

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. Electronics and Communication Systems
(I to IV Semester)**

for 2022-23 Admitted Students

**DEPARTMENT OF ELECTRONICS AND
COMMUNICATION SYSTEMS**



SRI KRISHNA ARTS AND SCIENCE COLLEGE
COIMBATORE – 641008

DEPARTMENT OF ELECTRONICS AND COMMUNICATION SYSTEMS

2022-2023

I. Programme Educational Objectives (PEOs)

Post Graduates from the M.Sc. Electronics and Communication Systems Programme are expected to achieve the following PEOs

PEO 1	Graduates will be scientific designers in the field of Electronics and Communication Systems by applying modern tools and design strategies.
PEO 2	Graduates with an ability to solve complex scientific or engineering problems related to the needs of society and industry by adopting advanced technologies.
PEO 3	Graduates will be team leaders or entrepreneurs capable of working effectively with diverse teams and governing professional ethics practices.
PEO 4	Graduates will communicate effectively and gain knowledge through continuous learning to set up their career paths in service/manufacturing companies or teaching or research.

II. Programme Learning Outcomes (PLOs)

The Graduates of B.Sc. Electronics and Communication Systems programme will be able to:

PLO 1	Knowledge: Apply the knowledge of Electronic Science, Mathematics, Computer Fundamentals and Communication specialization to the solution of complex scientific problems. (Cognitive)
PLO 2	Critical Thinking Skills: Use critical thinking to carry out research /investigation and development work to solve complex engineering problems. (Cognitive)
PLO 3	Practical Skills: Develop a passion for hardware and software design and be part of the electronic design industry/software company to become leaders in indigenous product development. (Psychomotor)
PLO 4	Teamwork Skills: Function effectively on teams to accomplish a common goal and build a team for group work in various settings. (Affective)
PLO 5	Communication Skills: Exhibit good communication skills in writing reports, documenting complex scientific activities and give presentations to scientific communities. (Affective)

PLO 6	Digital Skills: Design electronic systems which are in tune with current digital technology and adaptable for future changes. <i>(Affective)</i>
PLO 7	Numeracy Skills: Capture the credibility of mathematics in digital world through development of mathematical model of the systems. <i>(Cognitive)</i>
PLO 8	Leadership Skills: Function effectively as a leader and as well as team member in diverse/ multidisciplinary environments. <i>(Affective)</i>
PLO 9	Lifelong Learning Skills: Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change. <i>(Affective)</i>
PLO 10	Entrepreneurial Skills: Emerge as socially responsible entrepreneur. <i>(Affective)</i>
PLO 11	Ethics & Professional Skills: Apply professional and ethical principles and function with responsibility. <i>(Affective)</i>

III. Programme Learning Outcomes Vs Graduate Attributes Vs Taxonomy 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. Mapping of PEOs and PLOs

	PLO1	PLO2	PLO3	PLO4	PLO5	PLO6	PLO7	PLO8	PLO9	PLO10	PLO11
PEO1	√		√			√					
PEO2		√	√		√		√				
PEO3				√				√		√	√
PEO4	√				√				√		

V. Additional Programme Outcomes (APOs)

The Additional Programme Outcomes for M.Sc. Electronics and Communication Systems are:

APO 1	Graduates will have ability with social intelligence with good Intelligent Quotient (IQ) and Emotional Quotient (EQ).
APO 2	Graduates will have a sense of creating and observing unique insights in what is seen and observed.
APO 3	Graduates will have design thinking capabilities.
APO 4	Graduates will have computational thinking capabilities (ability to translate vast data in the abstract concept) and understand database reasoning.
APO 5	Graduates will have virtual collaborative ability.
APO 6	Graduates will have ability to use social and open source media effectively for productive use.
APO 7	Graduates will have critical thinking and innovative skills.
APO 8	Graduates will have good digital foot prints.

VI. Programme Specific Outcomes (PSOs)

On the completion of M.Sc. Electronics and Communication Systems, the graduates will be able to

PSO 1	Graduates will be able to design and develop applications for Information Technology, Communication Systems, Signal Processing, Embedded Systems, Control Systems, VLSI, Nano Electronics, Networking, IoT, Industrial Automation, Automotive Electronics and Robotics.
PSO 2	Graduates will be able to understand the ethical and environmental constraints in scientific and engineering practises and deal with social and safety issues.
PSO 3	Graduates will be able to find research gaps in different fields in their domain and come up with solutions for new ideas and innovations.

VII. Mapping of PEOs with PSOs

	PSO 1	PSO 2	PSO 3
PEO 1	√		√
PEO 2	√	√	√
PEO 3		√	
PEO 4	√		√

VIII. Curriculum Structure for M.Sc. Electronics and Communication Systems**Course Components, Credits & Marks Distribution**

Course Type	Number of Courses	Credits per Course	Total Credits	Marks	Semester
Discipline Specific Courses (DSCs)	17	4-5	70	1750	I to IV
Discipline Specific Elective Courses (DSEs)	3	4	12	300	II & III
Generic Electives Courses (GECs)	3	2-3	8	200	II & III
Drive Through Courses (DTCs) - (SWAYAM-NPTEL, Coursera, Any courses certified by statutory bodies, etc.)	Additional 4 credits per course will be given on submission of certificate				I to IV
Total			90	2250	

1. Discipline Specific Courses (DSC) (17 Courses)

These courses are to be studied compulsorily by the students as a core requirement. The students are required to take DSCs across four 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	22ECP01	Telecommunication and Fiber Optics	I	4	4	100
2	22ECP02	Instrumentation and Control Systems	I	4	4	100
3	22ECP03	Nano Electronics	I	4	4	100
4	22ECP04	ASIC Design	I	5	4	100
5	22ECP05	Programmable Logic Controller and SCADA	I	5	4	100
6	22ECP06	Instrumentation and PLC Lab	I	4	3	100
7	22ECP07	VHDL and Verilog Programming Lab	I	4	3	100
8	22ECP08	Wireless Communications and Networks	II	4	4	100
9	22ECP09	Digital Image and Video Processing	II	5	4	100
10	22ECP10	Embedded Systems	II	5	4	100
11	22ECP11	Communication Systems Lab	II	4	3	100
12	22ECP12	Embedded Systems Lab	II	4	3	100
13	22ECP13	Digital Signal Processing	III	5	4	100
14	22ECP14	Internet of Things with python	III	5	4	100
15	22ECP15	Digital Signal and Image Processing Lab	III	4	3	100
16	22ECP16	IoT Lab	III	4	3	100
17	22ECP17	Project Work	IV	-	12	150
Total					70	1750

Project Work

During the fourth semester, each of the students has to undertake a Project Work individually. A guide will be allotted to each student by the department. Student can select any relevant topic in discussion with the guide. The project report shall be subject to internal evaluation followed by a viva-voce. The project should be demonstrated at the time of examination.

Internal Evaluation:

Reviews (3) – 45 Marks
 Work Dairy – 10 Marks
 Report – 20 Marks
 Total – 75 Marks

End Semester Viva-Voce will be conducted for 75Marks.

(Dissertation - 50 Marks & Viva-voce - 25 Marks)

2. Discipline Specific Electives (DSE) (3 Courses)

Discipline Specific Elective Courses offered under the main discipline of study which may be specialized or advanced or supportive to the discipline of study. Students can choose any THREE courses from the following list.

Students can opt one course from each group.

S. No.	Course Code	Course Title	Semester	Contact Hours	Credits	Marks
1	22ECP18	Robotics and Automation	II	4	4	100
	22ECP19	Virtual Instrumentation				
2	22ECP20	Advanced Vehicle Systems	III	4	4	100
	22ECP21	Cloud Computing				
3	22ECP22	Artificial Intelligence	III	4	4	100
	22ECP23	Cryptography and Network Security				
Total					12	300

3. Generic Elective Courses (GEC) (3 Courses)

Generic Elective Courses are interdisciplinary in nature. They are additional courses based on expertise, specialization, requirements, scope, and need of the department. The students will have the choice of taking THREE GECs.

List of Courses Offered by IT Department

Group	Course Code	Course Title	Semester	Contact Hours	Credits	Marks
I	22GEP11	Android Programming	II	4	3	50
	22GEP12	LINUX and Shell Programming	III	4	3	50
	22GEP13	LINUX and Android Programming Lab	IV	3	2	100
II	22GEP14	Introduction to Data Analytics	II	4	3	50
	22GEP15	R Programming	III	4	3	50
	22GEP16	R Programming Lab	IV	3	2	100
Total					8	200

4. Drive Through Course (DTC)**i. DTC I & II: Online Certification – 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
2. Coursera
3. Any courses certified by statutory bodies.

ii. DTC III: Article Publication

Students individually or with the maximum of four members per batch are asked to publish article in Scopus/ Web of Science/UGC Care Journals or publish book chapter. Additional 4 credits per course will be given on submission of proof of the published paper or book chapter.

IX. Semester-wise Scheme

Semester I										
Course Code	Course Title	T/ P	Ins. Hrs/ week	Examination				Credits	SD/ EM/ EN	L/ R/ N/ G
				Dur. Hrs	CIA	ES	Total Marks			
22ECP01	DSC1 Telecommunication and Fiber Optics	T	4	3	50	50	100	4	EM	G
22ECP02	DSC2 Instrumentation and Control Systems	T	4	3	50	50	100	4	SD	G
22ECP03	DSC3 Nano Electronics	T	4	3	50	50	100	4	SD	G
22ECP04	DSC4 ASIC Design	T	5	3	50	50	100	4	EM	G
22ECP05	DSC5 Programmable Logic Controller and SCADA	T	5	3	50	50	100	4	EM	G
22ECP06	DSC6 Instrumentation and PLC Lab	P	4	4	50	50	100	3	EM	G
22ECP07	DSC7 VHDL and Verilog Programming Lab	P	4	4	50	50	100	3	EM	G
Drive Through Course I: Additional Credit Courses (NPTEL/Coursera)							Completed			
Total			30				700	26		
Semester II										
Course Code	Course Title	T/ P	Ins. Hrs/ week	Examination				Credits	SD/ EM/ EN	L/ R/ N/ G
				Dur. Hrs	CIA	ES	Total Marks			
22ECP08	DSC8 Wireless Communications and Networks	T	4	3	50	50	100	4	EM	G
22ECP09	DSC9 Digital Image and Video Processing	T	5	3	50	50	100	4	EN	G
22ECP10	DSC10 Embedded Systems	T	5	3	50	50	100	4	EN	G
22ECP11	DSC11 Communication Systems Lab	P	4	4	50	50	100	3	EM	G
22ECP12	DSC12 Embedded Systems Lab	P	4	4	50	50	100	3	EN	G
22ECP18/ 22ECP19	DSE1 Robotics and Automation/ Virtual Instrumentation	T	4	3	50	50	100	4	EM	G
22GEP11/ 22GEP14	GEC1 Android Programming/ Introduction to Data Analytics	T	4	3	25	25	50	3	EM	G
Drive Through Course II: Additional Credit Courses (NPTEL/Coursera)							Completed			
Total			30				650	25		

Semester III										
Course Code	Course Title	T/ P	Ins. Hrs/ week	Examination				Credits	SD/ EM/ EN	L/ R/ N/ G
				Dur. Hrs	CIA	ES	Total Marks			
22ECP13	DSC13 Digital Signal Processing	T	5	3	50	50	100	4	SD	G
22ECP14	DSC14 Internet of Things with Python	T	5	3	50	50	100	4	EN	G
22ECP15	DSC15 Digital Signal and Image Processing Lab	P	4	4	50	50	100	3	SD	G
22ECP16	DSC16 IoT Lab	P	4	4	50	50	100	3	EN	G
22ECP20/ 22ECP21	DSE2 Advanced Vehicle Systems / Cloud Computing	T	4	3	50	50	100	4	EM	G
22ECP22/ 22ECP23	DSE3 Artificial Intelligence / Cryptography and Network Security	T	4	3	50	50	100	4	EM	G
22GEP12/ 22GEP15	GEC-2 LINUX and Shell Programming / R Programming	T	4	3	25	25	50	3	EM	G
Total			30				650	25		
Semester IV										
Course Code	Course Title	T/ P	Ins. Hrs/ week	Examination				Credits	SD/ EM/ EN	L/ R/ N/ G
				Dur. Hrs	CIA	ES	Total Marks			
22ECP17	DSC17 Project Work	-	-	-	75	75	150	12	EM	G
22GEP13/ 22GEP16	GEC3 LINUX and Android Programming Lab / R Programming Lab	P	3	3	50	50	100	2	SD	G
Drive Through Course III: Article Publications / Book Publications							Completed			
Total			3				250	14		
Total							2250	90		
Drive-Through Courses (DTCs): 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 focus on the following needs	
SD	Skill Development
EM	Employability
EN	Entrepreneurship
L	Local
R	Regional
N	National
G	Global

Semester-wise Distribution

Semester	Total Marks	Total Credits
I	700	26
II	650	25
III	650	25
IV	250	14
Total	2250	90

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Offered By**List of Courses Offered by IT Department for M.Sc. ECS**

SEM	Course Code	Course Title	T/P	Ins. Hrs/ week	Examination				Credits	SD/ EM/ EN	L/ R/ N/ G
					Dur. Hrs	CIA	ES	Total Marks			
II	22GEP12	Android Programming	T	4	3	25	25	50	3	EM	G
III	22GEP14	LINUX and Shell Programming	T	4	3	25	25	50	3	SD	G
IV	22GEP16	LINUX and Android Programming Lab	P	3	3	50	50	100	2	EM	G
OR											
II	22GEP13	Introduction to Data Analytics	T	4	3	25	25	50	3	SD	G
III	22GEP15	R Programming	T	4	3	25	25	50	3	SD	G
IV	22GEP17	R Programming Lab	P	3	3	50	50	100	2	SD	G

Offered to**List of Courses Offered to M.Sc. (SS)**

SEM	Course Code	Course Title	T/P	Ins. Hrs/ week	Examination				Credits	SD/ EM/ EN	L/ R/ N/ G
					Dur. Hrs	CIA	ES	Total Marks			
I	22GEP19	Digital Electronics	T	4	3	50	50	100	3	SD	G
I	22GEP20	Digital Electronics Lab	P	3	3	50	50	100	2	SD	G
II	22GEP21	Embedded Systems	T	4	3	50	50	100	3	EM	G
II	22GEP22	Embedded Systems Lab	P	3	3	50	50	100	2	EM	G
III	22GEP23	Internet of Things	T	4	3	50	50	100	3	EN	G
III	22GEP24	Internet of Things Lab	P	3	3	50	50	100	2	EN	G
OR											
I	22GEP32	VLSI Design and Verilog	T	4	3	50	50	100	3	SD	G

I	22GEP33	Verilog Programming Lab	P	3	3	50	50	100	2	SD	G
II	22GEP34	Programmable Logic Controller	T	4	3	50	50	100	3	EM	G
II	22GEP35	Programmable Logic Controller Lab	P	3	3	50	50	100	2	EM	G
III	22GEP36	Robotics Programming	T	4	3	50	50	100	3	EN	G
III	22GEP37	Robotics Programming Lab	P	3	3	50	50	100	2	EN	G

List of Courses Offered to M.Sc (IT), M.Sc (CT) and M.Sc (CS)

SEM	Course Code	Course Title	T/P	Ins. Hrs/ week	Examination				Credits	SD/ EM/ EN	L/ R/ N/ G
					DurHrs	CIA	ES	Total Marks			
II	22GEP25	Robotics Programming	T	4	3	25	25	50	3	EM	G
II	22GEP26	Robotics Programming Lab	P	3	3	25	25	50	2	EM	G