# SRI KRISHNA ARTS AND SCIENCE COLLEGE

An Autonomous College Affiliated to Bharathiar University
Coimbatore - 641008, Tamil Nadu, India.

# LEARNING OUTCOMES BASED CURRICULUM FRAMEWORK (LOCF)

## M.Sc. Software Systems
## (I to II Semester)

## For 2023-24 admitted students

## DEPARTMENT OF COMPUTER SCIENCE

# SRI KRISHNA ARTS AND SCIENCE COLLEGE
## COIMBATORE – 641008

### DEPARTMENT OF COMPUTER SCIENCE

### (2023-2024)

| I. PROGRAMME EDUCATIONAL OBJECTIVES (PEOs) | |
|---|---|
| **PEO 1** | Able to become a software architect for designing systems with research in the contemporary software platforms. |
| **PEO 2** | Become a team leader and work with a group in solving complex problems through domain knowledge with effective communication skills. |
| **PEO 3** | Able to keep up-to-date information in advanced field for lifelong learning by providing professional services with competence. |
| **PEO 4** | Able to demonstrate ethical and professional values in providing services including entrepreneurial skills. |

| II. PROGRAMME LEARNING OUTCOMES (PLOs) | |
|---|---|
| **No.** | **The Graduates of M.Sc. Software Systems Program will be able to:** |
| **PLO1** | **Knowledge:** Acquire knowledge in the core theoretical and practical concepts in the computer science domain. *(Cognitive)* |
| **PLO2** | **Critical Thinking Skills:** Able to critically think, analyse and provide feasible solutions to real life problems in computing area. *(Cognitive)* |
| **PLO3** | **Practical Skills:** Acquire proficiency in the key areas of computer science like object-oriented programming, mobile and open-source technologies *(Psychomotor)* |
| **PLO4** | **Team-work Skills:** Function effectively as a member and leader in a team, to manage projects and in multidisciplinary environments. *(Affective)* |
| **PLO5** | **Communication Skills:** Communicate effectively while developing and presenting effective solutions to the problems. *(Affective)* |
| **PLO6** | **Digital Skills:** Select and apply appropriate techniques, resources, tools for prediction and providing solutions to complex real time problems. *(Affective)* |
| **PLO7** | **Numeracy Skills:** An ability to apply mathematical foundations, algorithmic principles, and computer science theory in the modelling and design of computational systems. *(Cognitive)* |
| **PLO8** | **Leadership Skills:** An ability to apply mathematical foundations, algorithmic principles, and computer science theory in the modelling and design of computational systems. *(Affective)* |
| **PLO9** | **Lifelong Learning Skills:** An ability to engage in life-long learning in the context of technological change. *(Affective)* |
| **PLO10** | **Entrepreneurial Skills:** Acquire skills to design, develop and provide effective solutions to become an entrepreneur. *(Affective)* |
| **PLO11** | **Ethics &Professional Skills:** Apply ethical principles and commit to professional ethics and social responsibilities. *(Affective)* |

## III. PROGRAMME LEARNING OUTCOMES VS GRADUATE ATTRIBUTES VS TAXONOMY OF VERBS

| PLO | Knowledge | Critical Thinking | Practical Skills | Team work | Communication skills | Digital skills | Numeracy | Leadership skills | Lifelong learning | Entrepreneurial skills | Ethics & Professionalism | Cognitive | Psychomotor | Affective |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | √ | | | | | | | | | | | √ | | |
| 2 | | √ | | | | | | | | | | √ | | |
| 3 | | | √ | | | | | | | | | | √ | |
| 4 | | | | √ | | | | | | | | | | √ |
| 5 | | | | | √ | | | | | | | | | √ |
| 6 | | | | | | √ | | | | | | | | √ |
| 7 | | | | | | | √ | | | | | √ | | |
| 8 | | | | | | | | √ | | | | | | √ |
| 9 | | | | | | | | | √ | | | | | √ |
| 10 | | | | | | | | | | √ | | | | √ |
| 11 | | | | | | | | | | | √ | | | √ |

## IV. PROGRAMME LEARNING OUTCOMES VS PROGRAMME EDUCATIONAL OBJECTIVES

| PLO | PEO 1 | PEO 2 | PEO 3 | PEO 4 |
|---|---|---|---|---|
| PLO 1 | √ | | | |
| PLO 2 | √ | | | |
| PLO 3 | | √ | | |
| PLO 4 | | | √ | |
| PLO 5 | | | √ | |
| PLO 6 | | √ | | |
| PLO 7 | | √ | | |
| PLO 8 | | | √ | |
| PLO 9 | | | | √ |
| PLO 10 | | | | √ |
| PLO 11 | | √ | | |

| V. ADDITIONAL PROGRAMME OUTCOMES (APOs) | |
|---|---|
| APO 1 | Ability to build networks and broaden horizons and engaging authentically through Social Intelligence Quotient and Emotional Quotient. |
| APO 2 | Ability to translate vast data into abstract concepts and to understand data base reasoning. |
| APO 3 | Ability to develop working in virtual collaborating platforms to transfer different types of information and work towards a common goal |
| APO 4 | Ability to develop critical thinking and innovative skills as a potential to advance career. |
| APO 5 | Having a good digital foot print. |

| VI. PROGRAMME SPECIFIC OUTCOMES (PSO's) | |
|---|---|
| PSO 1 | Ability to use software development tools, computing platforms and other advanced tools for lifelong learning. |
| PSO 2 | Ability to apply computing knowledge to produce effective designs and solutions for real-time applications. |

## VII. Curriculum Structure for M.Sc. Software Systems

### Course Components, Credits & Marks Distribution

| Basic Structure: Distribution of Courses | Number of Courses | Total Marks | Total Credits |
|---|---|---|---|
| DSC – Discipline Specific Courses | 48 | 4400 | 165 |
| DSE – Discipline Specific Electives | 4/8 | 400 | 15 |
| GEC – Generic Elective Courses | 7 | 700 | 19 |
| Mini Project / Major Project | 3 | 500 | 35 |
| ANCC I - Audit Non-Credit Courses | 1 | Completed | |
| ANCC II - Audit Non-Credit Courses | 1 | Completed | |
| DTC – Drive Through Courses (SWAYAM-NPTEL, Coursera, Any courses certified by statutory bodies, etc) | Additional 4 Credits per Course will be given on submission of Certificate | - | Addl. Credits |
| **Total** | | **6000** | **234** |

## 1. Discipline Specific Courses (DSCs)  (I & II Semesters)

These courses are to be studied compulsorily by the students as a core requirement. The students are required to take DSCs across the semesters. The courses designed under this category aim to cover the basics that a student is expected to imbibe in the particular discipline.

| S. No. | Course Code | Course Title | Semester | Contact Hours | Credits | Marks |
|--------|-------------|--------------|----------|---------------|---------|-------|
| 1 | 23SSI01 | DSC 1: English I | I | 4 | 3 | 100 |
| 2 | 23SSI02 | DSC 2: C Programming | I | 4 | 4 | 100 |
| 3 | 23SSI03 | DSC 3: Algebra | I | 4 | 3 | 100 |
| 4 | 23SSI04 | DSC 4: Computer Organization and Architecture | I | 5 | 4 | 100 |
| 5 | 23SSI05 | DSC 5:Practical - Programming Lab- C | I | 3 | 2 | 50 |
| 6 | 23SSI06 | DSC 6: Self Study Paper –PC Software Lab | I | 1 | 1 | 50 |
| 7 | 23SSI07 | DSC 7: English II | II | 3 | 2 | 100 |
| 8 | 23SSI08 | DSC 8: Calculus and Laplace Transforms | II | 4 | 3 | 100 |
| 9 | 23SSI09 | DSC 9: Object Oriented Programming using C++ | II | 4 | 4 | 100 |
| 10 | 23SSI10 | DSC 10: Data Structures and Algorithms | II | 4 | 4 | 100 |
| 11 | 23SSI11 | DSC 11: Practical- C++ with Data Structures Lab | II | 2 | 2 | 50 |

## 2. Discipline Specific Electives DSE)

Discipline Specific Elective Courses offered under the main discipline of study which may be specialized or advanced or supportive to the discipline of study.

## 3. Generic Elective Courses (GECs) (I & II Semesters)

Generic Elective Courses are interdisciplinary in nature. They are additional courses based on expertise, specialization, requirements, scope, and need of the department.

| Sl. No. | Course Code | Course Title | Semester | Ownership Department | Contact Hours | Credits | Marks | SD/ EM/ EN | G/ L/ R/ N |
|---|---|---|---|---|---|---|---|---|---|
| 1 | 23GEP12 | Digital Electronics | I | ECS | 4 | 3 | 100 | SD | G |
| 2 | 23GEP13 | Digital Electronics Lab | I | ECS | 3 | 2 | 100 | SD | G |
| 3 | 23GEP14 | VLSI Design and Verilog | I | ECS | 4 | 3 | 100 | SD | G |
| 4 | 23GEP15 | Verilog Programming Lab | I | ECS | 3 | 3 | 100 | SD | G |
| 5 | 23GEP16 | Embedded Systems | II | ECS | 4 | 3 | 100 | EM | G |
| 6 | 23GEP17 | Embedded Systems Lab | II | ECS | 3 | 2 | 100 | EM | G |
| 7 | 23GEP18 | Programmable Logic Controller | II | ECS | 4 | 3 | 100 | EM | G |
| 8 | 23GEP19 | Programmable Logic Controller Lab | II | ECS | 3 | 2 | 100 | EM | G |

## 4. Audit Non-Credit Courses (ANCC)

Non-Credit Courses are intended for students who want to gain general knowledge, learn a new skill, upgrade existing skills, enrich their understanding of a wide range of topics, or develop personal interests. A student has to complete any two courses during Semester I and II.

| Part IV-  ANCC | | |
|---|---|---|
| **S. No.** | **Course Code** | **Course Name** |
| **Semester I - ANCC – I** | | |
| 1. | 23ANC01 | Environmental Studies |
| **Semester II - ANCC II - Values & Ethics** | | |
| 2. | 23ANC02 | Human Rights |
| 3. | 23ANC03 | Women's Rights |
| 4. | 23ANC04 | Yoga for Human Excellence |
| 5. | 23ANC05 | Indian Culture and Heritage |
| 6. | 23ANC06 | Introduction to Cyber Security |
| 7. | 23ANC07 | Consumer Protection |
| 8. | 23ANC08 | Constitution of India |
| 9. | 23ANC09 | Waste Management |
| 10. | 23ANC10 | Cyber Ethics |

## 5. Drive-Through Course (DTC)I & II– Additional Credits

These courses are intended to bring out and promote the self-learning initiative of the students – where their own motivation is what drives them to complete the course and not external compulsions. This fosters the habit of keeping oneself updated always by means of self-study. It gives opportunities to the students to explore new areas of interest and earn additional credits. Students can take any number of courses under this cafeteria system. The credits will not be taken for CGPA calculation. Additional 4 credits per Course will be given on submission of certificate.

## 1. SWAYAM-NPTEL
- 4 Additional Credits will be given on submission of the certificate.

## 2. Coursera

- 4 Additional Credits will be given on completion of Specialization Course with 7 – 8 modules
- 3 Additional Credits will be given on completion of Specialization Course with 5 – 6 modules
- 2 Additional Credits will be given on completion of Specialization Course with 3 – 4 modules

## 3. Any courses certified by statutory bodies.

## VIII. Semester-wise Scheme

### Semester I

| Course Code | Course Title | T/P/E | ESE Dur. Hrs | Ins. Hrs/ Week | CIA Marks | ES Marks | Total Marks | Credits | SD/ EM/ EN | G/L /R/ N |
|---|---|---|---|---|---|---|---|---|---|---|
| 23SSI01 | DSC 1: English I | T | 3 | 4 | 25 | 75 | 100 | 3 | SD | G |
| 23SSI02 | DSC 2: C Programming | T | 3 | 4 | 25 | 75 | 100 | 4 | SD/EM | G |
| 23SSI03 | DSC 3: Algebra | T | 3 | 4 | 25 | 75 | 100 | 3 | SD | G |
| 23SSI04 | DSC 4: Computer Organization and Architecture | T | 3 | 5 | 25 | 75 | 100 | 4 | SD | G |
| 23SSI05 | DSC 5: Practical -Programming Lab- C | P | 3 | 3 | 10 | 40 | 50 | 2 | SD/EM | G |
| 23SSI06 | DSC 6: Self Study Paper – PC Software Lab | P | 3 | 1 | - | 50 | 50 | 1 | SD | G |
| 23GEP12 | GEC 1: Digital Electronics | T | 3 | 4 | 25 | 75 | 100 | 3 | SD | G |
| 23GEP13 | GEC 2: Digital Electronics Lab | P | 3 | 3 | 40 | 60 | 100 | 2 | SD | G |
| **DTC - I - Additional Credit Courses (NPTEL/Coursera)** | | | | | | | | | | |
| 23ANC01 | **ANCC I -** Environmental Studies | T | - | 2 | - | - | Completed | | SD | G |
| **Total** | | | | **30** | | | **700** | **22** | | |

### Semester II

| Course Code | Course Title | T/P/E | ESE Dur. Hrs | Ins. Hrs/ Week | CIA Marks | ES Marks | Total Marks | Credits | SD/ EM/ EN | G/L /R/ N |
|---|---|---|---|---|---|---|---|---|---|---|
| 23SSI07 | DSC 7: English II | T | 3 | 3 | 25 | 75 | 100 | 2 | SD | G |
| 23SSI08 | DSC 8: Calculus and Laplace Transforms | T | 3 | 4 | 25 | 75 | 100 | 3 | SD | G |
| 23SSI09 | DSC 9: Object Oriented Programming using C++ | T | 3 | 4 | 25 | 75 | 100 | 4 | SD/ EM | G |

| Code | Course | T/P | | | | | | | Needs | |
|---|---|---|---|---|---|---|---|---|---|---|
| 23SSI10 | DSC 10: Data Structures and Algorithms | T | 3 | 4 | 25 | 75 | 100 | 4 | SD | G |
| 23SSI11 | DSC 11: Practical- C++ with Data Structures Lab | P | 3 | 2 | 10 | 40 | 50 | 2 | SD/ EM | G |
| 23GEP16 | GEC 3: Embedded Systems | T | 3 | 4 | 25 | 75 | 100 | 3 | SD | G |
| 23GEP17 | GEC 4: Embedded Systems Lab | P | 3 | 3 | 40 | 60 | 100 | 2 | EM | G |
| 23GEP22 | GEC 5: Fundamentals of Accounting | T | 3 | 4 | 25 | 75 | 100 | 4 | EM | G |
| **DTC II : Additional Credit Courses (NPTEL/Coursera)** | | | | | | | | | | |
| 23ANC10 | **ANCC II - Value & Ethics:** Cyber Ethics | T | - | 2 | - | - | Completed | | EN | R |
| **Total** | | | | 30 | | | 750 | 24 | | |
| **Drive-Through Course (DTC):** Courses offered in SWAYAM-NPTEL, Coursera OR Any courses certified by statutory bodies. | Additional 4 credits per Course will be given on submission of Certificate | During Semester I to Semester VI | | | | | | | | |

| The Courses focuses the following needs: | | | | |
|---|---|---|---|---|
| **Needs** | **G- Global** | **N –Regional** | **R-Regional** | **L-Local** |
| SD | Skill Development | | | |
| EM | Employability | | | |
| EN | Entrepreneurship | | | |

**Semester-wise Distribution of Marks and Credits:**

| Semester | Total Marks | Total Credits |
|---|---|---|
| I | 700 | 22 |
| II | 750 | 24 |

## OFFERED BY (I & II Semesters)

**List of Courses Offered by B. Com CA Department**

| Semester | Course Code | Course Name | Programme | T/P/E | Ins. hrs | CIA | ES | Total Marks | Credit |
|----------|-------------|-------------|-----------|-------|----------|-----|-----|-------------|--------|
| III | 23GEP22 | Fundamentals of Accounting | M.Sc. SS | T | 4 | 25 | 75 | 100 | 4 |