

SICES Degree College of Arts, Science and Commerce

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Department of Computer Science

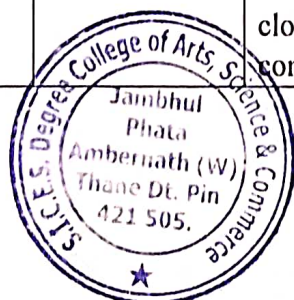
Program outcomes and course outcomes

**Program : B. Sc.(Computer Science)**

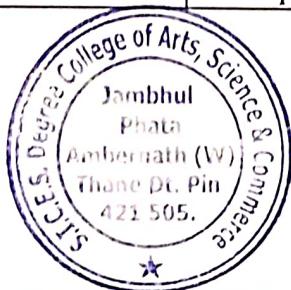
**Program Outcomes:**

1. This Program is designed to transform students into technically competent, socially responsible and ethical Computer Science professionals.
2. The objective of this Program is to create a pool of technologically savvy, theoretically strong, innovatively skilled and ethically responsible generation of computer science professionals.
3. Form strong foundation of Computer science.
4. Introduce emerging trends to the students in gradual way.
5. Groom the students for the challenges of ICT industry
6. The proposed curriculum is more contextual, industry affable and suitable to cater the needs of society and nation in present day context.
7. Program is systematically designed considering the current industry needs in terms of skills sets demanded under new technological environment.

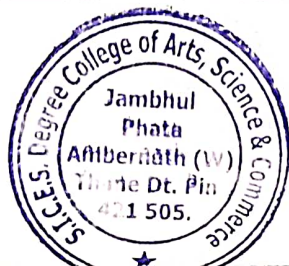
Class	Semester	Course Name	Course Outcomes
T.Y.B.Sc	VI	USCS601 Wireless Sensor Networks and Mobile Communicatio n	After completion of this course, learner should be able to list various applications of wireless sensor networks, describe the concepts, protocols, design, implementation and use of wireless sensor networks. Also implement and evaluate new ideas for solving wireless sensor network design issues.
T.Y.B.Sc	VI	USCS602 Cloud Computing	After successfully completion of this course, learner should be able to articulate the main concepts, key technologies, strengths, and limitations of cloud computing and the possible applications for state-of-the-art cloud computing using open source technology. Learner should be able to identify the architecture and infrastructure of cloud computing, including SaaS, PaaS, IaaS, public cloud, private cloud, hybrid cloud, etc. They should explain the core issues of cloud computing such as security,



			privacy, and interoperability
T.Y.B.Sc	VI	USCS603 Cyber Forensics	The student will be able to plan and prepare for all stages of an investigation - detection, initial response and management interaction, investigate various media to collect evidence, report them in a way that would be acceptable in the court of law
T.Y.B.Sc	VI	USCS604 Information Retrieval	After completion of this course, learner should get an understanding of the field of information retrieval and its relationship to search engines. It will give the learner an understanding to apply information retrieval models.
T.Y.B.Sc	VI	USCS605 Digital Image Processing	Learner should review the fundamental concepts of a digital image processing system. Analyze the images in the frequency domain using various transforms. Evaluate the techniques for image enhancement and image segmentation. Apply various compression techniques. They will be familiar with basic image processing techniques for solving real problems.
T.Y.B.Sc	VI	USCS606 Data Science	After completion of this course, the students should be able to understand & comprehend the problem; and should be able to define suitable statistical method to be adopted.
T.Y.B.Sc	VI	USCS607 Ethical Hacking	Learner will know to identify security vulnerabilities and weaknesses in the target applications. They will also know to test and exploit systems using various tools and understand the impact of hacking in real time machines.
T.Y.B.Sc	VI	USCSP601 Practical of Elective-I USCS601: Wireless Sensor Networks and Mobile Communication USCS602:	<p>1. In this era of wireless and adhoc network, connecting different wireless devices and understanding their compatibility is very important. Information is gathered in many different ways from these devices. Learner should be able to conceptualize and understand the framework. On completion, will be able to have a firm grip over this very important segment of wireless network.</p> <p>2. To provide learners with the comprehensive and</p>

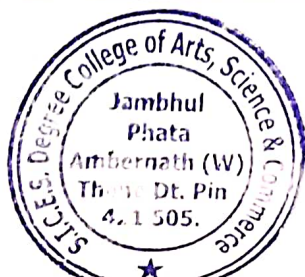


		Cloud Computing USCS603: Cyber Forensics	<p>in-depth knowledge of Cloud Computing concepts, technologies, architecture, implantations and applications. To expose the learners to frontier areas of Cloud Computing, while providing sufficient foundations to enable further study and research.</p> <p>3. To understand the procedures for identification, preservation, and extraction of electronic evidence, auditing and investigation of network and host system intrusions, analysis and documentation of information gathered</p>
T.Y.B.Sc	VI	USCSP602 Practical of Elective-II USCS604: Information Retrieval USCS605: Digital Image Processing USCS606: Data Science	<p>1. Learner should get an understanding of the field of information retrieval and its relationship to search engines. It will give the learner an understanding to apply information retrieval models.</p> <p>2. To study two-dimensional Signals and Systems. To understand image fundamentals and transforms necessary for image processing. To study the image enhancement techniques in spatial and frequency domain. To study image segmentation and image compression techniques.</p> <p>3. Understanding basic data science concepts. Learning to detect and diagnose common data issues, such as missing values, special values, outliers, inconsistencies, and localization. Making aware of how to address advanced statistical situations, Modeling and Machine Learning.</p>
T.Y.B.Sc	VI	USCSP603 Project Implementation	<p>This curriculum has not only taken the specific areas of computer science into consideration but will also give the opportunity to the student to prove his/her ability in the subject practically through the Project Implementation. In Semester VI student has to undertake a Project. It can boost his/her confidence and also can encourage the student to perform innovations in the subject as the choice of the Project topic is kept open covering most of the areas of Computer Science subject as per the students interest and the subject they have learned during the Course</p>
T.Y.B.Sc	VI	USCSP604 Practical of Skill Enhancement	<p>Student to evaluate his/her computer science domain specific skills and also to meet industry expectations.</p>

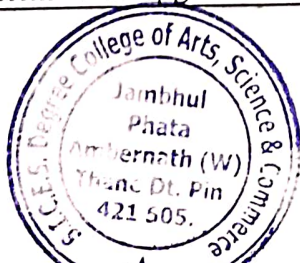




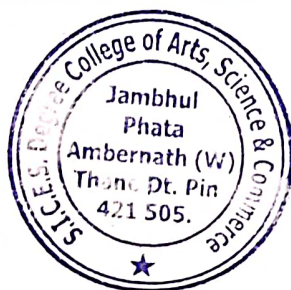
		USCS607 : Ethical Hacking	
T.Y.B.Sc	V	USCS501 Artificial Intelligence	After completion of this course, learner should get a clear understanding of AI and different search algorithms used for solving problems. The learner should also get acquainted with different learning algorithms and models used in machine learning.
T.Y.B.Sc	V	USCS502 Linux Server Administratio n	Learner will be able to develop Linux based systems and maintain. Learner will be able to install appropriate service on Linux server as per requirement. Learner will have proficiency in Linux server administration.
T.Y.B.Sc	V	USCS503 Software Testing and Quality Assurance	Understand various software testing methods and strategies. Understand a variety of software metrics, and identify defects and managing those defects for improvement in quality for given software. Design SQA activities, SQA strategy, formal technical review report for software quality control and assurance.
T.Y.B.Sc	V	USCS504 Information and Network Security	Understand the principles and practices of cryptographic techniques. Understand a variety of generic security threats and vulnerabilities, and identify & analyze particular security problems for a given application. Understand various protocols for network security to protect against the threats in a network.
		USCS505 Architecting of IoT	Learners are able to design & develop IoT Devices. They should also be aware of the evolving world of M2M Communications and IoT analytics.
		USCS506 Web Services	Emphasis on SOAP based web services and associated standards such as WSDL. Design SOAP based / RESTful / WCF services Deal with Security



			and QoS issues of Web Services
		USCS507 Game Programming	Learner should study Graphics and gaming concepts with present working style of developers where everything remains on internet and they need to review it, understand it, be a part of community and learn
	V	USCSP501 Practical of Elective-I USCS501: Artificial Intelligence USCS502: Linux Server Administratio n USCS503: Software Testing and Quality Assurance	<ol style="list-style-type: none"> <li>1. After completion of this course, learner should get a clear understanding of AI and different search algorithms used for solving problems. The learner should also get acquainted with different learning algorithms and models used in machine learning</li> <li>2. Learner will be able to develop Linux based systems and maintain. Learner will be able to install appropriate service on Linux server as per requirement. Learner will have proficiency in Linux server administration.</li> <li>3. Understand various software testing methods and strategies. Understand a variety of software metrics, and identify defects and managing those defects for improvement in quality for given software. Design SQA activities, SQA strategy, formal technical review report for software quality control and assurance</li> </ol>
	V	USCSP502 Practical of Elective-II USCS504: Information and Network Security USCS505: Architecting of IoT USCS506: Web Services	<ol style="list-style-type: none"> <li>1. Understand the principles and practices of cryptographic techniques. Understand a variety of generic security threats and vulnerabilities, and identify &amp; analyze particular security problems for a given application. Understand various protocols for network security to protect against the threats in a network.</li> <li>2. Learners are able to design &amp; develop IoT Devices. They should also be aware of the evolving world of M2M Communications and IoT analytics.</li> <li>3. Emphasis on SOAP based web services and associated standards such as WSDL. Design SOAP based / RESTful / WCF services Deal with Security and QoS issues of Web Services</li> </ol>
	V	USCSP503 Project Implementatio	This curriculum has not only taken the specific areas of computer science into consideration but will also give the opportunity to the student to prove his/her

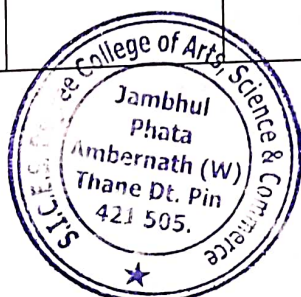


		n	ability in the subject practically through the Project Implementation. In Semester VI student has to undertake a Project. It can boost his/her confidence and also can encourage the student to perform innovations in the subject as the choice of the Project topic is kept open covering most of the areas of Computer Science subject as per the students interest and the subject they have learned during the Course
	V	USCSP504 Practical of Skill Enhancement USCS507 :: Game Programming	Student to evaluate his/her computer science domain specific skills and also to meet industry expectations.
S.Y.B.Sc.	IV	USCS401 Fundamentals of Algorithms	1. Understand the concepts of algorithms for designing good program 2. Implement algorithms using Python
		USCS402 Advanced Java	1) Understand the concepts related to Java Technology 2) Explore and understand use of Java Server Programming
		USCS403 Computer Networks	1. Learner will be able to understand the concepts of networking, which are important for them to be known as a 'networking professionals'. 2. Useful to proceed with industrial requirements and International vendor certifications.
		USCS404 Software Engineering	1. Understand the concepts of algorithms for designing good program
		USCS405 Linear Algebra using Python	1. Appreciate the relevance of linear algebra in the field of computer science. 2. Understand the concepts through program implementation 3. Instill a computational thinking while learning linear algebra.

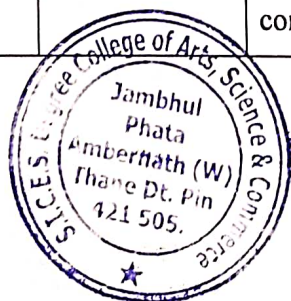




IV	USCS406 .Net Technologies	1. Understand the .NET framework 2. Develop a proficiency in the C# programming language 3. Proficiently develop ASP.NET web applications using C# 4. Use ADO.NET for data persistence in a web application
	USCS407 Android Developer Fundamentals	1) Understand the requirements of Mobile programming environment. 2) Learn about basic methods, tools and techniques for developing Apps 3) Explore and practice App development on Android Platform 4) Develop working prototypes of working systems for various uses in daily lives
	USCSP401 <b>Practical I</b> USCS401 Fundamentals of Algorithms + USCS402 Advanced JAVA + Computer Networks USCS403	1. To understand basic principles of algorithm design and why algorithm analysis is important,. To understand how to implement algorithms in Python 2. Explore advanced topic of Java programming for solving problems. 3. Useful to proceed with industrial requirements and International vendor certifications.
	USCSP402 <b>Practical II</b> USCS405+ USCS406+ USCS407	1. Appreciate the relevance of linear algebra in the field of computer science. 2. Understand the .NET framework 3) Explore and practice App development on Android Platform 4) Develop working prototypes of working systems for various uses in daily lives

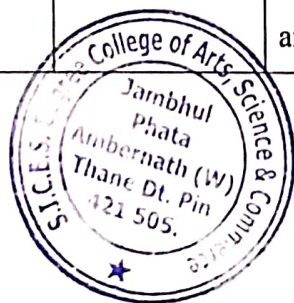


S.Y.B.Sc.	III	USCS301 Theory of Computation	1. Understand Grammar and Languages 2. Learn about Automata theory and its application in Language Design 3. Learn about Turing Machines and Pushdown Automata 4. Understand Linear Bound Automata and its applications
S.Y.B.Sc.	III	USCS302 Core Java	1. Object oriented programming concepts using Java. 2. Knowledge of input, its processing and getting suitable output. 3. Understand, design, implement and evaluate classes and applets. 4. Knowledge and implementation of AWT package.
S.Y.B.Sc.	III	USCS303 Operating System	1. To provide a understanding of operating system, its structures and functioning 2. Develop and master understanding of algorithms used by operating systems for various purposes.
S.Y.B.Sc.	III	USCS304 Database Management Systems	1. Master concepts of stored procedure and triggers and its use. 2. Learn about using PL/SQL for data management 3. Understand concepts and implementations of transaction management and crash recovery
S.Y.B.Sc.	III	USCS305 Combinatorics and Graph Theory	1. Appreciate beauty of combinatorics and how combinatorial problems naturally arise in many settings. 2. Understand the combinatorial features in real world situations and Computer Science applications. 3. Apply combinatorial and graph theoretical concepts to understand Computer Science concepts



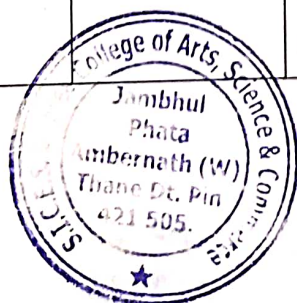


			and apply them to solve problems
S.Y.B.Sc.	III	USCS306 Physical Computing and IoT Programming	<ol style="list-style-type: none"> <li>1. Enable learners to understand System On Chip Architectures.</li> <li>2. Introduction and preparing Raspberry Pi with hardware and installation.</li> <li>3. Learn physical interfaces and electronics of Raspberry Pi and program them using practical's</li> <li>4. Learn how to make consumer grade IoT safe and secure with proper use of protocols</li> </ol>
S.Y.B.Sc.	III	USCS307 Web Programming	<ol style="list-style-type: none"> <li>1. To design valid, well-formed, scalable, and meaningful pages using emerging technologies.</li> <li>2. Understand the various platforms, devices, display resolutions, viewports, and browsers that render websites</li> <li>3. To develop and implement client-side and server-side scripting language programs.</li> <li>4. To develop and implement Database Driven Websites.</li> <li>5. Design and apply XML to create a markup language for data and document centric applications.</li> </ol>
S.Y.B.Sc.	III	USCSP301 Practical I USCS302 : Core JAVA + USCS303 Operating System +USCS304 Database Management Systems	<ol style="list-style-type: none"> <li>1. Object oriented programming concepts using Java, Knowledge of input, its processing and getting suitable output. Understand, design, implement and evaluate classes and applets. Knowledge and implementation of AWT package.</li> <li>2. To provide a understanding of operating system, its structures and functioning, Develop and master understanding of algorithms used by operating systems for various purposes..</li> <li>3. Master concepts of stored procedure and triggers and its use. Learn about using PL/SQL for data</li> </ol>



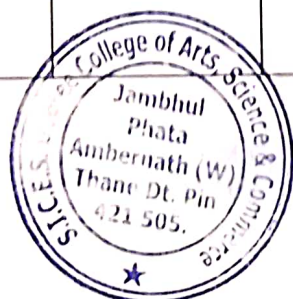
			<p>management</p> <p>4. Understand concepts and implementations of transaction management and crash recovery</p>
<b>S.Y.B.Sc.</b>	<b>III</b>	<p>USCSP302 <b>Practical II</b> USCS305: Combinatorics and Graph Theory + USCS306: Physical Computing and IoT Programming + USCS307: Web Programming</p>	<p>1. Understand the combinatorial features in real world situations and Computer Science applications.</p> <p>2. Apply combinatorial and graph theoretical concepts to understand Computer Science concepts and apply them to solve problems.</p> <p>3. Learn physical interfaces and electronics of Raspberry Pi and program them using practical's</p> <p>4. Learn how to make consumer grade IoT safe and secure with proper use of protocols</p> <p>5. To design valid, well-formed, scalable, and meaningful pages using emerging technologies.</p> <p>6. Understand the various platforms, devices, display resolutions, viewports, and browsers that render websites</p>
<b>F.Y. B.Sc.</b>	<b>II</b>	<p>USCS201 Programming with C</p>	<p>1) Students should be able to write, compile and debug programs in C language.</p> <p>2) Students should be able to use different data types in a computer program.</p> <p>3) Students should be able to design programs involving decision structures, loops and functions.</p> <p>4) Students should be able to explain the difference between call by value and call by reference</p> <p>5) Students should be able to understand the dynamics of memory by the use of pointers.</p>

			6) Students should be able to use different data structures and create/update basic data files.
		USCS202 Programming with Python – II	<p>1) Students should be able to understand how to read/write to files using python.</p> <p>2) Students should be able to catch their own errors that happen during execution of programs.</p> <p>3) Students should get an introduction to the concept of pattern matching.</p> <p>4) Students should be made familiar with the concepts of GUI controls and designing GUI applications.</p> <p>5) Students should be able to connect to the database to move the data to/from the application.</p> <p>6) Students should know how to connect to computers, read from URL and send email</p>
		USCS203 Linux	<p>1) Upon completion of this course, students should have a good working knowledge of Linux, from both a graphical and command line perspective, allowing them to easily use any Linux distribution.</p> <p>2) This course shall help student to learn advanced subjects in computer science practically.</p> <p>3) Student shall be able to progress as a Developer or Linux System Administrator using the acquired skill set</p>
		USCS204 Data Structures	<p>1) Learn about Data structures, its types and significance in computing</p> <p>2) Explore about Abstract Data types and its implementation</p> <p>3) Ability to program various applications using different data structure in Python</p>

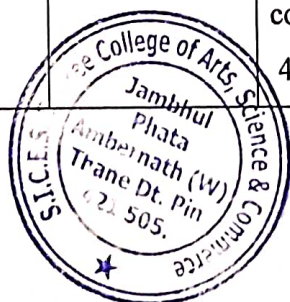




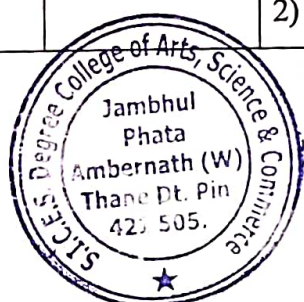
		USCS205 Calculus	<p>1) Understanding of Mathematical concepts like limit, continuity, derivative, integration of functions.</p> <p>2) Ability to appreciate real world applications which uses these concepts.</p> <p>3) Skill to formulate a problem through Mathematical modeling and simulation.</p>
		USCS206 Statistical Methods and Testing of Hypothesis	<p>1) Enable learners to know descriptive statistical concepts</p> <p>2) Enable study of probability concept required for Computer learners</p>
		USCS207 Green Technologies	<p>1) Learn about green IT can be achieved in and by hardware, software, network communication and data center operations.</p> <p>2) Understand the strategies, frameworks, processes and management of green IT</p>
		USCSP2 Practical of USCS201 + USCS202 + USCS203+ USCS204+ USCS205+ USCS206	<p>1) Students should be able to write, compile and debug programs in C language.</p> <p>2) The objective of this paper is to explore the style of structured programming to give the idea to the students how programming can be used for designing real-life applications by reading/writing to files, GUI programming, Students should be able to use different data types in a computer program</p> <p>3) Student shall be able to progress as a Developer or Linux System Administrator using the acquired skill set.</p> <p>4) This course introduces various tools and techniques commonly used by Linux programmers, system administrators and end users to achieve their day to day work in Linux</p>



			<p>environment.</p> <p>5) To explore and understand the concepts of Data Structures and its significance in programming. Provide and holistic approach to design, use and implement abstract data types. Understand the commonly used data structures and various forms of its implementation for different applications using Python.</p> <p>6) Understanding of Mathematical concepts like limit, continuity, derivative, integration of functions</p> <p>7) Enable learners to know descriptive statistical concepts</p>
<b>F.Y. B.Sc.</b>	<b>I</b>	<b>USCS101 Computer Organization and Design</b>	<p>1) To learn about how computer systems work and underlying principles</p> <p>2) To understand the basics of digital electronics needed for computers</p> <p>3) To understand the basics of instruction set architecture for reduced and complex instruction sets</p> <p>4) To understand the basics of processor structure and operation</p> <p>5) To understand how data is transferred between the processor and I/O devices</p>
		<b>USCS102 Programming with Python- I</b>	<p>1) Students should be able to understand the concepts of programming before actually starting to write programs. 2) Students should be able to develop logic for Problem Solving.</p> <p>3) Students should be made familiar about the basic constructs of programming such as data, operations, conditions, loops, functions etc.</p> <p>4) Students should be able to apply the problem</p>



			solving skills using syntactically simple language
		USCS103 Free and Open Source Software	<p>1) Upon completion of this course, students should have a good working knowledge of Open Source ecosystem, its use, impact and importance.</p> <p>2) This course shall help student to learn Open Source methodologies, case studies with real life examples</p>
		USCS104 Database Systems	<p>1) Students should be able to evaluate business information problem and find the requirements of a problem in terms of data.</p> <p>2) Students should be able to design the database schema with the use of appropriate data types for storage of data in database.</p> <p>3) Students should be able to create, manipulate, query and back up the databases</p>
		USCS105 Discrete Mathematics	<p>1) To provide overview of theory of discrete objects, starting with relations and partially ordered sets.</p> <p>2) Study about recurrence relations, generating function and operations on them.</p> <p>3) Give an understanding of graphs and trees, which are widely used in software.</p> <p>4) Provide basic knowledge about models of automata theory and the corresponding formal languages.</p>
		USCS106 Descriptive Statistics and Introduction to Probability	<p>1) Enable learners to know descriptive statistical concepts</p> <p>2) Enable study of probability concept required for Computer learners</p>
		USCS107 Soft Skills Development	<p>1) To know about various aspects of soft skills and learn ways to develop personality</p> <p>2) Understand the importance and type of</p>





			<p>communication in personal and professional environment.</p> <p>3) To provide insight into much needed technical and non-technical qualities in career planning.</p>
		<p>USCSP01 Practical of USCS101 + USCS102 + USCS103+ USCS104+ USCS105+ USCS106</p>	<p>1. To understand the structure and operation of modern processors and their instruction sets</p> <p>2. The objective of this paper is to introduce various concepts of programming to the students using Python.</p> <p>3. Open Source has acquired a prominent place in software industry. Having knowledge of Open Source and its related technologies is an essential for Computer Science student. This course introduces Open Source methodologies and ecosystem to students.</p> <p>4. The objective of this course is to introduce the concept of the DBMS with respect to the relational model, to specify the functional and data requirements for a typical database application and to understand creation, manipulation and querying of data in databases</p> <p>5. Provide basic knowledge about models of automata theory and the corresponding formal languages.</p> <p>6. The purpose of this course is to familiarize students with basics of Statistics. This will be essential for prospective researchers and professionals to know these basics.</p>

