Rayat Shikshan Sanstha's
KARMAVEER BHAURAO PATIL COLLEGE, VASHI.
NAVI MUMBAI (Autonomous)
Department of Computer Science
B. Sc. Computer Science
ProgramOutcomes(POs)

Learners are able to–

PO-1	Disciplinary Knowledge	Understand the basic concepts, fundamental principles, theoretical formulations and experimental findings and the scientific theories related to Physics, Chemistry, Mathematics, Microbiology, Computer Science, Biotechnology, Information Technology and its other fields related to the program.
PO-2	Communication Skills	Develop various communication skills such as reading, listening and speaking skills to express ideas and views clearly and effectively.
PO-3	Critical Thinking	Propose novel ideas in explaining the scientific data, facts and figures related to science and technology.
PO-4	Analytical Reasoning and Problem Solving	Hypothesize, analyze, formulate and interpret the data systematically and solve theoretical and numerical problems in the diverse areas of science and technology.
PO-5	Sense of Inquiry	Curiously ask relevant questions for better understanding of fundamental concepts and principles, scientific theories and applications related to the study.
PO-6	Use of Modern Tools	Operate modern tools, equipment, instruments and laboratory techniques to perform the experiments and write the programs in different languages (software).
PO-7	Research Skills	Understand to design, collect, analyze, interpret and evaluate information/data that is relevant to science and technology.
PO-8	Application of Knowledge	Develop a scientific outlook and apply the knowledge with respect to subject.
PO-9	Ethical Awareness	Imbibe ethical, moral and social values and exercise it in day to day life.
PO-10	Teamwork	Work collectively and participate to take initiative for various field-based situations related to science, technology and society at large.
PO-11	Environment and Sustainability	Create social awareness about the environment and develop sustainability for the betterment of the future.
PO-12	Lifelong Learning	Ability of self-driven to explore, learn and gain knowledge and new skills to improve the quality of life and sense of self-worth by paying attention to the ideas and goals throughout the life.

Program Co-ordinator :   BOS Chairman   Principal

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Program Specific Outcomes(PSO)

PSO-1	Recalling the concepts learned through courses like Algorithms, data structures, Formal methods and theoretical computer science to real life problems and research.
PSO-2	Apply the concepts learned through courses like operating system, Artificial intelligence, Database, Networking, Web Technology and Various programming languages to software developments.
PSO-3	Ability to lead and work in a team with good communication, project management and documentation skills.

Program Co-ordinator :   BOS Chairman   Principal

Course Title: Computer Organization and Design
Course Code: UGCS101
Class: **F.Y. SEM I**

Course Outcomes
The Learner will be able to:-

1. Recall the history and development of modern computers.
2. Discuss the number systems and its interconversion.
3. Interpret the concept of memory organization.
4. Describe the 8085 microprocessor & 8051 microcontroller.

Course Coordinator : *Vrushali wadkar* Wadkar

Course Title: Python I
Course Code: UGCS102
Class: **F.Y. SEM I**

Course Outcomes
The Learner will be able to:-

1.Develop programs using simple Python statements and expressions.
2.Explain control flow and functions concept in Python for solving problems.
3. Illustrate the use of built-in data structures like String,Lists, Tuple and Dictionary.
4. Explain files handling in Python
5. Construct regular expressions for solving problems.

Course Co-ordinator : *Dr. Manisha Abhyankar*

Course Title: C Programming
Course Code: UGCS103
Class: **F.Y. SEM I**

Course Outcomes
The Learner will be able to:-

1. Explain the programming environment with C Program structure.
2. Recognize the different data types, variables, operators in C programming.
3. Design programs involving decision structures, loops and functions.
4. Construct the concept of array , string & use of pointers.
5. Describe the structures, union & dynamic memory allocation in C.

Course Co-ordinator : Miss. Sonam A. Bais

Course Title: Soft skills
Course Code: UGCS104
Class: **F.Y. SEM I**

Course Outcomes
The Learner will be able to:-

1. Discuss the various aspects of soft skills and learning ways to develop personality.
2. Recognize one's self learning, emotional handling,Etiquette, Mannerism and Academic Skills.
3. Interpret today's communication ,multitasking with time,Public Speaking.
4. Illustrate Professional Skills,Leadership,Decision Making,Stress and Time Management.

Course Co-ordinator : snchal mandhare

Course Title: Discrete Mathematics
Course Code: UGCS105
Class: **F.Y. SEM I**

Course Outcomes
The Learner will be able to:-

1. Recall the concepts of set, function and logic.
2. Describe recurrence relations & evaluate recurrence relations using different methods.
3. Develop the knowledge of permutations and combinations and counting principles.
4. Analyze the basic concepts of graphs and trees, languages, regular expressions, problems on finite state automata and Turing Machine.

Course Co-ordinator : Miss. Deepali Y. Patil

Course Title: Digital Electronics
Course Code: UGCS106
Class: **F.Y. SEM I**

Course Outcomes
The Learner will be able to:-

1. Recognize the knowledge of computer systems work and underlying principles and the basics of digital electronics needed for computers.
2. Recall the basics of instruction set architecture for reduced and complex instruction sets.
3. Describe the basics of processor structure and operation.
4. Explain how data is transferred between the processor and I/O devices.

Course Co-ordinator : Dr. Manisha Abhyankar

Course Title: Database Management System
Course Code: UGCS201
Class: **F.Y. SEM II**

Course Outcomes
The Learner will be able to:-

1. Analyze database requirements and determine the entities involved in the system and their relationship to one another.
2. Create tables by using DDL commands,perform query using DML commands in MYSQL.
3. Explain Relational data model & Relational Algebra ,functions,join ,subqueries.
4. Describe the normalization,indexes,views and Database Protection.

Course Co-ordinator : Miss. Sonam A. Bais

Course Title: Python II
Course Code: UGCS202
Class: **F.Y. SEM II**

Course Outcomes
The Learner will be able to:-

1. Explain the concept of thread and describe the date and time modules in python
2. Illustrate exception handling in Python applications for error handling.
3. Recognize the Knowledge of working with databases, designing GUI in Python and implement networking in Python
4. Describe OOP concepts in Python including class, object,Inheritance , Polymorphism and interface

Course Co-ordinator : Dr. Manisha Abhyankar

Course Title: Data Structure using Python
Course Code: UGCS203
Class: **F.Y. SEM II**

Course Outcomes
The Learner will be able to:-

1. Recognize Data structures, its types and significance in computing.
2. Develop searching and sorting techniques
3. Examine the difference between stack and queue
4. Illustrate concepts of binary trees, develop applications using data structure and Evaluate postfix and prefix expressions.

Course Co-ordinator : Dr. Manisha Abhyankar

Course Title: Free & Open Source System And Green Technology
Course Code: UGCS204
Class: **F.Y. SEM II**

Course Outcomes
The Learner will be able to:-

1. Discuss knowledge of the Open Source system, its use, impact and importance.
2. Compare between Open source and closed source software.
3. Describe the Life Cycle of an open source project.
4. Compare between the Legal Impacts of Open Software and Free Software Licensing.

Course Co-ordinator : Nikisha Dakee

Course Title: Descriptive Statistics I
Course Code: UGCS205
Class: **F.Y. SEM II**

Course Outcomes
The Learner will be able to:-

1. Identify the descriptive statistical concepts & present it graphically.
2. Recognize basic knowledge of R language.
3. Analyze the data and its properties by use of central tendency and variability.
4. Analyze the relationship between two quantitative variables using Correlation and Regression.

Course Co-ordinator : Miss. Deepali Y. Patho

Course Title: Physical Computing and IoT Programming
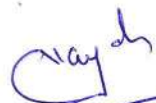Course Code: UGCS206
Class: **F.Y. SEM II**

Course Outcomes
The Learner will be able to:-

1) Interpret System On Chip Architectures
2) Prepare Raspberry Pi with hardware and installation.
3) Analyze physical interfaces and electronics of Raspberry Pi and program them using practical's
4) Examine how to make consumer grade IoT safe and secure with proper use of protocols

Course Co-ordinator : Nikisha Dakee

Program Co-ordinator :

BOS Chairman

I/C PRINCIPAL
Principal
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Course Title: OS & Linux
Course Code: UGCS301
Class: **S.Y. SEM III**

Course Outcomes
The Learner will be able to:-

1. Explain the working knowledge of operating System & Linux, from both a graphical and command line perspective, allowing them to easily use any Linux distribution.
2. Apply UNIX/Linux utilities to create and manage simple file processing operations, Organize directory structures with appropriate security, and develop shell scripts to Perform more complex tasks.
3. Determine as a Developer or Linux System Administrator using the acquired skill set and Identify system performance, network activities.
4. Apply the knowledge of shell scripting and regular expressions.

Course Co-ordinator : Nikisha Dalee

Course Title: Core JAVA
Course Code: UGCS302
Class: **S.Y. SEM III**

Course Outcomes
The Learner will be able to:-

1. Recall the concept of Object oriented programming using Java & String manipulation.
2. Diagnose the abnormal termination of a java program using exception handling and multithreading.
3. Explain I/O Streams,Networking,Wrapper Classes in Java.
4. Describe the Collection framework, Inner class and AWT

Course Co-ordinator : Miss. Sonam A. Bais

Course Title: PL/SQL
Course Code: UGCS303
Class: **S.Y. SEM III**

Course Outcomes
The Learner will be able to:-

1. Define the variables, constants, operators and data type of the database system.
2. Describe the structure of control statements.
3. Contract the stored procedures and Function in DBMS.
4. Apply Rollback and Commit operations on Database.

Course Co-ordinator : Dr. manisha Abhyankar trish

Course Title: Combinatorics and Graph Theory
Course Code: UGCS304
Class: **S.Y. SEM III**

Course Outcomes
The Learner will be able to:-

1. Analyze the applications of combinatorics & its uses & Problems , Mathematical Induction.
2. Summarize the concepts of graphs & its different types.
3. Select different algorithms to find shortest path & minimal spanning tree.
4. Define the terminology of network flow & discuss the Combinatorial Applications of Network Flows

Course Co-ordinator : Miss. Deepali Y. Pati

Course Title: Computer Networks
Course Code: UGCS305
Class: **S.Y. SEM III**

Course Outcomes
The Learner will be able to:-

1. Explain types of addresses, data communication, OSI model.
2. Examine the concepts of networking, which are important for them to be known as 'networking professionals'.
3. Analyze the concept of networking models, protocols connectionless and connection oriented, functionality of each layer.
4. Interpret routing Algorithms.

Course Co-ordinator : Nikisha Dalee

Course Title: Advanced JAVA
Course Code: UGCS401
Class: **S.Y. SEM IV**

Course Outcomes
The Learner will be able to:-

1. Describe the JDBC architecture and Perform the connectivity with the database , the servlet , its features and Develop the web application.
2. Discuss the JSP LifeCycle ,its object and Give the various examples on them and JSF as an application with its component.
3. Elaborate the architecture of basic MVC and Struts 2 framework and JavaBeans architecture.
4. Analyze JSON object notation with java.

Course Co-ordinator : Miss Sonam A. Bais

Course Title: Physical Computing and IoT Programming
Course Code: UGCS402
Class: **S.Y. SEM IV**

Course Outcomes
The Learner will be able to:-

1. Interpret System On Chip Architectures
2. Prepare Raspberry Pi with hardware and installation.
3. Analyze physical interfaces and electronics of Raspberry Pi and program them using practical's.
4. Examine how to make consumer grade IoT safe and secure with proper use of protocols.

Course Co-ordinator : Nikisha Dalvee

Course Title: Software Engineering
Course Code: UGCS403
Class: **S.Y. SEM IV**

Course Outcomes
The Learner will be able to:-

1. Visualize software engineering lifecycle by demonstrating competence in communication, planning, analysis, design, construction, and deployment.
2. Illustrate the techniques and diagrams related to structural modeling.
3. Analyze the concept of Project Scheduling and Project Management.
4. Correlate the current theories, models, and techniques that provide a basis for the software lifecycle and to use the techniques and tools necessary for engineering practice.

Course Co-ordinator : Vrushali wadkar

Course Title: Android Developer Fundamentals
Course Code: UGCS404
Class: **S.Y. SEM IV**

Course Outcomes
The Learner will be able to:-

1. Recognize the requirements of the Mobile programming environment.
2. Design and configure Android application development tools ,basic methods and techniques for developing Apps.
3. Practice App development on Android Platform and Connect database with App.
4. Develop working prototypes of working systems for various uses in daily lives.

Course Co-ordinator : Dr. Manisha Abhyankar

Course Title: .NET Technologies
Course Code: UGCS405
Class: **S.Y. SEM IV**

Course Outcomes
The Learner will be able to:-

1. Visualize ADO.NET for data persistence in a web application.
2. Examine the Microsoft .NET Framework and ASP.NET page structure
3. Operate the Master pages, Data binding , LINQ, Rich control,Use page layout, styles, text balance, site map, Master pages and content Pages.
4. Create dynamic web pages using c# code, ASP.Net, .MS Visual Studio, NET IDE and Console Applications.

Course Co-ordinator : Snehal mandhodre

Program Co-ordinator :   **BOS Chairman**   **Principal**
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Course Title: Artificial Intelligence
Course Code: UGCS501
Class: **T.Y. SEM V**

Course Outcomes
The Learner will be able to:-

1. Identify systems with Artificial Intelligence.
2. Evaluate Artificial Intelligence capabilities that are beyond conventional technology, for example, chess-playing computers, self-driving cars, robotic vacuum cleaners.
3. Perform Artificial Intelligence techniques for problem solving.
4. Explain the concept of Neural Networks and Learning probabilistic models.

Course Co-ordinator : Dr. Manisha Abhyankar

Course Title: Linux Server Administration
Course Code: UGCS502
Class: **T.Y. SEM V**

Course Outcomes
The Learner will be able to:-

1. Interpret decisions during the configuration process to create a properly functioning Linux environment.
2. Identify the different uses and advantages of Linux in a business environment in order to participate in discussions regarding network servers and services.
3. Analyse how a Linux server can be integrated within a multi-platform environment.
4. Apply the programs and utilities to administer a Linux machine

Course Co-ordinator : Nikisha Dalvee

Course Title: Software Testing and Quality Assurance
Course Code: UGCS503
Class: **T.Y. SEM V**

Course Outcomes
The Learner will be able to:-

1. Discuss various software testing methods and strategies.
2. Perform various testing techniques.
3. Explain a variety of software metrics, and identify defects and manage those defects for improvement in quality for given software.
4. Design SQA activities, SQA strategy, formal technical review report for software quality control and assurance.

Course Co-ordinator : Dr. Manisha Abhyankar

Course Title: Information and Network Security
Course Code: UGCS504
Class: **T.Y. SEM V**

Course Outcomes
The Learner will be able to:-

1. Identify some of the factors driving the need for network security & Evaluate public-key cryptography principles.
2. Recognize Digital Signature Standards and Demonstrate Authentication Application, Authentication techniques .
3. Determine cryptographic Encryption and decryption techniques and Compare symmetric and asymmetric encryption systems
4. Illustrate IP security, identify and Classify Types of malwares.

Course Co-ordinator : Snehal mandhare

Course Title: Architecting of IoT
Course Code: UGCS505
Class: **T.Y. SEM V**

Course Outcomes
The Learner will be able to:-

1. Recall the architecture of IOT
2. Explain the transport, session, service layer protocols of IOT
3. Design & develop IoT Devices
4. Examine M2M Communications and IoT analytics.

Course Co-ordinator : Nikisha Dakee

Course Title: Web Services
Course Code: UGCS506
Class: **T.Y. SEM V**

Course Outcomes
The Learner will be able to:-

1. Describe structure of SOAP based web services and associated standards such as WSDL.
2. Explain the standardized way or medium to propagate communication between the client and server application.
3. Compare various components of web services and cloud computing over on WCF
4. Analyze the Windows Communication Foundation architecture.

Course Co-ordinator : Dr. Manisha Abhyankar

Course Title: Game Programming
Course Code: UGCS507
Class: **T.Y. SEM V**

Course Outcomes
The Learner will be able to:-

1. Determine the concept of coordinate system & transformation for computer graphics.
2. Establish the knowledge of DirectX with understanding GPU architectures.
3. Compute the Unity Editor to create 2D and 3D games, apps.
4. Interpret the concept of Rendering Pipeline.

Course Co-ordinator : Miss. Deepali 4 - Patil

Course Title: Wireless Sensor Networks and Mobile Communication
Course Code: UGCS601
Class: **T.Y. SEM VI**

Course Outcomes
The Learner will be able to:-

1. List various applications of wireless sensor networks
2. Implement and evaluate new ideas for solving wireless sensor network design issues.
3. Analyze modeling and simulation of various communication networks
4. Recall the concepts of Routing algorithms like its challenges, issues in Wireless Sensor Networks.

Course Co-ordinator : Nikisha Dalce

Course Title: Cloud Computing
Course Code: UGCS602
Class: **T.Y. SEM VI**

Course Outcomes
The Learner will be able to:-

1. Define the concept of Cloud Computing and Compare cloud computing with distributed computing.
2. Identify the architecture and infrastructure of cloud computing, including SaaS, PaaS, IaaS, public cloud, private cloud, hybrid cloud, etc.
3. Describe the characteristics of Virtualized Environments,Virtualization using KVM
4. Explain the concept of OpenStack in cloud computing.

Course Co-ordinator : Miss. Sonam A. Bais

Course Title: Cyber Forensics
Course Code: UGCS603
Class: **T.Y. SEM VI**

Course Outcomes
The Learner will be able to:-

1. Interpret and appropriately apply the laws and procedures associated with identifying, acquiring, examining and presenting digital evidence.
2. Recognize the ethical standards of the profession and apply those standards to all aspects of the study and practice of digital forensics.
3. Create the Plans and prepare for all stages of an investigation - detection, initial response and management interaction, investigate various media to collect evidence, reporting.
4. Summarize the knowledge of mobile forensics, Social media Forensics, various tools, IT Acts and cyber laws.

Course Co-ordinator : Snehal mandhare

Course Title: Information Retrieval
Course Code: UGCS604
Class: **T.Y. SEM VI**

Course Outcomes
The Learner will be able to:-

1. Identify Database Management systems and data warehouses
2. Explain the field of information retrieval and its relationship to search engines.
3. Compare the Text-centric versus data-centric XML retrieval.
4. Illustrate the concept of Web Search Algorithm.

Course Co-ordinator : Nikisha Dalce

Course Title: Digital Image Processing
Course Code: UGCS605
Class: **T.Y. SEM VI**

Course Outcomes
The Learner will be able to:-

1. Explain the fundamental concepts of a digital image processing system.
2. Analyze the images in the frequency domain and spatial domain using various transforms.
3. Describe and analyse how digital images are represented,manipulated, encoded and processed, compressed with emphasis on algorithm design, implementation and performance evaluation.
4. Evaluate the concepts of convolution and correlation using various methods.

Course Co-ordinator : Dr. manisha Abhyankar

Course Title: Data Science
Course Code: UGCS606
Class: **T.Y. SEM VI**

Course Outcomes
The Learner will be able to:-

1. Recognize how to obtain, clean/process and transform data.
2. Analyze and interpret data using an ethically responsible approach.
3. Choose appropriate models of analysis, assess the quality of input, derive insight from results, and investigate potential issues.
4. Apply computing theory, languages and algorithms, as well as mathematical and statistical models, and the principles of optimization to appropriately formulate and use data analyses.
5. Summarize various packages in R software

Course Co-ordinator : Miss. Deepali Y. Patil

Course Title: Ethical Hacking
Course Code: UGCS607
Class: **T.Y. SEM VI**

Course Outcomes
The Learner will be able to:-

1. Describe various Vulnerabilities on Websites and define information Security
2. Evaluate Penetration Testing and Vulnerability Assessment.
3. Conclude and discuss about real scenario on types of attacks
4. Analyze the various Malware types with security mechanism

Course Co-ordinator : Nikisha Dakee

Program Co-ordinator :   **BOS Chairman**   **I/C PRINCIPAL**
                                                              Principal
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