PSGR Krishnammal College for Women

BACHELOR OF SCIENCE IN CYBER SECURITY

PROGRAMME CODE: CY

CHOICE BASED CREDIT SYSTEM (CBCS) &

LEARNING OUTCOMES-BASED CURRICULUM FRAMEWORK (LOCF)

SCHEME OF EXAMINATION & SYLLABUS

(w.e.f 2026 - 27 onwards)

REGULATIONS 2026

UNDERGRADUATE PROGRAMMES

(a) Qualification Descriptors

Aligned with NHEQF Level 6 (Bachelor's Degree Level).

A Bachelor's Degree signifies that a learner has completed a structured programme of study that develops disciplinary knowledge, professional competence, transferable skills and ethical values.

Graduates are expected to demonstrate:

- A systematic understanding of the discipline and its linkages with related fields
- Procedural and professional knowledge relevant to employment, higher education and public service
- Ability to identify problems, collect and analyze data, and develop evidence-based solutions
- Effective communication of academic and professional work
- Capacity for self-directed learning and adaptation to new contexts
- Ability to apply disciplinary knowledge and transferable skills in real-world contexts
- Development of employability skills relevant to professional careers

(b) Graduate Attributes (GAs)

GA Code	Graduate Attributes
GA1	Disciplinary Knowledge
GA2	Communication Skills
GA3	Critical Thinking
GA4	Problem Solving
GA5	Analytical Reasoning
GA6	Research-related Skills
GA7	Cooperation/Teamwork
GA8	Scientific Reasoning
GA9	Reflective Thinking
GA10	Information/Digital Literacy
GA11	Self-Directed Learning
GA12	Multicultural Competence
GA13	Moral and Ethical Awareness/Reasoning
GA14	Leadership Readiness
GA15	Lifelong Learning

(c) GAs – Written Measured

These GAs are directly measurable through written examinations, assignments, or structured theory evaluation.

GA	Attribute	Measure	Assessment Method
GA1	Disciplinary Knowledge	Strongly	Theory examinations, concept-based questions, structured problem solving
GA3	Critical Thinking	Strongly	Case analysis, reasoning questions
GA4	Problem Solving	Strongly	Application-oriented problems, scenario-based questions
GA5	Analytical Reasoning	Strongly	Data interpretation, logical analysis, numerical exercises
GA6	Research-related Skills	Partially	Research oriented questions, data interpretation, literature review writing
GA8	Scientific Reasoning	Partially	Evidence-based explanations, logical justification questions
GA9	Reflective Thinking	Limited	Short reflective writing responses
GA10	Information/Digital Literacy	Limited	Application of digital tools and information ethics

(d) GAs – Performance based

These require observation of behaviour, participation, skill demonstration, or real-time engagement.

GA	Attribute	Measure	Assessment Method
GA2	Communication Skills	Strongly	Presentations, seminars, viva voce, group discussions
GA7	Cooperation/Teamwork	Strongly	Group projects, peer evaluation, collaborative assignments
GA11	Self-Directed Learning	Limited	Independent assignment / Project work / Online learning task
GA12	Multicultural Competence	Partially	Group activities with diverse teams / Fieldwork / Community engagement, Participation in cultural activities,
GA13	Moral and Ethical Awareness/Reasoning	Partially	Behavioural observation methods, Reflective reports
GA14	Leadership Readiness	Limited	Team leadership in project, Event coordination
GA15	Lifelong Learning	Limited	Participation in value added courses, certification

Department of Computer Science with Cyber Security

Vision

To empower women through quality education in Computer Science with Cyber Security, cultivating technical expertise, ethical values, innovation, and confidence to build a secure digital society and contribute meaningfully to global technological advancement.

Mission

- To provide inclusive theoretical knowledge and practical skills while developing competent professionals with expertise in programming, cyber security practices, ethical hacking, and emerging technologies.
- To adopt innovative teaching–learning methods, industry exposure, and hands-on training to promote critical thinking, problem-solving, and lifelong learning.
- To instill ethical values, digital responsibility, and social commitment so that students contribute to building a safe and equitable digital society.
- To encourage research, innovation, and collaborative learning that empower women to excel in the evolving cyber and technology landscape.
- To provide practical exposure to real-world cyber threats, security challenges, and incident response techniques to prepare students for effectively detecting, analyzing, and mitigating cyber-attacks.

Bachelor of Computer Science with Cyber Security

Programme Objectives, Outcomes and Mapping

Programme Educational Objectives (PEOs)

(Expected career and professional achievements of graduates within three to five years of completing the programme)

PEO1: Graduates will establish successful careers or pursue higher education in Computer Science and Cyber Security, demonstrating professional competence, ethical responsibility, and adaptability in a rapidly evolving technological environment.

PEO2: Graduates will contribute to the development of secure and reliable digital systems by applying computing knowledge with integrity, social responsibility, and respect for diversity, inclusion, and human dignity.

PEO3: Graduates will engage in lifelong learning, research, and professional development to keep pace with emerging technologies, cyber security challenges, and global technological advancements.

PEO4: Graduates will demonstrate leadership, teamwork, and effective communication skills to collaborate in multidisciplinary environments and contribute meaningfully to societal development.

PEO5: Graduates will promote innovation, entrepreneurship, and sustainable technological practices that support environmental responsibility, community welfare, and equitable access to digital resources.

Programme Learning Outcomes (PLOs)

(Specific abilities, knowledge, and skills that graduates are expected to demonstrate upon Graduation)

PLO1: Apply foundational concepts of computer science, programming, networking, and cyber security principles to perform computing tasks and system operations.

PLO2: Analyze computing problems and cyber security threats using algorithmic thinking, data analysis, and logical reasoning techniques.

PLO3: Design and develop secure software applications, databases, and network solutions using appropriate programming tools and cyber security frameworks.

PLO4: Evaluate vulnerabilities, risks, and cyber incidents in computing environments using scientific methods, security tools, and analytical reasoning.

PLO5: Conduct basic research and investigative activities in emerging computing and cyber security domains by collecting, interpreting, and presenting technical data.

PLO6: Communicate technical information, cyber security risks, and computing solutions effectively through written reports, presentations, and digital media.

PLO7: Collaborate effectively in multidisciplinary teams to plan, implement, and evaluate computing or cyber security projects.

PLO8: Demonstrate ethical decision-making and professional responsibility while addressing cyber security challenges and managing digital information.

PLO9: Adapt to diverse professional and cultural environments while promoting inclusive and responsible use of digital technologies.

PLO10: Demonstrate self-directed learning and continuous skill development to remain current with emerging technologies and cyber security practices.

PLOs with Bloom's Levels, Assessment Methods, and Graduate Attribute Mapping

PLO No	Programme Learning Outcome	Bloom's Level	Assessment Methods	Mapped GAs
PLO1	Apply foundational concepts of computer science, programming, networking, and cyber security principles to perform computing tasks and system operations.	K3	CIA, ESE, Practical, Viva	GA1, GA10
PLO2	Analyze computing problems and cyber security threats using algorithmic thinking, data analysis, and logical reasoning techniques.	K4	CIA, Case Study, Practical, ESE	GA3, GA5
PLO3	Design and develop secure software applications, databases, and network solutions using appropriate programming tools and cyber security frameworks.	K6	Project, Practical, Viva	GA4, GA10
PLO4	Evaluate vulnerabilities, risks, and cyber incidents in computing environments using scientific methods, security tools, and analytical reasoning.	K5	Practical, Case Study, ESE, Internship	GA5, GA8
PLO5	Conduct basic research and investigative activities in emerging computing and cyber security domains by collecting, interpreting, and presenting technical data.	K4	Project, Seminar, Viva	GA6, GA9
PLO6	Communicate technical information, cyber security risks, and computing solutions effectively through written reports, presentations, and digital media.	K3	Seminar, Viva, Project	GA2
PLO7	Collaborate effectively in multidisciplinary teams to plan, implement, and evaluate computing or cyber security projects.	K3	Project, Internship, Field Work	GA7, GA14

PLO8	Demonstrate ethical decision-making and professional responsibility while addressing cyber security challenges and managing digital information.	K5	Case Study, Seminar, Viva	GA13
PLO9	Adapt to diverse professional and cultural environments while promoting inclusive and responsible use of digital technologies.	K3	Field Work, Internship, Seminar	GA12
PLO10	Demonstrate self-directed learning and continuous skill development to remain current with emerging technologies and cyber security practices.	K5	Seminar, Project, Internship	GA11, GA15

Programme Specific Outcomes (PSOs)

(Expected knowledge, skills, and competencies that graduates will acquire by the end of the programme)

PSO1: Develop secure and efficient software solutions using structured programming, Python, and algorithmic techniques for problem solving.

PSO2: Design and manage secure data systems by applying database concepts and operating system security mechanisms.

PSO3: Design and develop intelligent, secure computing solutions by integrating machine learning techniques, secure software engineering practices, and emerging security technologies.

PSO4: Perform vulnerability assessment and penetration testing using ethical hacking tools and techniques to identify and mitigate system weaknesses.

PSO5: Analyze and investigate cyber threats through malware analysis and digital forensic techniques to support incident response.

PSO Alignment with Core Courses and Skill Competencies

PSO No	Programme Specific Outcome	Supporting Core Courses	Skill Competency
PSO1	Develop secure and efficient software solutions using structured programming, Python, and algorithmic techniques for problem solving.	Problem Solving Techniques in C, Python Programming, Data Structures and Algorithms	Programming and Computational thinking
PSO2	Design and manage secure data systems by applying database concepts and operating system security mechanisms.	Database Management System, Operating Systems and Security, DBMS and OS Security Lab	Data handling and system-level security integration
PSO3	Design and develop intelligent, secure computing solutions by integrating machine learning techniques, secure software engineering practices, and emerging security technologies.	Computer Networks and Security, Security Information and Event Management, Cyber Security Tools Lab, Machine Learning, Software Engineering and Testing, Cloud Security / Web Application Security	Networking monitoring defensive security progression and Advanced integration of Artificial Intelligence secure system development
PSO4	Perform vulnerability assessment and penetration testing using ethical hacking tools and techniques to identify and mitigate system weaknesses.	Vulnerability Assessment and Penetration Testing, Ethical Hacking, VAPT Lab / Ethical Hacking Lab	Hands-on offensive security specialization
PSO5	Analyze and investigate cyber threats through malware analysis and digital forensic techniques to support incident response.	Malware Analysis, Digital Forensics, Malware Analysis Lab / Digital Forensics Lab	Advanced cyber investigation and analysis

SCHEME OF EXAMINATION

Sem	Part	Course Code	Course Title	Course Type	Hours / Week	Credits	Examination			
							Duration in Hours	Maximum Marks		
								CA	ESE	TOTAL
I	I	TAM2601A	Tamil Paper I	**AEC**	4	3	3	25	75	100
		HIN2601A	Hindi Paper I							
		FRE2601A	French Paper I							
	II	ENG2601A	English Paper I	**AEC**	4	3	3	25	75	100
	III	CY26C01	Core I: Problem Solving Techniques in C	**DSC**	5	4	3	25	75	100
		CY26C02	Core II: Computer Networks and Security	**DSC**	5	4	3	25	75	100
		CY26CP1	Core Practical I: C Programming and Cyber Security Tools Lab	**DSC**	4	2	3	15$^{\$\$}$	35$^{\$\$}$	50
		TH26A03	Generic Elective I: Numerical and Statistical Techniques	**MDC**	6	5	3	25	75	100
	IV	NME26B1	Basic Tamil I	**AEC**	2	2	-	100*		100
		NME26A1	Advanced Tamil I							
		NME26ES	Introduction to Entrepreneurship	**VAC**						
I - II	VI	NM26GAW	General Awareness	**VAC**	SS	-	-	-	-	-
I - II		COM26SER	Community Services 30 Hours	**VAC**	-	-	-	-	-	-
I - V		26BONL1 26BONL2 26BONL3	Online Course I Online Course II Online Course III	**ACC**	-	-	-	-	-	-
Semester I Total					**30**	**23**				**650**
II	I	TAM2602A	Tamil Paper II	**AEC**	4	3	3	25	75	100
		HIN2602A	Hindi Paper II							
		FRE2602A	French Paper II							
	II	ENG2602A	English Paper II	**AEC**	4	3	3	25	75	100
	III	IN26C03	Core III: Python Programming	**DSC**	5	4	3	25	75	100
		CY26C04	Core IV: Data Structures and Algorithms	**DSC**	4	3	3	25	75	100
		CY26CP2	Core Practical II: Python Programming Lab	**DSC**	5	3	3	15$^{\$\$}$	35$^{\$\$}$	50

		TH26A12	Generic Elective II: Number Theory and Algebra	**MDC**	6	5	3	25	75	100
	IV	NME26B2	Basic Tamil II	**AEC**	2[€]	Gr.		100*	-	100[£]
		NME26A2	Advanced Tamil II							
		NM26UHR	Universal Human Values and Human Rights	**VAC**	2	2	-	100*	-	100
I - II	VI	NM26GAW	General Awareness	**VAC**	SS	Gr.	-	100*		100[£]
I – II		COM26SER	Community Services 30 Hours	**VAC**	-	St.	-	-	-	-
I – V		26BONL1 26BONL2 26BONL3	Online Course I Online Course II Online Course III	**ACC**	-	-	-	-	-	-
Semester II Total					**30**	**23**				**650**
III	I	TAM2603A	Tamil Paper III	**AEC**	4	3	3	25	75	100
		HIN2603A	Hindi Paper III							
		FRE2603A	French Paper III							
	II	ENG2603A	English Paper III	**AEC**	4	3	3	25	75	100
	III	CY26C05	Core V: Database Management System	**DSC**	5	4	3	25	75	100
		CY26C06	Core VI: Operating Systems and Security	**DSC**	5	4	3	25	75	100
		CY26CP3	Core Practical III: DBMS and OS Security Lab	**DSC**	5	3	3	15[$$]	35[$$]	50
		TH26A20	Generic Elective III: Optimization Techniques	**MDC**	4	3	3	25	75	100
	IV	NM26DRM	Disaster Risk Reduction and Management	**SEC**	3	3	-	100*	-	100
		NM26HAW	Health and Wellness	**VAC**	SS	1	-	100*	-	100
I - V	VI	26BONL1 26BONL2 26BONL3	Online Course I Online Course II Online Course III	**ACC**	-	-	-	-	-	-
Semester III Total					**30**	**24**				**750**
IV	I	TAM2604A	Tamil Paper IV	**AEC**	4	3	3	25	75	100
		HIN2604A	Hindi Paper IV							
		FRE2604A	French Paper IV							
	II	ENG2604A	English Paper IV	**AEC**	4	3	3	25	75	100
	III	CY26C07	Core VII: Security Information and Event Management	**DSC**	4	3	3	25	75	100

		CY26C08	Core VIII: Vulnerability Assessment and Penetration Testing	**DSC**	5	4	3	25	75	100

		CY26CP4	Core Practical IV: VAPT Lab	**DSC**	4	2	2	15$^{\$\$}$	35$^{\$\$}$	50
		CY26A01	Generic Elective IV: Governance Risk and Compliance (**OR**)	**MDC**	4	3	3	25	75	100
		CY26A02	Generic Elective IV: Cyber Threats and Modeling	**MDC**						
	IV	CY26SECE	Foundations of Cyber Security	**SEC**	3	3	-	100*	-	100
		NM26EII	Entrepreneurship and Innovation (IgniteX)	**VAC**	2	2	-	100*	-	100
		NM26EVS	Environmental Studies	**VAC**	SS	Gr.	-	100*	-	100$^{£}$
	V	26COACT	Co-Curricular Activities	**VAC**	-	1	-	100*	-	100
I - V	VI	26BONL1 26BONL2 26BONL3	Online Course I Online Course II Online Course III	**ACC**	-	-	-	-	-	-
Semester IV Total					**30**	**24**				**850**
V	III	CY26C09	Core IX: Machine Learning	**DSC**	5	4	3	25	75	100
		CY26C10	Core X: Ethical Hacking	**DSC**	5	4	3	25	75	100
		CY26C11	Core XI: Software Engineering and Testing	**DSC**	5	4	3	25	75	100
		CY26CP5	Core Practical V: Ethical Hacking Lab	**DSC**	5	3	3	15$^{\$\$}$	35$^{\$\$}$	50
		CY26E01	Elective I: Cloud Security **(OR)**	**DSE**	5	4	3	25	75	100
		CY26E02	Elective I: Web Application Security							
		CY26AC1	Advance Learner Course I: Data Security **(OR)**	**ACC**	SS	5^	3	25	75	100^
		CY26AC2	Advance Learner Course I: Artificial Intelligence							
	IV	CY26SEP1	Mobile app Development	**SEC**	3	3	-	100*	-	100
		NM26CS1	Cyber Security I	**VAC**	2	Gr.	-	100*	-	100$^{£}$
		CY26INST	Field work/ Institutional Training (21 Days)	**VAC**	-	2	-	100*	-	100
	VI	CY26COM	Comprehensive Examination	**DSC**	-	Gr.	-	100*	-	100$^{€}$
I - V	VI	26BONL1 26BONL2 26BONL3	Online Course I Online Course II Online Course III	**ACC**	-	Cr. ^ /St.	-	-	-	-

Semester V Total					**30**	**24**				**650**
VI	III	CY26C12	Core XII: Malware Analysis	**DSC**	5	4	3	25	75	100
		CY26C13	Core XII: Digital Forensics	**DSC**	5	3	3	25	75	100
		CY26CP6	Core Practical VI: Malware Analysis Lab	**DSC**	5	3	6	15$^{\$\$}$	35$^{\$\$}$	50
		CY26E03	Elective II: IoT and Security **(OR)**	**DSE**	5	4	3	25	75	100
		CY26E04	Elective II Block Chain and Technology							
	IV	CY26SEP2	Digital Forensics Lab	**SEC**	3	3	-	100*	-	100
		CY26PROJ	Project and Viva-voce	**DSE**	7	5	3	25	75	100
	III	CY26AC3	Advance Learner Course II: Big Data Analytics **(OR)**	**ACC**	SS	5^	3	25	75	100^
		CY26AC4	Advance Learner Course II: Operational Technology							
Semester VI Total					**30**	**22**				**550**
I - VI	**Total**					**140 + Additional Credits**				**4100 + Marks for Additional Credit Courses**

Hours of Instructions is inclusive of lectures, seminars, presentations, case-studies, etc

Symbols and Notations

Symbols	Notations
*	Course assessed through Internal Assessment (CIA) only
Gr.	Grade awarded based on CBCS grading system
St.	Course Status (Completed/Not Completed)
^	Advanced Learner Course, Online Courses – Additional Credit Courses
@	Course assessed through End Semester Examination (ESE) only
#	Open Book Examination
$	Evaluation Pattern converted from 25:75:100 to 20:55:75 (CIA: ESE: Total) structure
$$	Evaluation Pattern converted from 25:75:100 to 15:35:50 (CIA: ESE: Total) structure
€	Hours per Week Outside Class Hours
£	Marks not considered for total; grade will be awarded

Abbreviation	Course Type
DSC	Discipline Specific Core Courses
DSE	Discipline Specific Elective Courses
MDC	Multidisciplinary Courses
AEC	Ability Enhancement Course
SEC	Skill Enhancement Course
VAC	Value Added Courses
ACC	Additional Credits Courses
SS	Self-Study

Assessment and Evaluation Framework

Continuous Internal Assessment (CIA) – 25%

Component	Activities Included
Internal Tests	Periodic written tests
Assignments / Case Studies	● Written assignments ● Case analysis reports ● Article reviews ● Literature review tasks ● Data interpretation exercises ● Policy analysis (Arts & Humanities) ● Business case studies (Commerce & Management) ● Lab-based analytical reports (Science)
Seminars / Presentations	● PowerPoint presentations ● Poster presentations ● Panel discussions ● Group seminars ● Viva voce ● Digital presentations using multimedia tools ● Peer evaluation rubrics
ICT-based Tasks	● Spreadsheet analysis ● Accounting software / statistical software ● Online quizzes ● Simulation tools ● E-content creation ● Coding platforms (for relevant disciplines)
Projects / Field Reports	● Field surveys ● Industry visits ● Internship reports ● Mini-projects ● Laboratory experiments ● Community-based research ● Data collection & statistical analysis ● Reflective journals

End Semester Examination (ESE) – 75%

Component	Description
Written Examination	3-hour written examination covering all CLOs
Cognitive Levels	Questions aligned with multiple Bloom's Taxonomy (K-levels)
Professional Conduct	Ethical and professional conduct during examination
Academic Compliance	Timely submission and participation as per regulations

Assessment Components Aligned with Blooms Levels

EXAMINATION SYSTEM

Semester system will be followed. A semester consists of a minimum of 90 working days excluding the days of conduct of ESE. There will be Continuous Internal Assessment (CA) to evaluate the performance of students in each course and the End Semester Examination will be held at the end of every semester. Marks for ESE and CA with reference to the maximum marks for the courses will be as follows:

Max. Marks	CA	ESE
100	25	75
75	20	55
50	15	35

A. Bloom's levels are followed in question papers and aligned with CLOs and CA components.

Remember - K1

Understand - K2

Apply - K3

Analyze - K4

Evaluate - K5

Create - K6

B. Continuous Internal Assessment CA

The weightage assigned to various components of the CA is as follows

<u>Undergraduate Programmes</u>

a. Theory

AEC (Language, English), DSC (Core, Elective) & MDC (GE-Allied)

CA Components	Marks	K level
CIA Test	5 Marks (Conducted for 45 marks after 50 days – 3 units)	K1 to K6 as per QP Pattern
Model Exam	7 Marks (Conducted for 75 marks after 85 days - Each Unit 15 Marks)	
Seminar	4 Marks	K6
Assignment	4 Marks	K5
ICT (Quiz)	2 Marks	K2
Attendance	3 Marks (Attendance 75% - 80% - 1 Mark, 81% - 90% - 2 Marks, 91% - 100% - 3 Marks)	
Total	**25 Marks**	

For Science allied courses with theory as 75 marks, the split-up is 20 marks as internal and 55 as external. Internal conducted for 25 and converted to 20 marks and external conducted for 75 and converted to 55 marks.

b. Practical

CA Components	Marks	K level
Lab Performance	7 Marks	K4
Internal Viva Voce	5 Marks	K4
Model Exam	10 Marks	K5
Attendance	3 Marks	
Total	**25 Marks**	

For practical courses with 50 marks as ESE, the split-up is 15 marks as internal and 35 as external. Internal conducted for 25 and converted to 15 marks and external conducted for 75 and converted to 35 marks.

c. Skill Enhancement Courses

Theory courses

CA Components	Marks	K level
Test I	30 Marks (Conducted for 45 marks and converted to 30 Marks – 3 Units)	K2 to K6 as per QP Pattern
Test II	50 Marks (Conducted for 75 marks after 85 days - Each Unit 15 Marks)	
Assignment	10 Marks	K5
Seminar	10 Marks	K6
Total	**100 Marks**	

Practical Courses

CA Components	Marks	K level
Practical exam	80 Marks (Practical Execution: 65 Marks, Record: 15 Marks)	K5
Lab Performance	10 Marks	K4
Internal Viva Voce	10 Marks	K4
Total	**100 Marks**	

Theory and Practical

CA Components	Marks	K level
Test I (Theory)	30 Marks (Conducted for 45 Marks and converted to 30 Marks)	K2 – K6
Test II (Practical)	50 Marks (Practical Execution: 40 Marks, Record: 10 Marks)	K5
Lab Performance	10 Marks	K4
Internal Viva Voce	10 Marks	K4
Total	**100 Marks**	

Theory and Project

CA Components	Marks	K level
Test I (Theory)	30 Marks (Conducted for 45 Marks and converted to 30 Marks)	K2 – K6
Project Examination	30 Marks	K5
Internal Viva Voce	40 Marks	K4
Total	**100 Marks**	

d. Project: Individual / Group Project

Components	Marks	K level
Continuous Internal Assessment (CA)	25 Marks	K3, K4, K6
End Semester Examination	75 Marks	K5, K6
Total	**100 Marks**	

Continuous Internal Assessment (CA)

CA Components	Marks	K level
I Review - Project Proposal Presentation	5 Marks	K3
II Review - Periodic Review-Progress Evaluation	10 Marks	K4
III Review - Project Report Draft Submission	10 Marks	K6
Total	**25 Marks**	

End semester examination

Components	Marks	K level
Evaluation of the Project Report	25 Marks	K6
Viva Voce	50 Marks	K5
Total	**75 Marks**	

e. Introduction to Entrepreneurship / Women Studies / Universal Human Values and Human Rights / Environmental Studies / Cyber Security I

CA Components	Marks	K level
ICT (Quiz)	50 Marks	K2
Assignment	25 Marks	K5
Project / Case study / Poster	25 Marks	K6
Total	**100 Marks**	

f. Entrepreneurship and Innovation (IgniteX)

CA Components	Marks	K level
ICT (Quiz)	50 Marks (3 Quizzes each quiz 25 marks, 75 marks converted to 50 marks)	K2
ICT (Pitch Deck Presentation)	20Marks	K6
Assignment	30 marks (30 Venture Activities)	K5
Total	**100 Marks**	

g. Advanced Tamil & Basic Tamil

Components	Marks	K level
CIA	25 Marks (conducted for 45 marks after 50 days)	K1 to K6 as per QP Pattern
Model	50 marks (conducted for 75 marks after 85 days)	
ICT (Quiz)	15Marks	K2
Assignment	10 Marks	K5
Total	**100 Marks**	

h. General Awareness / Comprehensive Examination / Co-Curricular Activities / Community Services

Course Title	Marks	K level
General Awareness	100	K3
Comprehensive Examination	100	K3
Co-Curricular Activities	100	K6
Community Services	*St.*	K6

i. ***Field Work / Institutional Training*:**

CA Components	Marks	K level
Work diary	15 Marks	K3
Report	50 Marks	K6
Viva Voce	25 Marks	K5
Attendance	10 Marks	
Total	**100 Marks**	

j. Advance learner Course:

CA Components	Marks	K level
Test 1	10 Marks (conducted for 45 marks after 50 days – 3 units)	K1 to K6 as per QP Pattern
Model Exam	15 Marks (Conducted for 75 marks after 85 days (Each Unit 15 Marks)	
Total	**25 Marks**	

Postgraduate Programme

a. Core and Elective (Including Course with Open Book Examination)

CA Components	Marks	K Level
CIA Test	5 Marks (conducted for 45 marks after 50 days – 3 units)	K2 to K6 as per QP Pattern
Model Exam	7 Marks (Conducted for 75 marks after 85 days) (Each Unit 15 Marks)	
Seminar	4 Marks	K6
Assignment	4 Marks	K5
ICT (Quiz)	2 Marks	K2
Attendance	3 Marks (Attendance 75% - 80% - 1 Mark, 81% - 90 % - 2 Marks, 91% - 100% - 3 Marks)	
Total	**25 Marks**	

b. Coursera in combination with Core Course:

CA Components	Marks	K Level
Coursera	25 Marks (100 marks from Coursera converted to 25 marks)	K4
CIA Test	25 Marks (conducted for 45 marks from Coursera converted to 25 marks)	K2 to K6 as per QP Pattern
Model Exam	30 Marks (conducted for 75 marks from Coursera converted to 30 marks)	
Assignment	10 Marks	K5
Seminar	10 Marks	K6
Total	**100 Marks**	

c. Practical

CA Components	Marks	K Level
Lab Performance	7 Marks	K4
Internal Viva-Voce	5 Marks	K4
Model Exam	10 Marks	K5
Attendance	3 Marks	
Total	**25 Marks**	

For practical courses with 50 marks as ESE, the split-up is 15 marks as internal and 35 as external. Internal conducted for 25 and converted to 15 marks and external conducted for 75 and converted to 35 marks.

d. Cyber Security II

CA Components	Marks	K Level
ICT (Quiz)	50 Marks	K2
Assignment	25 Marks	K5
Project / Case Study / Poster	25 Marks	K6
Total	**100 Marks**	

e. Advance Learner Course

CA Components	Marks	K Level
Test 1	10 Marks (conducted for 45 marks after 50 days – 3 units)	K2 to K6 as per QP Pattern
Model Exam	15 Marks (Conducted for 75 marks after 85 days (Each Unit 15 Marks)	
Total	**25 Marks**	

f. Comprehensive Examination

Course Title	Marks	K level
Comprehensive Examination	100	K3

g. Project and Viva voce

Components	Marks	K level
Continuous Internal Assessment (CA)	25 Marks	K3, K4, K6
End Semester Examination	75 Marks	K5, K6
Total	**100 Marks**	

Continuous Internal Assessment (CA)

CA Components	Marks	K Level
I Review - Project Proposal Presentation	5 Marks	K3
II Review - Periodic Review-Progress Evaluation	10 Marks	K4
III Review - Project Report Draft Submission	10 Marks	K6
Total	**25 Marks**	

End Semester Examination

Components	Marks	K level
Evaluation of the Project Report	25 Marks	K6
Viva Voce	50 Marks	K5
Total	**75 Marks**	

h. *Summer Internship* / Field Work / Institutional Training

CA Components	Marks	K Level
Work diary	15 Marks	K3
Report	50 Marks	K6
Viva Voce	25 Marks	K5
Attendance	10 Marks	
Total	**100 Marks**	

C. Schedule for CA Tests

One test for Continuous Assessment (3 Units) will be conducted on pre-determined date i.e., commencing on the 50th day from the date of reopening. The model exam (5 units) will be conducted after completing 85th working day.

D. Question Paper Pattern and Distribution of Marks for CA – UG

UG: Language, English, Core, Elective, Allied, ALC, Basic Tamil and Advanced Tamil - (First 3 Units)

Description	Marks	Number of questions in K level					
Questions from each unit comprising of		**K1**	**K2**	**K3**	**K4**	**K5**	**K6**
One question with a weightage of 2 Marks	3 X 2 = 6	**1**	**2**				
One question with a weightage of 5 Marks (Internal Choice at the same CLO level)	3 X 5 = 15			1	1	1	
One question with a weightage of 8 Marks (Internal Choice at the same CLO level)	3 X 8 = 24			1	1		1
Total	**45 Marks**						

Skill Enhancement Courses - UG

Description	Marks	Number of questions in K level					
Questions from each unit comprising of		**K1**	**K2**	**K3**	**K4**	**K5**	**K6**
One question with a weightage of 5 Marks (Internal Choice at the same CLO level)	3 x 5 =15		1	1	1	1	1
One question with a weightage of 10 Marks (Internal Choice at the same CLO level)	3 x 10 = 30			2	1	1	1
Total	**45 Marks**						

E. Model /End Semester Examination – Question Paper Pattern and Distribution of Marks

UG: Language, English, Core, Elective, Allied, ALC, Basic Tamil & Advanced Tamil

Description	Marks	Number of questions in K level					
Questions from each unit comprising of		**K1**	**K2**	**K3**	**K4**	**K5**	**K6**
One question with a weightage of 2 Marks	5 x 2 = 10	2	3				
One question with a weightage of 5 Marks (Internal Choice at the same CLO level)	5 x 5 =25			2	2	1	
One question with a weightage of 8 Marks (Internal Choice at the same CLO level)	5 x 8 =40			2	1	1	1
Total	**75 Marks**						

ESE Practical Pattern (UG)

The End Semester Examination will be conducted for a maximum of 75 marks with a maximum 15 marks for the record and other submissions if any.

Practical Components	Marks	K level
Practical Execution	60 Marks	K5
Record	15 Marks	K2
Total	**75 Marks**	

Submission of Record note books for Practical Examinations

Submission of Bonafide record note books is mandatory to appear for the practical examination. If a candidate is unable to submit the record note book on valid grounds, she may be permitted to appear for the practical examinations, provided the head of the department certifies that the candidate has performed the experiments prescribed for the course and she will be awarded zero (0) marks for record note book.

Rubrics for Assessments

Rubrics for Assessment

Standard 4-Level Performance Scale

Level	Descriptor	Score Range (Illustrative)
Level 4	Excellent	80–100% of component marks
Level 3	Good	60–79%
Level 2	Satisfactory	40–59%
Level 1	Needs Improvement	Below 40%

1. Theory

End Semester Examination (ESE)

Section	K-Level	Criteria	Level 4 (Excellent)	Level 3 (Good)	Level 2 (Satisfactory)	Level 1 (Needs Improvement)
SEC A (Theory / Knowledge)	K1–K2	Knowledge recall & understanding	Thorough understanding across all required cognitive levels	Good understanding, minor gaps	Basic understanding, limited depth	Inadequate or incorrect understanding
SEC B (Application & Analysis)	K3–K5	Problem-solving, application of concepts, analytical reasoning	Accurately applies concepts, strong logical reasoning, handles problems independently	Mostly correct application, minor errors, reasonable reasoning	Partial application, procedural errors, limited reasoning	Unable to apply concepts, incorrect, poor reasoning
SEC C (Comprehensive / Higher-Order Tasks)	K3–K6	Analytical reasoning, creation, problem-solving, innovation	Clear logical reasoning, structured solutions, innovative or optimized solutions	Reasonable logic with minor gaps, mostly correct solutions	Limited reasoning, basic attempt at solution	Poor or no reasoning, incorrect or missing solutions

Continuous Internal Assessment (CIA)

Section	K-Level	Criteria	Level 4 (Excellent)	Level 3 (Good)	Level 2 (Satisfactory)	Level 1 (Needs Improvement)
SEC A (Theory / Knowledge)	K1–K2	Knowledge recall & understanding	Thorough understanding across all required cognitive levels	Good understanding, minor gaps	Basic understanding, limited depth	Inadequate or incorrect understanding
SEC B (Application & Analysis)	K3–K5	Problem-solving, application of concepts, analytical reasoning	Accurately applies concepts, strong logical reasoning, handles problems independently	Mostly correct application, minor errors, reasonable reasoning	Partial application, procedural errors, limited reasoning	Unable to apply concepts, incorrect, poor reasoning
SEC C (Comprehensive / Higher-Order Tasks)	K3, K4, K6	Analytical reasoning, creation, problem-solving, innovation	Clear logical reasoning, structured solutions, innovative or optimized solutions	Reasonable logic with minor gaps, mostly correct solutions	Limited reasoning, basic attempt at solution	Poor or no reasoning, incorrect or missing solutions

2. Internal Components – Other Activities

Component	K-Level	Criteria	Level 4	Level 3	Level 2	Level 1
Assignment	K5	Application & Problem Solving	Strong solutions, accurate	Mostly correct	Partial	Incorrect / missing
Seminar / Presentation	K6	Creation, Communication & Analysis	Insightful, professional, confident	Good, minor gaps	Basic	Poor / incomplete
ICT Quiz	K2	Knowledge & Application	Accurate & confident	Mostly correct	Basic	Incorrect
Attendance	—	Participation & Punctuality	Full attendance, punctual	Mostly present	Occasional	Poor / frequently absent

3. Practical

Continuous Internal Assessment (CIA)

Component	Bloom's Level	Level 4 (Excellent)	Level 3 (Good)	Level 2 (Satisfactory)	Level 1 (Needs Improvement)
Model Practical (Converted to 10)	K5	Independent execution, accurate results, strong analysis, handles unexpected issues confidently	Minor errors, mostly accurate, guided problem-solving	Performs with guidance, partial understanding, limited analysis	Unable to perform, inaccurate results, no reasoning
Internal Viva	K4	Strong conceptual knowledge, clear reasoning, confident troubleshooting	Good understanding, minor gaps, can handle problems with guidance	Basic understanding, limited problem-solving	Weak knowledge, unable to respond or reason
Lab Performance	K4	Active participation, consistent improvement, skillfully applies concepts	Mostly regular participation, moderate improvement	Irregular, minimal improvement	Rarely participates, no skill growth
Attendance	—	Full attendance, punctual	Mostly present	Occasionally absent	Frequently absent

End Semester Practical Examination (ESE)

Component	Bloom's Level	Level 4 (Excellent)	Level 3 (Good)	Level 2 (Satisfactory)	Level 1 (Needs Improvement)
Practical Execution	K5	Accurate execution, proper procedure, precise results, handles unexpected issues confidently	Minor errors, mostly correct, can handle problems with help	Multiple errors, partial results, limited troubleshooting	Incorrect procedure, unable to execute, fails completely
Record Verification	K2	Complete experiments, accurate results, correct interpretation, neat & structured	Minor omissions, minor errors, mostly clear	Incomplete, errors present, basic clarity	Very incomplete, incorrect, untidy
External Viva	K4	Strong theoretical knowledge, clear understanding & application, confident reasoning	Good understanding, minor gaps, partial application	Basic knowledge, limited linkage to experiment	Weak knowledge, unable to explain or apply concepts

4. Projects

Continuous Internal Assessment (CIA)

Component	Bloom's Level	Level 4 (Excellent)	Level 3 (Good)	Level 2 (Satisfactory)	Level 1 (Needs Improvement)
Project Proposal Presentation	K3	Clear, focused problem definition; well-defined objectives; feasible plan; confident presentation	Minor gaps in clarity or planning; mostly clear	Broad or partially defined problem; basic objectives; basic presentation	Vague/unclear problem; objectives missing; poor presentation
Periodic Review / Progress Evaluation	K4	Consistent, timely progress; correct application; identifies & resolves issues independently; systematic documentation; proactive	Minor delays, minor guidance needed, mostly updated documentation; moderately proactive	Irregular progress, partial application, needs support, basic documentation	Very limited progress, incorrect application, passive, poor documentation
Project Report Draft Submission	K6	Well-structured report; accurate understanding; adequate data; logical analysis; proper referencing & presentation	Minor structural or conceptual gaps; minor data issues; reasonable analysis; minor formatting issues	Basic structure; partial understanding; limited data; basic analysis; basic formatting	Poorly organized; incorrect understanding; insufficient data; no analysis; poor presentation

End Semester Examination (ESE)

Component	Bloom's Level	Level 4 (Excellent)	Level 3 (Good)	Level 2 (Satisfactory)	Level 1 (Needs Improvement)
Final Project Report Evaluation (External)	K6	Topic relevant & meaningful; accurate application of concepts; adequate & relevant data; logical analysis; effective problem-solving; professional formatting	Mostly relevant; minor conceptual errors; minor gaps in data; mostly logical; reasonable solutions; minor formatting issues	Moderately relevant; basic application; limited data; basic analysis; basic problem-solving; basic formatting	Poor relevance; incorrect application; insufficient data; weak analysis; no solution; poor formatting
External Viva Voce	K5	Thorough understanding; strong linkage to project; logical reasoning; confident & accurate responses; professional communication	Minor gaps in understanding or reasoning; mostly correct answers; acceptable communication	Basic understanding; limited linkage; basic reasoning; limited answers; basic communication	Weak understanding; no linkage; no reasoning; unable to respond; poor communication

SYLLABUS
FIRST SEMESTER

Course Code	Course Title	Hours			Credits
		Total	Lecture	Examination	
CY26C01	**Core I: Problem Solving Techniques in C**	**75**	**70**	**5**	**4**

Preamble

- Introduces fundamental problem-solving approaches and programming concepts using the C language.
- It emphasizes algorithmic thinking, logical reasoning, and structured programming techniques required for developing efficient programs.
- Students learn to translate computational problems into algorithms, flowcharts, and C programs using variables, control structures, arrays, functions, pointers, and file handling mechanisms.
- The course also develops analytical abilities required for debugging and optimizing programs. It provides a strong foundation for advanced programming and cyber security–related computing applications.

Prerequisite

Students should possess basic knowledge of computer fundamentals, logical reasoning, and elementary mathematical concepts to understand problem-solving approaches and programming logic.

Course Learning Outcomes (CLOs)

On the successful completion of the course, students will be able to,

CLO No	Course Learning Outcome	Bloom's Level
CLO1	Recall fundamental concepts of problem solving, including algorithms, flowcharts, and basic C constructs such as arrays, functions, pointers, and file handling.	K1
CLO2	Explain key programming concepts in C, including data types, operators, control structures, arrays, pointers and structures and demonstrate problem solving using algorithms and flowcharts.	K2
CLO3	Apply structured programming techniques to develop C programs using control statements, arrays, functions, pointers and file handling mechanism.	K3
CLO4	Analyze problems and design suitable algorithms and modular programs using functions, structures, pointers, and file handling operations.	K4

CLO5	Evaluate and optimize programming solutions using Arrays, functions, pointers, structures, and dynamic memory management techniques.	K5
CLO6	Develop complete C-based applications for real-world problems using modular design, file operations, and dynamic memory allocation.	K6

Unit-wise CLO Mapping

Unit	Coverage	Mapped CLOs
Unit I	Problem solving concepts, algorithms, flowcharts, pseudocode	CLO1, CLO2, CLO3, CLO4, CLO5, CLO6
Unit II	C basics, data types, operators, input/output, decision and looping	CLO1, CLO2, CLO3, CLO4, CLO5, CLO6
Unit III	Arrays, multidimensional arrays, strings, string functions	CLO1, CLO2, CLO3, CLO4, CLO5, CLO6
Unit IV	Functions, recursion, structures and unions	CLO1, CLO2, CLO3, CLO4, CLO5, CLO6
Unit V	Pointers, dynamic memory allocation, file handling	CLO1, CLO2, CLO3, CLO4, CLO5, CLO6

Alignment of CLO with PLO

3 = High, 2 = Medium, 1 = Low, – = Not Applicable

CLO \ PLO	PLO1	PLO2	PLO3	PLO4	PLO5	PLO6	PLO7	PLO8	PLO9	PLO10
CLO1	3	1	1	1	1	1	1	1	1	1
CLO2	3	2	1	1	1	1	1	1	1	1
CLO3	3	3	2	1	1	1	1	1	1	1
CLO4	2	3	2	1	1	1	1	1	1	1
CLO5	2	2	3	2	1	1	1	1	1	1
CLO6	2	2	3	1	1	1	1	1	1	1

CORE I: PROBLEM SOLVING TECHNIQUES IN C (CY26C01) (70 Hrs)

Unit I (14 hrs)

Introduction: Introduction to problem solving Concept – Steps for problem solving - Problem solving techniques — Algorithms – flowcharts – Types of Algorithms – Use flowcharts to represent algorithms – Pseudo code.

Unit II (14 hrs)

Overview of C - Constants, Variables and Data types - Operators and Expressions - Managing Input and Output Operations -Sulba Sutras-Decision Making and Branching - Decision Making and Looping.

Unit III (14 hrs)

Shloka Arrays: One-Dimensional - Two Dimensional - Multidimensional Arrays-Character Arrays and Strings: Declaring and Initializing String Variables - Reading Strings from Terminal - Writing Strings to Screen - String Handling Functions.

Unit IV (14 hrs)

Chandas -User-Defined Functions: Need - Return Values and Types - Function Calls – Function declaration - Category of Functions - No Arguments and No Return Values - Arguments but No Return Values - Arguments with Return Values - Recursion - Scope Visibility and Life time of Variables Structures and Unions - Definition: Structure Initialization - Comparison of Structure Variables - Arrays of Structures - Arrays within Structures - Unions.

Unit V (14 hrs)

Pointers: Understanding Pointers - Accessing the Address of a Variable - Declaring and Initializing Pointers - Accessing a Variable through its Pointers - Pointers and Arrays. File Management in C: Defining and Opening a File - Closing File - I/O Operations on Files - Dynamic Memory allocation MALLOC, CALLOC, REALLOC.

*** Course Alignment with SDGs: 4**

Text Books

S.No.	Authors	Title	Publisher	Year & Edition
1	Yashwvant Kanetkar	Let Us C: Authentic Guide To C Programming Language	BPB Publications	2020,17th Edition

Reference Books

S.No.	Authors	Title	Publisher	Year & Edition
1	Byron Gottfried	Programming with C	Tata McGraw Hill	2018,4th Edition
2	E. Balagurusamy	Programming In ANSI C	Tata Mc Graw Hill	2019, 8th Edition

Related Online References

1. Problem Solving techniques in C – studocu - https://www.studocu.com/in/document/bengaluru-north-university/bca/problem-solving-techniques-using-c/16264070

Pedagogy

The course will be delivered using a combination of traditional and learner-centered teaching methods, including:

- Lecture - Chalk and Talk
- PowerPoint presentations
- E-content and digital learning resources
- Numerical problem-solving exercises
- Group discussions
- Assignments
- Quizzes
- Peer learning activities
- Student seminars

Course Content and Lecture Schedule

Course Designers & Teaching–Learning Strategies

Course Code & Title	**CY26C01, Core I: Problem Solving Techniques in C**
Course Designers	Dr. G. Sophia Reena, Dr. K. Geethalakshmi, M. Selvanayaki
Teaching–Learning Strategies	Participatory Learning: 40.91 %
	Experiential Learning: 36.37 %
	Problem-based Learning: 22.72 %

Course Code	Course Title	Hours			Credits
		Total	Lecture	Examination	
CY26C02	Core II: Computer Networks and Security	75	70	5	4

Preamble

- Course introduces the fundamental concepts of computer networking and security principles essential for modern computing environments.
- It covers layered network architectures, communication protocols, and data transmission techniques across different layers.
- The course also emphasizes network vulnerabilities, threats, and security mechanisms used to safeguard data and systems.
- Practical exposure to security tools and protocols enables students to understand real-world cyber security challenges. This foundation supports further learning in advanced networking and cyber security domain

Prerequisite

A basic understanding of computer fundamentals, including the structure and functioning of computer systems, is essential for this course. It provides awareness of fundamental concepts in data communication and the Internet will support effective learning of network architectures and cyber security principles.

Course Learning Outcomes (CLOs)

On the successful completion of the course, students will be able to

CLO No	Course Learning Outcome	Bloom's Level
CLO1	Recall fundamental concepts of computer networks, layered models, and basic security terminology and tools	K1
CLO2	Explain the functions of OSI and TCP/IP layers, networking protocols, security mechanisms and routing algorithms	K2
CLO3	Apply networking concepts and protocols to configure basic communication and security operations	K3
CLO4	Analyze network layer operations, transport protocols, and security threats to identify vulnerabilities	K4
CLO5	Evaluate network security mechanisms, protocols, and tools to assess risks and protection strategies	K5
CLO6	Design basic secure network solutions using appropriate protocols, tools, and security practices	K6

Unit-wise CLO Mapping

Unit	Coverage	Mapped CLOs
Unit I	Network fundamentals, OSI & TCP/IP models, Physical Layer	CLO1, CLO2, CLO3, CLO4, CLO5, CLO6
Unit II	Data Link Layer, Network Layer, IP addressing, Routing	CLO1, CLO2, CLO3, CLO4, CLO5, CLO6
Unit III	Transport Layer, TCP/UDP, Application Layer protocols	CLO1, CLO2, CLO3, CLO4, CLO5, CLO6
Unit IV	Network security concepts, attacks, and models	CLO1, CLO2, CLO3, CLO4, CLO5, CLO6
Unit V	Internet security, TLS, HTTPS, SSH, tools (Kali Linux, Nmap, Wireshark)	CLO1, CLO2, CLO3, CLO4, CLO5, CLO6

Alignment of CLO with PLO

3 = High, 2 = Medium, 1 = Low, – = Not Applicable

CLO \ PLO	PLO1	PLO2	PLO3	PLO4	PLO5	PLO6	PLO7	PLO8	PLO9	PLO10
CLO1	3	1	1	1	1	1	1	1	1	1
CLO2	3	2	1	1	1	1	1	1	1	1
CLO3	3	2	2	1	1	1	1	1	1	1
CLO4	1	1	1	1	1	1	1	1	1	1
CLO5	1	2	1	3	2	1	1	1	1	1
CLO6	1	1	3	2	1	1	1	2	1	2

CORE II: COMPUTER NETWORKS AND SECURITY (CY26C02) (70 Hrs)

UNIT I **14 Hrs**

Introduction: Network, Uses of Networks, Types of Networks, Reference Models: TCP/IP Model, The OSI Model, Comparison of the OSI and TCP/IP reference model. Architecture of Internet. Physical Layer: Guided transmission media, Wireless transmission media, Switching

UNIT II **14 Hrs**

Data Link Layer: Design issues, Error Detection & Correction, Elementary Data Link Layer Protocols, Sliding window protocols, Multiple Access Protocols, Data link layer switching. Network Layer: Network Layer Design issues, store and forward packet switching, connection less and connection-oriented networks-routing algorithms, IP addresses, IPv4 and IPv6 Protocol, ARP, RAR.

UNIT III **14 Hrs**

Transport Layer: connection establishment, Connection release, Error Control & Flow Control, Crash Recovery. The Internet Transport Protocols: UDP, TCP. Application Layer: providing services, Applications layer paradigms: Client server model, HTTP, E-mail, WWW, TELNET

UNIT IV **14 Hrs**

Network security- Examples of security violations - Computer security concepts-confidentiality-Integrity-Availability-Accountability, Challenges of computer security Hacking-Vulnerability-threats-attacks- Active attacks and passive attacks-types- Denial of service attacks-Model for network security- Kali Linux Setup-Cyber Security Tools-Nmap-Wireshark

UNIT V **14 Hrs**

Internet Security-Transport Layer Security-Web Security Considerations-HTTPs-Secure Shell-Wireless Network Security-Mobile Device Security-Electronic Mail Security-Internet Mail Architecture-Email Formats-Email Threats and Comprehensive Email Security-DNS-Based Authentication of Named Entities.

*** Course Alignment with SDGs: 4**

Text Books

S. No	Author	Title of the Book	Publisher	Year and Edition
1	Andrew S. Tanenbaum, David J. Wetherall	Computer Networks	Prentice Hall Press	2021, 2nd Edition
2	William Stallings	Network Security Essentials Applications and Standards	Pearson Education	2018, 6th Edition
3	William Stallings	Cryptography & Network Security	Pearson Education	2018, 7th Edition

Reference Books

S. No	Author	Title of the Book	Publisher	Year and Edition
1	Atul Kahate	Cryptography and Network Security	McGraw Hill	2011, 3rd Edition
2	C K Shyamala, N Harini, Dr T R Padmanabhan	Cryptography and Network Security	Wiley India	2011, 1st Edition

Related Online References

Computer Networks and Security

1. https://www.geeksforgeeks.org/computer-networks/computer-network-tutorials/
2. https://www.guru99.com/type-of-network-topology.html

Pedagogy

The course will be delivered using a combination of traditional and learner-centered teaching methods, including:

- Lecture - Chalk and Talk
- PowerPoint presentations
- E-content and digital learning resources
- Numerical problem-solving exercises
- Group discussions
- Assignments
- Quizzes
- Peer learning activities
- Student seminars

Course Designers & Teaching–Learning Strategies:

Course Code & Title	**CY26C02, CoreI I: Computer Networks and Security**
Course Designers	Dr. A. Sabitha Banu
Teaching–Learning Strategies	Participatory Learning: 45 %
	Experiential Learning: 36 %
	Problem-based Learning: 19%

Course Code	Course Title	Hours			Credits
		Total	Practical	Examination	
CY26CP1	Core Practical I: C Programming and Cyber Security Tools Lab	60	57	3	2

Preamble

- This course provides hands-on training in C programming and introductory cyber security tools**.** Students practice developing programs using fundamental C constructs such as control structures, arrays, strings, functions, structures, and pointers.
- It emphasizes logical thinking and problem-solving through practical implementation of programming exercises.
- Students gain practical exposure to virtualization and cyber security tools by configuring Kali Linux environments and performing basic network analysis.
- Course also provides activities such as network scanning, port identification, and packet sniffing help students understand the fundamentals of network monitoring and security analysis

Prerequisite

Students should possess a basic understanding of computer fundamentals, C Programming, Cyber security tools and operating system concepts.

Course Learning Outcomes (CLOs)

On the successful completion of the course, students will be able to,

CLO No	Course Learning Outcome	Bloom's Level
CLO1	Recall the syntax, structure, and basic concepts of the C programming language and fundamental cyber security tools.	K1
CLO2	Explain the working principles of control structures, arrays, strings, functions, and basic network scanning tools used in cyber security.	K2
CLO3	Implement C programs using arrays, strings, structures, functions, and pointers to solve computational problems.	K3
CLO4	Analyze C program execution and network scanning results to identify logical errors, open ports, and network behaviour.	K4

CLO5	Evaluate the effectiveness of C programs and cyber security tools in solving computing and security related problems by using the tools such as Nmap and Wireshark to determine potential vulnerabilities.	K5
CLO6	Develop integrated C programs and perform basic cyber security tasks using virtual machines and network analysis tools.	K6
K1 - Remember; **K2** - Understand; **K3** - Apply; **K4** - Analyze; **K5** - Evaluate; **K6** - Create		

Unit-wise CLO Mapping

Unit	Coverage	Mapped CLOs
Program 1	Basic Operations Statement	CLO1, CLO2
Program 2	Control Structures	CLO1, CLO2, CLO3
Program 3	Arrays	CLO1, CLO2, CLO3, CLO4
Program 4	String Handling Functions	CLO1, CLO2, CLO3, CLO4, CLO5
Program 5	User Defined Functions	CLO1, CLO2, CLO3, CLO4, CLO5
Program 6	Structures	CLO1, CLO2, CLO3, CLO4, CLO5
Program 7	Pointers	CLO1, CLO2, CLO3, CLO4, CLO5
Program 8	Network Setup using CISCO Packet Tracer	CLO1, CLO2, CLO3, CLO4, CLO5
Program 9	Setup Kali Linux in Virtual Machine and Network Adapter Configuration	CLO1, CLO2, CLO3, CLO4, CLO5
Program 10	Identify Open Ports using Nmap	CLO1, CLO2, CLO3, CLO4, CLO5, CLO6
Program 11	Sniffing using Wireshark Tool	CLO1, CLO2, CLO3, CLO4, CLO5, CLO6

Alignment of CLO with PLO

3 = High, 2 = Medium, 1 = Low, – = Not Applicable

CLO \ PLO	PLO1	PLO2	PLO3	PLO4	PLO5	PLO6	PLO7	PLO8	PLO9	PLO10
CLO1	3	1	1	1	1	1	1	1	1	1
CLO2	2	3	1	1	1	1	1	1	1	1
CLO3	2	2	3	1	1	1	1	1	1	1
CLO4	1	3	2	3	1	1	1	1	1	1
CLO5	1	2	1	3	2	1	1	1	1	1
CLO6	1	1	3	2	2	1	1	1	1	2

CORE PRACTICAL I : C PROGRAMMING AND CYBER SECURITY TOOLS LAB (CY26CP1)

57 Hrs

Programs List

- Basics Operations Statement.
- Control Structures.
- Arrays.
- String handling functions.
- User defined functions
- Structure.
- Pointers.

Cyber Security Tools

- Network Setup using CISCO Packet Tracer
- Set up Kali Linux in a virtual machine and set up a network Adapter.
- Identify the open ports using NMAP.
- Sniffing using Wireshark Tool.

*** Course Alignment with SDGs: 9**

Pedagogy

The course will be delivered using a combination of traditional and learner-centered teaching methods, including:

- Demonstration of working environment / Tools / Software / Program

Course Designers & Teaching–Learning Strategies

Course Code & Title	**CY26CP1, Core Practical I: C Programming and Cyber Security Tools Lab**
Course Designers	Dr. R. Divya
Teaching–Learning Strategies	Participatory Learning: 20%
	Experiential Learning: 60%
	Problem-based Learning: 20%

Course Code	Course Title	Hours			Credits
		Total	Lecture	Examination	
TH26A03	**Generic Elective: Numerical and Statistical Techniques**	**90**	**85**	**5**	**5**

Preamble

- This course introduces fundamental numerical and statistical techniques used for solving mathematical and real-life problems.
- It covers numerical methods for solving linear simultaneous equations, interpolation, differentiation and integration.
- The course also provides a foundation in statistical concepts such as correlation, regression and probability.
- In addition, students learn theoretical probability distributions including binomial, Poisson and normal distributions.
- The course develops analytical and computational skills required for quantitative analysis in various academic disciplines.

Prerequisite

Basic knowledge of elementary algebra, functions, and introductory statistics studied at the higher secondary level.

Course Learning Outcomes (CLOs)

On the successful completion of the course, students will be able to,

CLO No	Course Learning Outcome	Bloom's Level
CLO1	Define the fundamental concepts of numerical methods, correlation, probability and theoretical distributions.	K1
CLO2	Explain the principles of interpolation, numerical differentiation, numerical integration and correlation techniques.	K2
CLO3	Apply numerical methods and statistical techniques to solve simple mathematical and statistical problems.	K3
CLO4	Analyze relationships between variables using correlation, regression and probability concepts.	K4
CLO5	Evaluate suitable numerical or statistical methods for solving given quantitative problems.	K5

CLO6	Develop simple models or solutions using numerical and statistical techniques for real-world situations.	K6
K1 - Remember; **K2** - Understand; **K3** - Apply; **K4** - Analyze; **K5** - Evaluate; **K6** - Create		

Unit-wise CLO Mapping

Unit	Coverage	Mapped CLOs
Unit I	Solution of linear simultaneous equations (Gauss elimination, Gauss Jordan, Gauss Seidel, Gauss Jacobi methods) and interpolation methods (Newton forward and backward).	CLO1, CLO2, CLO3, CLO4, CLO5
Unit II	Numerical differentiation, numerical integration (Newton–Cotes formulas, trapezoidal rule, Simpson's rules) and Taylor series method.	CLO1, CLO2, CLO3, CLO4, CLO5, CLO6
Unit III	Skewness, correlation analysis, Karl Pearson's coefficient, rank correlation, regression analysis.	CLO1, CLO2, CLO3, CLO4, CLO5
Unit IV	Probability concepts, probability calculation, theorems of probability and mathematical expectation.	CLO1, CLO2, CLO3, CLO4, CLO5
Unit V	Theoretical distributions: Binomial, Poisson and Normal distributions.	CLO1, CLO2, CLO3, CLO4, CLO5, CLO6

Alignment of CLO with PLO

3 = High, 2 = Medium, 1 = Low, – = Not Applicable

CLO \ PLO	PLO1	PLO2	PLO3	PLO4	PLO5	PLO6	PLO7	PLO8	PLO9	PLO10
CLO1	3	1	1	1	2	1	1	1	1	1
CLO2	2	3	1	1	1	1	1	1	1	1
CLO3	2	3	1	2	1	1	1	1	1	1
CLO4	1	3	1	2	1	1	1	1	1	1
CLO5	1	2	1	3	2	1	1	1	1	1
CLO6	1	2	3	1	3	1	1	1	1	2

Generic Elective: Numerical and Statistical Techniques (TH26A03) (85Hrs)

Unit I **(17 Hrs)**

Solution of Linear Simultaneous Equations: Gauss elimination - Gauss Jordan - Gauss Seidel and Gauss Jacobi methods -simple problems. Interpolation: Newton Forward and Backward Interpolation Formulae.

Unit II **(17 Hrs)**

Numerical Differentiation, Formulae for Derivatives: Newton's Forward Difference - Newton's Backward Difference, Numerical Integration: Introduction, Newton-Cotes Quadrature formulas: trapezoidal rule, Simpson's 1/3 and 3/8 rules, Taylor's series method.

Unit III **(17 Hrs)**

Skewness - Correlation analysis: Introduction - Significance of the study of correlation - correlation and causation - Types of correlation - Methods of studying correlation - Graphic method - Karl Pearson's coefficient of correlation - Coefficient of correlation and probable error - Coefficient of determination - Properties of the coefficient of the correlation - Rank correlation coefficient - Features of Spearman's correlation coefficient, Regression analysis.

Unit IV **(16 Hrs)**

Probability: Introduction - probability defined - Importance of the concept of probability - Calculation of probability - Theorems of probability (statements only) – Mathematical Expectation-Simple problems.

Unit V **(18 Hrs)**

Theoretical Distributions: Binomial distribution - Poisson distribution and normal distribution (without derivations & proof).

Text Books

S.No.	Authors	Title	Publisher	Year & Edition
1	B.S. Grewal	Numerical Methods in Engineering and Science with Programs in C & C++	Khanna Publishers	2014 & 11th edition
	Unit I: Chapter III &VII: 3.3, 3.4, 3.5 & 7.1-7.3 Unit II: Chapter VIII& X: 8.1, 8.2:(1,2),8.4, 8.5:(I, II, III),10.3			
2	S. P. Gupta	Statistical methods	Sultan Chand & Sons Publications	2005 & 43rd Edition
	Unit III: Volume I: Chapter 9(till measures of skewness),10,11. (pg: 329-341, 377-412, 435-454) Unit IV: Volume-II Chapter 1(till Baye's theorem) (pg: 751-771) Unit V: Volume-II Chapter2 (pg:805-824, 826-834, 836-856)			

Reference Books

S.No.	Authors	Title	Publisher	Year & Edition
1	P.A. Navanitham	Business Mathematics and Statistics	Jai Publishing Company	2014
2	S.C Gupta and V.K. Kapoor	Fundamentals of Mathematical Statistics	Sultan Chand & Sons Publications	2001 & 10th revised edition

3	P. Kandasamy, K. Thilagavathy and K. Gunavathy	Numerical Methods	S. Chand and company LTD	Reprint 2007
4	V.K. Kapoor	Fundamentals of Applied Statistics	Sultan Chand & Sons	2020 &12th revised edition

Related Online References

https://nptel.ac.in/courses/111/107/111107105/

(Lectures by Prof. Ameeya Kumar Nayak and Prof. Sanjeev Kumar, Department of Mathematics, Indian Institution of Technology Roorkee)

Lecture 02 Gaussian elimination with partial pivoting Lecture 04 Jacobi and Gauss Seidel methods

Lecture 20 Newton's Forward Difference & Newton's Backward Difference Lecture 34 Simpsons 1/3rd rule and 3/8 rule https://nptel.ac.in/courses/111/106/111106112/

(6 Lectures by Prof. G. Srinivasan, Department of Management Studies, Indian Institution of Technology Madras)

Lecture 12 Probability

Lecture 13 Rules of probability Lecture 19 Binomial distribution Lecture 20 Poisson distribution

Pedagogy

The course will be delivered using a combination of traditional and learner-centered teaching methods, including:

- Lecture - Chalk and Talk
- PowerPoint presentations
- E-content and digital learning resources
- Numerical problem-solving exercises
- Group discussions
- Assignments
- Quizzes
- Peer learning activities
- Student seminars

Course Designers & Teaching–Learning Strategies

Course Code & Title	**TH26A03, & Generic Elective: Numerical and Statistical Techniques**
Course Designers	Dr. J. Rejula Mercy, Dr. S. Deepa
Teaching–Learning Strategies	Participatory Learning: **31 %**
	Experiential Learning: **26 %**
	Problem-based Learning: **43 %**

Course Code	Course Title	Hours			Credits
		Total	Lecture	Examination	
NME26ES	Introduction to Entrepreneurship	30	30	-	2

Preamble

- To introduce the basic concepts and importance of entrepreneurship in economic and social development.
- To familiarize students with entrepreneurial traits, types of entrepreneurs, and the process of starting small enterprises.
- To provide awareness about entrepreneurship development programmes, institutional support, and financial assistance available for entrepreneurs.

Prerequisite

- Basic awareness of business activities, economic environment, and interest in entrepreneurial initiatives.

Course Learning Outcomes (CLOs)

CLO No	Course Learning Outcome	Bloom's Level
CLO1	Define the fundamental concepts, characteristics, and types of entrepreneurship and entrepreneurs.	K1
CLO2	Explain the role of entrepreneurship development programmes, institutional support systems, and government incentives for entrepreneurs.	K2
CLO3	Apply creative thinking and innovation techniques to identify entrepreneurial opportunities and solve business problems.	K3
CLO4	Analyze the significance of intellectual property rights and institutional support in promoting entrepreneurial ventures.	K4
CLO5	Evaluate different project ideas and assess their feasibility using basic project appraisal concepts.	K5
CLO6	Develop a basic project report for a small entrepreneurial venture based on identified opportunities.	K6
K1 - Remember; **K2** - Understand; **K3 -** Apply; **K4 -** Analyze; **K5 -** Evaluate; **K6** - Create		

Unit –CLO Mapping

Unit	Coverage	Mapped CLOs
Unit 1	Introduction to Entrepreneurship, factors, barriers, entrepreneurial traits and types, steps for starting small industries, MSMEs, social entrepreneurship	**CLO1, CLO2**
Unit 2	Entrepreneurship Development Programmes, institutional framework (IFCI, ICICI, IDBI, IRBI, EXIM Bank, NSIC, SIDBI, SFC, SIPCOT, TIIC), incentives and subsidies	**CLO1, CLO2, CLO3, CLO4**
Unit 3	Innovation, types of innovation, creative problem solving, incubators, angel investors, venture capital	**CLO1, CLO2 CLO3, CLO4**
Unit 4	Intellectual Property Rights – copyright, patents, trademarks, design and registration procedures	**CLO1, CLO2, CLO3, CLO4**
Unit 5	Project identification and classification, project formulation, project appraisal, project report presentation	**CLO1, CLO2, CLO3, CLO4, CLO5, CLO6**

Alignment of CLO with PLO

3 = High, 2 = Medium, 1 = Low, – = Not Applicable

CLO \ PLO	PLO1	PLO2	PLO3	PLO4	PLO5	PLO6	PLO7	PLO8	PLO9	PLO10
CLO1	1	1	1	1	1	2	1	3	1	1
CLO2	1	1	1	1	2	1	1	1	3	1
CLO3	1	3	1	1	1	1	2	1	1	1
CLO4	1	3	1	1	1	1	1	2	1	1
CLO5	1	2	1	1	3	1	1	1	1	1
CLO6	1	1	1	1	3	2	1	1	1	1

INTRODUCTION TO ENTREPRENEURSHIP - NME23ES (30 HRS)

Unit 1 **(6hrs)**

Entrepreneurship-Introduction-Factors-Barriers-Entrepreneurial Traits and Types- Steps for starting a Small Industry- MSMEs – Social entrepreneurship.

Unit 2 **(6hrs)**

Entrepreneurship Development Programmes-Institutional Framework (IFCI, ICICI, IDBI, IRBI, EXIM Bank, NSIC, SIDBI, SFC, SIPCOT AND TIIC) - Role of Incentives and Subsidies

Unit 3 **(6hrs)**

Innovation - Types –Role- Creative Problem Solving -Incubators - Angel Investors - Venture Capital.

Unit 4 **(6hrs)**

Intellectual Property- Meaning- Copy Right Registration- Patents- Trademark- Design and Procedure for registration.

Unit 5 **(6hrs)**

Project Preparation

Project identification and Classification - Project Formulation- Project Appraisal- Project Report Presentation.

Text Books

Sl. No.	Author(s)	Title of the Book	Publisher	Year of Publication& Edition
1.	Gupta. C.B and Srinivasan.N. P	Entrepreneurial Development	Sultan Chand and Sons	2020
2	Sauhari Vinnie and Bhushan Sudhashu	Innovation Management	Oxford	2014

Reference Books

Sl. No.	Author(s)	Title of the Book	Publisher	Year of Publication & Edition
1.	KolbBonitaM	Entrepreneurship for the creative and cultural industries	Routedge	2015
2.	P.T.Vijayashree & M.Alagammai	Entrepreneurship and Small Business Management	Margham	2020