



A Charutar Vidya Mandal's Institution
V.P. & R.P.T.P. SCIENCE COLLEGE
(AUTONOMOUS – GRANT – IN – AID)
Affiliated to Sardar Patel University
VALLABH VIDYANAGAR-388120



NEP Structure B.Sc. Semester: V
Syllabus with Effect from: 2026-27

Course Type	Course Code	Name of Course	T / P	Credit	Contact Hours Per Week	Exam Duration in hrs	Component of Marks		
							Internal	External	Total
Major Course									
Computer Science	US05MACSC01	Object Oriented Programming Using Java	T	4	4	2:30	50	50	100
	US05MACSC02	Relational Database Management System	T	4	4	2:30	50	50	100
	US05MACSC03	Practical	P	4	8	3	50	50	100
Skill Enhancement Course/Internship/Dissertation	US05SECSC01	Introduction to Artificial Intelligence	T	2	4	1:30	25	25	50



A Charutar Vidya Mandal's Institution
V.P. & R.P.T.P. SCIENCE COLLEGE
 (AUTONOMOUS – GRANT – IN – AID)
 Affiliated to Sardar Patel University
 VALLABH VIDYANAGAR-388120



Bachelor of Science (Computer Science)
B.Sc. (CS) Semester V
 Syllabus with effect from the Academic Year 2026-2027

Course Code	US05MACSC01	Title of the Course	Object Oriented Programming Using Java
Total Credits of the Course	4	Hours per Week	4

Course Objectives:	1. To introduce basic programming concepts and necessary constructs of the Java programming language. 2. To understand the fundamental concepts of object-oriented programming using Java. 3. To describe exception handling and Input Output Management. 4. To understand Applet programming using Abstract Window Toolkit (AWT).
--------------------	---

Course Content		
Unit	Description	Weightage* (%)
1.	Introduction – History of Java, features, the Java environment, the Java Virtual Machine (JVM) – Structure of a Java program, a simple Java program, implementing a Java program – Tokens, comments, constants, variables and data types – Scope of variables, type casting – Operators: arithmetic, relational, logical, assignment, increment/decrement, conditional, ternary operator and special operators – Decision making: if statement, if...else statement, nesting of if...else, the else if ladder, switch statement – Looping: while, do...while, for, loop jumps in loops, labeled loops	25%
2.	Arrays, Classes, Objects, Interfaces and Inheritance – Arrays: one, two dimensional arrays – Defining a class, members of a class: variables and methods, creating objects, constructors, accessing class members – Static members v/s instance members – Introduction to inheritance, super keyword – Interfaces: Introduction, definition, extending, implementing & accessing – Final variables, methods and classes, abstract methods and classes – Introduction to method overloading and overriding	25%



A Charutar Vidya Mandal's Institution
V.P. & R.P.T.P. SCIENCE COLLEGE
 (AUTONOMOUS – GRANT – IN – AID)
 Affiliated to Sardar Patel University
 VALLABH VIDYANAGAR-388120



3.	Exception Handling, I/O Management and Packages – Managing errors & exceptions: introduction, types of errors, exceptions, syntax of exception handling construct, multiple catch statements, the finally clause, defining and throwing user-defined exceptions, the throw statement – Managing I/O files: introduction, concept of streams, Character stream classes – Introduction to the concept of package, Java API packages – Using java. lang (String, Math)	25%
4.	Applet Programming – Applet architecture and skeleton – java.awt package (Button, CheckBox, CheckBoxGroup, Choice, Color, Label, List, TextArea, TextField) – HTML applet tag, display techniques (DrawString, Lines, Rectangle, Ellipses, Circles, Arcs, Polygons, Color) – Introduction to event handling	25%

Teaching-Learning Methodology	Blended learning approach incorporating both traditional classroom teaching as well as usage of ICT tools.
-------------------------------	--

Evaluation Pattern		
Sr. No.	Details of the Evaluation	Weightage
1.	Internal Examination	50%
2.	University Examination	50%

Course Outcomes: Having completed this course, the learner will be able to develop	
1.	Understanding of the basic programming concepts and necessary constructs of the Java programming language.
2.	Understanding of the fundamental concepts of object-oriented programming using Java.
3.	Ability to describe exception handling and Input Output Management.
4.	Understanding of Applet programming using Abstract Windows Toolkit (AWT)



A Charutar Vidya Mandal's Institution
V.P. & R.P.T.P. SCIENCE COLLEGE
(AUTONOMOUS – GRANT – IN – AID)
Affiliated to Sardar Patel University
VALLABH VIDYANAGAR-388120



Suggested References:

Sr. No.	References
1.	Programming with Java- A Primer by E. Balaguruswami, 3 rd Edition, TMH Publication, 2006.
2.	The Complete Reference – Java 2, 7 th Edition Herbert Schildt. TMH Publication, 2017.
3.	Saba Zame , Handbook of Object technology, CRC Press, Washington DC, 1999.
4.	Mary Campion and Kathy Walrath, Java tutorial, Second Edition, Addison Wesley Pun. 1998.
5.	Java 2 Programming Black Book, Steven Holzner, 2005.

On-line resources to be used if available as reference material

On-line Resources

1. <https://www.tutorialspoint.com/>

2. <https://www.w3schools.com/>

3. <https://www.javatpoint.com/>



A Charutar Vidya Mandal's Institution
V.P. & R.P.T.P. SCIENCE COLLEGE
 (AUTONOMOUS – GRANT – IN – AID)
 Affiliated to Sardar Patel University
 VALLABH VIDYANAGAR-388120



Bachelor of Science (Computer Science)
 Syllabus with effect from the Academic Year 2026-2027
B.Sc. (CS) Semester V

Course Code	US05MACSC02	Title of the Course	Relational Database Management System
Total Credits of the Course	4	Hours per Week	4

Course Objectives:	1. To introduce the students to the relational data model and RDBMS. 2. To teach SQL for accessing an RDBMS.
--------------------	---

Course Content		
Unit	Description	Weightage* (%)
1.	Relational Database Theory and Data Modeling – The three-schema architecture for a Database Management System (DBMS) – Introduction to data models (hierarchical, network, relational) – The relational data model: concepts and terminology, operations on data (DDL, DML), relationships and relationship types – Integrity constraints – Codd rules – Entity-relationship modeling (different types of entities, attributes, relationships and their representation in the E-R diagram) – Case studies of data modeling using E-R modeling	25%
2.	Introduction to SQL – SQL - introduction, advantages and disadvantages – Data types – built-in (number, char, varchar2, date, raw, long raw) – Types of SQL Statements: DDL (Data Definition Language), DML (Data Manipulation Language), DCL (Data Control Language), TCL (Transaction Control Language) – Working with SQL*Plus – overview and basic commands like ed, start, get, save, exit, connect, set linesize, set pagesize and host – Creating table and inserting data - CREATE TABLE, INSERT, retrieving data using query – SELECT, manipulating data – DELETE and UPDATE, modifying and removing table – ALTER TABLE and DROP TABLE.	25%



A Charutar Vidya Mandal's Institution
V.P. & R.P.T.P. SCIENCE COLLEGE
(AUTONOMOUS – GRANT – IN – AID)
Affiliated to Sardar Patel University
VALLABH VIDYANAGAR-388120



3.	Data Constraints and Functions – Pseudo columns – ROWID, ROWNUM, USER, UID, SYSDATE – Null values, TAB table, DUAL table – Operators – arithmetic, relational, logical, range searching, pattern matching and set – Data constraints – Introduction, advantages and disadvantages – Type of data constraints – NOT NULL, UNIQUE, PRIMARY KEY, FOREIGN KEY and CHECK – Functions – introduction, merits and demerits, types of functions (scalar and aggregate) – Scalar: Numeric functions, Character functions, Date functions, Conversion functions. – Aggregate fun: AVG, COUNT, MAX, MIN, SUM	25%
4.	Query, Subquery, Joins, Transaction Management and Reporting through SQL*Plus – Query and subquery, types of subquery – Creation and manipulation of database objects – views – Joining tables, types of joins (cross join, natural join, inner join, equijoin, outer joins, self-join). – Data control language statements – GRANT and REVOKE – Transaction control language statements – COMMIT, ROLLBACK and SAVEPOINT – PL-SQL Block – FUNCTION AND PROCEDURE	25%



A Charutar Vidya Mandal's Institution
V.P. & R.P.T.P. SCIENCE COLLEGE
(AUTONOMOUS – GRANT – IN – AID)
Affiliated to Sardar Patel University
VALLABH VIDYANAGAR-388120



Teaching- Learning Methodology	Multiple teaching approaches: lectures and discussion, exploration and inquiry, cooperative group work, demonstrations, and presentations.
--------------------------------------	--

Evaluation Pattern		
Sr. No.	Details of the Evaluation	Weightage
1.	Internal Examination	50%
2.	University Examination	50%

Course Outcomes: Having completed this course, the learner will be able to	
1.	Apply the basic knowledge of the relational data model and RDBMS
2.	Use SQL for accessing an RDBMS

Suggested References:	
Sr. No.	References
1.	An introduction to Database Systems : Bipin C. Desai, Galgotia Publications Pvt. Ltd, 1981.
2.	Ivan Bayross: SQL,PL/SQL The programming language of Oracle, 3 rd revised edition, BPB Publications, 2010.
3	SQL/PLSQL for Oracle9i, P. S. Deshpande, dreamtech press, reprint edition 2009.
4	Understanding Database Management Systems: S. Parthsarthy and B.W.Khalkar, Master Academy, First edition – 2007.



A Charutar Vidya Mandal's Institution
V.P. & R.P.T.P. SCIENCE COLLEGE
(AUTONOMOUS – GRANT – IN – AID)
Affiliated to Sardar Patel University
VALLABH VIDYANAGAR-388120



Bachelor of Science (Computer Science)

Syllabus with effect from the Academic Year 2026-2027

B.Sc. (CS) Semester-V

Course Code	US05MACSC03	Title of the Course	Practical
Total Credits of the Course	4	Hours per Week	08

Course Objectives:	1. To study the concepts of object-oriented programming concepts using Java. 2. To learn query processing techniques.
--------------------	--

Course Content		
Part	Description	Weightage (%)
I	Practical based on US05MACSC01	50%
II	Practical based on US05MACSC02	50%

Teaching-Learning Methodology	Hands on training through required ICT tools.
-------------------------------	---

Evaluation Pattern		
Sr. No.	Details of the Evaluation	Weightage
1.	Internal Examination	50%
2.	University Examination	50%

Course Outcomes: After completing this course, the learner will be able to	
1.	gain knowledge of object-oriented programming concepts using Java.
2.	gain the knowledge of RDBMS.

* * * *



A Charutar Vidya Mandal's Institution
V.P. & R.P.T.P. SCIENCE COLLEGE
(AUTONOMOUS – GRANT – IN – AID)
Affiliated to Sardar Patel University
VALLABH VIDYANAGAR-388120



Bachelor of Science (Computer Science)
Syllabus with effect from the Academic Year 2026-2027
B.Sc. (CS) Semester-V

Course Code	US05SECSC01	Title of the Course	Introduction Artificial Intelligence
Total Credits of the Course	2	Hours per Week	2

Course Objectives:	1. To introduce the term Artificial Intelligence and its related domains. 2. To study basic concepts related to KBS. 3. To learn various search methods.
--------------------	--

Course Content		
Unit	Description	Weightage (%)
1.	Artificial Intelligence (AI) – Concepts and Definitions of AI – Brief history of AI – Introduction to their related fields like Expert Systems, Natural Language Programs, Robotics, Machine Learning, Speech Recognition, Neural Networks, etc – Application Areas of Artificial Intelligence Search Algorithms in AI: – Blind search (Breadth-first search and Depth-first search) – Heuristic search algorithms (Greedy Search and A* Search)	50
2.	Knowledge Based Systems (KBS) – KBS Structure, Components of KBS, Categories of KBS, – Knowledge-Based Shell – Advantages, limitations and applications of KBS – Knowledge Acquisition, Knowledge Update – Factual and Procedural Knowledge Representations – Knowledge Based Systems Development Model	50



A Charutar Vidya Mandal's Institution
V.P. & R.P.T.P. SCIENCE COLLEGE
(AUTONOMOUS – GRANT – IN – AID)
Affiliated to Sardar Patel University
VALLABH VIDYANAGAR-388120



Teaching-Learning Methodology	Blended learning approach incorporating both traditional classrooms teaching as well as usage of ICT tools.	
Evaluation Pattern		
Sr. No.	Details of the Evaluation	Weightage
1.	Internal Written Examination (As pe r CBCS R.6.8.3) Internal Continuous Assessment in the form of Quizzes, Seminars, Assignments, Attendance (As per CBCS R.6.8.3)	50%
2.	University Examination	50%

Course Outcomes: Having completed this course, the learner will be able to understand	
1.	the term Artificial Intelligence and its related domains.
2.	basic concepts related to KBS.
3.	various search methods.

Suggested References:	
Sr. No.	References
1.	Elain Rich : Artificial Intelligence, McGraw Hill, 2001.
2.	Patterson, Dan W. : Introduction to Artificial Intelligence, Prentice Hall of India (PHI), 2015.
3.	R.Akerkar : Introduction to Artificial Intelligence, PHI, 2005.
4.	Rich and Knight, Artificial Intelligence, Tata McGraw Hill Publishing Co. Ltd., 21 st Indian Reprint, 2001.
5.	Akerkar RA and Sajja P S, Knowledge-Based Systems, Jones & Bartlett Publishers, Sudbury, MA, USA, 2009.



A Charutar Vidya Mandal's Institution
V.P. & R.P.T.P. SCIENCE COLLEGE
(AUTONOMOUS – GRANT – IN – AID)
Affiliated to Sardar Patel University
VALLABH VIDYANAGAR-388120

