

1.	The main objective of this course is to help students to understand the concept of organizing and managing data in computer's memory.
2.	Therefore, this course introduces different data structure techniques along with their representation in computer's memory.

UNIT – I

Introduction to Data Structures, abstract data types, Linear list – singly linked list implementation, insertion, deletion and searching operations on linear list, Stacks-Operations, array and linked representations of stacks, stack applications, Queues-operations, array and linked representations. Dictionaries: linear list representation, skip list representation, operations - insertion, deletion and searching. Hash Table Representation: hash functions, collision resolution-separate chaining, open addressing-linear probing, quadratic probing, double hashing, rehashing, extendible hashing.

UNIT – II

Search Trees: Binary Search Trees, Definition, Implementation, Operations- Searching, Insertion and Deletion, AVL Trees, Definition, Height of an AVL Tree, Operations – Insertion, Deletion and Searching, Red –Black, Splay Trees.

UNIT-III

Graphs: Graph Implementation Methods. Graph Traversal Methods. Sorting: Heap Sort,
External Sorting- Model for external sorting, Merge Sort.

UNIT-IV

Pattern Matching and Tries: Pattern matching algorithms-Brute force, the Boyer –Moore algorithm, the Knuth-Morris-Pratt algorithm, Standard Tries, Compressed Tries, Suffix tries.

References:

1. Fundamentals of Data Structures in C, 2nd Edition, E. Horowitz, S. Sahni and Susan Anderson Freed, Universities Press.
2. Data Structures using C – A. S. Tanenbaum, Y. Langsam, and M.J. Augenstein, PHI/Pearson Educ
3. Data Structures: A Pseudocode Approach with C, 2nd Edition, R. F. Gilberg and B.A. Forouzan, Cengage Learning.

Course Outcomes:

After the course completion, the students will be able to

CO-1.	Understand the concept of algorithm complexity and will acquire knowledge about mathematical notations, which can be used to measure the algorithm's complexity.
CO-2.	Comprehend different data structure techniques, such as array, stacks, queue, linked
CO-3.	Apply linear search and binary search techniques in real word applications to identify the particular element.
CO-4.	Get knowledge about different sorting algorithms along with their time complexities.
CO-5.	List, trees, and graphs, along with the operations performed on them.
CO-6.	Understand the memory representation of the above-mentioned data structures.

B.Sc. (Artificial Intelligence & Data Science)
Semester – II
COMMUNICATION SKILLS IN ENGLISH
Code:BCSE-1222

L	T	P	Credits
3	0	1	4

Time: 3 Hours **Max. Marks: 100**
Theory: 60
Practical: 15
Internal Assessment: 25

Suggested Pattern of Question Paper:
The question paper will be divided into two sections. Section A will consist of Twelve(12) questions of One(1) mark each. Section B will consist of Six questions of Eight(8) marks each. There will be internal choice wherever possible.

Section A

1. Do as directed
Tenses and Change of voice

(12X1=12Marks)

Section B

1. **Listening Skills**: Barriers to listening; effective listening skills; feedback skills.
2. **Speaking and Conversational Skills:** Components of a meaningful and easy conversation; understanding the cue and making appropriate responses; forms of polite speech; asking and providing information on general topics.
3. Drafting of a short speech on a given topic.
4. Transcoding (given dialogue to prose or given prose to dialogue).
5. Taking notes on a speech/lecture/telephonic conversations .
6. Translation from Vernacular (Punjabi/ Hindi) to English (Paragraph)

(6X8=48 Marks)

Course Objectives:
I: To develop competence in oral and visual communication.
II: To inculcate innovative and critical thinking among the students.
III: To enable them to grasp the application of communication theories.
IV: To acquire knowledge of the latest technology related to communication skills.
V: To provide knowledge of multifarious opportunities in the field of this programme.

Course Contents:
1. Listening Skills: Barriers to listening; effective listening skills; feedback skills, attending telephone calls; note taking.

Activities:
a) Listening exercises – Listening to conversation, speech/ lecture and taking notes.

2. Speaking and Conversational Skills: Components of a meaningful and easy conversation; understanding the cue and making appropriate responses; forms of polite speech; asking and providing information on general topics, situation based Conversation in English; essentials of Spoken English

Activities:
a) Conversation; dialogue and speech
b) Oral description or explanation of a common object, situation or concept.
c) Interviews and group discussion

Recommended Books:

1. *Oxford Guide to Effective Writing and Speaking* by John Seely.
2. *The Written Word* by Vandana R Singh, Oxford University Press
3. *Murphy's English Grammar* (by Raymond Murphy) CUP

Course Outcomes:

The completion of this course enables students to:

1. Identify common errors in language and rectify them.
2. Develop and expand Oral skills through controlled and guided activities.
3. Develop coherence, cohesion and competence in oral discourse through intelligible pronunciation.
4. Develop the ability to handle the interview process confidently and learn the subtle nuances of an effective group discourse.
5. Communicate contextually in specific and professional situations with courtesy.

PRACTICAL (Marks: 15)

Course Contents:-

1. Oral Presentation. (5 Marks)
2. Group Discussion. (5 Marks)
3. Mock Interview (5 Marks)

B.Sc. (Artificial Intelligence & Data Science)

Semester – II

Punjabi (Compulsory)-2

ਪੰਜਾਬੀ(ਲਾਜ਼ਮੀ)–2

Credit& Marks Distribution and Pre-Requisites of the Course

Course title & Code	Total Teaching Hours	Total Credits/ Hours per week	Credit distribution			Total Marks 100		Time Allowed in Exam
			L	T	P	Theory	IA	
ਪੰਜਾਬੀ (ਲਾਜ਼ਮੀ)–2 **BHPB-1201**	60	4	4	0	0	75	25	3 Hours

ਕੋਰਸ ਦਾ ਉਦੇਸ਼ Course Objective	**ਪਾਠ–ਕ੍ਰਮ ਨਤੀਜੇ Course Outcomes (COs)**
▪ ਵਿਦਿਆਰਥੀਆਂ ਵਿਚ ਸਾਹਿਤਕ ਰੁਚੀਆਂ ਪੈਦਾ ਕਰਨਾ। ▪ ਆਲੋਚਨਾਤਮਕ ਰੁਚੀਆਂ ਨੂੰ ਵਿਕਸਤ ਕਰਨਾ। ▪ ਵਿਦਿਆਰਥੀ ਨੂੰ ਦਫ਼ਤਰੀ ਅਤੇ ਘਰੇਲੂ ਚਿੱਠੀ ਪੱਤਰ ਤੋਂ ਜਾਣੂ ਕਰਵਾਉਣਾ। ▪ ਭਾਸ਼ਾਈ ਗਿਆਨ ਵਿਚ ਵਾਧਾ ਕਰਨਾ।	▪ ਉਸ ਅੰਦਰ ਸਾਹਿਤਕ ਰੁਚੀਆਂ ਪ੍ਰਫੁਲਿੱਤ ਹੋਣਗੀਆਂ। ▪ ਉਸ ਅੰਦਰ ਸਾਹਿਤ ਸਿਰਜਣਾ ਦੀ ਸੰਭਾਵਨਾ ਵਧੇਗੀ। ▪ ਵਿਦਿਆਰਥੀ ਚਿੱਠੀ–ਪੱਤਰ ਦੀ ਲਿਖਣ ਸ਼ੈਲੀ ਤੋਂ ਜਾਣੂ ਹੋਵੇਗਾ। ▪ ਉਹ ਭਾਸ਼ਾਈ ਬਣਤਰ ਤੋਂ ਜਾਣੂ ਹੋਵੇਗਾ।

ਅੰਕ–ਵੰਡ ਅਤੇ ਪ੍ਰੀਖਿਅਕ ਲਈ ਹਦਾਇਤਾਂ

ਸਿਲੇਬਸ ਦੇ ਚਾਰ ਭਾਗ ਹਨ ਪਰ ਪ੍ਰਸ਼ਨ–ਪੱਤਰ ਦੇ ਪੰਜ ਭਾਗ ਹੋਣਗੇ। ਪਹਿਲੇ ਭਾਗ ਵਿਚ 1.5–1.5 (ਡੇਢ–ਡੇਢ) ਅੰਕ ਦੇ ਅਤਿ–ਸੰਖੇਪ (Objective Type) 10 ਪ੍ਰਸ਼ਨ ਪੁੱਛੇ ਜਾਣਗੇ ਜੋ ਕਿ ਸਾਰੇ ਸਿਲੇਬਸ ਵਿਚੋਂ ਹੋਣਗੇ ਅਤੇ ਸਾਰੇ ਪ੍ਰਸ਼ਨ ਹੱਲ ਕਰਨੇ ਲਾਜ਼ਮੀ ਹੋਣਗੇ। ਸਿਲੇਬਸ ਦੇ ਬਾਕੀ ਚਾਰ ਭਾਗਾਂ ਵਿਚ 02–02 ਲੇਖ ਨੁਮਾ ਪ੍ਰਸ਼ਨ ਪੁੱਛੇ ਜਾਣਗੇ। ਹਰੇਕ ਭਾਗ ਵਿਚੋਂ 01–01 ਪ੍ਰਸ਼ਨ ਕਰਨਾ ਲਾਜ਼ਮੀ ਹੋਵੇਗਾ। ਹਰੇਕ ਪ੍ਰਸ਼ਨ ਦੇ ਬਰਾਬਰ 15 ਅੰਕ ਹੋਣਗੇ। ਪੇਪਰ ਸੈੱਟਰ ਜੇਕਰ ਚਾਹੇ ਤਾਂ ਪ੍ਰਸ਼ਨਾਂ ਦੀ ਵੰਡ ਅੱਗੋਂ ਵੱਧ ਤੋਂ ਵੱਧ ਚਾਰ ਉਪ–ਪ੍ਰਸ਼ਨਾਂ ਵਿਚ ਕਰ ਸਕਦਾ ਹੈ।

ਪਾਠ–ਕ੍ਰਮ

ਭਾਗ–ਪਹਿਲਾ

ਵਾਰਤਕ ਦੇ ਰੰਗ, (ਨਿਬੰਧ ਅਤੇ ਰੇਖਾ–ਚਿਤਰ) (ਸੰਪਾਦਕ) ਡਾ. ਮਹਿਲ ਸਿੰਘ, ਕਸਤੂਰੀ ਲਾਲ ਐਂਡ ਸਨਜ਼, ਅੰਮ੍ਰਿਤਸਰ।
(ਨਿਬੰਧ ਭਾਗ ਵਿਚੋਂ ਸਾਰ/ਵਿਸ਼ਾ–ਵਸਤੂ। ਰੇਖਾ–ਚਿਤਰ ਭਾਗ ਵਿਚੋਂ ਸਾਰ/ਨਾਇਕ ਬਿੰਬ)

ਭਾਗ–ਦੂਜਾ

ਪੰਜਾਬ ਦੇ ਮਹਾਨ ਕਲਾਕਾਰ (ਬਲਵੰਤ ਗਾਰਗੀ)
ਗੁਰੂ ਨਾਨਕ ਦੇਵ ਯੂਨੀਵਰਸਿਟੀ, ਅੰਮ੍ਰਿਤਸਰ।
(ਸਤੀਸ਼ ਗੁਜਰਾਲ ਤੋਂ ਸੁਰਿੰਦਰ ਕੌਰ ਤਕ)
(ਵਿਸ਼ਾ–ਵਸਤੂ/ਸਾਰ/ਨਾਇਕ ਬਿੰਬ)

ਭਾਗ–ਤੀਜਾ

(ੳ) ਦਫ਼ਤਰੀ ਚਿੱਠੀ ਪੱਤਰ
(ਅ) ਮੁਹਾਵਰੇ ਅਤੇ ਅਖਾਣ

ਭਾਗ–ਚੌਥਾ

(ੳ) ਸ਼ਬਦ–ਬਣਤਰ ਅਤੇ ਸ਼ਬਦ–ਰਚਨਾ – ਪਰਿਭਾਸ਼ਾ ਅਤੇ ਮੁਢਲੇ ਸੰਕਲਪ
(ਅ) ਸ਼ਬਦ–ਸ਼੍ਰੇਣੀਆਂ

B.Sc. (Artificial Intelligence & Data Science)Semester – II

Basic Punjabi-2

ਮੁਢਲੀ ਪੰਜਾਬੀ–2

(In Lieu of Compulsory Punjabi)

Credit & Marks Distribution and Pre-Requisites of the Course

Course title & Code	Total Teaching Hours	Total Credits/ Hours per week	Credit distribution			Total Marks 100		Time Allowed in Exam
			L	T	P	Theory	IA	
ਮੁਢਲੀ ਪੰਜਾਬੀ–2 BPBI-1202	60	4	4	0	0	75	25	3 Hours

ਕੋਰਸ ਦਾ ਉਦੇਸ਼ Course Objective	**ਪਾਠ–ਕ੍ਰਮ ਨਤੀਜੇ Course Outcomes (COs)**
• ਵਿਦਿਆਰਥੀ ਅੰਦਰ ਸ਼ਬਦ ਬਣਤਰ ਦੀ ਸਮਝ ਵਿਕਸਤ ਕਰਨਾ। • ਵਿਦਿਆਰਥੀ ਨੂੰ ਸ਼ਬਦ ਪ੍ਰਕਾਰ ਬਾਰੇ ਜਾਣਕਾਰੀ ਪ੍ਰਦਾਨ ਕਰਨਾ। • ਪੰਜਾਬੀ ਭਾਸ਼ਾ ਦੇ ਵਿਆਕਰਨਕ ਪ੍ਰਬੰਧ ਸਬੰਧੀ ਗਿਆਨ ਕਰਾਉਣਾ। • ਸਿਖਲਾਈ ਤੇ ਅਭਿਆਸ ਦੁਆਰਾ ਪੰਜਾਬੀ ਸ਼ਬਦ ਭੰਡਾਰ ਵਧਾਉਣਾ।	• ਉਹ ਪੰਜਾਬੀ ਸ਼ਬਦ-ਬਣਤਰ ਦੀ ਜਾਣਕਾਰੀ ਹਾਸਲ ਕਰਕੇ ਭਾਸ਼ਾਈ ਗਿਆਨ ਨੂੰ ਵਿਕਸਿਤ ਕਰਨਗੇ। • ਪੰਜਾਬੀ ਸ਼ਬਦ-ਰਚਨਾ ਸਬੰਧੀ ਮੁਹਾਰਤ ਹਾਸਲ ਕਰਨਗੇ। • ਵਿਦਿਆਰਥੀ ਸ਼ਬਦਾਂ ਦੀਆਂ ਭਿੰਨ-ਭਿੰਨ ਕਿਸਮਾਂ ਤੋਂ ਜਾਣੂ ਹੋਵੇਗਾ। • ਵਿਦਿਆਰਥੀਆਂ ’ਚ ਨਿੱਤ ਵਰਤੋਂ ਦੀ ਪੰਜਾਬੀ ਸ਼ਬਦਾਵਲੀ ਭੰਡਾਰ ’ਚ ਵਾਧਾ ਹੋਵੇਗਾ।

ਅੰਕ–ਵੰਡ ਅਤੇ ਪ੍ਰੀਖਿਅਕ ਲਈ ਹਦਾਇਤਾਂ

ਸਿਲੇਬਸ ਦੇ ਚਾਰ ਭਾਗ ਹਨ ਪਰ ਪ੍ਰਸ਼ਨ-ਪੱਤਰ ਦੇ ਪੰਜ ਭਾਗ ਹੋਣਗੇ। ਪਹਿਲੇ ਭਾਗ ਵਿਚ 01-01 ਅੰਕ ਦੇ ਅਤਿ-ਸੰਖੇਪ ਉੱਤਰ ਵਾਲੇ (Objective Type) 11 ਪ੍ਰਸ਼ਨ ਪੁੱਛੇ ਜਾਣਗੇ ਜੋ ਕਿ ਸਾਰੇ ਸਿਲੇਬਸ ਵਿਚੋਂ ਹੋਣਗੇ ਅਤੇ ਸਾਰੇ ਪ੍ਰਸ਼ਨ ਹੱਲ ਕਰਨੇ ਲਾਜ਼ਮੀ ਹੋਣਗੇ।ਪ੍ਰਸ਼ਨ ਪੱਤਰ ਦੇ ਦੂਸਰੇ ਅਤੇ ਤੀਸਰੇ ਭਾਗ ਵਿਚ, ਸਿਲੇਬਸ ਦੇ ਪਹਿਲੇ ਅਤੇ ਦੂਸਰੇ ਭਾਗ ਵਿਚੋਂ 8-8 ਅੰਕਾਂ ਦੇ 3-3 ਪ੍ਰਸ਼ਨ ਪੁੱਛੇ ਜਾਣਗੇ। ਜਿੰਨ੍ਹਾਂ ਵਿਚੋਂ ਵਿਦਿਆਰਥੀ ਨੇ ਕੋਈ 2-2 ਪ੍ਰਸ਼ਨ ਹੱਲ ਕਰਨੇ ਹੋਣਗੇ। ਇਸੇ ਤਰ੍ਹਾਂ ਪ੍ਰਸ਼ਨ ਪੱਤਰ ਦੇ ਚੌਥੇ ਭਾਗ ਵਿਚ 4-4 ਅੰਕਾਂ ਦੇ 5 ਪ੍ਰਸ਼ਨ ਪੁੱਛੇ ਜਾਣਗੇ। ਜਿੰਨ੍ਹਾਂ ਵਿਚੋਂ ਵਿਦਿਆਰਥੀ ਨੇ 4 ਪ੍ਰਸ਼ਨ ਹੱਲ ਕਰਨੇ ਹੋਣਗੇ।ਭਾਗ ਪੰਜਵੇਂ ਵਿਚ 8-8 ਅੰਕਾਂ ਦੇ 3 ਪ੍ਰਸ਼ਨ ਪੁੱਛੇ ਜਾਣਗੇ।ਜਿੰਨ੍ਹਾਂ ਵਿਚੋਂ ਵਿਦਿਆਰਥੀ ਨੇ 2 ਪ੍ਰਸ਼ਨ ਕਰਨੇ ਲਾਜ਼ਮੀ ਹੋਣਗੇ।

ਪਾਠ–ਕ੍ਰਮ

ਭਾਗ–ਪਹਿਲਾ

ਪੰਜਾਬੀ ਸ਼ਬਦ-ਬਣਤਰ:

ਧਾਤੂ, ਵਧੇਤਰ (ਅਗੇਤਰ, ਮਧੇਤਰ, ਪਿਛੇਤਰ), ਪੰਜਾਬੀ ਕੋਸ਼ਗਤ ਸ਼ਬਦ ਅਤੇ ਵਿਆਕਰਨਕ ਸ਼ਬਦ

ਭਾਗ–ਦੂਜਾ

ਪੰਜਾਬੀ ਸ਼ਬਦ-ਪ੍ਰਕਾਰ:

(ੳ) ਸੰਯੁਕਤ ਸ਼ਬਦ, ਸਮਾਸੀ ਸ਼ਬਦ, ਦੋਜਾਤੀ ਸ਼ਬਦ, ਦੋਹਰੇ/ਦੁਹਰੁਕਤੀ ਸ਼ਬਦ ਅਤੇ ਮਿਸ਼ਰਤ ਸ਼ਬਦ

(ਅ) ਸਿਖਲਾਈ ਤੇ ਅਭਿਆਸ

ਭਾਗ–ਤੀਜਾ

ਪੰਜਾਬੀ ਸ਼ਬਦ-ਰਚਨਾ:

ਇਕ-ਵਚਨ/ਬਹੁ-ਵਚਨ, ਲਿੰਗ-ਪੁਲਿੰਗ, ਬਹੁਅਰਥਕ ਸ਼ਬਦ, ਸਮਾਨਅਰਥਕ ਸ਼ਬਦ, ਬਹੁਤੇ ਸ਼ਬਦਾਂ ਲਈ ਇਕ ਸ਼ਬਦ, ਸ਼ਬਦ ਜੁੱਟ, ਵਿਰੋਧਅਰਥਕ ਸ਼ਬਦ, ਸਮਨਾਮੀ ਸ਼ਬਦ

ਭਾਗ–ਚੌਥਾ

ਨਿੱਤ ਵਰਤੋਂ ਦੀ ਪੰਜਾਬੀ ਸ਼ਬਦਾਵਲੀ

ਖਾਣ-ਪੀਣ, ਸਾਕਾਦਾਰੀ, ਰੁੱਤਾਂ, ਮਹੀਨਿਆਂ, ਗਿਣਤੀ, ਮੌਸਮ, ਬਜ਼ਾਰ, ਵਪਾਰ, ਧੰਦਿਆਂ ਨਾਲ ਸੰਬੰਧਿਤ

B.Sc. (Artificial Intelligence & Data Science)
Semester – II

PUNJABHISTORY& CULTURE(C321TO1000A.D.)

(Special Paper in lieu of Punjabi compulsory)
(For those students who are not domicile of Punjab)
Course Code: BPHC-1204

Credit Hours(per week):04
L- T- P
04-0-0
Time:3Hours **Total.Marks:100**
Theory:75
InternalAssessment:25

Instructions for the Paper Setters:
Question paper should consist of two sections—Section A and Section B. The paper setter must ensure that questions in Section–A do not cover morethanonepoint,andquestionsinSection–Bshouldcoveratleast50percentofthetheme.

Section–A: The examiner will set 15 objective type questions out of which the candidate shall attempt any 10 questions, each carrying 1½ marks. Thetotalweightageofthissectionwillbe15marks. Answer to each question should be in approximately one to two sentences.

Section–B: Theexaminerwillset8questions,two from each Unit. The candidate will attempt 4 questions selecting one from each Unit in about 1000 words. Each question willcarry15marks.Thetotalweightageofthissectionwillbe60marks
Note: **The examiner is to set the question paper in two languages: English & Hindi.**

Course Objectives: The main objective of this course is to educate the students who are not domicile of the Punjab about the history and culture of the Ancient Punjab. It is to provide them knowledge about the social, economic, religious, cultural and political life of the people of the Punjab during the rule of various dynasties such as The Mauryans, The Khushans, TheGuptas,The Vardhanas and other ancient ruling dynasties of the period under study.

Unit-I

1. The Punjab under Chandra gupta Maurya and Ashoka.
2. The Kushans and their Contribution to the Punjab.

Unit-II

3. The Punjab under the Gupta Emperors.
4. The Punjab under the Vardhana Emperors

Unit-III

5. Political Developments 7th Century to 1000A.D.

6. Socio-cultural History of Punjab from 7th Century to 1000A.D.

Unit-IV

7. Development of languages and Literature.

8. Development of art & Architecture.

Suggested Readings:-

L. Joshi (ed.*), History and Culture of the Punjab*, Part-I, Patiala, 1989 (3rdedition).

L.M. JoshiandFaujaSingh(ed), *HistoryofPunjab*,Vol.I,Patiala1977.

Budha Parkash,*GlimpsesofAncientPunjab*, Patiala, 1983.

B.N.Sharma, *LifeinNorthernIndia*,Delhi. 1966.

CourseOutcomes:

On completingthecourse, thestudentswillbeableto:

CO-1 Understand the history and culture of the Punjab in Ancient Period.
CO-2 Analyse social,economic,religious,cultural and political life of Ancient Indian dynasties.
CO-3 Study about the politicaldevelopmentsfrom7th centuryto 1000AD.
CO-4 Understand socio-cultural history of the Punjab from 7th century to 1000 AD.
CO-5 Analyse language, literature,art and architecture of Ancient Punjab.

B.Sc. (Artificial Intelligence & Data Science)
Semester – II
BAIDS-124P
LAB I: Data Structures Implementation using Python

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

Practical Marks: 37

Internal Assessment Marks:13

Credits		
L	**T**	**P**
0	**0**	**2**

Course Objectives:

1.	The main objective of this practical lab is to make the students to be able to implement the programs utilizing different data structure techniques to organize and manage data in computer's memory.
2.	The students will gain an understanding of different approaches available for searching and sorting the data and further be able to identify the methods requiring minimum time to perform the pre-mentioned tasks.

Data Structures Implementation using Python

1. Binary Search in Python
2. Linear Search in Python
3. Bubble Sort in Python
4. Insertion Sort in Python
5. Heap Sort in Python
6. Merge Sort in Python
7. Python program to create a Circular Linked List of N nodes and count the number of nodes
8. Python program to create a Circular Linked List of n nodes and display it in reverse order
9. Python program to create and display a Circular Linked List
10. Python program to delete a node from the beginning of the Circular Linked List
11. Python program to delete a node from the end of the Circular Linked List
12. Python program to delete a node from the middle of the Circular Linked List
13. Python program to find the maximum and minimum value node from a circular linked list
14. Python program to insert a new node at the beginning of the Circular Linked List
15. Python program to insert a new node at the end of the Circular Linked List
16. Python program to insert a new node at the middle of the Circular Linked List
17. Python program to remove duplicate elements from a Circular Linked List

18. Python program to search an element in a Circular Linked List
19. Python program to sort the elements of the Circular Linked List
20. Python program to convert a given binary tree to doubly linked list
21. Python program to create a doubly linked list from a ternary tree
22. Python program to create a doubly linked list of n nodes and count the number of nodes
23. Python program to create a doubly linked list of n nodes and display it in reverse order
24. Python program to create and display a doubly linked list
25. Python program to delete a new node from the beginning of the doubly linked list
26. Python program to delete a new node from the end of the doubly linked list
27. Python program to delete a new node from the middle of the doubly linked list
28. Python program to find the maximum and minimum value node from a doubly linked list
29. Python program to insert a new node at the beginning of the Doubly Linked list
30. Python program to insert a new node at the end of the Doubly Linked List

Course Outcomes:

After the completion of this course, students will be able

CO-1.	To implement the real world applications by making use of linear data structure, such as, arrays, stacks, queues, linked lists, trees and graphs, to handle the data stored in computer's memory.
CO-2.	To perform the implementation using non-linear data structure, such as, trees and graphs.
CO-3.	To perform traversing, insertion, and deletion operations on the above-mentioned data structures.
CO-4.	To perform the search operations by making use of suitable search technique.
CO-5.	To sort the data by using different sorting techniques and can also assess the time requirement of the available sorting techniques.

B.Sc. (Artificial Intelligence & Data Science)
Semester – II
BAIDS-125P
Lab II: Data Mining Algorithms implementation

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

Credits		
L	**T**	**P**
0	**0**	**2**

Practical Marks: 37

Internal Assessment Marks:13

COURSEOBJECTIVES

1.	Be familiar with mathematical data mining tools & implement them practically.
2.	Understand and implementation of classical models and algorithms in SQL.
3.	Characterization, pattern recognition, rule mining, classification and clustering.
4.	Master data mining techniques in various applications like social, scientific and environmental context.
5.	Develop skills in selecting the appropriate data mining algorithm for solving practical problems

Data Mining Algorithms

1. C4.5 Algorithm
2. K-mean Algorithm
3. Support Vector Machines
4. Apriori Algorithm
5. Expectation-Maximization Algorithm
6. PageRank Algorithm
7. Adaboost Algorithm
8. kNN Algorithm
9. Naive Bayes Algorithm
10. CART Algorithm

Course Outcomes:

C0-1	Understand the functionality of the various data mining and data warehousing languages.
C0-2	Understand the strengths and limitations of various data mining and data warehousing models & their implementations.
C0-3	Apply, Create and Explain the analysing techniques of various data in SQL,PL/SQL.
C0-4	Analyse and Describe different methodologies used in data mining and data ware housing in various software.

B.Sc. (Artificial Intelligence & Data Science)

Semester – II

Skill Enhancement Course

ਪੰਜਾਬੀ ਵਿਚ ਸਿਰਜਨਾਤਮਕ ਲੇਖਣ

Creative Writing in Punjabi

SEC-124

Credit & Marks Distribution, Eligibility and Pre-Requisites of the Course

Course title & Code	Total Teaching Hours	Total Credits/ Hours per week	Credit distribution			Total Marks 25		Duration of Course	Time Allowed in Exam
			L	T	P	Th	I A		
ਪੰਜਾਬੀ ਵਿਚ ਸਿਰਜਨਾਤਮਕ ਲੇਖਣ SEC-124	30	1	2	0	0	19	06	30 Hours	3 Hours

ਕੋਰਸ ਦਾ ਉਦੇਸ਼ Course Objectives (Cos)	**ਪਾਠ-ਕ੍ਰਮ ਨਤੀਜੇ Course Outcomes (COs)**
• ਵਿਦਿਆਰਥੀਆਂ ਨੂੰ ਸਾਹਿਤ ਦੇ ਪ੍ਰਮੁੱਖ ਰੂਪ ਕਹਾਣੀ ਤੋਂ ਜਾਣੂ ਕਰਵਾਉਣਾ। • ਵਿਦਿਆਰਥੀਆਂ ਨੂੰ ਸਾਹਿਤ ਦੇ ਪ੍ਰਮੁੱਖ ਰੂਪ ਕਵਿਤਾ ਅਤੇ ਕਹਾਣੀ ਦਾ ਸਿਰਜਨਾਤਮਕ ਹੁਨਰ ਪੈਦਾ ਕਰਨਾ।	• ਵਿਦਿਆਰਥੀ ਸਾਹਿਤ ਦੇ ਪ੍ਰਮੁੱਖ ਰੂਪ ਕਹਾਣੀ ਬਾਰੇ ਜਾਣੂ ਹੋਣਗੇ। • ਵਿਦਿਆਰਥੀਆਂ ਅੰਦਰ ਸਾਹਿਤ ਦੇ ਪ੍ਰਮੁੱਖ ਰੂਪ ਕਹਾਣੀ ਦਾ ਸਿਰਜਨਾਤਮਕ ਹੁਨਰ ਪੈਦਾ ਹੋਵੇਗਾ।

ਅੰਕ-ਵੰਡ ਅਤੇ ਪ੍ਰੀਖਿਅਕ ਲਈ ਹਦਾਇਤਾਂ

ਸਿਲੇਬਸ ਦੇ ਪਹਿਲੇ ਭਾਗ ਆਧਾਰ 'ਤੇ ਪ੍ਰਸ਼ਨ-ਪੱਤਰ ਦੇ ਦੋ ਭਾਗ ਬਣਾਏ ਜਾਣਗੇ। ਪਹਿਲੇ ਭਾਗ ਵਿੱਚ 01-01 ਅੰਕ ਦੇ 04 ਬਹੁ-ਵਿਕਲਪੀ ਪ੍ਰਸ਼ਨ ਪੁੱਛੇ ਜਾਣਗੇ। ਦੂਸਰੇ ਭਾਗ ਵਿਚ 5-5 ਅੰਕਾਂ ਦੇ 5 ਪ੍ਰਸ਼ਨ ਪੁੱਛੇ ਜਾਣਗੇ, ਜਿਨ੍ਹਾਂ ਵਿੱਚੋਂ ਕੋਈ 03 ਪ੍ਰਸ਼ਨ ਕਰਨੇ ਲਾਜ਼ਮੀ ਹੋਣਗੇ।

ਨੋਟ: 06 ਅੰਕਾਂ ਦੀ ਇੰਟਰਨਲ ਅਸੈੱਸਮੈਂਟ ਅਸਾਈਨਮੈਂਟ ਦੇ ਅਧਾਰ 'ਤੇ ਹੋਵੇਗੀ।

ਪਾਠ-ਕ੍ਰਮ

ਭਾਗ–ਪਹਿਲਾ

ਨਿੱਕੀ ਕਹਾਣੀ : ਪਰਿਭਾਸ਼ਾ ਤੇ ਪ੍ਰਕਿਰਤੀ

(ੳ) ਨਾਵਲ, ਕਹਾਣੀ ਅਤੇ ਨਿੱਕੀ ਕਹਾਣੀ: ਅੰਤਰ ਨਿਖੇੜ

(ਅ) ਨਿੱਕੀ ਕਹਾਣੀ ਦੇ ਤੱਤ : ਗੋਂਦ, ਚਰਿਤ੍ਰ-ਚਿਤ੍ਰਣ, ਵਾਰਤਾਲਤਪ, ਵਾਤਾਵਰਣ, ਭਾਸ਼ਾ-ਸ਼ੈਲੀ ਅਤੇ ਉਦੇਸ਼।

(ੲ) ਕਹਾਣੀ ਕਿਵੇਂ ਸਮਝੀਏ ਤੇ ਲਿਖੀਏ?

ਭਾਗ-ਦੂਜਾ

ਅਭਿਆਸ/ਅਸਾਈਨਮੈਂਟ

(ੳ) ਕਵਿਤਾ (ਅ) ਨਿੱਕੀ ਕਹਾਣੀ

B.Sc. (Artificial Intelligence & Data Science)

Semester – II

Course Code: ZDA121

Course Title-DRUGABUSE:PROBLEM,MANAGEMENTAND PREVENTION

DRUGABUSE: MANAGEMENT AND PREVENTION

(Compulsory for all Under Graduate Classes)

Credithrs/wk.:1

Time: 3 Hours Max.Marks:25

Instructions for the Paper Setters:

1) There will be two sections A and B.
2) Section A is compulsory and will be of 5 marks consisting of 8 short answer type questions carrying 1mark each covering the whole syllabus. The candidates are required to attempt 5 questions out of 8 short answer type questions. The answer should notexceed50 words.
3) Candidates shall be required to attempt 4 questions from Section B, selecting one question from each unit and each question carries 5 marks. Preferably, the question should not be split into more than two sub-parts.

Course Objectives: The course aim is to-

CO-1.	Describe the role of family in the prevention of drug abuse.
CO-2.	Describe the role of school and teachers in the prevention of drug abuse.
CO-3.	Emphasize the role of media and educational and awareness program.
CO-4.	Provide know how about various legislation and Acts against drug abuse.

UNIT-I

Role of family: Parent child relationship, Family support, Supervision, Shaping values, Active Scrutiny.

UNIT-II

School: Counselling, Teacher as role model.

Parent-Teacher-Health Professional Coordination, Random testing on students.

UNIT-III

Controlling Drug Abuse: Media: Restraint on advertisements of drugs, advertisements on bad effects of drugs, Publicity and media, Campaigns against drug abuse, Educational and awareness program

UNIT-IV

Legislation: NDPS act, Statutory warnings, Policing of Borders, Checking Supply/Smuggling of Drugs, Strict enforcement of laws, Time bound trials.

References:

1. Ahuja,Ram(2003),SocialProblemsin India, RawatPublication,Jaipur.
2. Extent,PatternandTrendofDrugUseinIndia, MinistryofSocialJusticeand Empowerment, Government of India, 2004.
3. Inciardi,J.A.1981. TheDrugCrimeConnection.BeverlyHills: SagePublications.
4. JasjitKaurRandhawa&SamreetRandhawa,"DrugAbuseProblem,Management& Prevention", KLS, ISBN No. 978-81-936570-8-9, (2019).
5. Kapoor.T.(1985)DrugepidemicamongIndian Youth,NewDelhi:Mittal Pub.
6. Modi,IshwarandModi,Shalini(1997)Drugs:AddictionandPrevention,Jaipur:RawatPublication.
7. Sain,Bhim1991,DrugAddictionAlcoholism,SmokingobscenityNewDelhi:Mittal Publications.
8. Sandhu,RanvinderSingh,2009,DrugAddictioninPunjab:ASociologicalStudy. Amritsar. Guru Nanak Dev University.
9. Singh,C.P. 2000.Alcoholand DependenceamongIndustrial Workers:Delhi: Shipra.
10. Sussman,SandAmes,S.L.(2008).DrugAbuse:Concepts,PreventionandCessation, Cambridge University Press.
11. WorldDrugReport2011, UnitedNations officeof Drugand Crime.

Course Outcomes: The students will be able to-

CO-1.	Understand the importance of family and its role in drug abuse prevention.
CO-2.	Understandtheroleofsupportsystemespeciallyinschoolsandinter-relationships Between students, parents and teachers.
CO-3.	Understand impact of media on substance abuse prevention.
CO-4.	Understand the role of awareness drives, campaigns etc. in drug abuse management.
CO-5	Learn about the Legislations and Acts governing drug trafficking and Abuse in India.