# SRI KRISHNA ARTS AND SCIENCE COLLEGE

An Autonomous College Affiliated to Bharathiar University

Coimbatore - 641008, Tamil Nadu, India.

# LEARNING OUTCOMES BASED CURRICULUM FRAMEWORK (LOCF)

## B.Sc. Computer Science with Cognitive Systems

## For 2023-24 admitted students

## DEPARTMENT OF ICT & COGNITIVE SYSTEMS

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

**DEPARTMENT OF ICT &**
**COGNITIVE SYSTEMS**

**(2023-2024)**

| I. PROGRAMME EDUCATIONAL OBJECTIVES (PEOs) | |
|---|---|
| **PEO 1** | Prepare knowledgeable and industry relevant quality graduates who possess software & application skills and critical thinking skills in serving the domestic and global community in the relevant area. |
| **PEO 2** | Acquire the technical information from various sources in solving the computer related problems through software development skills and demonstrateprofessionalism and ethical values in the relevant field. |
| **PEO 3** | Perform as a team player and becoming a market leader in the field of consultancy and skill development with effective communicative skills which will help theorganization to grow. |
| **PEO 4** | Become technologically competent with sense of programming and entrepreneurial skills in the area of artificial intelligence with a passion of lifelong learning to create their own brand image. |

| II. PROGRAMME LEARNING OUTCOMES (PLOs) | |
|---|---|
| **No.** | **The Graduates of B.Sc Computer Science with Cognitive Systems Programme will be able to:** |
| **PLO1** | Describe the knowledge of computer science to meet the requirements of current industry standards. (Cognitive) |
| **PLO2** | Analyze challenging problems and solve using critical thinking skills (Cognitive) |
| **PLO3** | Adapt to implement and evaluate a computational system to meet the pining needs within realistic constraints. (Psychomotor Skills) |
| **PLO4** | Function effectively in teams to solve problems and produce positive outcomes. (Affective) |
| **PLO5** | Communicate effectively in a variety of professional contexts to promote ideas, goals or products. (Affective) |
| **PLO6** | Incorporate digital tools and techniques in designing software products, prototypes and solutions. (Affective) |
| **PLO7** | Apply appropriate mathematical principles for solving relevant industrial computational problems. (Cognitive) |
| **PLO8** | Initiate and function effectively as an individual to lead teams in diversified environments. (Affective) |

| | |
|---|---|
| **PLO9** | Promote professional development growth through contextual, reflective and lifelong learning. (Affective) |
| **PLO10** | Enhance entrepreneurial skill for making the students to undertake independent ventures. (Affective) |
| **PLO11** | Follow ethical principles and commits to professional ethics and responsibilities for a relevant technical practice (Affective) |

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

| PLO | Graduate Attributes | | | | | | | | | | | Blooms | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 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 OUTOMES 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** | The students will have an ability to be socially intelligent with intelligent quotient and emotional quotient |
| **APO 2** | They will be having virtual collaborating ability |
| **APO 3** | They will have the ability to use the social media effectively for productive use |
| **APO 4** | They will have critical thinking and innovative skills |
| **APO 5** | They will be provided with good digital footprint |

| VI. PROGRAMME SPECIFIC OUTCOMES (PSO's) | |
|---|---|
| **PSO 1** | Ability to understand the programming concepts ,methodologies and apply algorithms, mathematical and scientific reasoning to solve ranged computational problems. |
| **PSO 2** | Ability to apply emerging software development techniques and tools in providing real-time solutions |

## VII. Curriculum Structure for B.Sc Computer Science with Cognitive Systems

**Course Components, Credits & Marks Distribution**

| Part No | Group | Basic Structure: Distribution of Courses | Number of Courses | Total Marks | Total Credits |
|---|---|---|---|---|---|
| I - III | 1 | AEC – Ability Enhancement Courses | 10 | 1000 | 24 |
| III & IV | 2 | DSC – Discipline Specific Courses | 15 | 1500 | 60 |
| | 3 | DSE – Discipline Specific Electives | 10 | 1000 | 40 |
| | 4 | GEC – Generic Elective Courses | 4 | 400 | 12 |
| | 5 | SEC – Skill Enhancement Courses | 2 | 100 | 4 |
| IV | 6 | ANCC I & II – Audit Non-Credit Courses | 3 | - | - |
| V | | ANCC III – Audit Non-Credit Courses | 1 | Completed | |
| - | 7 | DTC – Drive Through Courses (SWAYAM-NPTEL, Coursera, Any courses certified by statutory bodies, etc) | Any number | - | Addl. Credits |
| **Total** | | | | **4000** | **140** |

**Group 1. Ability Enhancement Courses (AECs) (I & II Semesters)**

AEC are the courses based upon the content that leads to knowledge enhancement. Ability Enhancement Courses (AEC) are the following:

| S. No. | Course Code | Course Title | Semester | Ownership Department | Contact Hours | Credits | Marks |
|---|---|---|---|---|---|---|---|
| 1 | 23AEC02/ 23AEC07/ 23AEC11 | **AEC Part I: Language – I:** Tamil - I - Tamil Aazhi / Hindi-I/ French-I | I | Language Dept. | 6 | 3 | 100 |
| 2 | 23AEC26 | **AEC Part II: English-I:** English for Professional Communication | I | English Dept. | 4 | 3 | 100 |
| 3 | 23AEC33 | **AEC Part III:** Academic Skills for Computer Skills | I | CS Dept. | 2 | 2 | 100 |
| 4 | 23AEC02/ 23AEC08/ 23AEC12/ | **AEC Part I: Language – II:** Tamil-II - Sudar Tamil / Hindi-II/ French-II | II | Language Dept. | 6 | 3 | 100 |
| 5 | 23AEC28 | **AEC Part II: English – II:** Campus to Corporate | II | English Dept | 4 | 3 | 100 |

**Group 2. 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 six semesters. The courses designed under this category aim to cover the basics that a student is expected to imbibe in the particular discipline. It includes Major project

| S. No. | Course Code | Course Title | Semester | Contact Hours | Credits | Marks |
|---|---|---|---|---|---|---|
| 1 | 23CGU01A | **DSC 1A:** Operating System | I | 3 | 3 | 50 |
| | 23CGU01B | **DSC 1B:** Practical - Operating System | | 3 | 2 | 50 |
| 2 | 23CGU02 | **DSC 2:** Data Structures and Algorithms | I | 5 | 4 | 100 |
| 3 | 23CGU03 | **DSC 3:** Practical - Introduction to Work Sheets | II | - | 2 | 100 |
| 4 | 23CGU04 | **DSC 4:** Computer Networks | II | 5 | 3 | 100 |
| 5 | 23CGU05 | **DSC 5:** Practical - Computer Networks | II | 3 | 2 | 100 |
| 6 | 23CGU06A | **DSC 6A:** Web Technologies | II | 3 | 2 | 50 |
| 7 | 23CGU06B | **DSC 6B:** Practical: WebTechnologies | II | 2 | 2 | 50 |

**Group 4. 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. The student has to subscribe any 4 courses in the following list:

| Sl. No. | Course Code | Course Title | Semester | Ownership Department | Contact Hours | Credits | Marks | SD/ EM/ EN | G/L/R/N |
|---|---|---|---|---|---|---|---|---|---|
| 1 | 23GEU07 | **GEC 1:** Probability and Statistics | I | Maths Dept | 5 | 3 | 100 | EM | G |
| 2 | 23GEU08 | **GEC 2:** Discrete Mathematics | II | Maths Dept | 5 | 3 | 100 | EM | G |

**Group 5 : Skill Enhancement Courses(SEC)**

SEC I : Compulsory Course : Talent Enhancement Course : Career Guidance

SEC II : A Bucket of Skill based Courses are offered for the Under Graduate programmes aimed at imparting advanced skill. A Student has to subscribe one course from list offered by the department.

Courses Offered by Nan Mudhalvan Scheme/Certification in Core Area/Department offered Certification Course.

**Group 6. 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 1** | | |
| 1. | 23ANC01 | Environmental Studies |
| **Semester II - ANCC 2 - 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 |

**Group 7.**

**i) 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.**

**ii) Drive-Through Course (DTC – III) – To be Completed**
**Internship Training/Mini Project/ Spoken Tutorial/Economic Talent test etc.**

Students individually or with the maximum of four members per batch should take up either Internship training or mini project for a period of fifteen days during IV Semester vacation. The report will be evaluated and viva-voce examination will be conducted during 5th semester. Otherwise, the students have to complete one spoken tutorial course or any certification course suggested by the department.

## 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** |
| 23AEC02/ 23AEC07/ 23AEC11/ | **AEC Part I: Language – I:** Tamil-I - Tamil Aazhi Hindi I French I | T | 3 | 6 | 25 | 75 | 100 | 3 | SD | L/ N/ G/ R |
| 23AEC22 | **AEC PART II: English I:** English for Professional Communication | T | 3 | 4 | 25 | 75 | 100 | 3 | SD | G |
| 23AEC33 | **AEC Part III:** AcademicSkills for ComputerStudies | T | - | 2 | 100 | - | 100 | 2 | SD | G |
| 23CGU01A | **DSC 1A:** OperatingSystems | E | 2 | 3 | 10 | 40 | 50 | 3 | SD/ EN | G |
| 23CGU01B | **DSC 1B:** Practical: Operating Systems | | 2 | 3 | 20 | 30 | 50 | 2 | SD/ EN | G |
| 23CGU02 | **DSC 2:** Data Structures and Algorithm | T | 3 | 5 | 25 | 75 | 100 | 4 | SD | G |
| **23GEU07 / 23GEU09 / 23GEU11** | **GEC 1: Probability and Statistics / Statistics for Machine Learning / Mathematical Foundation for Computer Science** | T | 3 | 5 | 25 | 75 | 100 | 3 | EM | G |
| **DTC - I - Additional Credit Courses (NPTEL/Coursera)** | | | | | | | | | | |
| 23ANC01 | **ANCC-1** Environmental Studies | T | - | 2 | - | - | Completed | | SD | G |
| **Total** | | | | **30** | | | **600** | **20** | | |
| | | | | | | | | | | |
| **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** |
| 23AEC04/ 23AEC08/ 23AEC12/ | **AEC Part I:** Tamil-II –Sudar Tamil Hindi-II/ French-II/ | T | 3 | 6 | 25 | 75 | 100 | 3 | SD | G |
| 23AEC24 | **AEC Part II:**English – II:Campus to Corporate | T | 3 | 4 | 25 | 75 | 100 | 3 | SD | G |
| 23CGU03 | **DSC 3:** Practical: Introduction toWork Sheets | P | 3 | - | 25 | 75 | 100 | 2 | SD/ EN | G |
| 23CGU04 | **DSC 4:** ComputerNetworks | T | 3 | 5 | 25 | 75 | 100 | 3 | EM | G |
| 23CGU05 | **DSC 5:** Practical: Computer Networks | P | 2 | 3 | 25 | 75 | 100 | 2 | SD/ EM | G |
| 23CGU06 A | **DSC 6A:** WebTechnologies | E | 2 | 3 | 10 | 40 | 50 | 2 | EN | G |
| 23CGU06 B | **DSC 6B:** Practical: Web Technologies | | 2 | 2 | 20 | 30 | 50 | 2 | EN | G |
| 23GEU08 / 23GEU10 / 23GEU12 | **GEC 2:** Discrete Mathematics/ Linear Algebra for Machine Learning / Numerical Methods and Statistics | T | 3 | 5 | 25 | 75 | 100 | 3 | EM | G |
| **DTC II : Additional Credit Courses (NPTEL/Coursera)** | | | | | | | | | | |
| | **ANCC-2 Value & Ethics:** | T | - | 2 | - | - | Completed | | EN | R |
| **Total** | | | | **30** | | | **700** | **20** | | |
| **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 | 600 | 20 |
| II | 700 | 20 |

**OFFERED BY (I & II Semesters)**

**List of Courses Offered by Mathematics Department**

| Semester | Course Code | Course Name | Programme | T/P/E | Ins. hrs | CIA | ES | Total Marks | Credit |
|---|---|---|---|---|---|---|---|---|---|
| I | 23GEU07 | Probability and Statistics | T | 5 | 3 | 25 | 75 | 100 | 3 |
| II | 23GEU08 | Discrete Mathematics | T | 5 | 3 | 25 | 75 | 100 | 3 |