**Bachelor of Science in Computer Science**  **SRKI**  

**Bachelor of Science in Computer Science Honors**



**Faculty of Science**

Shree Ramkrishna Institute of Computer Education &

Applied Sciences, Surat

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

**and**

**B. Sc. (Computer Science Honors)**

**With Effect From 2024**

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**Bachelor of Science in Computer Science**  **SRKI**  

**Bachelor of Science in Computer Science Honors**

**Bachelor of Science Computer Science and**

**Bachelor of Science Computer Science 2024-25**

**Introduction:**

The B.Sc. in Computer Science program welcomes students from a variety of academic backgrounds having interest in pursuing study and career in the field of Information Technology. It will empower you to fulfil your academic potential and help you gain the industry-specific and interpersonal skills you need to work as an IT professional.

Your studies will combine theoretical principles with technical skills. The student will learn how Information and Communications Technology (ICT) systems are developed, made live and managed. In addition, you will gain a practical understanding of the latest professional and ethical issues in the field.

The subject includes software development as well as its operations, support and systems administration. It features a wide variety carefully designed courses that are based on web and mobile systems and technologies, database systems, computer communication and networks, network security, software engineering and software testing, system architecture, information systems, and human computer interaction, embedded systems and IOT.

The B.Sc. in Bachelor of Science program prepares students to meet the information and communication technology needs of government, business, healthcare, universities, and other kinds of organizations.

**Objectives of the programme:**   
Main objective of the program is to impart knowledge of fundamentals, latest theories, concepts, methods, techniques and tools related to various areas of computer applications and information technology and specifically in the area of mobile based, cloud based, web based application development, software engineering, data management.

**Eligibility Criteria:**

● A candidate must have passed 10+2 in any stream with Mathematics / Physics / Electronics / Statistics / Business maths/Accountancy as one of the subjects or an equivalent examination.

● The candidate who has passed equivalent exam from other subjects or boards need to avail eligibility certificate for this programme from the Board of Equivalence (BoE) of the Sarvajanik University.

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**Credit Structure: (Annexture-1)**

**Semester wise course group wise credit allocation for Under Graduate Programme**

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Semester** | **Major** | | | | | | **Minor** | | **Skill**  **Enhance ment** | | **Ability**  **Enhancement** | | **Multidisci plinary** | | **Value**  **Added** | | **Tota l Cre dits** |
|  | **Theory** | | **Lab** | |  | **N**  **o.**  **of**  **P**  **a**  **p**  **er**  **s** | **Credi ts** | **No.**  **of**  **Pap ers** | **Cre dits** | **No. of Paper s** | **Credit s** | **No.**  **of**  **Pape rs** | **Cre dits** | **No.**  **of**  **Pap ers** | **Cre dits** |
| **Major**  **no. of Papers** | **Theo ry**  **Hour s** | **Theo ry**  **Cred its** | **Lab Hrs** | **Lab**  **credi t** | **Total Maj**  **or**  **Cred its** |
| 1 | 2 | 3+3 | 3+3 | 2 + 2 | 1 + 1 | 8 | 1 | 4 | 1 | 2 | 1 | 2 | 1 | 4 | 1 | 2 | 22 |
| 2 | 2 | 3 +3 | 3 + 3 | 2 + 2 | 1 + 1 | 8 | 1 | 4 | 1 | 2 | 1 | 2 | 1 | 4 | 1 | 2 | 22 |
| 3 | 3 | 3 + 3 + 3 | 3 + 3 + 3 | 2 + 2 + 2 | 1 + 1 + 1 | 12 | 0 | 0 | 1 | 2 | 1 | 2 | 1 | 4 | 1 | 2 | 22 |
| 4 | 3 | 3 + 3 + 3 | 3 + 3 + 3 | 2 + 2 + 2 | 1 + 1 + 1 | 12 | 1 | 4 | 1 | 2 | 1 | 2 |  |  | 1 | 2 | 22 |
| 5 | 3 | 3 + 3 + 3 | 3 + 3 + 3 | 2 + 2 + 2 | 1 + 1 + 1 | 12 | 2 | 8 | 1 | 2 |  |  |  |  |  |  | 22 |

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**Bachelor of Science in Computer Science**  **SRKI**  

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| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 6 | 3 | 3 + 3 + 3 | 3 + 3 + 3 | 2 + 2 + 2 | 1 + 1 + 1 | 12 | 1 | 4 | Inte rns  hip | 4 | 1 | 2 |  |  |  |  | 22 |
| **Total (After 3yrs)** | **16** |  |  |  |  | **64** | **6** | **24** | **5 + I** | **10+ 4** | **5** | **10** | **3** | **12** | **4** | **8** | **132** |
| 7(Honors ) | 4 | 3 + 3  + 3+3 | 3 + 3  + 3+3 | 2+2+ 2+2 | 1+1+ 1+1 | 16 | 1 | 4 | 1 | 2 |  |  |  |  |  |  | 22 |
| 8(Honors ) | 4 | 3 + 3  + 3+3 | 3 + 3  + 3+3 | 2+2+ 2+2 | 1+1+ 1+1 | 16 | 1 | 4 | 1 | 2 |  |  |  |  |  |  | 22 |
| 7(Resear ch) | 3 | 3 + 3 + 3 | 3 + 3 + 3 | 2+2+ 2 | 1+1+ 1 | 12 | 1 | 4 | RP | 6 |  |  |  |  |  |  | 22 |
| 8(Resear ch) | 3 | 3 + 3 + 3 | 3 + 3 + 3 | 2+2+ 2 | 1+1+ 1 | 12 | 1 | 4 | RP | 6 |  |  |  |  |  |  | 22 |
| **Total (After 4yrs)** | **24/22** |  |  |  |  | **96/8 8** | **8** | **32** | **7+I** | **18/2 6** | **5** | **10** | **3** | **12** | **4** | **8** | **176** |

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**Evaluation Scheme for Semester 1 and 2:**

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| --- | --- | --- | --- | --- | --- | --- | --- |
| **Semester** | **Subject group** | **Continuous Comprehensive Evaluation** | | | | **Semester**  **End**  **Examination (SEE)** | **Grand Total** |
| **CE** | **Attend.** | **Assign.** | **Total CEE** |
| 1 | Major | 30 | 10 | 10 | 50 | 50 | 100 |
| Major | 30 | 10 | 10 | 50 | 50 | 100 |
| Major | 30 | 10 | 10 | 50 | 50 | 100 |
| SEC | 15 | 05 | 05 | 25 | 25 | 50 |
| Multidisciplinary | 10 | 10 | 30 | 50 | 50 | 100 |
| Ability  Enhancement Course | 15 | 05 | 05 | 25 | 25 | 50 |
| Value Added Course | 15 | 05 | 05 | 25 | 25 | 50 |
|  |  |  |  | **Total** | **275** | **275** | **550** |
| 2 | Major | 30 | 10 | 10 | 50 | 50 | 100 |
| Major | 30 | 10 | 10 | 50 | 50 | 100 |
|  | 30 | 10 | 10 | 50 | 50 | 100 |
|  | 15 | 05 | 05 | 25 | 25 | 50 |
| Multidisciplinary | 10 | 10 | 30 | 50 | 50 | 100 |
| Ability  Enhancement Course | 15 | 05 | 05 | 25 | 25 | 50 |
| Value Added Course | 15 | 05 | 05 | 25 | 25 | 50 |
| **Total** | | | | | **275** | **275** | **550** |

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**Faculty of Science**

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**B.Sc. Computer Science**

**SEMESTER- 1**

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**Structured Programming Methodology**

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| **Course Code** |  |
| **Course Title** | **Major : Structured Programming Methodology** |
| **Credit** | 3 (Theory) + 1 (Practical) |
| **Teaching per Week** | 3hrs (Theory) + 2hrs (Practical) |
| **Minimum**  **weeks per**  **Semester** | 15 (Including Class work, examination, preparation, holidays etc.) |
| **Last Review / Revision** | --- |
| **Purpose of**  **Course** | The aim of this course is to introduce to the students the rudiments of  programming using java language. Students will become familiar with problem solving techniques and algorithm development. |
| **Course**  **Objective** | To Gain knowledge about Programming languages, programming methodology.  To Gain knowledge about basic Java language syntax and semantics to write Java programs and use concepts such as variables, conditional and iterative execution methods etc.  To understand how to work with Arrays and Strings. |
| **Pre-requisite** | NIL |
| **Course Out come** | At the end of the course, student is expected to have understanding about the concepts of Programming languages, programming basics, Functions, Strings and  Arrays, etc. |
| **Course**  **Content** | **Unit 1 Introduction to programming [6 hrs]**  1.1What is a program?  1.2 Levels of programming languages  1.3 Programming methodologies – structured and object-oriented 1.4 Java History   1.5 Features of Java, Bytecode, Steps of java program execution  **Unit 2 Introduction to program design [6 hrs]**  2.1What is a Flowchart?  2.2Flowchart symbols and its usage  2.3What is an Algorithm?  2.4 Characteristics of good algorithm |

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|  | **Unit 3 Getting started with structured programming [6 hrs]**  3.1 Basic structure of program in java   3.2 Variables, Datatypes, Keywords, Constants, Comments 3.3 Printing output   3.4 String literal   3.5 Operators   3.5.1 Arithmetic Operators   3.5.2 Unary Operators   3.5.3 Relational Operators   3.5.4 Assignment Operators   3.5.5 Conditional Operators  3.6 Type casting  **Unit 4 Control structures [6 hrs]**  4.1Looping statements   4.1.1 while Loop   4.1.2 do-while Loop   4.1.3 for Loop   4.2 Various forms of if Statement   4.2.1 If, else if, nested if   4.2.2 Switch statement   4.2.3 Break and Continue Statements  **Unit 5 Introducing Functions [7 hrs]**  5.1Inbuilt functions  5.2User defined functions   5.2.1 Function declaration, definition and function calling 5.2.2 Passing parameter to functions   5.2.3 Returning values from functions  **Unit 6 Strings and Arrays [8 hrs]**  6.1String class  6.2Inbuilt String methods  6.3Operations on String without using inbuilt functions 6.4Concept of Substring  6.5 6.5 Creating and accessing an array, array literal 6.6Single Dimensional array  6.7Multi-Dimensional array  6.8Operations on Arrays  6.9Passing array to the function |
| **Practical** | List of practical will be prepared at the beginning of each semester |

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| **Text and**  **Reference**  **Literature** | 1.The Complete Reference Java2 Herbert Schildt TMH, New Delhi 2.Mastering JAVA2 John Zukowski BPB  3.3. Teach Yourself Java2 platform in 21 days Lamey & Cadenhead Teach Media  4.Java in Nut shell - O’Relly Publication  5.Java Language Reference - O’Relly Publication |
| **Teaching**  **Methodology** | Discussion, Independent Study, Seminars and Assignment, Internal Project Development Practical Assignments 80% (Approximately weekly) |
| **Evaluation Method** | 50% Internal assessment is based on class attendance, participation, class test, quiz, assignment, seminar, internal examination etc.  50% assessment is based on end semester written examination |

**Database Management System-I**

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| **Course Code** |  |
| **Course Title** | **Major:Database Management Systems-I** |
| **Credit** | 3 (Theory) + 1 (Practical) |
| **Teaching per Week** | 3hrs (Theory) + 2hrs (Practical) |
| **Minimum weeks per Semester** | 15 (Including Class work, examination, preparation, holidays etc.) |
| **Last Review / Revision** | - |
| **Purpose of Course** | This course imparts the knowledge of Database Management system, Entity Relationship model, Relationship Model, SQL (DDL, DML and DCL). |
| **Course Objective** | To introduce the concept of database systems, modeling of data and to make use of SQL for efficient storage and retrieval of data. |
| **Prerequisite** | Nil |
| **Course Out come** | Students will be able to  · Differentiate between database approach and conventional file processing system  · Understand concepts of database  · Design an entity-relationship model based on user requirements  · Use SQL statements to store, modify and retrieve data fromone ormore Tables |

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| **Course Content** | **Unit 1 Introduction to DBMS [6 hrs]**  1.1 Fundamental concepts - data, information, database, DBMS, table, row, field   1.2 Need of Information - Business, Research, Governance   1.3 Requirement of DBMS   1.4 Levels of Abstraction in DBMS   1.5 Database Users and Administrator  **Unit 2 Database Architecture and models [5 hrs]**  2.1 Database Architecture - Centralized database, Client-server, Parallel database,  Distributed database  2.2 Introduction to data models - Relational, E-R, Object-Oriented  **Unit 3 Relational Database Design [7 hrs]**  3.1 Structure of relational database.  3.2 Keys   3.3 E.F. Codd’s rule   3.4 Functional Dependency   3.5 Anomalies of DBMS   3.6 Normal Forms: 1NF, 2NF, 3NF, BCNF  **Unit 4 Entity Relationship Model [7 hrs]**  4.1 Basic concepts and symbols used in E-R notation 4.2 Mapping cardinalities   4.3 Types of attributes   4.4 Keys - Super key, candidate key, Primary key 4.5 Generalization, Specialization   4.6 Designing E-R diagram  **Unit 5 DDL Statements and Indexing [7 hrs]**  5.1 Data Types of attributes   5.2 Schema-based operations: Table Creation, Table structure modifications and removal   5.3 Domain Constraints   5.4 Referential Integrity Constraints   5.5 Create, Alter and Drop Index  **Unit 6 DML Statements [8 hrs]**  6.1 Data manipulation   6.2 Retrieving the data   6.3 Operators: IN, BETWEEN, LIKE, Relational, Arithmetic and Logical Operators |

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| Practical | List of practical will be prepared at the beginning of each semester |
| **Text and**  **Reference**  **Literature** | 1. Silberschatz, Korth, Sudarshan ,Database System Concepts, McGraw-Hill computer science series  2. C J Date, An introduction to Database Systems, Addition-Wesley  3. Nilesh shah, Database System using Oracle, PHI.  4. Ramez Elmasri & Shamkant B. Navathe, Fundamentals of Database Systems, Addison-Wesley  5. Hector Gracia-Molina, Jeffrey D. Ullman, and Jennifer Widom, Database System Implementation, Pearson.  6. Ivan Bayross, SQL, PL/SQL, BPB Publications  7. Scott Urman, Oracle9i PL/SQL programming, McGraw-Hill |
| **Teaching**  **Methodology** | Discussion, Independent Study, Seminars and Assignment, Internal Project Development  Practical Assignments 80% (Approximately weekly) |
| **Evaluation**  **Method** | 50% Internal assessment is based on class attendance, participation, class test, quiz, assignment, seminar, internal examination etc.  50% assessment is based on end semester written examination |

**Fundamentals of Computer Systems**

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| Course Code |  |
| Course Title | Minor: Fundamentals of Computer Systems |
| Credit | 4(Theory) |
| Teaching per  Week | 4 Hrs |
| Minimum weeks per Semester | 15 (Including Class work, examination, preparation, holidays etc.) |
| Last Review / Revision | - |
| Purpose of  Course | The purpose of course is to make students aware of the basic concept of computer architecture and fundamentals regarding software development process. |
| Course Objective | To provide Fundamental knowledge of computer hardware technologies and its process, basic Web page design |
| Pre-requisite | Basic understanding of computers. |
| Course Out  come | After completion of this course, the student will get knowledge of computer internal structure, memories, various operating systems and basic idea for software development processes. |
| Course Content | **Unit 1 Computer Organisation [7 hrs]**   1.1 Personal Computer, Workstation, Server, Mainframe, Super Computer, Embedded System   1.2 Basic building blocks – CPU, interconnection Bus, Input-Output   1.3 Internal architecture of processor – Register, ALU, Control Unit, Program Counter, Stack Pointer   1.4 Inter connection Bus structure – Data Bus, Address Bus, Control Bus 1.5 Processor Operations – Instruction cycle, Instruction fetch, Instruction decode, instruction execute, Program flow control, Processor clock, Machine cycle and T-state, interrupts and interrupt service routine  **Unit 2 Basics of Operating System [3 hrs]** 2.1.Basic concept of Operating System   2.2.Purpose of Operating System   2.3.Types of Operating System  **Unit 3 Memory Management [9 hrs]** 3.1.Types of Memory   3.2.Processor - Memory interaction   3.3.Secondary Memory, Direct Memory Access (DMA)   3.4. I/O Device controllers, I/O Processors   3.5.Virtual Memory   3.6.Overview of Memory management – addressing, allocation, garbage collection, free memory list, paging, segmentation   3.7.Boolean algebra   3.8.Number System - Conversion of Numbers, Binary addition & subtraction, ASCII and ANSI character code  **Unit 4 Fundamentals of Computer Networking [4 hrs]** |

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|  | 4.1 Need for Computer Networking   4.2 Types of Networks – LAN, MAN, WAN, Internet, Intranet 4.3 Applications of Network  **Unit 5 Fundamentals of Internet [ 6 hrs]**  5.1 Overview of Internet, Intranet and types   5.2 World Wide Web (WWW),   5.3 Website Basics - WebPages(static and dynamic); HyperText,   Web browser, Web Servers; Web Hosting, Web Portal, Domain name server,   5.4 Overview of Client & Server Side Scripting, Applications of Internet  **Unit 6 Software Basics [5 hrs]** 6.1 Types of Software   6.2 Software development life cycle   6.3 Software engineering practice – communication, planning, modelling, constructions, deployment   6.4 Software application architectures – Desktop applications, client-server/Web application, cloud application  **Unit 7 Software Engineering [4 hrs]** 7.1 Various roles in software engineering   7.2 Software quality attributes – FURPS   7.3 Various programming methodologies – Structured, object oriented, event driven, pair programming, extreme programming   7.4 Coding standards and guidelines  **Unit 8 Advance Processing System [4 hrs]** 8.1 Parallel Processing with Uniprocessor   8.2 Pipeline computers, Array computers, Multiprocessor system 8.3 Overview of SIMD, MIMD |
| Reference Book | 1. Computer Architecture: K M Hebbar  2. Computer System Architecture: M. Morris Mano  3. Introduction to computers: 4th Edition – Peter Norton  4. Fundamentals of Computers: V. Rajaraman  5. Computer Architecture and Organization- A Journey Through Evolution: P. Chakraborty  6. Computer Architecture and Organization: Subrata Ghosal |
| Teaching Methodology | Discussion, Independent Study, Seminars and Assignment |
| Evaluation Method | 50% Internal assessment is based on class attendance, participation, class test, quiz, assignment, seminar, internal examination etc.  50% assessment is based on end semester written examination |

**WEB DESIGNING - I**

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| **Course Code** |  |
| **Course Title** | **SEC- 1: Web Designing-I** |
| **Credit** | 1 (Theory) + 1 (Practical) |
| **Teaching per Week** | 1 hrs (Theory) + 2 hrs (Practical) |
| **Minimum weeks per Semester** | 15 (Including Class work, examination, preparation, holidays etc.) |
| **Last Review / Revision** | - |
| **Purpose of**  **Course** | The course gives students an idea about client server architecture and how to design basic web page design and to make students capable of developing effective and interactive web client parts of web applications. |
| **Course**  **Objective** | To provide fundamental knowledge of Web page design with HTML5, CSS, Javascript. |
| **Pr-requisite** | - |
| **Course**  **Outcome** | After completion of this subject, student will be able to   ●The student will be capable of designing effective and interactive web pages using HTML5, CSS, Javascript.  ●Design front web designing. |
| **Course**  **Description:** | It is a Web application development platform for designing effective and interactive web applications. |
| **Course Content** | **Unit 1 Web designing Fundamentals [8 hrs]**  1.1 Overview of Client & Server architecture   1.2 Website Basics - WebPages(static and dynamic)   1.3 Web browser, Web Servers; Web hosting, Web Portal, Domain name server  **Unit 2 Basic Web page designing with HTML 5**   **[8 hrs]**  2.1 HTML Structure   2.2 Basic HTML Tags – Formatting, Table, Headings   2.3 Other Tags – Ordered Lists, Unordered Lists, Links   2.4 Tables and Frame, Form Tags   2.5 HTML 5- standard and custom attributes, events   2.6 Web Form 2.0, Web storage, Web SQL   2.7 SVG, Canvas, Embedding and Playing Audio & Video  **Unit 3 Cascade Style Sheets**   **[8 hrs]**  3.1 Introduction to CSS and Its types   3.2 Common Tasks with CSS-styling fonts, margins, links With Background related tags, Border related tags, Font  related tags, Margin related tags, Text related tags, Page   related tags, List related tags, Colour tag, Layer tag, Size and location |

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|  | related properties.  3.3 Assigning classes  **Unit 4 JavaScript**   **[8 hrs]**  4.1 Structure of JavaScript   4.2 Data Types and Variables in JavaScript   4.3 Operators : Arithmetic Operator, Assignment Operator, Comparison   Operator, Logical Operator, Conditional Operator in JavaScript   4.4 Control Structure : If…Else, While, Do…While, For and Functions in   JavaScript  4.5 Handling events in JavaScript-Windows event, Event object |
| **Text and**  **Reference**  **Literature** | 1. HTML5 Black Book: Covers CSS3, Javascript, XML, XHTML, Ajax, PHP and Jquery, Dreamtech Press  2. WEB TECHNOLOGIES: HTML, JAVASCRIPT, PHP, JAVA, JSP, ASP.NET, XML AND AJAX, BLACK BOOK: HTML, Javascript, PHP, Java, Jsp, XML and Ajax, Black Book, Dreamtech Press  3. HTML5 and CSS3 made Simple, Ivan Byross, BPB  4. Pro HTML5 and CSS3 Design Patterns, Dionysios Synodinos, Michael Bowers and Victor Sumner, Pearson  5. HTML5 In easy steps, Mike McGrath, McGrawHill  6. Programming in HTML5 with JavaScript and CSS3 Training Guide, Johnson G, PHI  7. JavaScript in easy Steps, Mike McGrath, McGrawHill. |
| Practical | List of practical will be prepared at the beginning of each semester |
| **Teaching**  **Methodology** | Discussion, Independent Study, Seminars and Assignment, Internal Project Development Practical Assignments 80% (Approximately weekly) |
| **Evaluation**  **Method** | 50% Internal assessment is based on class attendance, participation, class test, quiz, assignment, seminar, internal examination etc.  50% assessment is based on end semester written examination |