Rayat Shikshan Sanstha's
KARMAVEER BHAURAO PATIL COLLEGE, VASHI.
NAVI MUMBAI
(Autonomous)
Name of the Faculty: Science and Technology
Name of the Program : Bachelors of Science.
Program Outcomes (POs)

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, equipments, 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 environment and develop sustainability for betterment of 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 Coordinator **BOS Chairman** **Principal**

KARMAVEER BHAURAO PATIL COLLEGE VASHI NAVI MUMBAI

I/C PRINCIPAL
KARMAVEER BHAURAO PATIL COLLEGE
VASHI, NAVI MUMBAI 400 703.

Rayat Shikshan Sanstha's
KARMAVEER BHAURAO PATIL COLLEGE, VASHI.
NAVI MUMBAI
(Autonomous)
Department of Computer Science
Program Specific Outcomes(PSO)

PSO-1	Applications of Computing: Ability to use knowledge in various domains to provide solutions to new ideas and innovations.
PSO-2	Identify required data structures, design suitable algorithms, develop and maintain software for real world problems.

Program Coordinator

BOS Chairman

Principal

I/C PRINCIPAL
KARMAVEER BHAURAO PATIL COLLEGE
VASHI, NAVI MUMBAI 400 703.

KARMAVEER BHAURAO PATIL COLLEGE
VASHI
NAVI MUMBAI

Title of Specific Program : B.Sc. Computer Science		
Course Outcome (CO)		
Course Code	**Course Title**	**Course Outcome**
	F.Y. SEM I	
UGCSC101	Database Management Systems	**CO1:**Analyze database requirements and determine the entities involved in the system and their relationship to one another.[3]* **CO2:**Create tables by using DDL commands,perform query using DML commands in MYSQL.[6]* **CO3:**Explain Relational data model & Relational Algebra ,functions,join ,subqueries.[2]* **CO4:**Describe the normalization,indexes,views and Database Protection.[2]*
UGCSC102	C Programming	**CO1:**Explain the programming environment with C Program structure. [2]* **CO2:**Recognize the different data types, variables, operators in C programming.[1]* **CO3:**Design programs involving decision structures, loops and functions.[3]* **CO4:**Construct the concept of array , string & use of pointers.[3]* **CO5:**Describe the structures, union & dynamic memory allocation in C.[3]*
UGCSAEC103	Professional Communication Skills	**CO1:**Discuss the various aspects of soft skills and learning ways to develop personality.[2]* **CO2:**Recognize one's self learning, emotional handling,Etiquette, Mannerism and Academic Skills.[5]* **CO3:**Interpret today's communication ,multitasking with time,Public Speaking. [4]* **CO4:**Illustrate Professional Skills,Leadership,Decision Making,Stress and Time Management.[4]*
UGCSGE104A	Discrete Mathematics	**CO1:**Recall the concepts of set, function and logic.[1]* **CO2:**Describe recurrence relations & evaluate recurrence relations using different methods.[2]*

		CO3: Develop the knowledge of permutations and combinations and counting principles.[3]* **CO4:**Analyze the basic concepts of graphs and trees, languages, regular expressions ,problems on finite state automata and Turing Machine.[4]*
UGCSGE104B	Computer Organization Architecture	**CO1:**Recall the history and development of modern computers.[1]* **CO2:**Discuss the number systems and its interconversion.[2]* **CO3:**Interpret the concept of memory organization.[5]* **CO4:**Analyze the 8085 microprocessor & 8051 microcontroller.[4]*
F.Y. SEM II		
UGCSC201	Python	**CO1:** Define logic statements.[1]* **CO2:**Identify and apply various properties relating to the integers. [2]* **CO3:**Apply different methods of proof to verify mathematical assertions.[3]* **CO4:**Apply Fundamental theorem of algebra for finding roots of given polynomials.[3]* **CO5:** Describe OOP concepts in Python including Inheritance and Polymorphism[4]* **CO6:** Apply files, regular expression and concept of threads for developing efficient program[4]* **CO7:**Illustrate exception handling in Python applications for error handling.[4]* **CO8:** Recognize the Knowledge of working with databases, designing GUI in Python and implement networking in Python[1]*
UGCSC202	Data Structure using Python	**CO1:**Recognize Data structures, its types and significance in computing.[1]* **CO2:**Develop searching and sorting techniques[6]* **CO3:**Examine the difference between stack and queue.[3]* **CO4:**Illustrate concepts of binary trees, develop applications using data structure and Evaluate postfix and prefix expressions.[4]*
UGCSAEC203	Environmental Studies(Green Technologies)	**CO1:**Learn about green IT can be achieved in and by hardware, software, network communication and data center operations.[1]* **CO2:**Understand the strategies, frameworks, processes and management of green IT[2]*

UGCSGE204A	Descriptive Statistics I	**CO1:**Identify the descriptive statistical concepts & present it graphically.[2]* **CO2:**Recognize basic knowledge of R language.[1]* **CO3:**Analyze the data and its properties by use of central tendency and variability.[4]* **CO4:**Analyze the relationship between two quantitative variables using Correlation and Regression[4]*
UGCSGE204B	Physical Computing and IoT Programming	**CO1:**Interpret System On Chip Architectures[3]* **CO2:**Prepare Raspberry Pi with hardware and installation.[6]* **CO3:**Analyze physical interfaces and electronics of Raspberry Pi and program them using practical's[4]* **CO4:**Examine how to make consumer grade IoT safe and secure with proper use of protocols[3]*

Course Outcome (CO)		
Course Code	**Course Title**	**Course Outcome**
	S.Y. SEM III	
UGCSC301	OS & Linux	**CO1:**Explain the working knowledge of operating System & Linux, from both a graphical and command line perspective, allowing them to easily use any Linux distribution.[3]* **CO2:**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.[4]* **CO3:** Determine as a Developer or Linux System Administrator using the acquired skill set and Identify system performance, network activities.[3]* **CO4:**Apply the knowledge of shell scripting and regular expressions[3]*
UGCSC302	Computer Networks	**CO1:** Explain types of addresses, data communication, OSI model.[4]* **CO2:**Examine the concepts of networking, which are important for them to be known as 'networking professionals'.[3]* **CO3:**Analyze the concept of networking models, protocols connectionless and connection oriented, functionality of each layer.[4]* **CO4:**Interpret routing Algorithms.[2]*

UGCSC303	Core JAVA	**CO1:**Recall the concept of Object oriented programming using Java & String manipulation.[1]* **CO2:**Diagnose the abnormal termination of a java program using exception handling and multithreading.[5]* **CO3:**Explain I/O Streams,Networking,Wrapper Classes in Java.[2]* **CO4:**Describe the Collection framework, Inner class and AWT.[3]*
UGCSSECP304 A	Web Programming -I	**CO1:**Structure and implement HTML/CSS.[5]* **CO2:**Apply intermediate and advanced web development practices[4]* **CO3:** Implement basic JavaScript.[3]* **CO4:**Create visualizations in accordance with UI/UX theories.[6]*
UGCSSECP304 B	PL/SQL- I	**CO1:**Define the variables, constants, operators and data type of the database system.[1]* **CO2:**Describe the structure of control statements.[2]* **CO3:**Contract the stored procedures and Function in DBMS.[3]* **CO4:**Apply Rollback and Commit operations on Database.[3]*
UGCSGE305 A	Descriptive Statistics - II	**CO1:**Analyze the applications of combinatorics & its uses & Problems , Mathematical Induction.[4]* **CO2:**Summarize the concepts of graphs & its different types.[5]*
UGCSGEP305 B	Game Programming	**CO1:** Determine the concept of coordinate system & transformation for computer graphics.[3]* **CO2:**Establish the knowledge of DirectX with understanding GPU architectures.[4]* **CO3:**Compute the Unity Editor to create 2D and 3D games, apps.[4]* **CO4:**Interpret the concept of Rendering Pipeline.[2]*
S.Y. SEM IV		
UGCSC401	Advanced JAVA	**CO1:**Describe the JDBC architecture and Perform the connectivity with the database , the servlet , its features and Develop the web application.[2]* **CO2:** Discuss the JSP LifeCycle ,its object and Give the various examples on them and JSF as an application with its component.[2]* **CO3:**Elaborate the architecture of basic MVC and Struts 2 framework and JavaBeans architecture.[5]*

		CO4: Analyze JSON object notation with java.[4]*
UGCSC402	Software Engineering	**CO1:**Visualize software engineering lifecycle by demonstrating competence in communication, planning, analysis, design, construction, and deployment.[1]* **CO2:**Illustrate the techniques and diagrams related to structural modeling[3]* **CO3:**Analyze the concept of Project Scheduling and Project Management.[4]* **CO4:** 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[5]*
UGCSC403	Dot Net Technologies with C#	**CO1:**Visualize ADO.NET for data persistence in a web application.[1]* **CO2:**Examine the Microsoft .NET Framework and ASP.NET page structure[3]* **CO3:** Operate the Master pages, Data binding , LINQ, Rich control,Use page layout, styles, text balance, site map, Master pages and content Pages.[5]* **CO4:**Create dynamic web pages using c# code, ASP.Net, .MS Visual Studio, NET IDE and Console Applications.[6]*
UGCSSECP404 A	Web Programming II	**CO1:**Develop a static, interactive and well-formed webpage using JavaScript, CSS3 and HTML5.**[3]*** **CO2:**Use PHP7 to improve accessibility of a web document.[1]* **CO3:**Gain necessary skills for designing and developing web applications.[2]*
UGCSSECP404 B	PL/SQL II	**CO1:**Define the variables, constants, operators and data type of the database system.[1]* **CO2:**Describe the structure of control statements.[3]* **CO3:**Contract the stored procedures and Function in DBMS.[6]* **CO4:**Apply Rollback and Commit operations on Database.[3]*
UGCSGE 405A	Android Developer Fundamentals	**CO1:**Recognize the requirements of the Mobile programming environment.[1]* **CO2:**Design and configure Android application development tools ,basic methods and techniques for developing Apps.[6]* **CO3:**Practice App development on Android Platform and Connect database with App.[6]* **CO4:**Develop working prototypes of working systems for various uses in daily lives.[6]*

Course Outcome (CO)		
Course Code	**Course Title**	**Course Outcome**
	T.Y. SEM V	
UGCS501	Artificial Intelligence	**CO1:**Identify systems with Artificial Intelligence.[2]* **CO2:**Evaluate Artificial Intelligence capabilities that are beyond conventional technology, for example, chess-playing computers, self-driving cars, robotic vacuum cleaners.[5]* **CO3:**Perform Artificial Intelligence techniques for problem solving.[3]* **CO4:**Explain the concept of Neural Networks and Learning probabilistic models.[2]*
UGCS502	Linux Server Administration	**CO1:**Interpret decisions during the configuration process to create a properly functioning Linux environment.[3]* **CO2:** Identify the different uses and advantages of Linux in a business environment in order to participate in discussions regarding network servers and services.[2]* **CO3:** Analyze how a Linux server can be integrated within a multi-platform environment.[4]* **CO4:**Apply the programs and utilities to administer a Linux machine.[3]*
UGCS503	Software Testing and Quality Assurance	**CO1:**Discuss various software testing methods and strategies.[2]* **CO2:**Perform various testing techniques.[3]* **CO3:** Explain a variety of software metrics, and identify defects and manage those defects for improvement in quality for given software.[2]* **CO4:**Design SQA activities, SQA strategy, formal technical review report for software quality control and assurance. [6]*
UGCS504	Information and Network Security	**CO1:**Identify some of the factors driving the need for network security & Evaluate public-key cryptography principles. [2]* **CO2:**Recognize Digital Signature Standards and Demonstrate Authentication Application, Authentication techniques [1]*. **CO3:**Determine cryptographic Encryption and decryption techniques and Compare symmetric and asymmetric encryption systems.[3]* **CO4:**Illustrate IP security, identify and Classify Types of malwares.[3]*

UGCS505	Architecting of IoT	**CO1:**Recall the architecture of IOT.[1]* **CO2:**Explain the transport, session, service layer protocols of IOT[2* **CO3:** Design & develop IoT Devices[6]* **CO4:**Examine M2M Communications and IoT analytics.[3]*
UGCS506	Web Services	**CO1:**Describe structure of SOAP based web services and associated standards such as WSDL.[4]* **CO2:**Explain the standardized way or medium to propagate communication between the client and server application.[3]* **CO3:**Compare various components of web services and cloud computing over on WCF[5]* **CO4:**Analyze the Windows Communication Foundation architecture. [4]*
UGCS507	Game Programming	**CO1:**Determine the concept of coordinate system & transformation for computer graphics.[3]* **CO2:**Establish the knowledge of DirectX with understanding GPU architectures.[5]* **CO3:**Compute the Unity Editor to create 2D and 3D games, apps.[3]* **CO4:** Interpret the concept of Rendering Pipeline. [2]*
T.Y. SEM VI		
UGCS601	Wireless Sensor Networks and Mobile Communication	**CO1:**List various applications of wireless sensor networks[1]* **CO2:**Implement and evaluate new ideas for solving wireless sensor network design issues.[3]* **CO3:**Analyze modeling and simulation of various communication networks[4]* **CO4:**Recall the concepts of Routing algorithms like its challenges, issues in Wireless Sensor Networks. [1]*
UGCS602	Cloud Computing	**CO1:**Define the concept of Cloud Computing and Compare cloud computing with distributed computing.[1]* **CO2:**Identify the architecture and infrastructure of cloud computing, including SaaS, PaaS, IaaS, public cloud, private cloud, hybrid cloud, etc.[2]* **CO3:**Describe the characteristics of Virtualized Environments,Virtualization using KVM[3]* **CO4:**Explain the concept of OpenStack in cloud computing.[2]*

UGCS603	Cyber Forensics	**CO1:**Interpret and appropriately apply the laws and procedures associated with identifying, acquiring, examining and presenting digital evidence.[2]* **CO2:** Recognize the ethical standards of the profession and apply those standards to all aspects of the study and practice of digital forensics.[1]* **CO3:**Create the Plans and prepare for all stages of an investigation - detection, initial response and management interaction, investigate various media to collect evidence, reporting[6]* **CO5:**Summarize the knowledge of mobile forensics, Social media Forensics, various tools, IT Acts and cyber laws.[5]*
UGCS604	Information Retrieval	**CO1:**Identify Database Management systems and data warehouses[2]* **CO2:**Explain the field of information retrieval and its relationship to search engines.[3]* **CO3:** Compare the Text-centric versus data-centric XML retrieval. [4]* **CO4:** Illustrate the concept of Web Search Algorithm.[3]*
UGCS605	Digital Image Processing	**CO1:** Explain the fundamental concepts of a digital image processing system.[2]* **CO2:** Analyze the images in the frequency domain and spatial domain using various transforms.[4]* **CO3:**Describe and analyse how digital images are represented,manipulated, encoded and processed, compressed with emphasis on algorithm design, implementation and performance evaluation.[3]* **CO4:**Evaluate the concepts of convolution and correlation using various methods. [5]*
UGCS606	Data Science	**CO1:**Recognize how to obtain, clean/process and transform data.[1]* **CO2:** Analyze and interpret data using an ethically responsible approach.[4]* **CO3:**Choose appropriate models of analysis, assess the quality of input, derive insight from results, and investigate potential issues.[3]* **CO4:**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. [3]* **CO5:** Summarize various packages in R software[5]*
UGCS607	Ethical Hacking	**CO1:**Describe various Vulnerabilities on Websites and define information Security[3]*

		CO2: Evaluate Penetration Testing and Vulnerability Assessment.[5]* **CO3:**Conclude and discuss about real scenario on types of attacks[2]* **CO4:** Analyze the various Malware types with security mechanism[4]*

Note:Number in bracket() indicates cognitive levels of revised Bloom's Taxonomy as follows:(1):Remembering,(2):Understanding,(3):Applying,(4):Analyzing,(5):Evaluating, (6):Creating,

Program Coordinator **BOS Chairman** **Principal**

I/C PRINCIPAL
KARMAVEER BHAURAO PATIL COLLEGE
VASHI, NAVI MUMBAI 400 703.

KARMAVEER BHAURAO PATIL COLLEGE VASHI NAVI MUMBAI