

## ST JOSEPH'S COLLEGE FOR WOMEN (AUTONOMOUS)

### VISAKHAPATNAM

#### DEPARTMENT OF COMPUTER SCIENCE

The Department of Computer Science, St. Joseph's College for Women (A) serves BSc Programme students to excel in the field of Computer Science and IT industry. The department offers Computer Science in three core combinations Mathematics - Physics - Computer Science, Mathematics – Economics - Computer Science and Mathematics – Statistics - Computer Science of BSc. programme. In order to cater to the diverse interests of students and employers, a total of 10 theory and 8 practical courses are offered as part of computer science in all the three combinations.

#### Programme Specific Outcomes of BSc Programme with Computer Science

**PSOs:** Students after graduating with computer science as one of the core subjects will have:

**PSO 1:** Be able to demonstrate basic knowledge in the core areas of computer science (Programming with C, Object Oriented Programming through Java, Data Structures, Operating Systems, Database Management System, Web Technologies, Software Engineering, Data ware house and Data Mining, Computer Networks and Cloud Computing).

**PSO 2:** Ability to analyze and use a range of programming languages and tools to develop computer programs that are effective to solve the problems in the practical courses

**PSO 3:** Ability to work in teams to build software solutions including Web site design and development and database management by applying various technologies .

#### Assessment Methodology

**PSO 1:** Be able to demonstrate basic knowledge in the core areas of computer science (Programming with C, Object Oriented Programming through Java, Data Structures, Operating Systems, Database Management System, Web Technologies, Software Engineering, Data ware house and Data Mining, Computer Networks and Cloud Computing).

Direct method of computing PSO 1 attainment is based on the student performance in all assessment instruments namely online and offline - subjective and objective tests for all the courses offered (CS1601, CS3601, C5601/ CS5901/ CST5301, C5602/ CS5902/ CST5302,

CS2601, C4600/ CS4900/ CST4300, C6601/CS6901/CST6301, CC16601/CSC16901 / CSTC16301, CC26602/CSC26902/CSTC26302, CC36603/CSC36903/CSTC316303). These exams test student's knowledge, understanding and application levels in the respective courses. Indirect method of computing PSOs is done through student's course exit survey wherein a structured questionnaire is administered to the students and their response is solicited on a 5 point scale. Responses are consolidated and student's satisfaction level with reference to course transaction is computed.

Assessment of all the theory courses is done in two parts, namely by formative assessment (40%) which is internal and summative assessment (60%) which is external. The evaluation of 100% of the assessment in each semester is distributed as follows:

Mid Semester Examination 1	15% (which is offline)
Mid Semester Examination 2	15% (which is online)
Accessory Assessment	5% (written quiz, Assignment, Seminars etc.)
Attendance	5% (above 75% attendance will be rewarded)
End semester examination	60% (which is descriptive)

**Level of attainment of PSO1 (all theory courses offered by the department): 77%**

**PSO 2:** Ability to analyze and use a range of programming languages and tools to develop computer programs that are effective to solve the problems in the practical courses ( CS1651, CS3651, C5651/ CS5951/ CST5351, C5652/ CS5952/ CST5352, CS2601, C4650/CS4950/CST4350, C6651/CS6951/CST6351, CC36653/CSC36953/CSTC36353).

Assessment of all the practical courses: Assessment is done in two parts, namely by internal assessment (40%) and summative assessment (60%). In internal assessment practical course will be assessed for 40% by conducting practical exam and viva-voce to test their skills. Summative assessment (60%) of practical courses is through end semester practical exams and viva-voce to test student's knowledge as well as skills in programming to get desired results. A written record of experimental work carried out throughout the semester is also assessed.

**Level of attainment PSO2 (all practical courses offered by the department): 82.8%**

**PSO 3:** Ability to work in teams to build software solutions including Web site design and development and database management by applying various technologies .

Attainment of PSO 3 is ascertained through the practical course CC16651/CSC16951/CSTC16351 by assessing project study as one of the experiments. This project work provides an opportunity for the student to apply knowledge and skills obtained in computer Science theory and practical coursework. Students choose one topic based on their own interest. The Project work can be carried out in the college and a Coordinator will be appointed to coordinate the Project Work. Internal guides from the department will be assigned to the students. Periodically (weekly) the students should submit project Task Report to their internal guide. Reviews will be conducted followed by collective report submission and individual oral presentation before the Final Viva-Voce. Attainment of this learning outcome is ensured and assessed by the concerned faculty member at every stage through guidance and monitoring.

**Level of attainment of PSO3 (projects done by the students): 83%**

**Course outcomes of all the courses offered by Department of Computer Science**

Code	Title of the paper	Outcomes
CS1601 (Th.)	Programming in C	CO1: Analyse a given problem and develop an algorithm to solve the problem. CO2: Understand the structure, syntax and semantics of C programming. CO3: Choose different control structures like decision control, loop control to solve the problem. CO4: Study the modular programming concepts and storage classes. CO5: Learn the concepts of basic data types, derived data types and user defined data types. CO6: learn the concept of Programs involving the use of arrays. CO7: Understand the dynamics of memory by the use of pointers. CO8: Understand how to perform various FILE I/O operations.
<b>Level of attainment of CO1 to CO8: 73.5%</b>		
CS1651 (Pr.)	C Programming Lab	CO1: understand the execution of programs written in C language. CO2: Acquire knowledge about the basic concept of writing a program. CO3: Explain the role of constants, variables, identifiers, operators and other building blocks of C Language. CO4: Use the conditional expressions and looping statements to solve problems associated with conditions and repetitions. CO5: Demonstrate the role of Functions involving the

		<p>idea of modularity.</p> <p>CO6: Understand the concept of Array and pointers dealing with memory management.</p> <p>CO7: Write programs that perform operations using derived data types.</p>
<b>Level of attainment of CO1 to CO7: 94%</b>		
CS2601 (Th)	Object Oriented Programming with Java	<p>CO1: Understand the concept and underlying principles of Object-Oriented Programming</p> <p>CO2: Implement, compile, test and run Java programs comprising more than one class, to address a particular software problem.</p> <p>CO3: Demonstrate the principles of object oriented programming.</p> <p>CO4: Use simple data structures like arrays in a Java program.</p> <p>CO5: Understand the concept of package, interface, multithreading and File handling in java.</p> <p>CO6: Use members of classes found in the Java API.</p> <p>CO7: Employ various types of selection constructs in a Java program.</p> <p>CO8: Employ a hierarchy of Java classes to provide a solution to a given set of requirements.</p> <p>CO 9: Develop efficient Java applets and applications using OOP concept.</p>
<b>Level of attainment of CO1 to CO9: 78%</b>		
CS2651 (Pr)	Java Programming Lab	<p>CO 1: Understand programming language concepts, particularly Java and object-oriented concepts.</p> <p>CO2: Write, debug, and document well-structured Java applications.</p> <p>CO 3: Implement Java classes from specifications and effectively create and use objects.</p> <p>CO 4: Understand the behaviour of primitive data types and arrays.</p> <p>CO5: Apply decision and iteration control structures to implement algorithms.</p> <p>CO6: Implement interfaces, inheritance, and polymorphism as programming techniques and apply exceptions handling.</p>
<b>Level of attainment of CO1 to CO6: 85%</b>		
CS3601(3) (Th)	Data Structures Using Java	<p>CO 1: Demonstrate familiarity with major algorithms and data structures.</p> <p>CO2: Determine which algorithm or data structure to use in different scenarios and be familiar with writing recursive methods.</p> <p>CO3: Demonstrate understanding of the abstract properties of various data structures such as stacks, queues, lists, trees and graphs and Use various data</p>

		<p>structures effectively in application programs.</p> <p>CO4: Demonstrate understanding of various sorting algorithms, including bubble sort, insertion sort, selection sort, merge sort and quick sort.</p> <p>CO5: Understand the importance of different ordered and unordered searching algorithms.</p> <p>CO 6: Understand and apply fundamental algorithmic problems including Tree traversals, Graph traversals, and shortest paths.</p> <p>CO 7: Gain knowledge about Hashing and Collisions and B- Trees.</p>
<b>Level of attainment of CO1 to CO7: 79%</b>		
CS3651(2)(PR)	Data Structures Lab	<p>CO1: Implement different sorting and searching algorithms.</p> <p>CO2: Implement the stack, Queue and their applications.</p> <p>CO3: Implement various types of linked lists and their applications.</p> <p>CO4: Perform basic operations on trees and graphs and determine minimum spanning tree.</p>
<b>Level of attainment of CO1 to CO4: 73%</b>		
<b>CS 4601(3) TH</b>	Operating System	<p>CO1: Understand the structure and functionalities of Operating System.</p> <p>CO2: Understand the difference between different types of modern operating systems, virtual machines and their structure of implementation and applications.</p> <p>CO3: Understand the difference between process , threads and use of locks</p> <p>CO4: understand semaphores, synchronizing multiprogramming with multithreaded systems and implement them in multithreaded programs.</p> <p>CO5: Apply CPU scheduling algorithms, deadlock prevention and detection algorithms and different page replacement algorithms</p> <p>CO6: Illustrate different problems and solutions related to process synchronization</p> <p>CO7: Describe the concepts of paging and segmentation for memory management</p> <p>CO8: Analyze the operating system support for virtual memory, disk management</p> <p>CO9: Gain knowledge about the concepts of deadlock in operating systems and how they can be managed / avoided and implement them in multiprogramming system.</p> <p>CO10: Demonstrate the design and management concepts along with issues and challenges of main memory, virtual memory and file system.</p>
<b>Bench mark set for the paper: 75%</b>		

<p><b>CS 4651(2)</b> <b>PR</b></p>	<p>Unix Lab</p>	<p>CO1: To introduce Basic Unix general purpose Commands CO2: To learn network Unix commands. CO3: To learn C programming in Unix editor environment. CO4: To learn shell script concepts</p>
<p><b>Bench mark set for the paper: 80%</b></p>		
<p>C5601/ CS5901/ CST5301 (Th)</p>	<p>DATABASE MANAGEMENT SYSTEMS</p>	<p>CO1: Differentiate database systems from file systems by enumerating the features provided by database systems and describe each in both function and benefit. CO2: Understand the basic principles of database management systems. CO3: Demonstrate an understanding of the relational data model. CO4: Design Entity-Relationship diagrams to represent simple database application scenarios. CO5: Develop relational tables and sql queries for a given context in relational database. CO6: Draw various data models for Data Base and Write queries mathematically. CO7: Apply normalization techniques to a given database application. CO8: Describe transaction processing and concurrency control. CO9: Understand the basic principles of Distributed database management systems.</p>
<p><b>Level of attainment of CO1 to CO9: 71.5%</b></p>		
<p>C5651/ CS5951/ CST5351 (Pr)</p>	<p>DBMS Lab</p>	<p>CO1: Design and implement a database for a given problem-domain CO2: Formulate query for a database using DDL/DML commands CO3: Apply integrity constraints on a database CO4: Develop programs including procedures, stored functions, cursors and triggers for data manipulation.</p>
<p><b>Level of attainment of CO1 to CO4:74%</b></p>		
<p>C5602/ CS5902/ CST5302 (Th)</p>	<p>Web Technologies</p>	<p>CO1: Design static websites with html and css. CO2: Design Dynamic websites with JavaScript. CO3: Develop interactive web pages with regular expressions, event handling. CO4: Create an online form by using field validations. CO5: Creating a database in PHP my admin. CO6: Read and process data in MYSQL database. CO7: Writing server side scripts by using PHP. CO8: Create an online form by using field validations. CO9: Understand how to use session variables, setting cookies creating destroy session in PHP.</p>
<p><b>Level of attainment of CO1 to CO9: 87%</b></p>		

C5652/ CS5952/ CST5352 (Pr)	Web Technologies Lab	CO1: Create sample static web pages for given scenario. CO2: Apply server side technologies to establish dynamic applications. CO3: Design web applications with event handlers and regular expressions for effective data management. CO4: Develop secure web applications with session management APIs.
<b>Level of attainment of CO1 to CO4: 82%</b>		
CS-E1-6601(3) (Th)	Software Engineering	CO1: Understand the core principles of software engineering CO2: Apply appropriate software process model for a given scenario. CO3: Analyze the requirements for a given problem CO4: Apply the design paradigms to design simple software system CO5: Identify the fundamental principle of test-driven development methods CO6: Interpret the risk strategies to assure the quality of software
<b>Level of attainment of CO1 to CO6: 72.5%</b>		
CS-E1-6651(2) (Pr)	UML LAB	CO1: Learn basic concepts of UML. CO2: Master the rules of the UML and learn how to Model it effectively. CO3: Understand how to apply the UML to solve a number of common modelling problems. CO4: Model the systems, from concept to executable artifact, using object -oriented techniques.
<b>Level of attainment of CO1 to CO4: 82%</b>		
CS-C1-6601(3) (Th)	Computer Networks	CO1: Study of network interconnecting devices and other associated network hardware. CO2: Ability to Understand TCP/IP and Internet layered architecture of the network. CO3: Students will know the configuration of interconnections between networking systems(network topologies) CO4: Understand IPV4 & IPV6 and network classes. CO5: Classify different types of physical layer transmissions and various transmission media.
<b>Level of attainment of CO1 to CO5: 76.5%</b>		
CS-C2-6601(3)	Cloud Computing	CO1: Understand the concept of virtualization and how this has enabled the development of Cloud Computing CO2: Know the fundamentals of cloud, cloud Architectures and types of services in cloud CO3: Understand scaling, cloud security and disaster management.

		CO4: Design different Applications in cloud CO5: Explore some important cloud computing driven commercial systems
<b>Level of attainment of CO1 to CO5: 84.5%</b>		
CS-C3-6601(3)	Data Warehousing & Data Mining	CO1: Understand the fundamentals of data mining and data warehousing concepts CO2: Understand operational database, warehousing and multidimensional need of data base to meet industrial needs. CO2: Understand the data extraction and transformation techniques. CO3: List the association rule mining techniques and understand association mining to correlation analysis, constraint based association mining. CO4: Discover the interesting patterns from different kinds of databases CO5: Understand the components of warehousing, classification methods and clustering analysis. 5 CO6: Demonstrate supervised (classification) and unsupervised (clustering) learning techniques. CO7: Describe the outlier detection methods and various data
<b>Level of attainment of CO1 to CO7: 78%</b>		
CS-C3-651(2)	Weka Lab	CO1: To evaluate the different models of OLAP and data pre-processing. CO2: To enlist various algorithms used in information analysis of Data Mining Techniques. CO3: To demonstrate the knowledge retrieved through solving problems
<b>Level of attainment of CO1 to CO3: 88%</b>		
CS-C1-6651(2)	Project Work	CO1: Apply the student's knowledge and implementation skills in the in computer science for the project course, and apply this to a specific project topic in that area. CO2: deepen their knowledge of computing through undertaking the project. CO3: Learn any specific technical skills required by their topic, and apply them to the project work. CO4: Learn relevant project-related skills, including project management and oral and written communication, and apply these to the project work.
<b>Level of attainment of CO1 to CO4: 83%</b>		



### Input mapping of COs correlation with PSOs

(Strongly correlated: 3      moderately correlated: 2      weakly correlated: 1)

Code	COs	PSO 1	PSO 2	PSO 3
CS1601	CO1	3		
	CO2	3		
	CO3	3		
	CO4	3		
	CO5	3		
	CO6	3		
	CO7	3		
	CO8	3		
CS1651	CO1		3	
	CO2		3	
	CO3		3	
	CO4		3	
	CO5		3	
	CO6		3	
	CO7		3	
CS2601	CO1	3		
	CO2	3		
	CO3	3		
	CO4	3		
	CO5	3		2
	CO6	3		
	CO7	3		
	CO8	3	2	2
CS2651	CO1		3	
	CO2		3	
	CO3		3	
	CO4		3	
	CO5		3	
C4600/ CS4900/ CST4300	CO1	3		
	CO2	3		
	CO3	3		
	CO4	3		
	CO5	3		
	CO6	3		
	CO7	3		
C4650/ CS4950/ CST4350	CO1		3	
	CO2		3	
	CO3		3	
	CO4		3	

CS4601	CO1	3		
	CO2	3		
	CO3	3		
	CO4	3		
	CO5	3		
	CO6	3		
	CO7	3		
	CO8	3		
CS4651	CO1		3	
	CO2		3	
	CO3		3	
	CO4		3	
C5601/ CS5901/ CST5301	CO1	3		
	CO2	3		
	CO3	3		
	CO4	3		
	CO5	3	1	1
	CO6	3		1
	CO7	3		
	CO8	3		
C5651/ CS5951/ CST5351	CO1		3	1
	CO2		3	1
	CO3		3	1
	CO4		3	1
C5602/ CS5902/ CST5302	CO1	3		1
	CO2	3		1
	CO3	3		1
	CO4	3		1
	CO5	3		1
	CO6	3		1
C5652/ CS5952/ CST5352	CO1		3	1
	CO2		3	1
	CO3		3	1
	CO4		3	1
C6601/ CS6901/ CST6301	CO1	3		
	CO2	3	2	1
	CO3	3	2	1
	CO4	3		1
	CO5	3		1
	CO6	3		
C6651/ CS6951/	CO1		3	1
	CO2		3	1

CST6351	CO3		3	1
	CO4		3	1
C-C1 (6601/ CS6901/ CST6301)	CO1	3		
	CO2	3		
	CO3	3		
	CO4	3		
	CO5	3		
C-C2 (6602/ CS6902/ CST6302)	CO1	3		
	CO2	3		
	CO3	3		
	CO4	3		
C-C3 (C6603/ CS6903/ CST6303) (Th)	CO1	3		
	CO2	3		
	CO3	3		
	CO4	3		
	CO5	3		
C-C3 (6653/ CS6953/ CST6353)	CO1		3	
	CO2		3	
	CO3		3	
C-C1 (6651/ CS6951/ CST6351) C-C2 (6652/ CS6952/ CST6352)	CO1		3	1
	CO2		3	1
	CO3		3	1