



## CHANGU KANA THAKUR

**Arts, Commerce and Science College, New Panvel (Autonomous)**

Re-accredited 'A+' Grade by NAAC (3<sup>rd</sup> Cycle-CGPA 3.61)

'College with Potential for Excellence' Status Awarded by University Grants Commission

'Best College Award' by University of Mumbai

### Course Outcomes

**Class: F.Y.BSc. CS**

**Semester I**

<b>Name of the Programme:</b> B.Sc.	<b>Programme Coordinator:</b> Dr. J. S. Thakur	<b>Head of the Department:</b> Mrs. P. M. Jadhav
Subject: <b>Computer Science</b>	Course: Computer Organization and Design Course Code: UCS1COD	Course Coordinator: Mrs. A. P. Raykar
	After completing the course, students will be able to	Bloom Taxonomy Level (BTL)
CO1	Explain the underlying principles of computers	Understand
CO2	Analyze the Instruction set architecture	Analyze
CO3	Analyze the role of various hardware components of processor	Analyze
CO4	Analyze how data is transferred between various peripheral devices in the computer	Analyze

<b>Name of the Programme:</b> B.Sc.	<b>Programme Coordinator:</b> Dr. J. S. Thakur	<b>Head of the Department:</b> Mrs. P. M. Jadhav
Subject: <b>Computer Science</b>	Course: Programming with Python-I Course Code: UCS1PP1	Course Coordinator: Mrs. P. M. Jadhav
	After completing the course, students will be able to	Bloom Taxonomy Level (BTL)
CO1	Understand the pros and cons of scripting languages vs. classical programming languages	Understand
CO2	Understand Python programming basics and paradigm	Understand
CO3	Apply loops, control statements, and string manipulations	Apply

CO4	Illustrate the use of lists, tuples & dictionaries for representing compound data	Understand
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<b>Name of the Programme:</b> B.Sc.	<b>Programme Coordinator:</b> Dr. J. S. Thakur	<b>Head of the Department:</b> Mrs. P. M. Jadhav
Subject: <b>Computer Science</b>	Course: Programming with C Course Code: UCS1PWC	Course Coordinator: Ms. V. V. Patil
	After completing the course, students will be able to	Bloom Taxonomy Level (BTL)
CO1	Explain the basic programming concepts and broad view of programming language.	Understand
CO2	Apply programming concepts such as operators, primitive data types, and loops	Apply
CO3	Illustrate the use of an array, pointer, and file handling techniques	Understand
CO4	Demonstrate the use of strings and string handling functions	Understand

<b>Name of the Programme:</b> B.Sc.	<b>Programme Coordinator:</b> Dr. J. S. Thakur	<b>Head of the Department:</b> Mrs. P. M. Jadhav
Subject: <b>Computer Science</b>	Course: Database Management Systems-I Course Code: UCS1DM1	Course Coordinator: Ms. A. U. Chavan
	After completing the course, students will be able to	Bloom Taxonomy Level (BTL)
CO1	Evaluate business information problem and the requirements of a problem in terms of data	Evaluate
CO2	Design the database schema with the use of appropriate data types for storage of data in database	Create

CO3	Create, manipulate, query and back up the databases	Create
CO4	Analyze various security mechanisms required for database protection	Analyze

<b>Name of the Programme:</b> B.Sc.	<b>Programme Coordinator:</b> Dr. J. S. Thakur	<b>Head of the Department:</b> Mrs. P. M. Jadhav
Subject: <b>Computer Science</b>	Course: Discrete Mathematics Course Code: UCS1DM	Course Coordinator: Mrs. N. R. Gharat
	After completing the course, Student will be able to	Bloom Taxonomy Level (BTL)
CO1	Explain the function, types of function and relation	Understand
CO2	Solve the problem on recurrence relation	Create
CO3	Analyze the permutation, combination and counting principle	Analyze
CO4	Examine the properties of the graph, application of graph and trees	Analyze

<b>Name of the Programme:</b> B.Sc.	<b>Programme Coordinator:</b> Dr. J. S. Thakur	<b>Head of the Department:</b> Mrs. P. M. Jadhav
Subject: <b>Computer Science</b>	Course: Descriptive Statistics Course Code: UCS1DST	Course Coordinator: Ms. R. P. Mali
	After completing the course, students will be able to	Bloom Taxonomy Level (BTL)
CO1	Understand and present data using table and graphs	Understand
CO2	Apply measures of central tendency and dispersion to draw conclusions	Apply
CO3	Apply the basic probability rules and theorem in problem-solving	Apply

CO4	Apply the method of least squares to estimate the parameters in a regression model	Apply
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<b>Name of the Programme:</b> B.Sc.	<b>Programme Coordinator:</b> Dr. J. S. Thakur	<b>Head of the Department:</b> Mrs. P. M. Jadhav
Subject: <b>Computer Science</b>	Course: Soft Skill Development Course Code: UCS1SSD	Course Coordinator: Mrs. R. Aaglawe
	After completing the course, Student will be able to	Bloom Taxonomy Level (BTL)
CO1	Develop Personality with the help of soft skills and hard skills	Create
CO2	Analyze the importance of communication, etiquette, and manners	Analyze
CO3	Identify the academic skills needed for employment	Apply
CO4	Develop professional skills like leadership, team building, and decision making	Create

<b>Name of the Programme:</b> B.Sc.	<b>Programme Coordinator:</b> Dr. J. S. Thakur	<b>Head of the Department:</b> Mrs. P. M. Jadhav
Subject: <b>Computer Science</b>	Course: Practical's of UCS1COD+UCS1PP1 Course Code: UCS1PPR1	Course Coordinator: Mrs. A. P. Raykar Mrs. P. M. Jadhav
	After completing the course, Student will be able to	Bloom Taxonomy Level (BTL)
CO1	Analyze the working of combinational circuits using logisim simulator	Analyze
CO2	Develop assembly language programs using SPIM simulator	Create
CO3	Develop solutions to simple computational problems using Python programs	Create
CO4	Demonstrate programs using simple Python statements and expressions.	Understand

<b>Name of the Programme:</b> B.Sc.	<b>Programme Coordinator:</b> Dr. J. S. Thakur	<b>Head of the Department:</b> Mrs. P. M. Jadhav
Subject: <b>Computer Science</b>	Course: Practical's of UCS1PWC+UCS1DM1 Course Code: UCS1PPR2	Course Coordinator: Ms. V.V Patil Mrs. A.U.Chavan
	After completing the course, Student will be able to	Bloom Taxonomy Level (BTL)
CO1	Design E-R diagram and convert it to tables	Create
CO2	Create database and perform CRUD operation	Create
CO3	Create user-defined data types such as structures and unions	Create
CO4	Design a C program to implement the concept of function.	Create

<b>Name of the Programme:</b> B.Sc.	<b>Programme Coordinator:</b> Dr. J. S. Thakur	<b>Head of the Department:</b> Mrs. P. M. Jadhav
Subject: <b>Computer Science</b>	Course: Practical's of UCS1DMA+UCS1DST Course Code: UCS1PPR3	Course Coordinator: Mrs. N.R. Gharat Mrs. R.P. Mali
	After completing the course, Student will be able to	Bloom Taxonomy Level (BTL)
CO1	Determine properties of function, relation and recurrence relation	Evaluate
CO2	Solve the problems by using Pigeonhole principle, Inclusion – Exclusion Principle , Permutation and Combination	Create
CO3	Perform various operations and apply common function to manipulate and analyse data using basic R syntax.	Apply
CO4	Visualize data attributes with functions and other statistics packages.	Evaluate

## Course Outcomes of Semester II

<b>Name of the Programme:</b> B.Sc.	<b>Programme Coordinator:</b> Dr. J. S. Thakur	<b>Head of the Department:</b> Mrs. P. M. Jadhav
Subject: <b>Computer Science</b>	Course: Object Oriented Programming with C++ Course Code: UCS2OOP	Course Coordinator: Mrs. A. P. Raykar Mrs. A.U. Chavan
	After completing the course, Student will be able to	Bloom Taxonomy Level (BTL)
CO1	Understand object-oriented programming and the difference between structured oriented and object-oriented programming features.	Analyze
CO2	Explain use of objects and classes for developing programs.	Understand
CO3	Apply virtual and pure virtual function & complex programming situations.	Apply
CO4	Illustrate various object-oriented concepts to solve different problems.	Understand

<b>Name of the Programme:</b> B.Sc.	<b>Programme Coordinator:</b> Dr. J. S. Thakur	<b>Head of the Department:</b> Mrs. P. M. Jadhav
Subject: <b>Computer Science</b>	Course: Programming with Python-II Course Code: UCS2PP2	Course Coordinator: Mrs. A.S. Pardeshi Mrs. P.M.Jadhav
	After completing the course, Student will be able to	Bloom Taxonomy Level (BTL)
CO1	Demonstrate programs using simple Python statements and expressions.	Understand
CO2	Explain files, exceptions, modules and packages in Python for solving problems.	Understand
CO3	To develop the skill of designing Graphical user Interfaces in Python.	Create
CO4	Explain the concepts of file handling, exception handling and database connectivity.	Evaluate

<b>Name of the Programme:</b> B.Sc.	<b>Programme Coordinator:</b> Dr. J. S. Thakur	<b>Head of the Department:</b> Mrs. P. M. Jadhav
Subject: <b>Computer Science</b>	Course: Linux Course Code: UCS2LIN	Course Coordinator: Mrs. A.U Chavan
	After completing the course, Student will be able to	Bloom Taxonomy Level (BTL)
CO1	Explain the Importance of Linux in Software Ecosystem and Architecture of Linux.	Understand
CO2	Apply various command line utilities.	Apply
CO3	Design Network using IP address, DNS and different network protocols.	Create
CO4	Apply System Administrative task on network.	Apply

<b>Name of the Programme:</b> B.Sc.	<b>Programme Coordinator:</b> Dr. J. S. Thakur	<b>Head of the Department:</b> Mrs. P. M. Jadhav
Subject: <b>Computer Science</b>	Course: Data Structures Course Code: UCS2DST	Course Coordinator: Mrs. V.V. Patil
	After completing the course, Student will be able to	Bloom Taxonomy Level (BTL)
CO1	Describe data structures and different abstract data types	Understand
CO2	Apply implementation of linked structures	Apply
CO3	Differentiate linear probing, rehashing and clustering	Analyse
CO4	Evaluate different implantations of tree traversals like binary tree, heap and search trees	Evaluate

<b>Name of the Programme:</b> B.Sc.	<b>Programme Coordinator:</b> Dr. J. S. Thakur	<b>Head of the Department:</b> Mrs. P. M. Jadhav
Subject: <b>Computer Science</b>	Course: Calculus Course Code: UCS2CAL	Course Coordinator: Mrs. N. R. Gharat
	After completing the course, Student will be able to	Bloom Taxonomy Level (BTL)
CO1	Recall the limit, continuity and derivative of a function	Remembering
CO2	Explain the properties and application of derivatives	Evaluating
CO3	Examine the properties and application of integration	Analyzing
CO4	Define partial derivatives and application of derivatives	Remembering

<b>Name of the Programme:</b> B.Sc.	<b>Programme Coordinator:</b> Dr. J. S. Thakur	<b>Head of the Department:</b> Mrs. P. M. Jadhav
Subject: <b>Computer Science</b>	Course: Statistical Methods and Testing of Hypothesis Course Code: UCS2SMH	Course Coordinator: Ms. R. P. Mali
	After completing the course, Student will be able to	Bloom Taxonomy Level (BTL)
CO1	Illustrate different probability functions with respect to discrete and continuous random variables.	Understanding
CO2	Determine the hypotheses and validate using appropriate statistical tests	Analysing
CO3	Recognize when analysis of variance (ANOVA) is appropriate and be able to perform one-way and two-way ANOVAs.	Evaluating
CO4	Comparison of parametric and nonparametric tests and identification of	Evaluating



	applications where nonparametric approaches are appropriate.	
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<b>Name of the Programme:</b> B.Sc.	<b>Programme Coordinator:</b> Dr. J. S. Thakur	<b>Head of the Department:</b> Mrs. P. M. Jadhav
Subject: <b>Computer Science</b>	Course: Digital Marketing Course Code: UCS2DIM	Course Coordinator: Mrs. A.S .Pardeshi
	After completing the course, Student will be able to	Bloom Taxonomy Level (BTL)
CO1	Explain use of Digital Media in Marketing.	Understand
CO2	Aware about cyber laws related to digital marketing	Understand
CO3	Explain benefits of digital marketing over traditional marketing	Understand
CO4	Summarize various tools of social media and Digital Marketing	Analyze

<b>Name of the Programme:</b> B.Sc.	<b>Programme Coordinator:</b> Dr. J. S. Thakur	<b>Head of the Department:</b> Mrs. P. M. Jadhav
Subject: <b>Computer Science</b>	Course: Practical's of UCS2OOP+UCS2PP2 Course Code: UCS2PPR1	Course Coordinator: Mrs.A.P. Raykar Mr.P. M. Jadhav Mrs. A.S. Pardeshi A.U.Chavan
	After completing the course, Student will be able to	Bloom Taxonomy Level (BTL)
CO1	Develop Programs using OOP	Create
CO2	Develop Simple Applications	Create
CO3	Create Graphical User Interface	Create
CO4	Create database using python programming	Create

<b>Name of the Programme:</b> B.Sc.	<b>Programme Coordinator:</b> Dr. J. S. Thakur	<b>Head of the Department:</b> Mrs. P. M. Jadhav
Subject: <b>Computer Science</b>	Course: Practical's of UCS2LIN+UCS2DST Course Code: UCS2PPR2	Course Coordinator: Mrs. V.A. Kulkarni Mrs. V.V. Patil
	After completing the course, Student will be able to	Bloom Taxonomy Level (BTL)
CO1	Demonstrate installation of Linux distribution (Ubuntu, fedora, debian ) using various modes.	Understand
CO2	Explain security of linux , command line interface , graphical user interface.	Evaluating
CO3	Design implementation of different linked structures with the help of data structures and ADTs	Create
CO4	Evaluate different sorting algorithms and its time complexities	Evaluate

<b>Name of the Programme:</b> B.Sc.	<b>Programme Coordinator:</b> Dr. J. S. Thakur	<b>Head of the Department:</b> Mrs. P. M. Jadhav
Subject: <b>Computer Science</b>	Course: Practical's of UCS2CAL+UCS2SMH Course Code: UCS2PPR3	Course Coordinator Mrs.N.R.Gharat Mrs. R.P.Mali
	After completing the course, Student will be able to	Bloom Taxonomy Level (BTL)
CO1	Analyse and manipulate data with in-build functions for hypothesis testing.	Analyze
CO2	Evaluate partial derivatives, directional derivatives	Analyze
CO3	Find the solution by using Newton's Method , Euler's Method , first order first degree differential equation	Remember
CO4	Examine Maxima and minima of functions , partial derivatives of a functions	Analyze

**Course Outcomes**  
**Class: S.Y.BSc. CS**  
**Semester III**

<b>Name of the Programme:</b> B.Sc.	<b>Programme Coordinator:</b> Dr. J. S. Thakur	<b>Head of the Department:</b> Mrs. P. M. Jadhav
<b>Subject:</b> Computer Science	<b>Course:</b> Theory of Computation <b>Course Code:</b> UCS3TOC	<b>Course Coordinator:</b> Mrs. G. C. Deshpande
	After completing the course, Student will be able to	Bloom Taxonomy Level (BTL)
CO1	Summarize the mathematical concepts of theoretical computer science	Understand
CO2	Build abstract machines using associated languages and grammars	Create
CO3	Apply rigorous formal mathematical methods to prove properties of languages, grammars, and automata	Apply
CO4	Evaluate solvable and unsolvable problems	Evaluate

<b>Name of the Programme:</b> B.Sc.	<b>Programme Coordinator:</b> Dr. J. S. Thakur	<b>Head of the Department:</b> Mrs. P. M. Jadhav
<b>Subject:</b> Computer Science	<b>Course:</b> Core Java <b>Course Code:</b> UCS3CJV	<b>Course Coordinator:</b> Mrs. A. S. Pardeshi
	After completing the course, students will be able to	Bloom Taxonomy Level (BTL)
CO1	Design java-based applications using Object-oriented features	Apply
CO2	Demonstrate the use of predefined and customizable packages for real-time applications	Create
CO3	Explain the concepts of Wrapper classes, Collections, and Inner classes	Understand
CO4	Explain the concepts of File, Exception handling and Networking	Understand

<b>Name of the Programme:</b> B.Sc.	<b>Programme Coordinator:</b> Dr. J. S. Thakur	<b>Head of the Department:</b> Mrs. P. M. Jadhav
<b>Subject:</b> Computer Science	<b>Course:</b> Operating System <b>Course Code:</b> UCS3OPS	<b>Course Coordinator:</b> Mrs. S. A. Labde
	After completing the course, students will be able to	Bloom Taxonomy Level (BTL)
CO1	Describe the fundamental structure of an operating system	Understand
CO2	Utilize operating system algorithms such as CPU scheduling, Process, and Deadlock	Apply
CO3	Analyze the behavior of the operating system in terms of process synchronization and coordination.	Analyze
CO4	Illustrate the concept of file and memory management of an operating system	Apply

<b>Name of the Programme:</b> B.Sc.	<b>Programme Coordinator:</b> Dr. J. S. Thakur	<b>Head of the Department:</b> Mrs. P. M. Jadhav
<b>Subject:</b> Computer Science	<b>Course:</b> Database management Systems <b>Course Code:</b> UCS3DMS	<b>Course Coordinator:</b> Ms. R. P. Mali
	After completing the course, students will be able to	Bloom Taxonomy Level (BTL)
CO1	Describe the principles of database management systems.	Understand
CO2	Identify different storage and recovery techniques used in database systems.	Apply
CO3	Apply crash recovery and transaction management techniques on database	Apply
CO4	Build a PL/SQL program that will handle data manipulation operations using Oracle databases	Create

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<b>Name of the Programme:</b> B.Sc.	<b>Programme Coordinator:</b> Dr. J. S. Thakur	<b>Head of the Department:</b> Mrs. P. M. Jadhav
<b>Subject:</b> Computer Science	<b>Course:</b> Combinatorics and Graph Theory <b>Course Code:</b> UCS3CGT	<b>Course Coordinator:</b> Dr. A. N. Kulkarni
	After completing the course, students will be able to	Bloom Taxonomy Level (BTL)
CO1	Utilize combination, permutation, and enumeration techniques to solve counting problems	Apply
CO2	Apply the basic concepts of graph theory, such as Eulerian trails, Hamiltonian cycles, bipartite graphs, and planar graphs	Apply
CO3	Evaluate real-time problems using the concept of graph theory.	Evaluate
CO4	Choose different strategies to find out the optimal solution.	Apply

<b>Name of the Programme:</b> B.Sc.	<b>Programme Coordinator:</b> Dr. J. S. Thakur	<b>Head of the Department:</b> Mrs. P. M. Jadhav
<b>Subject:</b> Computer Science	<b>Course:</b> Physical Computing and IoT Programming <b>Course Code:</b> UCS3IOT	<b>Course Coordinator:</b> Ms. A. R. Kadam
	After completing the course, students will be able to	Bloom Taxonomy Level (BTL)
CO1	Analyze System On Chip Architectures	Analyze
CO2	Explain the preparation of Raspberry Pi hardware and installation	Understand
CO3	Apply Linux commands to configure Raspberry Pi	Apply
CO4	Demonstrate the use of predefined raspberry pi interfaces for real-time applications	Understand

<b>Name of the Programme:</b> B.Sc.	<b>Programme Coordinator:</b> Dr. J. S. Thakur	<b>Head of the Department:</b> Mrs. P. M. Jadhav
<b>Subject:</b> Computer Science	<b>Course:</b> Skill Enhancement: Web Programming <b>Course Code:</b> UCS3WBP	<b>Course Coordinator:</b> Mr. A. L. Rawool
	After completing the course, students will be able to	Bloom Taxonomy Level (BTL)
CO1	Design valid, and meaningful web pages using emerging technologies.	Understand
CO2	Develop client-side and server-side web applications using scripting language	Create
CO3	Develop database-driven web-based applications	Create
CO4	Create web-based applications using XML	Create

<b>Name of the Programme:</b> B.Sc.	<b>Programme Coordinator:</b> Dr. J. S. Thakur	<b>Head of the Department:</b> Mrs. P. M. Jadhav
<b>Subject:</b> Computer Science	<b>Course:</b> Practical of UCS3CJV+ UCS3OPS + UCS3DMS <b>Course Code:</b> UCS3PR1	<b>Course Coordinator:</b> Mrs. A. S. Pardeshi Mrs. S. A. Labde Ms. R. P. Mali
	After completing the course, students will be able to:	Bloom`s Taxonomy Level (BTL)
CO1	Develop a client-server application using multithreading, and networking	Create
CO2	Create a graphical user interface using Abstract Windowing Toolkit	Create
CO3	Evaluate the working of operating system algorithms using java technology	Evaluate
CO4	Build PL/SQL code block for data validation and transaction management of database	Create

<b>Name of the Programme:</b> B.Sc.	<b>Programme Coordinator:</b> Dr. J. S. Thakur	<b>Head of the Department:</b> Mrs. P. M. Jadhav
<b>Subject:</b> Computer Science	<b>Course:</b> Practical of UCS3CGT+ UCS3IOT + UCS3WBP <b>Course Code:</b> UCS3PR2	<b>Course Coordinator:</b> Dr. A. N. kulkarni Ms. A. R. Kadam Mr. A. L. Rawool
	After completing the course, students will able to:	Bloom`s Taxonomy Level (BTL)
CO1	Apply Dijkstra`s algorithm to find the shortest path in the graph.	Apply
CO2	Demonstrate the use of Ford Fulkerson algorithm to find out maximum flow in a network	Understand
CO3	Create IoT-based projects using Raspberry Pi	Create
CO4	Develop static web pages using HTML, CSS, and JavaScript	Create

## Course Outcomes

### Semester IV

<b>Name of the Programme:</b> B.Sc.	<b>Programme Coordinator:</b> Dr. J. S. Thakur	<b>Head of the Department:</b> Mrs. P. M. Jadhav
<b>Subject:</b> <b>Computer Science</b>	<b>Course:</b> Fundamentals of Algorithms <b>Course Code:</b> UCS4FOA	<b>Course Coordinator:</b>
	After completing the course, students will be able to	Bloom Taxonomy Level (BTL)
CO1	Understand concepts of algorithms to design efficient program	Understand

CO2	Formulate problems as an algorithmic problems with optimize solution	Create
CO3	Apply types of Data Structures to real world problem	Understand
CO4	Analyze algorithms for Time and Space Complexity.	Analyze

<b>Name of the Programme:</b> B.Sc.	<b>Programme Coordinator:</b> Dr. J. S. Thakur	<b>Head of the Department:</b> Mrs. P. M. Jadhav
<b>Subject:</b> <b>Computer Science</b>	Course: Advanced JAVA Course Code: UCS4AJV	Course Coordinator: Mrs. R.S.Padlikar
	After completing the course, Student will be able to	Bloom Taxonomy Level (BTL)
CO1	Explain the concepts of J2EE architecture and MVC Architecture along with struts framework.	Understand
CO2	Design dynamic web applications using java database connectivity and server side technologies.	Create
CO3	Understand and explore use of java server programming	Understand
CO4	Design java application using JavaBeanS and JSON	Create



<b>Name of the Programme:</b> B.Sc.	<b>Programme Coordinator:</b> Dr. J. S. Thakur	<b>Head of the Department:</b> Mrs. P. M. Jadhav
Subject: <b>Computer Science</b>	Course: Computer Networks Course Code: UCS4CNT	Course Coordinator: Ms. A. R. Kadam
	After completing the course, Student will be able to	Bloom Taxonomy Level (BTL)
CO1	Explain the concepts of networking	Evaluate
CO2	Analyze IP addressing and its role in networking	Analyze
CO3	Analyze the role of each layer in the network model	Analyze
CO4	Outline the role of protocols provided by each layer of network model	Understand

<b>Name of the Programme:</b> B.Sc.	<b>Programme Coordinator:</b> Dr. J. S. Thakur	<b>Head of the Department:</b> Mrs. P. M. Jadhav
Subject: <b>Computer Science</b>	Course: Software Engineering Course Code: UCS4SEN	Course Coordinator: Mrs. R.S.Padlikar
	After completing the course, Student will be able to	Bloom Taxonomy Level (BTL)
CO1	Illustrate the different phases of Software development life cycle	Understand

CO2	Apply software testing and quality assurance concepts while developing software	Apply
CO3	Design and develop software requirement specification documents using OOAD	Create
CO4	Understand software measurement and metrics	Understand

<b>Name of the Programme:</b> B.Sc.	<b>Programme Coordinator:</b> Dr. J. S. Thakur	<b>Head of the Department:</b> Mrs. P. M. Jadhav
<b>Subject:</b> <b>Computer Science</b>	Course: Linear Algebra using Python Course Code: UCS4LAP	Course Coordinator: Mrs. S.N. desai
	After completing the course, students will be able to	Bloom Taxonomy Level (BTL)
CO1	Develop a computational thinking while learning linear algebra.	Develop
CO2	Apply implementation of linear algebra concepts using python	Apply
CO3	Understand span, linear independence, basis, and dimension, and apply these concepts to various vector spaces and subspaces.	Understand
CO4	Relate the concepts of linear algebra in the field of computer science	Apply

<b>Name of the Programme:</b> B.Sc.	<b>Programme Coordinator:</b> Dr. J. S. Thakur	<b>Head of the Department:</b> Mrs. P. M. Jadhav
Subject: <b>Computer Science</b>	Course: .Net Technologies Course Code: UCS4NET	Course Coordinator: Mrs.S.A.Labde
	After completing the course, students will be able to	Bloom Taxonomy Level (BTL)
CO1	Understand the Framework of Dot Net technology.	Understand
CO2	Develop dynamic , interactive and responsive web applications using various controls and events.	Create
CO3	Apply various validation controls to authenticate web pages.	Apply
CO4	Build a connection between database and web page	Create

<b>Name of the Programme:</b> B.Sc.	<b>Programme Coordinator:</b> Dr. J. S. Thakur	<b>Head of the Department:</b> Mrs. P. M. Jadhav
Subject: <b>Computer Science</b>	Course: Skill Enhancement: Android Developer Fundamentals Course Code: UCS4ADF	Course Coordinator: Ms. R. P. Mali
	After completing the course, Student will be able to	Bloom Taxonomy Level (BTL)
CO1	Demonstrate the Understanding of fundamental of Android Programming.	Understand

CO2	Sketch attractive Interfaces by using layouts and controls.	Apply
CO3	Develop Android applications by using Java programming language	Create
CO4	Demonstrate programming skills for managing tasks on mobile platform	Understand

<b>Name of the Programme:</b> B.Sc.	<b>Programme Coordinator:</b> Dr. J. S. Thakur	<b>Head of the Department:</b> Mrs. P. M. Jadhav
<b>Subject:</b> <b>Computer Science</b>	Course: Practical of UCS4FOA+UCS4AJV + UCS4CNT Course Code: UCS4PR1	Course Coordinator: Mr. A. L. Rawool Mrs. R. S. Padlikar Ms. A. R, Kadam
	After completing the course, Student will be able to	Bloom Taxonomy Level (BTL)
CO1	Design dynamic web Applications using Servlets and JSP	Create
CO2	Develop Swing-based Graphical user Interface	Create
CO3	Apply the networking commands in order to troubleshoot network problems	Apply
CO4	Analyze the network with the help of the networking analyzer tool	Analyze
CO5	Develop algorithms for searching, sorting and traversing methods	Create

<b>Name of the Programme:</b> B.Sc.	<b>Programme Coordinator:</b> Dr. J. S. Thakur	<b>Head of the Department:</b> Mrs. P. M. Jadhav
Subject: <b>Computer Science</b>	Course: Practical of UCS4LAP+ UCS4NET + UCS4ADF Course Code: UCS4PR2	Course Coordinator: Mrs. S.N. Desai Mrs.S.A.Labde Ms. R. P. Mali
	After completing the course, Student will be able to	Bloom Taxonomy Level (BTL)
CO1	Design and develop C# programs using core concepts	Create
CO2	Design Server side ASP.NET Pages using server control , web control , rich control, and Ajax	Create
CO3	Evaluate the concepts of metrics using python	Evaluate
CO4	Design and develop mobile applications on Android Platform	Create

<b>Name of the Programme:</b> B.Sc.	<b>Programme Coordinator:</b> Dr. J. S. Thakur	<b>Head of the Department:</b> Mrs. P. M. Jadhav
Subject: <b>Computer Science</b>	<b>Course:</b> Database management Systems <b>Course Code:</b> UCS3DMS	<b>Course Coordinator:</b> Ms. R. P. Mali
	After completing the course, students will be able to	Bloom Taxonomy Level (BTL)
CO1	Describe the principles of database management systems.	Understand
CO2	Identify different storage and recovery techniques used in database systems.	Apply
CO3	Apply crash recovery and transaction management techniques on database	Apply
CO4	Build a PL/SQL program that will handle data manipulation operations using Oracle databases	Create

<b>Name of the Programme:</b> B.Sc.	<b>Programme Coordinator:</b> Dr. J. S. Thakur	<b>Head of the Department:</b> Mrs. P. M. Jadhav
<b>Subject:</b> Computer Science	<b>Course:</b> Combinatorics and Graph Theory <b>Course Code:</b> UCS3CGT	<b>Course Coordinator:</b> Dr. A. N. Kulkarni
	After completing the course, students will be able to	Bloom Taxonomy Level (BTL)
CO1	Utilize combination, permutation, and enumeration techniques to solve counting problems	Apply
CO2	Apply the basic concepts of graph theory, such as Eulerian trails, Hamiltonian cycles, bipartite graphs, and planar graphs	Apply
CO3	Evaluate real-time problems using the concept of graph theory.	Evaluate
CO4	Choose different strategies to find out the optimal solution.	Apply

## Course Outcomes

**Class: T.Y.BSc. CS**

### Semester V

<b>Name of the Programme:</b> B.Sc.	<b>Programme Coordinator:</b> Dr. J. S. Thakur	<b>Head of the Department:</b> Mrs. P. M. Jadhav
<b>Subject:</b> <b>Computer Science</b>	Course: Artificial Intelligence Course Code: UCS5AIN	Course Coordinator: Dr. A. N. Kulkarni
	After completing the course, students will be able to	Bloom Taxonomy Level (BTL)
CO1	Explain the concepts, techniques and building blocks of AI	Understand
CO2	Apply different AI strategies for problem-solving, inference, vision, knowledge representation, and learning	Apply
CO3	Design and develop various applications of AI techniques in Intelligent agent, and Expert system	Create
CO4	Compare different reinforcement learning approaches	Analyse

<b>Name of the Programme:</b> B.Sc.	<b>Programme Coordinator:</b> Dr. J. S. Thakur	<b>Head of the Department:</b> Mrs. P. M. Jadhav
Subject: <b>Computer Science</b>	Course: Linux Server Administration Course Code: UCS5LSA	Course Coordinator: Mrs. S.A.Labde
	After completing the course, students will be able to	Bloom Taxonomy Level (BTL)
CO1	Demonstrate the installation of Linux server	Understand
CO2	Demonstrate the role and responsibilities of a Linux system administrator	Understand
CO3	Develop and maintain Linux-based system	Create
CO4	Apply appropriate service on Linux server as per requirement	Apply

<b>Name of the Programme:</b> B.Sc.	<b>Programme Coordinator:</b> Dr. J. S. Thakur	<b>Head of the Department:</b> Mrs. P. M. Jadhav
Subject: <b>Computer Science</b>	Course: Software Testing and Quality Assurance Course Code: UCS5SQA	Course Coordinator: Mrs. S. N. Desai
	After completing the course, students will be able to	Bloom Taxonomy Level (BTL)
CO1	Describe fundamental concepts of software metrics and quality assurance	Understand



CO2	Demonstrate Software Quality Tools and their effectiveness	Understand
CO3	Apply various types of manual and automated testing	Apply
CO4	Identify and manage defects of software to improve its quality	Apply

<b>Name of the Programme:</b> B.Sc.	<b>Programme Coordinator:</b> Dr. J. S. Thakur	<b>Head of the Department:</b> Mrs. P. M. Jadhav
<b>Subject:</b> Computer Science	<b>Course:</b> Information and Network Security <b>Course Code:</b> UCS5INS	<b>Course Coordinator:</b> Mrs. P.M.Jadhav
	After completing the course, students will able to:	Bloom`s Taxonomy Level(BTL)
CO1	Identify generic security threats and vulnerabilities	Apply
CO2	Analyze information and network security Problems	Analyze
CO3	Assess and Apply various cryptographic techniques	Evaluate and Apply
CO4	Implement security solutions for confidentiality, authentication, and privacy	Create

<b>Name of the Programme:</b> B.Sc.	<b>Programme Coordinator:</b> Dr. J. S. Thakur	<b>Head of the Department:</b> Mrs. P. M. Jadhav
<b>Subject:</b> Computer Science	<b>Course:</b> Architecting of IoT <b>Course Code:</b> UCS5IOT	<b>Course Coordinator:</b> Ms. A. R. Kadam
	After completing the course, students will able to:	Bloom`s Taxonomy Level(BTL)
CO1	Design & develop IoT Devices	Create
CO2	Evaluate various IOT data link layer protocols	Evaluate
CO3	Evaluate various IOT Network layer protocols	Evaluate
CO4	Demonstrate the working of sensors, Actuators	Understand

<b>Name of the Programme:</b> B.Sc.	<b>Programme Coordinator:</b> Dr. J. S. Thakur	<b>Head of the Department:</b> Mrs. P. M. Jadhav
<b>Subject:</b> Computer Science	<b>Course:</b> Web Service <b>Course Code:</b> UCS5WEB	<b>Course Coordinator:</b> Mrs. G.C. Deshpande
	After completing the course, students will able to:	Bloom`s Taxonomy Level(BTL)
CO1	Describe the web service specification standards and the primitives of Service Oriented Architecture	Understand

CO2	Create web services using core components of the framework	Create
CO3	Examine the principles and applications of SOAP-based and REST-based web services	Analyze
CO4	Develop secure and quality-based web services	Create

<b>Name of the Programme:</b> B.Sc.	<b>Programme Coordinator:</b> Dr. J. S. Thakur	<b>Head of the Department:</b> Mrs. P. M. Jadhav
<b>Subject:</b> Computer Science	<b>Course:</b> Game Programming <b>Course Code:</b> UCS5GPG	<b>Course Coordinator:</b> Mrs. A.S. Pardeshi
	After completing the course, students will able to:	Bloom`s Taxonomy Level(BTL)
CO1	Apply geometric concepts for the preparation of animation clips	Apply
CO2	Demonstrate the use of DirectX graphical engine	Understand
CO3	Describe the architecture of Graphical Processing Unit	Understand
CO4	Differentiate Augmented, Virtual, and Mixed Reality techniques	Analyze

<b>Name of the Programme:</b> B.Sc.	<b>Programme Coordinator:</b> Dr. J.S.Thakur	<b>Head of the Department:</b> Mrs. P.M.Jadhav
<b>Subject:</b> Computer Science	<b>Course:</b> Practical of Elective-I <b>Course Code:</b> UCS5PR1	<b>Course Coordinator:</b> Dr. A. N. Kulkarni Mrs. S. N. Desai
	After completing the course, students will able to:	Bloom`s Taxonomy Level(BTL)
CO1	Apply informed and uninformed searching techniques to find out an optimum path for the given problem	Apply
CO2	Create a decision tree for classification of data set	Create
CO3	Apply Selenium automation tool for testing web-based application and quality assurance	Apply
CO4	Illustrate configuration of different types linux server	Understand

<b>Name of the Programme:</b> B.Sc.	<b>Programme Coordinator:</b> Dr. J.S.Thakur	<b>Head of the Department:</b> Mrs. P.M.Jadhav
<b>Subject:</b> Computer Science	<b>Course:</b> Practical of Elective-II <b>Course Code:</b> UCS6PR2	<b>Course Coordinator:</b> Mrs. P. M. Jadhav Mrs. G. C. Deshpande
	After completing the course, students will able to:	Bloom`s Taxonomy Level(BTL)

CO1	Design and Develop Cryptographic technique for security of information.	Create
CO2	Develop IOT-based project with the help of various IOT interfaces	Create
CO3	Design SOAP-based and REST-based web services.	Create
CO4	Build a web service using WCF.	Create

<b>Name of the Programme:</b> B.Sc.	<b>Programme Coordinator:</b> Dr. J.S.Thakur	<b>Head of the Department:</b> Mrs. P.M.Jadhav
<b>Subject:</b> Computer Science	<b>Course:</b> Project Implementation <b>Course Code:</b> UCS5PRJ	<b>Course Coordinator:</b> Mrs.R.P.Mali Mrs. A.R.Kadam Mrs. S.A. Labdae Mr. A.L.Rawool
	After completing the course, students will able to:	Bloom`s Taxonomy Level(BTL)
CO1	Design and develop computer-based software for current and advanced trends	Create
CO2	Demonstrate communication and technical skills	Understand

<b>Name of the Programme:</b> B.Sc.	<b>Programme Coordinator:</b> Dr. J.S.Thakur	<b>Head of the Department:</b> Mrs. P.M.Jadhav
<b>Subject:</b> Computer Science	<b>Course:</b> Practical of Skill Enhancement <b>Course Code:</b> UCS5PR3	<b>Course Coordinator:</b> Mrs. A. S. Pardeshi
	After completing the course, students will able to:	Bloom`s Taxonomy Level(BTL)
CO1	Develop 2D and 3D Android and web-based game	Create
CO2	Develop Animator Controller using Unity	Create

### Course Outcomes of Semester VI

<b>Name of the Programme:</b> B.Sc.	<b>Programme Coordinator:</b> Dr. J. S. Thakur	<b>Head of the Department:</b> Mrs. P. M. Jadhav
<b>Subject:</b> Computer Science	<b>Course:</b> Cloud Computing <b>Course Code:</b> UCS6CLC	<b>Course Coordinator:</b> Mrs. A. S. Pardeshi
	After completing the course, students will be able to	Bloom Taxonomy Level (BTL)
CO1	Explain delivery models of cloud computing architecture	Understand
CO2	Describe the functions of a virtual data centre and cloud computing	Remember

CO3	Analyse the Software as a Service in cloud computing	Analyse
CO4	Apply cloud computing frameworks in different environment	Apply

<b>Name of the Programme:</b> B.Sc.	<b>Programme Coordinator:</b> Dr. J. S. Thakur	<b>Head of the Department:</b> Mrs. P. M. Jadhav
Subject: Computer Science	Course: Cyber Forensics Course Code: UCS5	Course Coordinator: Mrs. P. M. Jadhav
	After completing the course, Student will be able to	Bloom Taxonomy Level (BTL)
CO1	Plan and Prepare all stages of an investigation to collect evidences	Apply
CO2	Analyse information gathered and report them in the form of document to present in the court	Analyse
CO3	Analyse legal aspect and Ethics in cyber forensics	Analyse
CO4	Evaluate real time case study in cyber forensics	Evaluate

<b>Name of the Programme:</b> B.Sc.	<b>Programme Coordinator:</b> Dr. J.S.Thakur	<b>Head of the Department:</b> Mrs. P.M.Jadhav
Subject: Computer Science	Course: Elective-I:- Wireless Sensor Network and mobile communication	Course Coordinator: Mr. A. L. Rawool

	Course Code: USCS601	
	After completing the course, students will able to:	Bloom`s Taxonomy Level(BTL)
CO1	Demonstrate the functioning of wireless communication system and standards	Understand
CO2	Explain multiple access techniques for Wireless Communication	Create
CO3	Understand various applications of wireless network	Understand
CO4	Design and implementation of wireless sensors	Create

<b>Name of the Programme:</b> B.Sc.	<b>Programme Coordinator:</b> Dr. J. S. Thakur	<b>Head of the Department:</b> Mrs. P. M. Jadhav
Subject: Computer Science	Course: Information Retrieval Course Code: UCS61NR	Course Coordinator: Mrs. G.C. Deshpande
	After completing the course, students will able to:	Bloom`s Taxonomy Level(BTL)
CO1	Describe the field of Information retrieval and its relationship to search engines	Understand
CO2	Compare different types of link analysis and specialized search methods.	Evaluate
CO3	Examine the different retrieval metrics for evaluating information retrieval.	Analyse
CO4	Analyse various search engine optimization techniques.	Analyse



<b>Name of the Programme:</b> B.Sc.	<b>Programme Coordinator:</b> Dr. J.S.Thakur	<b>Head of the Department:</b> Mrs. P.M.Jadhav
Subject: Computer Science	Course: Digital Image Processing Course Code: UCS6DIP	Course Coordinator: Mrs. G.C. Deshpande
	After completing the course, Students will able to:	Bloom`s Taxonomy Level(BTL)
CO1	Describe the fundamental concepts of a digital image processing system.	Understand
CO2	Analyse the images in the frequency domain using various transforms.	Analyse
CO3	Evaluate image enhancement techniques.	Evaluate
CO4	Apply various compression and segmentation techniques.	Apply

<b>Name of the Programme:</b> B.Sc.	<b>Programme Coordinator:</b> Dr. J.S.Thakur	<b>Head of the Department:</b> Mrs. P.M.Jadhav
Subject: Computer Science	Course: Data Science Course Code: UCS6DSC	Course Coordinator: Dr. A. N. Kulkarni
	After completing the course, students will be able to	Bloom Taxonomy Level (BTL)

CO1	Describe the concept of data, information and knowledge	Understand
CO2	Apply different data mining techniques to real world business problems and interpret results using data visualization techniques	Apply
CO3	Analyse ethical issues related to data security and privacy in business	Analyse
CO4	Develop data mining models	Create

<b>Name of the Programme:</b> B.Sc.	<b>Programme Coordinator:</b> Dr. J. S. Thakur	<b>Head of the Department:</b> Mrs. P. M. Jadhav
Subject: Computer Science	Course: Ethical Hacking Course Code: UCS6ETH	Course Coordinator: Mrs. S. N. Desai
	After completing the course, Students will able to:	Bloom`s Taxonomy Level(BTL)
CO1	Identify different phases of an attack	Apply
CO2	Demonstrate security, vulnerabilities and weakness in target application	Understand
CO3	Identify legal and ethical issues related to vulnerability and penetration testing.	Remember
CO4	Test and exploit system using various tools and understand impact of hacking and real time machines	Create

<b>Name of the Programme:</b> B.Sc.	<b>Programme Coordinator:</b> Dr. J.S.Thakur	<b>Head of the Department:</b> Mrs. P.M.Jadhav
Subject: Computer Science	Course: Practical of Elective-I Course Code: UCS6PR1	Course Coordinator: Mrs. A. S. Pardeshi Mrs. P. M. Jadhav
	After completing the course, Students will able to:	Bloom`s Taxonomy Level(BTL)
CO1	Demonstrate the use of Software as a Service and Infrastructure as a Service	Understand
CO2	Construct a virtual environment using VM ware or Virtual Box	Apply
CO3	Test and Analyze Evidences of crime	Analyze and Create
CO4	Demonstrate Data Back-up and Data Recovery	Understand
CO5	Illustrate wireless sensor network simulation	Create

<b>Name of the Programme:</b> B.Sc.	<b>Programme Coordinator:</b> Dr. J.S.Thakur	<b>Head of the Department:</b> Mrs. P.M.Jadhav
Subject: Computer Science	Course: Practical of Elective-II Course Code: UCS6PR2	Course Coordinator: Mrs. G. C. Deshpande Dr. A. N. Kulkarni
	After completing the course, Students will able to:	Bloom`s Taxonomy Level(BTL)
CO1	Test the different types of search engine algorithms and techniques.	Create

CO2	Analyse Hadoop framework and the working of Map Reduce.	Create
CO3	Apply Linear regression method to the dataset	Apply
CO4	Test different types of retrieval methods of NoSQL database	Create
CO5	Calculate different types of transforms for the given 2D matrix and Apply various techniques of image compression and enhancement	Apply

<b>Name of the Programme:</b> B.Sc.	<b>Programme Coordinator:</b> Dr. J.S.Thakur	<b>Head of the Department:</b> Mrs. P.M.Jadhav
Subject: Computer Science	Course: Project Implementation Course Code: UCS5PRJ	Course Coordinator: Mrs.R.P.Mali Mrs. A.R.Kadam Mrs. S.A. Labdae Mr. A.L.Rawool
	After completing the course, students will able to:	Bloom`s Taxonomy Level(BTL)
CO1	Design and develop computer-based software for current and advanced trends	Create
CO2	Demonstrate communication and technical skills	Understand

<b>Name of the Programme:</b>  B.Sc.	<b>Programme Coordinator:</b>  Dr. J.S.Thakur	<b>Head of the Department:</b>  Mrs. P.M.Jadhav
Subject:  Computer Science	Course: Practical of Skill Enhancement  Course Code: UCS6PR3	Course Coordinator:  Mrs. S. N. Desai
	After completing the course, Students will able to:	Bloom`s Taxonomy Level(BTL)
CO1	Apply techniques to secure information from malicious attack	Understand
CO2	Demonstrate the exploitation of Windows7 using Kali Linux	Understand

**Course Outcomes**  
**Class : MSc CS –Part I**  
**Semester I**

<b>Name of the Programme:</b> M.Sc.	<b>Programme Coordinator:</b> Dr. J. S. Thakur	<b>Head of the Department:</b> Mrs. P. M. Jadhav
Subject: <b>Computer Science</b>	Course: Analysis of Algorithm and Research Computing Course Code: PCS1ARC	Course Coordinator: Mrs. V.A. Kulkarni
	After completing the course, Student will be able to	Bloom Taxonomy Level (BTL)
CO1	Describe detailed design strategies of the algorithm	Understand
CO2	Illustrate various advanced design and analysis techniques	Understand
CO3	Analyze Number- Theoretic algorithms to solve NP-completeness problems	Analyze
CO4	Elaborate the ideas of research	Create

<b>Name of the Programme:</b> M.Sc.	<b>Programme Coordinator:</b> Dr. J. S. Thakur	<b>Head of the Department:</b> Mrs. P. M. Jadhav
Subject: <b>Computer Science</b>	Course: Design and Implementation of Modern Compiler Course Code PCS1DMC	Course Coordinator: Mrs. Anjali Jadhav

	After completing the course, Student will be able to	Bloom Taxonomy Level (BTL)
CO1	Explain step by step transformation of source code to target code.	Understand
CO2	Describe the Phases of Compiler.	Understand
CO3	Explain Methods for Code Optimization	Understand
CO4	Evaluate data flow, logic flow, liveness of variables through the program	Evaluate

<b>Name of the Programme:</b> M.Sc.	<b>Programme Coordinator:</b> Dr. J. S. Thakur	<b>Head of the Department:</b> Mrs. P. M. Jadhav
<b>Subject:</b> <b>Computer Science</b>	Course: Advanced Database Management System Course Code: PCS1ADS	Course Coordinator: Mrs. A.P.Raykar
	After completing the course, Student will be able to	Bloom Taxonomy Level (BTL)
CO1	Describe the concept of distributed database systems.	Understand
CO2	Analyse database management in a centralized and distributed environment.	Analyze
CO3	Illustrate data modelling and database development processes for object-oriented ,Temporal, and Spatial databases.	Understand
CO4	Explain the use of deductive,active, and multimedia databases	Evaluate

<b>Name of the Programme:</b> M.Sc.	<b>Programme Coordinator:</b> Dr. J. S. Thakur	<b>Head of the Department:</b> Mrs. P. M. Jadhav
<b>Subject:</b> Computer Science	<b>Course:</b> Robotics <b>Course Code:</b> PCS1RBT	<b>Course Coordinator:</b> Mrs. G.C. Deshpande
	After completing the course, Students will able to:	Bloom`s Taxonomy Level(BTL)
CO1	Describe the concepts of robotics and its components.	Understand
CO2	Analyze the internal and external perceptions of the robot based on different types of sensors.	Analyze
CO3	Evaluate the planning, mapping, and navigation of robots.	Evaluate
CO4	Construct a robot using Raspberry Pi	Create

<b>Name of the Programme:</b> M.Sc.	<b>Programme Coordinator:</b> Dr. J. S. Thakur	<b>Head of the Department:</b> Mrs. P. M. Jadhav
<b>Subject:</b> <b>Computer Science</b>	<b>Course:</b> Practical`s of PCS1ARC+ PCS1DMC <b>Course Code:</b> PCS1PPR1	<b>Course Coordinator:</b> Mrs.



	After completing the course, Student will be able to	Bloom Taxonomy Level (BTL)
CO1	Develop programs for the implementation of different algorithms.	Create
CO2	Evaluate time and space complexity for an algorithms	Create
CO3	Design Structure of Compilers	Create
CO4	Apply the basic concepts and methods of Compiler Design	Apply

<b>Name of the Programme:</b> M.Sc.	<b>Programme Coordinator:</b> Dr. J. S. Thakur	<b>Head of the Department:</b> Mrs. P. M. Jadhav
<b>Subject:</b> <b>Computer Science</b>	Course: Practical's of PCS1ADS+PCS1RBT Course Code: PCS1PPR2	Course Coordinator: Mrs. A.P. Raykar Mrs. G.C. Deshpande
	After completing the course, Student will be able to	Bloom Taxonomy Level (BTL)
CO1	Create a database using XML attributes and elements	Create
CO2	Create spatial and temporal database and apply queries on it	Create

CO3	Design a robot using different physical components	Create
CO4	Construct a Robot using Raspberry Pi	Create

### Course Outcomes of Semester II

<b>Name of the Programme:</b> M.Sc.	<b>Programme Coordinator:</b> Dr. J. S. Thakur	<b>Head of the Department:</b> Mrs. P. M. Jadhav
Subject: <b>Computer Science</b>	Course: Cloud Computing Course Code: PCS2CLD	Course Coordinator: Mrs. V.V. Patil
	After completing the course, Student will be able to	Bloom Taxonomy Level (BTL)
CO1	Articulate the main concepts, key technologies, strengths, and limitations of cloud computing and the possible applications for state-of-the-art cloud computing	Create
CO2	Implement different types of Service Oriented Architecture systems	Create
CO3	Identify problems, and explain, analyze, and evaluate various cloud computing platforms for the solution	Create
CO4	Analyze the issues in Resource provisioning and Security governance in clouds	Analyze

<b>Name of the Programme:</b> M.Sc.	<b>Programme Coordinator:</b> Dr. J. S. Thakur	<b>Head of the Department:</b> Mrs. P. M. Jadhav
Subject: <b>Computer Science</b>	Course: <b>Natural Language Processing</b> Course Code: PCS2NLP	Course Coordinator: Mrs. A.S.Pardeshi Dr. A.N. Kulkarni
	After completing the course, Student will be able to	Bloom Taxonomy Level (BTL)

CO1	Understand the mathematical and linguistic foundations underlying approaches to the various areas in NLP	Understand
CO2	Understand the field of natural language processing.	Understand
CO3	Apply NLP techniques to design real-world NLP applications such as machine translation, text categorization, text summarization, information extraction, etc.	Apply
CO4	Model linguistic phenomena with formal grammar	Create

<b>Name of the Programme:</b> M.Sc.	<b>Programme Coordinator:</b> Dr. J. S. Thakur	<b>Head of the Department:</b> Mrs. P. M. Jadhav
Subject: <b>Computer Science</b>	Course: Business Intelligence and Big Data Analytics Course Code: PCS2BI1	Course Coordinator: Mrs. Anjali Jadhav
	After completing the course, Student will be able to	Bloom Taxonomy Level (BTL)
CO1	Describe the concepts of Business Intelligence	Understand
CO2	Explain business Data Warehouse	Evaluate
CO3	Build business Data Warehouse	Create
CO4	Evaluate data mining process and Association analysis	Evaluate

<b>Name of the Programme:</b> M.Sc.	<b>Programme Coordinator:</b> Dr. J. S. Thakur	<b>Head of the Department:</b> Mrs. P. M. Jadhav
Subject: <b>Computer Science</b>	Course: Machine Intelligence Course Code: PCS2ML1	Course Coordinator: Dr. A.N.Kulkarni
	After completing the course, Student will be able to	Bloom Taxonomy Level (BTL)

CO1	Identify basic concepts and types of learning from data.	Apply
CO2	Describe dimensionality reduction technique for attribute reduction.	Remember
CO3	Create ensemble models using different Machine Learning techniques.	Create
CO4	Build probabilistic and unsupervised learning models for handling unknown pattern	Create

<b>Name of the Programme:</b> M.Sc.	<b>Programme Coordinator:</b> Dr. J. S. Thakur	<b>Head of the Department:</b> Mrs. P. M. Jadhav
<b>Subject:</b> <b>Computer Science</b>	Course: Practical's of CLD and NLP Course Code: PCS2PPR1	Course Coordinator: Mrs. V.V. Patil Mrs. A.S.Pardeshi
	After completing the course, Student will be able to	Bloom Taxonomy Level (BTL)
CO1	Design & develop backup strategies for cloud data based on features	Create
CO2	Develop an application to create dimension tables in a cube and generate star schema , and snowflake schema	Create
CO3	Apply NLP techniques to design real-world NLP applications such as machine translation, text categorization, text summarization, information extraction, etc.	Apply
CO4	Model linguistic phenomena with formal grammar	Create

<b>Name of the Programme:</b> M.Sc.	<b>Programme Coordinator:</b> Dr. J. S. Thakur	<b>Head of the Department:</b> Mrs. P. M. Jadhav
<b>Subject:</b> <b>Computer Science</b>	Course: Practical's BI1 and ML1 Course Code: PCS2PPR2	Course Coordinator: Dr. A.N. Kulkarni Mrs. Anjali Jadhav
	After completing the course, Student will be able to	Bloom Taxonomy Level (BTL)
CO1	Evaluate data mining process and Association analysis	Evaluate
CO2	Build business Data Warehouse	Create
CO3	Construct a regression and classification model using different algorithms	Create
CO4	Construct Ensemble Model using Bootstrap technique	Create
CO5	Build probabilistic and unsupervised learning models for handling unknown pattern	Create

## Course Outcomes

**Class: MSc CS Part -II**

**Semester III**

<b>Name of the Programme:</b> M.Sc.	<b>Programme Coordinator:</b> Dr. J. S. Thakur	<b>Head of the Department:</b> Mrs. P. M. Jadhav
Subject: <b>Computer Science</b>	Course: Ubiquitous Computing Course Code: PCS3UBC	Course Coordinator: Mr. K. R. Prabhu
	After completing the course, Student will be able to	Bloom Taxonomy Level (BTL)
CO1	Describe the characteristics of pervasive computing applications	Understand
CO2	Analyze the strengths, problems and limitations of the current tools, devices and communications for pervasive computing systems.	Analyze
CO3	Identify the different ways that humans will interact with systems in a ubiquitous environment	Apply
CO4	List and exemplify the key technologies involved in the development Ubicomp systems	Analyze

<b>Name of the Programme:</b> M.Sc.	<b>Programme Coordinator:</b> Dr. J. S. Thakur	<b>Head of the Department:</b> Mrs. P. M. Jadhav
Subject: <b>Computer Science</b>	Course: Social Network Analysis Course Code: PCS3SNA	Course Coordinator: Mrs. A. P. Jadhav
	After completing the course, Student will be able to	Bloom Taxonomy Level (BTL)
CO1	Describe the concept of Social Network Analysis	Understand
CO2	Analyze centrality and centralization in Social Network Analysis	Analyze
CO3	Apply similarity measures and equivalence concepts in Social Network Analysis	Apply
CO4	Design two mode social networks	Create

<b>Name of the Programme:</b> M.Sc.	<b>Programme Coordinator:</b> Dr. J. S. Thakur	<b>Head of the Department:</b> Mrs. P. M. Jadhav
Subject: <b>Computer Science</b>	Course: Cloud Computing-II Course Code: PCS3CL2	Course Coordinator:
	After completing the course, Student will be able to	Bloom Taxonomy Level (BTL)

CO1	Describe different characteristics of public, private and hybrid cloud deployment models	Understand
CO2	Choose various cloud technologies for building applications.	Apply
CO3	Analyze different types of Virtualization and service Oriented Architecture systems.	Analyze
CO4	Analyze the cloud security issues	Analyze

<b>Name of the Programme:</b> M.Sc.	<b>Programme Coordinator:</b> Dr. J. S. Thakur	<b>Head of the Department:</b> Mrs. P. M. Jadhav
<b>Subject:</b> <b>Computer Science</b>	Course: Cyber and Information Security-II Course Code: PCS3CI2	Course Coordinator: Mrs. P.M.Jadhav
	After completing the course, Student will be able to	Bloom Taxonomy Level (BTL)
CO1	Explain the fundamentals concepts of computer forensics	Understand
CO2	Analyze computer forensic methods for data recovery, evidence collection, and data seizure	Analyze
CO3	Develop different Security System for data and network	Create
CO4	Illustrate procedure of network and mobile forensics	Understand



<b>Name of the Programme:</b> M.Sc.	<b>Programme Coordinator:</b> Dr. J. S. Thakur	<b>Head of the Department:</b> Mrs. P. M. Jadhav
<b>Subject:</b> <b>Computer Science</b>	Course: Business Intelligence and Big Data Analytics-II(Mining Massive Data sets) Course Code: PCS3BI2	Course Coordinator: Mrs. A. A. Deshkulkarni
	After completing the course, Student will be able to	Bloom Taxonomy Level (BTL)
CO1	Apply preprocessing techniques on Big data	Apply
CO2	Apply relational algebra, matrix operations using map reduce	Apply
CO3	Analyze similarity and hashing concepts of documents	Analyze
CO4	Evaluate stream concepts like sampling, filtering, estimating moments etc.	Evaluate

<b>Name of the Programme:</b> M.Sc.	<b>Programme Coordinator:</b> Dr. J. S. Thakur	<b>Head of the Department:</b> Mrs. P. M. Jadhav
<b>Subject:</b> <b>Computer Science</b>	Course: Machine Learning II (Advanced Machine Learning) Course Code: PCS3AML	Course Coordinator: Dr. A.N.Kulkarni

	After completing the course, Student will be able to	Bloom Taxonomy Level (BTL)
CO1	Acquire point estimation techniques for estimating parameters of machine learning models	Understand
CO2	Analyze advanced Machine Learning techniques for classification	Apply
CO3	Compare different sampling techniques	Analyze
CO4	Construct directed acyclic graph	Create

<b>Name of the Programme:</b> M.Sc.	<b>Programme Coordinator:</b> Dr. J. S. Thakur	<b>Head of the Department:</b> Mrs. P. M. Jadhav
<b>Subject:</b> <b>Computer Science</b>	Course: Practical's of PCS3UBI and PCS3SNA Course Code: PCS3PPR1	Course Coordinator: Mr. K. R. Prabhu Mrs. A. P. Jadhav
	After completing the course, Student will be able to	Bloom Taxonomy Level (BTL)
CO1	Develop an attitude to identify and propose solutions for security and privacy issues.	Apply
CO2	Design Android security application	Create

CO3	Demonstrate various types of measures for Social Networks	Understand
CO4	Design sociogram for person-by-person network	Create

<b>Name of the Programme:</b> M.Sc.	<b>Programme Coordinator:</b> Dr. J. S. Thakur	<b>Head of the Department:</b> Mrs. P. M. Jadhav
<b>Subject:</b> <b>Computer Science</b>	Course: Practical's of PCS3CL2/ PCS3CI2 + PCS3BI2/ PCS3ML2  Course Code: PCS3PPR2	<b>Course Coordinator:</b> Mrs. S. N. Desai Mrs. P. M. Jadhav Mrs. A. A. Deshkulkarni Dr. A. N. Kulkarni
	After completing the course, Student will be able to	Bloom Taxonomy Level (BTL)
CO1	Build an application on a private cloud.	Create
CO2	Develop FOSS-Cloud functionality using cloud services	Apply
CO3	Analyze evidences and disk image of data from forensic tools	Analyze

CO4	Solve Investigation Case using Forensic tool.	Create
CO5	Apply various probability functions for standard statistical distributions	Apply
CO6	Develop a program for implementation of map reduction techniques and shingles for a given data set	Create

### Course Outcomes of Semester IV

<b>Name of the Programme:</b> M.Sc.	<b>Programme Coordinator:</b> Dr. J. S. Thakur	<b>Head of the Department:</b> Mrs. P. M. Jadhav
<b>Subject:</b> <b>Computer Science</b>	Course: Simulation and Modeling Course Code: PC4SIM	Course Coordinator: Mrs.A. P. Jadhav
	After completing the course, Student will be able to	Bloom Taxonomy Level (BTL)
CO1	Describe basic concepts of simulation models	Design
CO2	Apply verification and validation on simulation models	Apply
CO3	Analyze various types of simulation models	Analyze
CO4	Design state-based behaviour of simulation	Create

<b>Name of the Programme:</b> M.Sc.	<b>Programme Coordinator:</b> Dr. J. S. Thakur	<b>Head of the Department:</b> Mrs. P. M. Jadhav
<b>Subject:</b> <b>Computer Science</b>	Course: Cloud Computing-III(Building Clouds and Services) Course Code: PCS4CL3	Course Coordinator :Mrs. A. S. Pardeshi
	After completing the course, Student will be able to	Bloom Taxonomy Level (BTL)
CO1	Describe specialised Cloud mechanism	Understand
CO2	Analyse Cloud Computing Software architecture	Analyse
CO3	Acquire the knowledge about Virtualization concepts	Understand
CO4	Design real time monitoring mechanism for building private cloud	Create

<b>Name of the Programme:</b> M.Sc.	<b>Programme Coordinator:</b> Dr. J. S. Thakur	<b>Head of the Department:</b> Mrs. P. M. Jadhav
<b>Subject:</b> <b>Computer Science</b>	Course: Cyber and Information Security-II(Cryptography and CryptAnalysis) Course Code: PCS4CI3	Course Coordinator: Mrs. P.M.Jadhav

	After completing the course, Student will be able to	Bloom Taxonomy Level (BTL)
CO1	Analyze Particular information and network security Problems	Analyze
CO2	Identify generic security threats and Vulnerabilities	Apply
CO3	Assess and Apply various cryptographic techniques	Evaluate and Apply
CO4	Implement security solutions for confidentiality, Authentication and privacy	Create

<b>Name of the Programme:</b> M.Sc.	<b>Programme Coordinator:</b> Dr. J. S. Thakur	<b>Head of the Department:</b> Mrs. P. M. Jadhav
<b>Subject:</b> <b>Computer Science</b>	Course: Business Intelligence and Big Data Analytics-III(Intelligent Data Analysis) Course Code: PCS4BI3	Course Coordinator: Mrs. R.S.Padlikar
	After completing the course, Student will be able to	Bloom Taxonomy Level (BTL)
CO1	Explain various strategies of Clustering	Understand
CO2	Identify various algorithms for particular class of problems	Understand
CO3	Apply dimensionality reduction techniques	Apply

CO4	Explain the concepts of link analysis and recommendation systems	Evaluate
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<b>Name of the Programme:</b> M.Sc.	<b>Programme Coordinator:</b> Dr. J. S. Thakur	<b>Head of the Department:</b> Mrs. P. M. Jadhav
<b>Subject:</b> <b>Computer Science</b>	Course: Machine Learning-III (Computational Intelligence) Course Code: PCS4ML3	Course Coordinator: Dr. A. N. Kulkarni
	After completing the course, Student will be able to	Bloom Taxonomy Level (BTL)
CO1	Describe the basic concepts of ANN	Understand
CO2	Compare different types of evolutionary computation strategies	Analyze
CO3	Discuss various approaches of Swarm Intelligence	Create
CO4	Develop a rule based system using Fuzzy logic.	Create

<b>Name of the Programme:</b> M.Sc.	<b>Programme Coordinator:</b> Dr. J. S. Thakur	<b>Head of the Department:</b> Mrs. P. M. Jadhav
<b>Subject:</b> <b>Computer Science</b>	Course: Practical's of Simulation & Modelling and Specialization Course Code: PCS4PPR1	Course Coordinator: Mrs. R.S.Padlikar
	After completing the course, Student will be able to	Bloom Taxonomy Level (BTL)
CO1	Design and develop agent based and system dynamics models.	Create
CO2	Develop Cloud computing services using cloud tools	Create
CO3	Apply clustering , hierarchical and density based algorithms to the given data set	Apply
CO4	Design recommendation system	Create
CO5	Apply Evolutionary, Neural Network and optimization algorithms to the given data set	Apply

<b>Name of the Programme:</b> M.Sc.	<b>Programme Coordinator:</b> Dr. J. S. Thakur	<b>Head of the Department:</b> Mrs. P. M. Jadhav
<b>Subject:</b> <b>Computer Science</b>	Course: Internship with Industry Course Code: PCS4PPR2	Course Coordinator: Mrs. P. M. Jadhav



	After completing the course, Student will be able to	Bloom Taxonomy Level (BTL)
CO1	Assess interests and abilities in their field of study.	
CO2	Develop work habits and attitudes necessary for job success.	
CO3	Develop communication, interpersonal and other critical skills in the job interview process.	

<b>Name of the Programme:</b> M.Sc.	<b>Programme Coordinator:</b> Dr. J. S. Thakur	<b>Head of the Department:</b> Mrs. P. M. Jadhav
<b>Subject:</b> <b>Computer Science</b>	Course: Project Implementation Course Code: PCS4PPR3	Course Coordinator: Dr. Anjali Kulkarni
	After completing the course, Student will be able to	Bloom Taxonomy Level (BTL)
CO1	Analyse data and synthesize research findings	Analyze
CO2	Demonstrate an understanding of the ethical issues associated with practitioner research	Understand
CO3	Improve engagement in recent research areas of industry	Create

**Course Outcomes**  
**Class MSc Data Analytics Part I**  
**Semester I**

<b>Name of the Programme:</b> M.Sc. DA	<b>Programme Coordinator:</b> Dr. J. S. Thakur	<b>Head of the Department:</b> Mrs. P. M. Jadhav
<b>Subject:</b> <b>Computer Science</b>	Course: Statistical Methods and probability distribution  Course Code: PDA1SM P	Course Coordinator:  Ms. R. P. Mali
	After completing the course, Student will be able to	Bloom Taxonomy Level (BTL)
CO1	Apply the descriptive statistical concepts.	Apply
CO2	Categorize the data by making displays, summaries and tables.	Understand
CO3	Apply the standard discrete probability distributions to various situations.	Apply
CO4	Evaluate various continuous probability distributions.	Evaluate

<b>Name of the Programme:</b> M.Sc. DA	<b>Programme Coordinator:</b> Dr. J. S. Thakur	<b>Head of the Department:</b> Mrs. P. M. Jadhav
<b>Subject:</b>	Course: Python Programming	Course Coordinator:

<b>Computer Science</b>	Course Code: PDA1PYP	Mrs. P. M. Jadhav Mrs. A. S. Pardeshi
	After completing the course, Student will be able to	Bloom Taxonomy Level (BTL)
CO1	Explain the core concepts of the python programming language	
CO2	Create the python programs using compound data types	
CO3	Explain facts of object-oriented concepts & modules	
CO4	Design and implement GUI & Database applications	

<b>Name of the Programme:</b> M.Sc. DA	<b>Programme Coordinator:</b> Dr. J. S. Thakur	<b>Head of the Department:</b> Mrs. P. M. Jadhav
<b>Subject:</b> <b>Computer Science</b>	Course: Business Intelligence and Big Data Analytics Course Code: PDA1BDA	Course Coordinator: Mrs. N. S. Phophale Mrs. S. D. Chandvekar
	After completing the course, Student will be able to	Bloom Taxonomy Level (BTL)
CO1	Understand the basic concept of Business Intelligence and data Preprocessing in the real world	

CO2	Understand the concept of Data warehouse and Data mining	
CO3	Implement Analytical methods of Big Data	
CO4	Explore Big Data applications using Hadoop tools	

<b>Name of the Programme:</b> M.Sc. DA	<b>Programme Coordinator:</b> Dr. J. S. Thakur	<b>Head of the Department:</b> Mrs. P. M. Jadhav
<b>Subject:</b> <b>Computer Science</b>	Course: Cloud Computing & Virtualization Course Code: PDA1CCV	<b>Course Coordinator:</b> Mr. V.C. Nimkar Mr .Pravin Pawar
	After completing the course, Student will be able to	Bloom Taxonomy Level (BTL)
CO1	Define cloud computing principles.	
CO2	Explain cloud security mechanism.	
CO3	Differentiate between different types of virtualization.	
CO4	Explain cloud computing services and their components	

## Course Outcomes

### Semester II

<b>Name of the Programme:</b> M.Sc. DA	<b>Programme Coordinator:</b> Dr. J. S. Thakur	<b>Head of the Department:</b> Mrs. P. M. Jadhav
<b>Subject:</b> <b>Computer Science</b>	Course: Advanced Statistical methods and Testing of hypothesis Course Code: PGDA2SMT	Course Coordinator: Ms. V. A. Kulkarni
	After completing the course, Student will be able to	Bloom Taxonomy Level (BTL)
CO1	Analyze the estimation theory.	
CO2	Interpret sample and population distribution and their applications.	
CO3	Examine various statistical tests to classify the data.	
CO4	Evaluate regression and time series analysis.	

<b>Name of the Programme:</b> M.Sc. DA	<b>Programme Coordinator:</b> Dr. J. S. Thakur	<b>Head of the Department:</b> Mrs. P. M. Jadhav
<b>Subject:</b> <b>Computer Science</b>	Course: Data Science Course Code: PDA2DST	Course Coordinator: Mrs. Dnyanada Shete

		Mrs. Nikita Patil
	After completing the course, Student will be able to	Bloom Taxonomy Level (BTL)
CO1	Understand basic data science concepts.	
CO2	Explain layered frameworks and technology stack in data science.	
CO3	Elaborate management layers in data science and assess supersteps in data science.	
CO4	Utilize, transform and report supersteps.	

<b>Name of the Programme:</b> M.Sc. DA	<b>Programme Coordinator:</b> Dr. J. S. Thakur	<b>Head of the Department:</b> Mrs. P. M. Jadhav
<b>Subject:</b> <b>Computer Science</b>	Course: Next Generation Technology Course Code: PDA2NGT	Course Coordinator: Ms. A.U.Chavan Mrs. A.P.Raykar Mrs. Sonali Raut
	After completing the course, Student will be able to	Bloom Taxonomy Level (BTL)
CO1	Relate the differences between Relational and NoSQL databases.	
CO2	Understand graph databases like Neo4j and other technologies.	

CO3	Implement relational databases alternatives means from a business perspective.	
CO4	Make use of advanced database technologies/platforms like NoSQL, MongoDB for handling and managing data.	

<b>Name of the Programme:</b> M.Sc. DA	<b>Programme Coordinator:</b> Dr. J. S. Thakur	<b>Head of the Department:</b> Mrs. P. M. Jadhav
<b>Subject:</b> <b>Computer Science</b>	Course: Machine Learning Course Code: PDA2MAI	Course Coordinator: Ms. S.S. Wankhede
	After completing the course, Student will be able to	Bloom Taxonomy Level (BTL)
CO1	Identify basic concepts and types of learning from data.	
CO2	Describe dimensionality reduction technique for attribute reduction.	
CO3	Create ensemble models using different Machine Learning techniques.	
CO4	Build probabilistic and unsupervised learning models for handling unknown patterns.	