

KONGUNADU ARTS AND SCIENCE COLLEGE
(AUTONOMOUS)
COIMBATORE-641029



DEPARTMENT OF COMPUTER SCIENCE (UG) [AIDED]

CURRICULUM AND SCHEME OF EXAMINATIONS (CBCS)
(2026-2027 and onwards)

KONGUNADU ARTS AND SCIENCE COLLEGE (AUTONOMOUS)
Coimbatore-641029

Vision:

Developing the total personality of each and every student in a holistic way by adhering to the principles of Swami Vivekananda and Mahatma Gandhi.

Mission:

- Imparting holistic and man-making education with emphasis on character, culture and values - moral and ethical.
- Designing the curriculum and other courses that transform its students into value added and skilled human resources.
- Constantly updating academic and management practices towards total quality management and promotion of quality in all spheres.
- Extending the best student support services by making them comprehensive and by evolving a curriculum relevant to student community and society at large.
- Taking steps to make education affordable and accessible by extending scholarships to the meritorious and economically disadvantaged students.
- Motivating teachers in such a way that they become the role models in promoting Higher Education.

DEPARTMENT OF COMPUTER SCIENCE

Vision:

To inculcate Human, Moral and ethical values in the young minds of the students and thereby improving the total personality of the students.

Mission:

- To produce employable graduates to cater the needs of various industries.

PROGRAMME OUTCOMES (PO)

- PO1** Understand the basic concepts, fundamental principles and scientific theories that are needed for higher learning and research.
- PO2** Identify, formulate and analyze the complex situations to arrive acceptable solutions by applying domain specific knowledge, acquired through the programme.
- PO3** Learn moral and ethical values and commit to professional ethics and responsibilities in the associated disciplines. Exercise social concern with the ability to act with awareness of issues in diversified domains to participate in the national development.
- PO4** Ability to design, implement and evaluate a computational system to meet the desired needs within realistic constraints.
- PO5** Realize the need for self and life-long learning to move along with the scientific and technological developments.
- PO6** Ability to communicate and engage effectively with diverse stakeholders.
- PO7** Analyze the impacts of computing on individuals, organizations and society.
- PO8** Acquire skills of observing and drawing logical inferences from the scientific facts.

PROGRAMME SPECIFIC OUTCOMES (PSO)

- PSO1** Impart the core knowledge in the areas such as Software Engineering, Data Communication, Networking and Security, Database Management, Web Technology, Operating System, Artificial Intelligence and other emerging areas in Computer Science.
- PSO2** Provide well trained professionals to industries by enhancing the programming skills and new computing technologies through theoretical and practical knowledge.
- PSO3** Train to solve real world problems by selecting appropriate techniques and best logic.
- PSO4** Enhance the ability to design and develop software applications, to understand the basic concepts of hardware and to comprehend and apply mathematical and accounting principles.
- PSO5** Make use of Computer Science techniques to one's own work as a member or a leader in a team to arrive conclusions and carryout projects.

KONGUNADU ARTS AND SCIENCE COLLEGE (AUTONOMOUS)

COIMBATORE – 641 029

Programme Name : Department of Computer Science(Aided)

Curriculum and Scheme of Examination under CBCS

(Applicable to the students admitted during the Academic Year 2026-2027)

Semester	Part	Subject Code	Title of the Paper	Instruction hours/cycle	Exam. Marks			Duration of Exam (hours)	Credits
					CIA	ESE	TOTAL		
I	I	26TML101	Language I@	6	25	75	100	3	3
	II	26ENG101	English -I	6	25	75	100	3	3
	III	26UCS101	Core Paper 1 – C and C++ Programming	5	25	75	100	3	4
	III	26UCS1CL	Core Practical 1 - C and C++ Programming Lab	5	40	60	100	3	2
	III	26UCS1A1	Allied Paper 1 – Discrete Mathematics and Statistics	6	25	75	100	3	5
	IV	26EVS101	Environmental Studies **	2	-	50	50	3	2
	Total			30	-	-	550	-	
II	I	26TML202	Language II@	6	25	75	100	3	3
	II	26ENG202	English -II	6	25	75	100	3	3
	III	26UCS202	Core Paper 2 - JAVA Programming	5	25	75	100	3	4
	III	26UCS2CM	Core Practical 2 - JAVA Programming Lab	5	40	60	100	3	2
	III	26UCS2A2	Allied Paper 2 – Operations Research	6	25	75	100	3	5
	IV	26VED201	Value Education- Moral and Ethics**	2	-	50	50	3	2
	-	-					550		
III	I	26TML303	Language III@	6	25	75	100	3	3
	II	26ENG303	English -III	6	25	75	100	3	3
	III	26UCS303	Core Paper 3 – Python Programming	4	25	75	100	3	5
	III	26UCS3CN	Core Practical 3 - Python Programming Lab	5	40	60	100	3	2
	III	26UCS3A3	Allied Paper 3 - Data Structures	5	25	75	100	3	5
	IV	26UGC3S1	Skill Based subject 1- Basics of Cyber Security	2	100	-	100	3	3
	IV	26TBT301/ 26TAT301/ 26UHR3N1	Basic Tamil* / Advanced Tamil**/ Non-major elective- I**	2	-	75	75	3	2
IV	Total			30	-	-	675	-	
	I	26TML404	Language IV@	6	25	75	100	3	3
	II	26ENG404	English -IV	6	25	75	100	3	3
	III	26UCS404	Core Paper 4 – Relational Database Management System	4	25	75	100	3	5
	III	26UCS4CO	Core Practical 4 – Visual Basic.Net Programming Lab	5	40	60	100	3	2
	III	26UCS4A4	Allied Paper 4 – Digital Principles and Computer System Architecture	5	25	75	100	3	5
	IV	26UCS4SL	Skill Based subject 2- RDBMS Lab	2	25	75	100	3	3
V	IV	26TBT402/ 26TAT402/ 26UWR4N2	Basic Tamil* / Advanced Tamil**/ Non-major elective- II**	2	-	75	75	3	2
	Total			30	-	-	675	-	
	III	26UCS505	Core Paper 5 – Artificial Intelligence	5	25	75	100	3	6
	III	26UCS506	Core Paper 6 – Internet Of Things	6	25	75	100	3	5
	III	26UCS5CP	Core Practical 5 – Internet Of Things Lab	6	40	60	100	3	2
	III	26UCS507	Core Paper 7 – Data Communication and Networking	6	25	75	100	3	5
	III	26UCS5E1	Major Elective Paper 1	5	25	75	100	3	5
VI	IV	-	EDC	2	100	-	100	3	3
	-	26UCS5IT	Internship Training ****	Grade					
	Total			30	-	-	600	-	
	III	26UCS608	Core Paper 8 – Data Analytics	5	25	75	100	3	4
VI	III	26UCS609	Core Paper 9 – PHP Programming	4	25	75	100	3	5
	III	26UCS6CQ	Core Practical 6 - PHP Programming Lab	5	40	60	100	3	2

III	26UCS610	Core Paper 10 – Information Security	5	25	75	100	3	5
III	26UCS6E2	Major Elective Paper 2	5	25	75	100	3	5
III	26UCS6Z1	Project and viva voce***	4	20	80	100	-	5
IV	26UBI6S3	Skill Based subject 3- Basics of IPR	2	100	-	100	3	3
Total			30	-	-	700	-	-
V	26NCC [§] / NSS/YRC /PYE/ECC/ RRC/WEC101 #	Co-curricular Activities*	-	50	-	50	-	1
Grand Total			-	-	-	3800	-	140

Note :

CBCS – Choice Based Credit system, CIA– Continuous Internal Assessment, ESE– End of Semester Examinations

§ For those students who opt NCC under Cocurricular activities will be studying the prescribed syllabi of the UGC which will include Theory, Practical & Camp components. Such students who qualify the prescribed requirements will earn an additional 24 credits.

@ Hindi/Malayalam/ French/ Sanskrit – 26HIN/MLM/FRN/SAN101 - 404

* - No End-of-Semester Examinations. Only Continuous Internal Assessment (CIA)

** - No Continuous Internal Assessment (CIA). Only End-of-Semester Examinations (ESE)

*** Project Report – 60 marks; Viva voce – 20 marks; Internal-20 marks

**** The students shall undergo Internship training / field work for a minimum period of 14 working days at the end of the fourth semester during summer vacation and submit the report in the fifth semester which will be evaluated for 100 marks by the concerned guide and followed by an Internal Viva voce by the respective faculty or HOD as decided by the department. According to their marks, the grades will be awarded as given below.

Marks %	Grade
85 – 100	O
70 – 84	D
60 – 69	A
50 – 59	B
40 – 49	C
< 40	U (Reappear)

Major Elective Papers (2 papers are to be chosen from the following 6 papers)

1. Cloud Computing
2. Software Engineering and Testing
3. Embedded Systems
4. Systems Software and Operating Systems
5. Block Chain Technology
6. Machine Learning

Non-Major Elective Papers

1. Human Rights
2. Women's Rights
3. Consumer Affairs

Sub. Code & Title of the Extra Departmental Course (EDC) :

26UCS5XL - Web Designing Using HTML

List of Co-curricular Activities:

1. National Cadet Corps (NCC)
2. National Service Scheme (NSS)
3. Youth Red Cross (YRC)
4. Physical Education (PYE)
5. Eco Club (ECC)
6. Red Ribbon Club (RRC)
7. Women Empowerment Cell (WEC)

Note: In core/ allied subjects, no. of papers both theory and practical are included wherever applicable. However, the total credits and marks for core/allied subjects remain the same as stated below.

Tally Table:

S. No.	Part	Subject	Marks	Credits
1.	I	Language – Tamil/Hindi/Malayalam/ French/ Sanskrit	400	12
2.	II	English	400	12
3.	III	Core – Theory/Practical	1600	60
	III	Allied	400	20
		Electives/Project	300	15
4.	IV	Basic Tamil / Advanced Tamil (OR) Non-major electives	150	4
		Skill Based subject	300	9
		EDC	100	3
		Environmental Studies	50	2
		Value Education	50	2
5.	V	Co-curricular Activities	50	1
Total			3800	140

- 100 % CIA for Cyber Security, EDC and Basics of IPR.
- The students should complete **Health and Wellness Programme (26UHW401)^{###}** in the **4th semester** and the completion marks should be submitted through the HoD to the Controller of Examinations. Extra credits will be given to the candidates who have successfully completed.
- The students may be encouraged to complete any **MOOC course available for Online learning platforms like SWAYAM, NPTEL, Coursera^{\$\$}, IIT Bombay Spoken Tutorial, e-Pathshala etc.**, before the completion of the **5th semester** and the course completion certificate should be submitted through the HoD to the Controller of Examinations. Appropriate credits will be given to the candidates who have successfully completed.

^{\$\$}**Note:** One course to be taken from coursera for all the under graduate students of self finance stream during the even semester of the I year. **Appropriate extra credits^{@@@}** and certification as applicable shall be awarded to the students who have completed the course.

^{@@@}**Note :** Course Duration :

Duration	Extra Credits
< 10 hours	0
> =10 hours and < = 20 hours	1
> 20 hours	2

- An **Onsite Training** preferably relevant to the course may be undertaken as per the discretion of the HoD.
- Extra credits shall be awarded for innovative products/ individual paper presentations and

publications in reputed national/ international proceedings and in indexed journals by the UG students for their original research contributions.

- Product development through Technology Readiness Levels:
 - Phase 1 Level (TRL 1-3) : Basic research: 1 credits
 - Phase 2 Level (TRL 4 -6) : Development and validation : 2 credits
 - Phase 3 Level (TRL 7-9) : Deployment : 3 credits
 - National / International level paper presentation in conferences and publications of full papers in reputed Scopus/ web of Science indexed journals
 - National Level : 1 credit/ paper
 - International Level : 2 credits/ paper
 - Open access Journals are not included
- Extra credits shall be awarded to students who prefer to opt any course out of their programme on self learning mode. No internal components. 100% ESE.

Teaching Pedagogy

Smart Classroom/Powerpoint presentation/Seminar/Quiz/Discussion/Flipped Classroom/Peer Learning/Experimental Learning/Blended learning.

Flipped Classroom

Preamble:

- Under flipped classroom model, students review foundational content before class, with class time dedicated to practice, discussion, and problem – solving where the role of the teachers will be facilitating discussions and enabling students to embark on a holistic learning perspectives

Work instructions:

- One flipped session / unit is made mandatory and the course In-charge shall identify and specify the topic to be covered in the flipped session in the lesson plan.
- Detailed session plans must be intimated to all students at least one week in advance.
- Curated content such as LORs, video lectures, animations, and other relevant digital content shall be provided to students in advance to facilitate effective preparation for the flipped classroom session.

Peer Learning

Preamble:

- Peer Assisted learning enables students to learn from each other sharing knowledge in a collaborative learning environment.
- Development of leadership skills and student engagement through student to student academic support.
- Reduce drop out/failure rates of the students and create a supportive academic culture where a high performing or trained student assists peers academically.

Work Instructions:

- Course In-charge shall supervise the programme by periodically reviewing its implementation, conducting review meetings, and monitoring the progress reports.
- Course In-charge shall identify 5 to 6 fast learners based on their academic performance in internal and external examinations.
- Course In-charge shall also identify students who require additional academic support and assign 4 to 5 such students to each fast learner to facilitate peer learning.
- This team will operate remedial classes on a peer learning mode as per the following:
 - a) One session / week / course and each session shall be for 30 minutes in duration, with follow-up learning activities.
 - b) The faculty In-charge shall review attendance records and monitor the academic progress of the students.

Blended learning

Preamble:

- Blended learning integrates traditional in class instruction with digital tools exposing students to a myriad options for learning from subject experts across the globe
- It is provided with online learning sessions on recorded videos, lecture captured sessions (included under guided library hours), digital resources, and guided sessions facilitated by internal faculty members and external experts through Zoom meets etc.,

Work Instructions:

- For every course, students will be motivated to attend additional webinar/online courses through any interactive learning tools such as, telepresence systems, podcasts, interactive videos etc. with minimum of 2 sessions/course and maximum of 3 sessions/course.

Components of Continuous Internal Assessment

Components		Marks	Total
Theory			
CIA I	75	(75+75 = 150/10)	25
CIA II	75	15	
Objective Capacity Testing */Seminar		5	
Attendance		5	
Practical			
CIA Practical		25	40
Observation Notebook		10	
Attendance		5	
Project			
Review		15	20
Regularity		5	
Theory (Allied) (External : 55 marks)			
CIA I	55	(55+55)	20
CIA II	55	Converted to 10	
Objective Capacity Testing */Seminar		5	
Attendance		5	
Practical (Allied) (External : 30 marks)			
CIA Practical		10	20
Observation Notebook		5	
Attendance		5	

* Objective Capacity Testing:

For the first assessment, questions shall be set from 2 ½ units (25 questions) and evaluation for 5 marks. The assessment shall be conducted through any authentic online platform, one week prior to the commencement of I CIA theory examinations.

For the second assessment, questions shall be set from 2 ½ units (25 questions) and evaluation for 5 marks. The assessment shall be conducted through any authentic online platform, one week prior to the commencement of II CIA theory examinations.

The average of the first and second assessment scores shall be considered for the final **5 marks** allocation.

BLOOM'S TAXONOMY BASED ASSESSMENT PATTERN

K1-Remembering;K2-Understanding;K3-Applying;K4-Analyzing;K5-Evaluating

1. ESE Theory Examination:

(i) CIA I & II and ESE: 75 Marks

Knowledge Level	Section	Marks	Description	Total
K1 Q1 to 10	A (Answer all)	10 x 1 = 10	MCQ	75
K1 – K5 Q11 to 15	B (Either or pattern)	5 x 5 = 25	Short Answers	
K2 – K5 Q16 to 20	C (Either or pattern)	5 x 8 = 40	Descriptive / Detailed	

(ii) CIA I & II and ESE: 55 Marks (Allied)

Knowledge Level	Section	Marks	Description	Total
K1 Q1 to 10	A (Answer all)	10 x 1 = 10	MCQ	55
K2 – K4 Q11 to 15	B (Either or pattern)	5 x 3 = 15	Short Answers	
K2 – K5 Q16 to 20	C (Either or pattern)	5 x 6 = 30	Descriptive / Detailed	

2. ESE Practical Examination:

Knowledge Level	Section	Marks	Total
K3	Experiments Record Work	50	60
K4		10	
K5			

(For Allied papers)			
Knowledge Level	Section	Marks	Total
K3	Experiments	25	30
K4		05	
K5	Record Work		

3. ESE Project Viva Voce:

Knowledge Level	Section	Marks	Total
K3	Project Report	60	80
K4		20	
K5	Viva voce		

Scheme of Evaluation - Health and Wellness Programme (26UHW401)###

Part	Description	Mark
A	Report	40
B	Attendance	20
C	Activities (Observation during Practice)	40
Total		100

**KONGUNADU ARTS AND SCIENCE COLLEGE (AUTONOMOUS)
COIMBATORE – 641029**

**MODALITIES FOR THE CONDUCT OF 100% CIA FOR THE ONE
CREDIT SELF- STUDY COURSE AND THE MARK DISTRIBUTION
PATTERN FOR THE PART III THEORY PAPER OF APPLICABLE
COURSE**

PREAMBLE

The Curriculum Development Cell (CDC) meeting was convened on 16.10.2025 and recommended to have one credit Self Study Course for applicable programmes in both UG & PG programme in the V and II semester respectively for the students to be admitted from the academic year 2026-2027 and onwards.

In order to foster independent learning, enhance academic flexibility, and encourage students to explore knowledge, the institution introduces the One Credit Self Study Course. This initiative is designed to provide students with an opportunity to pursue structured self-learning during the regular programme of study.

The one credit Self Study Course for applicable UG & PG programme in the V and II semester respectively, for the students admitted from the academic year 2026-2027 and onwards.

1. CIA COMPONENTS FOR ONE CREDIT COURSE

CIA shall be conducted by the department concerned.

CIA I	50 (Converted to 10)	20	25
CIA II	50 (Converted to 10)		
Case Study		5	

QUESTION PAPER PATTERN

Duration : 2 Hours

Knowledge Level	Section	Marks	Description	Total
K1 Q1 to Q6	A (Answer all)	6 x 1 = 6	MCQ	50
K2 – K4 Q7 to Q 10	B (Either or pattern)	4 x 5 = 20	Short Answers	
K2 – K5 Q11 to Q 13	C (Either or pattern)	3 x 8 = 24	Descriptive / Detailed	

2. PART III THEORY APPLICABLE COURSE

(CIA : 20 MARKS, ESE : 55 MARKS)

CIA: 20 Marks

CIA I	55	(55+55)	20
CIA II	55	Converted to 10	
Objective Capacity Testing /Seminar		5	
Attendance		5	

ESE : 55 Marks**QUESTION PAPER PATTERN**

Knowledge Level	Section	Marks	Description	Total
K1 Q1 to 10	A (Answer all)	10 x 1 = 10	MCQ	55
K2 – K4 Q11 to 15	B (Either or pattern)	5 x 3 = 15	Short Answers	
K2 – K5 Q16 to 20	C (Either or pattern)	5 x 6 = 30	Descriptive / Detailed	



PRINCIPAL
PRINCIPAL

Kongunadu Arts & Science College
Coimbatore - 641 029

**KONGUNADU ARTS AND SCIENCE COLLEGE (AUTONOMOUS)
COIMBATORE – 641029**

**MODALITIES FOR THE CONDUCT OF OPEN BOOK EXAMINATION
SYSTEM FOR THE COURSES BASICS OF CYBER SECURITY AND
FUNDAMENTALS OF INFORMATION SECURITY FOR ALL UG AND
PG PROGRAMMES RESPECTIVELY**

PREAMBLE

The Curriculum Development Cell (CDC) meeting was convened on 16.10.2025 and recommended to implement an open book examination system for the courses, Basics of Cyber Security and Fundamentals Information Security for all UG and PG programmes to improvise conceptual understanding skills, promote deep learning, enhance assessment quality and strengthen comprehensive skills, for the students to be admitted from the academic year 2026-2027 and onwards.

1.Purpose

To provide guidelines for conducting open book examinations that encourage critical thinking, application of knowledge, and analytical skills.

2.Scope

Applicable to Basics of Cyber Security and Fundamentals of Information Security courses for the undergraduate and postgraduate programmes respectively.

3. Examination Guidelines

Question Paper Design

- ❖ Questions should be Focused on higher-order thinking (analysis & evaluation)
- ❖ Avoid direct recall questions

Communication to Students and Staff Members

- ❖ Inform students in advance about the format, rules, and allowed resources.

- ❖ Provide sample questions to familiarize them with the OBE style.
- ❖ All the Staff members should be familiar about the prescribed Books of the Basics of Cyber Security and Fundamentals of Information Security.
- ❖ Students are permitted to carry the prescribed Books (in original or xerox copy) duly signed by the respective staff in charge of courses to the examination Hall.
- ❖ Invigilators of the respective examination halls should permit the students with the prescribed book (in original or xerox copy) and not to allow the students with other than the prescribed Books.




PRINCIPAL

PRINCIPAL
Kongunadu Arts & Science Colleg
Coimbatore - 641 029

**KONGUNABU ARTS AND SCIENCE COLLEGE (AUTONOMOUS)
COIMBATORE – 641029**

**MODALITIES FOR THE AWARD OF APPROPRIATE EXTRA CREDIT
TO THE STUDENTS WHO PREFER TO OPT ANY COURSE OUT OF
THEIR PROGRAMME ON SELF LEARNING MODE**

PREAMBLE

The Curriculum Development Cell (CDC) meeting was convened on 16.10.2025 and recommended to motivate the students to opt any course(s) other than their core programme of study (theory papers only) through self-learning mode and extra credits can be awarded on their successful completion. However, such students availing this option shall not opt for any of the 100% CIA courses. This skill set will broaden intellectual horizons, foster holistic and integrative learning and equip diverse skill sets. This is applicable for the students to be admitted from the academic year 2026-2027 and onwards.

1. Semester Restriction:

Students may choose the courses offered only within their current semester. Courses beyond the semester in which they are enrolled shall not be permitted.

2. Course Type:

Only **theory courses** may be opted under this provision. Practical courses, Extra Departmental Courses (EDC), and courses assessed entirely through Continuous Internal Assessment (CIA) shall not be eligible.

3. Evaluation Method:

A **100% End of Semester Examination (ESE)** shall be conducted for the chosen course.

4. Marks & Scheme:

The ESE shall be conducted in accordance with the marks prescribed for the particular course in the approved scheme, along with its corresponding credit allocation.

5. **Conversion of Marks:**

The marks obtained by the student in the ESE shall be converted to a scale of **100 marks** for uniformity.

6. **Award of Credits:**

The credits allotted to the course in the scheme shall be transferred to the student as **Extra Credit**, provided the student secures the prescribed pass mark in the ESE.




PRINCIPAL

PRINCIPAL
Kongunadu Arts & Science College
Coimbatore - 641 029

**KONGUNADU ARTS AND SCIENCE COLLEGE (AUTONOMOUS)
COIMBATORE - 641029**

**THE MODALITIES FOR THE CONDUCT OF 100% CIA PRACTICAL
EXAMINATIONS (For EDC Courses)**

CONDUCT OF 100% CIA PRACTICAL EXAMINATIONS

1. The Students shall appear for **TWO** CIA practical examinations which are evaluated as 100% internal examinations.
2. The students must appear **TWO** CIA practical examinations compulsorily, since End of Semester examinations will NOT be conducted for the above said course.
3. If any of the student(s) could not appear for CIA Examinations, as per reasons mentioned in the College Calendar, re-examination shall be conducted as per the existing procedures and norms.

The CIA Practical Examination mark breakup for the Extra Departmental Courses (EDC) offered for the UG & PG Programme is given below:

S.No.	Component Distribution	Marks
1.	CIA Practical I – 60 marks converted to 30	30
2.	CIA Practical II – 60 marks converted to 30	30
3.	Continuous assessment of practical (Observation to be submitted*) (15 Experiments/Programs x 2 = 30 marks)	30
4.	Record	05
5.	Attendance	05
Total		100

* In case a student is absent for an Experiment/Program conducted on a particular day, the student will not be allowed to compensate that Experiment/Program and will be awarded zero for that particular Experiment/Program and shall be marked absent. In case any student has an attendance lack; the concerned faculty handling the course in consultation with HoD may permit the student who has an attendance lack to compensate one or two Experiment/Programs as the case may be to enable them to become eligible with mandate of 75% attendance to appear for the Continuous Internal Practical Examinations. However the compensated Experiment/Programs will not be awarded any marks whatsoever.




PRINCIPAL

PRINCIPAL
Kongunadu Arts & Science Col
Coimbatore - 641 029

**THE MODALITIES FOR THE CONDUCT OF 100% CIA
EXAMINATIONS**

PREAMBLE

As per the recommendations of the Curriculum Development Cell in its meeting held on 27.08.2021, and decision taken in the General Board of Studies meeting held on 16.03.2022, the courses **Cyber Security and Information Security** were introduced in the III semester for all the UG programmes and in the even semester for the PG programme respectively for the students admitted from the academic year 2022-2023 and onwards. Also, it was unanimously decided to conduct 100 % CIA examinations (No End of Semester Examinations) for these courses. The name of the Courses Cyber Security and Information Security are renamed as **Basics of Cyber Security** and **Fundamentals of Information Security** as per the decision taken in the General Board of Studies meeting held on 26.03.2026 for the students to be admitted from the academic year 2026-2027 & onwards. As per the recommendations of the Curriculum Development Cell in its meeting held on 07.03.2022, it was approved in the BOS meeting held on 19.03.2022 to conduct 100% CIA Examinations for the **Extra Departmental Courses** offered in the UG and PG Programmes for the students admitted from the academic year 2022-2023 and onwards. The cited decisions had been approved by the Academic council in its meeting held on 18.04.2022. As per the recommendations of the Curriculum Development Cell in its meeting held on 27.02.2024, and decision taken in the General Board of Studies meeting held on 02.05.2024, the course **Basics of IPR** was introduced in the VI semester for all the UG programmes for the students admitted from the academic year 2024-2025 and onwards and decided to conduct 100 % CIA examinations (NO End of Semester Examinations) for the course.

Hence, the modalities is recommended for the following:

- (i) Conduct of I & II CIA Examinations
- (ii) Question Paper Pattern
- (iii) CIA Examination Mark Breakup
- (iv) Attendance Calculation

CONDUCT OF I & II CIA EXAMINATIONS

1. The CIA Examinations I & II for the above said courses must be conducted along with the other courses under centralized system.
2. The students must appear I & II CIA Examinations compulsorily, since **End of Semester Examinations will NOT be conducted** for the above said courses.
3. If any of the student (s) could not appear for CIA Examinations for the above said courses, with reasons mentioned in the College Calendar, re-examination shall be conducted as per the existing procedures.

QUESTION PAPER PATTERN

The following question paper pattern will be followed for the above said courses:

Section A - Multiple Choice	(10 × 1 = 10 Marks)
Section B - Either or Type	(5 × 5 = 25 Marks)
Section C - Either or Type	(5 × 8 = 40 Marks)

Maximum Marks : 75

Duration : 3 Hours

CIA EXAMINATION MARK BREAKUP

The CIA Examination mark breakup for the courses **Basics of Cyber Security, Fundamentals of Information Security and Basics of IPR** is given below:

S.No.	Distribution Component	Marks
1	CIA I – 75 Marks Converted to 30	30
2	CIA II – 75 Marks Converted to 30	30
3	Seminar/Objective Capacity Testing	10
4	Seminar/Objective Capacity Testing	10
5	Attendance	05
6	Any Case Study related to Cyber Security (as a Group)	15
	Total	100

The CIA Examination mark breakup for the **Extra Departmental Courses** offered for UG/PG Programmes is given below:

S.No.	Distribution Component	Marks
1	CIA I – 75 Marks Converted to 40	40
2	CIA II – 75 Marks Converted to 40	40
3	Seminar/Objective Capacity Testing	05
4	Seminar/Objective Capacity Testing	05
5	Attendance	05
6	Others (Group Discussion, Flipped Class room, etc.,)	05
	Total	100

ATTENDANCE CALCULATION

1. Separate attendance register must be maintained for **Basics of Cyber Security, Fundamentals of Information Security and Basics of IPR** in the Department and the final consolidated Attendance must be submitted to the COE along with the assessment Marks.
2. The attendance must be calculated by using the following formula:
$$\text{Attendance percentage} = \text{Number of Classes attended} / \text{Number of Classes conducted} \times 100$$
3. The students should be allowed to write the CIA examinations as per the existing norms related to attendance. The staff in charge of the respective courses have the responsibility to calculate the attendance percentage and submit the same to the Coordinator of the CIA Examination Committee during the I CIA and II CIA Examinations.
4. If the staff in charge finds that students have not put up enough attendance during the I CIA Examinations, he/she shall counsel the student(s) appropriately so that at the end of the course they have sufficient Attendance.




PRINCIPAL
Kongunadu Arts & Science College
Coimbatore - 641 029

UCS 1

Sub Code: 26UCS101

ProgrammeCode:09		B.Sc., Computer Science		
Title of the Paper : Core Paper 1 – C and C++ Programming				
Batch 2026-2027	Hours/Week 5	Total Hours 75	Credits 4	Skill development

Course Objectives

1. To gain adequate knowledge on the need of programming languages and problem solving techniques.
2. To understand and differentiate the Procedure Oriented Paradigm and Object Oriented Paradigm .
3. To develop and implement the programs using Object Oriented concepts .

Course Outcomes (CO)

K1 to K5	CO1	Develop programming skills using the fundamentals and basics of C Language.
	CO2	Develop programs using the basic elements like control statements, Arrays and Strings
	CO3	Apply C++ features such as composition of objects ,Operator overloading, inheritance, Polymorphism etc., to develop programs
	CO4	Analyze the concepts of object oriented programming in terms of software reuse and managing complexity to solve real-world problems.
	CO5	Evaluate the concepts learnt through implementing and testing of the programs that are developed

Syllabus

UNIT I

[15 Hours]

Introduction to C – About ANSI Standard – Machine, Assembly and High level language – Assembler, Compiler and Interpreter – Structure of a C Program – Programming rules – Executing C Program – Advantages of C. The C declarations: The C Character set –Delimiters – Types of tokens – The C Keywords – Identifiers – Constants – Variables – Rules for defining variables – Data types – Type conversions.

UNIT II

[15 Hours]

Operator and Expressions: Operator precedence – Input and Output in C – Decision statements –The if statements – The if..else statements – The if..else..if ladder statements -The break statements – The continue statements – The goto statements – The switch statements – Loop control – The for loop – The while loop – The do..while loop. Array: Array declaration – Array initialization – Characteristics of array – One dimensional array – One dimensional array and operations – Two dimensional array and operations.

UNIT III

[15 Hours]

Functions in C++ - Classes of objects – Classes in C++ - Declaring objects – Defining member functions – Characteristics of member functions – inline function – Array of object – friend function – Overloading member functions – Constructor and Destructor: Constructor and

Destructor – Characteristics of Constructor and Destructor – Constructors with arguments – Overloading constructor – Copy constructor – Destructor

UNIT IV**[15 Hours]**

Operator Overloading and Type conversion – Overloading unary operator – Overloading binary operator – Overloading with friend function – Type conversion – Inheritance: Types of inheritance – Single inheritance – Multilevel inheritance – Multiple inheritance – Hierarchical inheritance – Hybrid inheritance – Virtual base class – Abstract class.

UNIT V**[15 Hours]**

Pointer: Features of pointer – Pointer Declaration – Pointer to pointer – void pointer – Pointer to class – Pointer to object – this pointer – pointer to derived classes and base class – pointer to member – Applications with files – Exception handling.

* - Self Study and questions for examinations may be taken from the self-study portions also.

Text Books:

1. Ashok N Kamthane (2002), “**Programming with ANSI and Turbo C**”, 1st Edition, Pearson Education Publications.
2. Michael J. Pont (2002), “**Embedded C**”, Pearson Education Publications (Chapter 1 Only).

Reference Books :

1. E .Balagurusamy(1998), “**Programming in ANSI C**”, TMH publications.
2. HenryMullish & Herbert L Cooper (1996), “**The Spirit of C**”, Jaico Publication House.

Website Links:

1. <https://bca.klesnc.edu.in/wp-content/uploads/2025/07/Chapter-3-Introduction-to-C-Programming.pdf>
2. <https://www.geeksforgeeks.org/c/decision-making-in-c/>
3. <https://www.geeksforgeeks.org/cpp/c-classes-and-objects/>
4. <https://www.gacbe.ac.in/pdf/ematerial/18MCS13C-U4.pdf>
5. <https://gacbe.ac.in/pdf/ematerial/18BIT23C-U4.pdf>

UCS 3

MAPPING

PSO CO	PSO 1	PSO 2	PSO 3	PSO 4	PSO 5
CO1	S	S	S	S	S
CO2	S	S	S	S	S
CO3	S	S	S	S	H
CO4	S	S	H	H	H
CO5	S	S	S	H	H

S – Strong

H – High

M – Medium

L – Low

Content prepared by (Based on Inputs)	
Signature of the Course in-charge	Signature of the HOD

UCS 4**Subject Code :26UCS1CL**

Programme Code:09		B.Sc., Computer Science		
Title of the Paper : Core Practical 1 – C and C++ Programming–Lab				
Batch 2026-2027	Hours/Week 5	Total Hours 75	Credits 2	Employability

Course Objectives

1. To understand the field of programming using C language.
2. To familiarize the fundamental syntax and semantics of C language.
3. To enhance the analyzing and problem solving skills and use the same for writing programs in C.

Course Outcomes (CO)

K3 to K5	CO1	Develop programming skills using the fundamentals and basics of C Language.
	CO2	Develop programs using the basic elements like control statements, Arrays and Strings
	CO3	Enable effective usage of arrays, structures, functions and pointers.
	CO4	Implement files and command line arguments.
	CO5	Evaluate the ideas and concepts using testing of the programs

LIST OF PRACTICAL PROBLEMS

1. Write a C Program to find the sum, average, Standard deviation for a given set of numbers.
2. Write a C Program to generate 'n' Prime numbers.
3. Write a C Program to find the biggest number among a set of numbers.
4. Write a C Program to arrange a set of numbers in ASCENDING ORDER.
5. Write a C Program to merge a set of numbers available in Two arrays into a single Array.
6. Write a C Recursive function to Calculate factorial value.
7. Write a C Program to display the content of an array using pointers.
8. Write a C Program Which takes a file as command line argument and copy it to another file.
9. Write a C++ Program to class ARITH which consists of a FLOAT and INTEGER variable. Write member functions ADD(), SUB(), MUL(), DIV(), MOD() to perform addition , multiplication , division and modulus respectively. Write a member functions to get and display values.
10. Write a Program to define class A,B,C . The class C is derived from A and B. Defining count() member function in all the classes as virtual , count the number of objects created.
11. Write a Program to implement destructor.
12. Write a Program to implement Multilevel Inheritance.
13. Write a Program to Overload member functions in Base and Derived class.
14. Write a Program to implement the concept function with default arguments
15. Write a Program using command line arguments to take 2 files as arguments and copy the contents of the first five into the second file with line number.

Guidelines to the distribution of marks for Practical Examinations:

Two Questions will be given for each student. (3 Hours / **60Marks**)

Record: **10 Marks**

Particulars	Program1 (Marks)	Program2 (Marks)
Algorithm	10	10
Program Coding	10	10
Execution	5	5

MAPPING

PSO CO	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	S	S	S	S	S
CO2	S	S	S	S	S
CO3	S	S	S	S	H
CO4	S	S	H	H	H
CO5	S	S	H	H	S

S– Strong

H –High

M–Medium

L–Low

Content prepared by (Based on Inputs)	
Signature of the Course in-charge	Signature of the HOD

UCS 6

Sub Code: 26UCS202

Programme Code:09		B.Sc., Computer Science		
Title of the Paper : Core Paper 2 – Java Programming				
Batch 2026-2027	Hours/Week 5	Total Hours 75	Credits 4	Skill development

Course Objectives

1. To understand and differentiate the Procedure Oriented Paradigm and Object Oriented Paradigm .
2. To acquire knowledge about Classes, Objects, Inheritance and Polymorphism
3. To develop and implement the programs using Object Oriented concepts .

Course Outcomes (CO)

K1 to K5	CO1	Remember the characteristics of Procedure and Object Oriented Programming Languages
	CO2	Understand the fundamentals of C++ programming structure, function overloading and constructors.
	CO3	Apply C++ features such as composition of objects ,Operator overloading, inheritance,Polymorphism etc., to develop programs.
	CO4	Analyze the concepts of object oriented programming in terms of software reuse and managing complexity to solve real-world problems.
	CO5	Evaluate the concepts learnt through implementing and testing of the programs that are developed.

Syllabus

UNIT I

[15 Hours]

Introduction to C++ - Key concepts of OOP – advantages – OOP languages –I/O in C++. C++ declarations. Control structures: Decision making statements: if..Else, jump, goto, break,continue, Switch case statements. **Loops in C++: for, while, do..while loops***-Functions in C++- inline Functions- function overloading.

UNIT II

[15 Hours]

Classes and Objects : Declaring objects – defining member functions- static member variables and functions – array of objects – friend functions – overloading member functions – constructors and destructors –
Note: Unit 2 and 3 refers to the Consumer Protection Act, 2086. Any change in law would be added .

UNIT III

[15 Hours]

Operator overloading: overloading unary, binary operators – overloading friend function- type conversion . Inheritance: Types of Inheritances – Single, multilevel, multiple, hierarchical, hybrid, Multipath inheritance- virtual base classes – abstract classes.

UNIT IV**[15 Hours]**

Pointers-Declaration-Pointer to class, object-this pointer – Pointer to derived classes and base classes- Arrays- characteristics – arrays of classes –Binding ,Polymorphism and Virtual Functions.

UNIT V**[15 Hours]**

Files – File Stream classes – File modes – Sequential File Read/Write operations –Templates – Exception handling – **Strings and String Functions ***.

* - Self Study and questions for examinations may be taken from the self study portions also.

Text Book:

1. Ashok N Kamthane (2003), “**Object oriented Programming with Ansi and Turbo C++**”, 1st Edition,Pearson Education Publication.

Reference Books:

1. E.Balagurusamy (1998), “**Object oriented programming with C++**”, TMH Publication.
2. Maria Litvin & Gary Litvin (2002), “**C++ for you**”, Vikas Publication.
3. John R Hubbard (2002), “**Programming with C++**”, 2nd Edition,TMH Publication.

Website Links:

1. <https://romanglushach.medium.com/the-evolution-of-java-a-historical-perspective-e15c3d7e5f85>
2. <https://www.baeldung.com/java-constants-good-practices>
3. <https://www.scribd.com/document/684397626/Array-String-and-Vector>
4. <https://www.slideshare.net/slideshow/error-managing-and-exception-handling-in-java/113316738>
5. <https://www.geeksforgeeks.org/java/file-handling-in-java/>

MAPPING

PSO CO	PSO 1	PSO 2	PSO 3	PSO 4	PSO 5
CO1	S	S	S	H	H
CO2	S	S	H	S	S
CO3	S	H	H	S	H
CO4	S	S	S	S	M
CO5	S	S	S	H	H

S – Strong

H – High

M – Medium

L – Low

Content prepared by (Based on Inputs)	
Signature of the Course in-charge	Signature of the HOD

UCS 8**Sub Code : 26UCS2CM**

Programme Code:09		B. Sc., Computer Science		
Title of the Paper : Core Practical 2 – Java Programming – Lab				
Batch 2026-2027	Hours/Week 5	Total Hours 75	Credits 2	Employability

Course Objectives

1. To understand the object-oriented programming principles implemented through JAVA programs.
2. To know the event-driven programming methods, including creating and manipulating objects, classes, graphics concepts and applet programming.
3. To design, code, debug and implement JAVA programs.

Course Outcomes (CO)

K3 to K5	CO1	Apply the fundamentals of Java programming language in software development.
	CO2	Examine the basics of Java programming, multi-threaded programs and Exception handling.
	CO3	Analyze and use Java in a variety of applications.
	CO4	Illustrate a software application using the Java programming language.
	CO5	Evaluate the ideas and concepts using testing of the programs.

LIST OF PRACTICAL PROBLEMS

1. Write a program to create and display a message on window.
2. Write a program to draw several shapes in a created window.
3. Write a program to create an Applet and draw grid lines.
4. Write a java program to create a frame with two buttons called father and mother. When we click the father button the name of the father, his age and designation must appear. When we click mother button similar details of mother should appear.
5. Write a java program to create four text fields for the name, street, city and pincode with suitable labels. Also add a button called My Details, when you click the My Details button your name, street, city and pincode must appear in the text fields.
6. Write a Java program to create a frame with three text fields for name, age and qualification and a text field of multiple line for address.
7. Write a Java program to demonstrate multiple selection list box.
8. Write the Java Program to create a menu bar and pulldown menus.

UCS 9

Sub Code : 26UCS2CM

9. Develop a Java Program to create a window, when we press M or m the window displays Good Morning, A or a the window displays Good Afternoon, E or e the window displays Good Evening N or n the window displays Good Night.
10. Write a Program to move different shapes (Circle, Ellipse, Square, Rectangle) according to the arrow key pressed
11. Write a Program to draw Circle, Ellipse, Square, Rectangle at the mouse click position.
12. Write a Program to handle the divide by zero exception.
13. Write a Program to create an exception called payout of bounds and throw the exception.
14. Write a Program to explain the multithreading with the use of multiplication tables. Three threads must be defined. Each one must create one multiplication table; they are 5 tables , 7 tables and 13 table.
15. Write a Program to illustrate thread priority. Create three threads and assign 3 different priorities.

Guidelines to the distribution of marks for Practical Examinations:

Two Questions will be given for each student. (3Hours/60 marks)

Record: **10 Marks**

Particulars	Program1 (Marks)	Program2 (Marks)
Algorithm	10	10
Program Coding	10	10
Execution	5	5

MAPPING

PSO CO	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	S	S	S	H	H
CO2	S	S	H	S	S
CO3	S	H	H	S	S
CO4	S	S	S	M	S
CO5	S	S	M	S	S

S– Strong

H –High

M–Medium

L–Low

Content prepared by (Based on Inputs)	
Signature of the Course in-charge	Signature of the HOD

Programme Code:09		B. Sc., Computer Science		
Title of the Paper : Core Paper 3 – Python Programming				
Batch 2026-2027	Hours/Week 4	Total Hours 60	Credits 5	Skill Development

Course Objectives

1. To Understand the fundamentals of Python Programming
2. To get exposure to Problem solving skills with Python
3. To Acquire knowledge about python's core data structures and functions

Course Outcomes (CO)

K1 to K5	CO1	Remember the concept of Data types in python programming
	CO2	Understand the concept of input / output operations in file
	CO3	Apply the arrays in python programming
	CO4	Illustrate a software application using the string functions in Python
	CO5	Evaluate the ideas and concepts using list

UNIT I:**[12 Hours]**

Introduction to python: Python – Features of python – Executing of a python program – Python Virtual Machine (PVM) – Memory management in python – Garbage collection in python – Data types in python: Comments in python – Built-in datatypes – sequences in python – Sets – Literals in python.

UNIT II:**[12 Hours]**

Operations in python - Input and Output: Output statements – Input statements. Control statements – The if statement - The if..else statement - The if..elif..else statement – While loop – Infinite loops – Nested loops – The break statement – The continue statement .

UNIT III:**[12 Hours]**

Arrays in python: Array – Creating an array – Importing the array module – indexing and slicing on array – Processing the arrays – Viewing and copying arrays – Dimensions of arrays

UNIT IV:**[12 Hours]**

Strings and Characters: Creating Strings – Length of a string – indexing in strings – Slicing the strings – Concatenation of strings – Removing space from a string – Sorting strings – Searching in the string. Function: Defining a function – Calling a function – Returning results from a function – Returning multiple values from a function.

UNIT V:**[12 Hours]**

List: Creating list using range() function – Updating the elements of a list – Concatenation of two lists – Methods to process list – Sorting the list elements – Dictionaries: Operations on Dictionaries – Dictionary methods.

* - Self Study and questions for examinations may be taken from the self study portions also.

Text Books:

1. Deepali Srivastava (2024) “Ultimate Python Programming” 1st edition, BPB Publications.
2. Monu Singh, Rakesh K Yadav, Srinivas Arukonda (2021), “Zero to Mastery in Python Programming” 2nd edition Vei Publications

Reference Book:

1. Dr.R.Nageswara Rao (2021), “Core Python Programming” 3rd edition, Dreamtech Publications.
2. M.Sundarrajan, Mani Deepak Choudhry, S.Jeevanandham, Akshya Jothi (2024), “Python Programming Beginners Guide”, Notionpress Publications.

Website Links:

1. <https://city.ac.in/Files/R20Materials/I-II/Python.pdf>
2. <https://www.geeksforgeeks.org/python/conditional-statements-in-python/>
3. <https://www.geeksforgeeks.org/python/python-arrays/>
4. <https://www.geeksforgeeks.org/python/python-string/>
5. <https://www.geeksforgeeks.org/python/python-lists/>

MAPPING

PSO CO	PSO 1	PSO 2	PSO 3	PSO 4	PSO 5
CO1	S	S	S	S	M
CO2	S	S	S	S	S
CO3	S	H	S	S	H
CO4	H	S	H	S	M
CO5	S	S	S	S	M

S – Strong

H – High

M – Medium

L – Low

Content prepared by (Based on Inputs)	
Signature of the Course in-charge	Signature of the HOD

Programme Code:09		B. Sc., Computer Science		
Title of the Paper : Core Practical 3 – Python Programming – Lab				
Batch 2026-2027	Hours/Week 5	Total Hours 75	Credits 2	Employability

Course Objectives

1. To gain knowledge on the concepts of python programming.
2. To design python applications in different domain and be able to analyse their performance.
3. To get exposure to programming with python.

Course Outcomes (CO)

K3 to K5	CO1	Apply the concepts of Python programming
	CO2	Understand the concepts of python using data structures
	CO3	Analyze programming with python
	CO4	Illustrate the python packages
	CO5	Evaluate the ideas and concepts using python.

LIST OF PRACTICAL PROBLEMS

1. Write a python program to find a given number is odd or even.
2. Write a python program to check whether given year is leap or not.
3. Write a python program to find largest number among three.
4. Write a python program to display multiplication table
5. Write a program to create, append and remove lists in python.
6. Write a program to demonstrate working with tuples in python.
7. Write a program to demonstrate working with dictionaries in python
8. Write a python program to convert temperatures to and from Celsius, Fahrenheit
9. Write a python program to find factorial of an number using recursion
10. Write a python program for stack operation.
11. Write a python program for queue operation.
12. Write a python program for singly linked list.
13. Write a python program for doubly linked list.
14. Write a python program for binary search.
15. Write a python program for merge sort.

Guidelines to the distribution of marks for Practical Examinations:

Two Questions will be given for each student. (3Hours/60 marks)

Record: 10 Marks

Particulars	Program1 (Marks)	Program2 (Marks)
Algorithm	10	10
Program Coding	10	10
Execution	5	5

MAPPING

PSO CO	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	S	S	S	H	H
CO2	S	S	H	S	S
CO3	S	H	H	S	S
CO4	S	S	S	M	S
CO5	S	S	M	S	S

S– Strong

H –High

M–Medium

L–Low

Content prepared by (Based on Inputs)	
Signature of the Course in-charge	Signature of the HOD

UCS 14

Sub Code: 26UCS3A3

Programme Code:09		B. Sc ., Computer Science		
Title of the Paper : Allied Paper 3 – Data Structures				
Batch 2026-2027	Hours/Week 5	Total Hours 75	Credits 5	Skill development

Course Objectives

1. To know the concepts of fundamentals of writing algorithms and approach in problem solving.
2. To represent the basic concepts of stack, queue, linked list, trees and graphs.
3. To understand the concepts of searching and sorting techniques.

Course Outcomes (CO)

K1 to K5	CO1	Remember the concepts of algorithms for searching, sorting and dynamic programming.
	CO2	Understand the representations of data and various algorithm
	CO3	Apply appropriate algorithms and data structures for real time applications.
	CO4	Analyze the complexity of different algorithms
	CO5	Evaluate the special trees and Hashing Techniques

Syllabus

UNIT I

[15 Hours]

Introduction – overview - **How to create programs and analyze them ***. Arrays – structures – ordered lists – representation of arrays – simple applications.

UNIT II

[15 Hours]

Stacks and queues – Fundamentals – structure-operations –Multiple stacks and queues. Applications
Evaluation of Expressions.

UNIT III

[15 Hours]

Linked lists – single linked lists – Linked stacks and queues – **The storage pool *** - Applications – Polynomial addition, sparse matrices. Double Linked Lists – Dynamic storage management – **Garbage collection and compaction ***.

UNIT IV**[15 Hours]**

Trees : Basic Terminology – Binary Trees – Binary Tree Representation – Applications of Trees.

Searching: Binary, sequential, and Fibonacci. Sorting:– Internal sorting Insertion, quick, merge, heap, radix sorts – Symbol tables – Static tree – Dynamic tree – Hash tables.

UNIT V**[15 Hours]**

Files Queries and Sequential Organization : Sequential - Random – Index - Inverted – Linked File organization , Cellular Partitions

* - Self Study and questions for examinations may be taken from the self study portions also.

Text Book:

1. Ellis Horowitz & Sartaj Sahani (1999), “**Fundamentals of Data Structures**”, Galgotia book source.

Reference Books:

1. Ashok N Kamthane (2004), “**Programming and Data Structures**”, Pearson Education.
2. Robert Kruse, C.L.Jondo, Bruse Leung (2008), “**Data Structures and Program Design in C**”, Pearson Education, Asia, Second Edition.

Website Links:

1. https://www.w3schools.com/dsa/dsa_intro.php
2. https://www.tutorialspoint.com/data_structures_algorithms/array_data_structure.htm
3. <https://www.c-sharpcorner.com/article/understanding-stacks-and-queues-in-data-structures/>
4. <https://www.tpointtech.com/dynamic-memory-allocation-in-data-structure>
5. <https://www.numberanalytics.com/blog/ultimate-guide-internal-sorting-data-structures>

MAPPING

CO \ PSO	PSO 1	PSO 2	PSO 3	PSO 4	PSO 5
CO1	S	S	S	H	H
CO2	S	H	S	M	S
CO3	S	H	M	H	H
CO4	S	S	S	S	S
CO5	S	S	S	H	H

S – Strong**H – High****M – Medium****L – Low**

Content prepared by (Based on Inputs)	
Signature of the Course in-charge	Signature of the HOD

Programme Code:09		B. Sc., Computer Science		
Title of the Paper : Core Paper 4 – Relational Database Management system				
Batch 2026-2027	Hours/Week 4	Total Hours 60	Credits 5	Skill Development & Entrepreneurship

Course Objectives

1. To understand the different issues involved in the design of database system.
2. To know the essential RDBMS Concepts like database security, integrity and normalization.
3. To design and build a simple database system and demonstrate competence with the fundamental tasks involved with modeling and designing a RDBMS

Course Outcomes (CO)

K1 to K5	CO1	Remember data independence, data models for database systems, database schema and database instances
	CO2	Understand and use data manipulation language to query and manage a database
	CO3	Analyze various database types
	CO4	Apply normalization concepts for designing a good database with integrity constraints
	CO5	Evaluate the principles behind systematic database design approaches by covering conceptual design, logical design through normalization.

Syllabus

UNIT I

[11 Hours]

Database Systems Architecture: Database management system – Introduction to RDBMS – The SQL language – Network architectures – Views of data – Data independence – Structure of data management systems – Database management system models.

UNIT II

[14 Hours]

Relational model – Entity Relationship model – Generalization and Specialization – Relational RDBMS – Relational operations – Integrity constraints over relations – normalization. Relational Query Languages: Introduction to SQL – SQL types.

UNIT III

[12 Hours]

Data Definition Language – Constraints – Data Manipulation language – Data query language – Sorting the data – Data Control Language – Transaction Control Language. Normalization – First normal form – Second normal form – Functional dependency - Third normal form – Transitive dependency – De-normalization.

UNIT IV

[12 Hours]

SQL concepts: Features of SQL – functions – Aggregate functions – Group by clause – Number functions – Character functions – Date functions – Set operators in SQL – Concepts of join – Types of joins.

UNIT V

[11 Hours]

PL/SQL concepts: Introduction to PL/SQL - PL/SQL - PL/SQL data types - PL/SQL Constructs - PL/SQL blocks using Dates – Cursors – Procedures – Functions – Packages – Triggers.

* - Self Study and questions for examinations may be taken from the self study portions also.

Text Book:

1. Dr. Ms.Manisha Bharambe, Mrs.Veena Gandhi, Dr.A.B.Nimbalkar (2023), “Relational Database Management System” 2nd Edition, Nirali Prakashan Publishers

Reference Books:

1. Dr.Madhavi Vaidya, “RDBMS In – Depth Mastering SQL and PL/SQL Concepts, Database design, ACID Transaction, and Practice Real Implementation of RDBMS”, BPB Publication, 2021.
2. Silberschatz, Abraham (2022) “Relational Database System Concepts” 7th Edition MCH Publications.

Website Links:

1. <https://www.geeksforgeeks.org/dbms/purpose-of-database-system-in-dbms/>
2. <https://www.scaler.com/topics/database-languages-in-dbms/>
3. <https://www.geeksforgeeks.org/dbms/relational-model-in-dbms/>
4. <https://www.geeksforgeeks.org/sql/sql-trigger-student-database/>
5. <https://www.geeksforgeeks.org/dbms/dbms-architecture-2-level-3-level/>
6. <https://www.ibm.com/think/topics/data-mining>

MAPPING

PSO CO	PSO 1	PSO 2	PSO 3	PSO 4	PSO 5
CO1	S	S	S	S	M
CO2	S	S	S	S	S
CO3	S	H	S	S	H
CO4	H	S	H	S	M
CO5	S	S	S	S	M

S – Strong

H – High

M – Medium

L – Low

Content prepared by
(Based on Inputs)

Signature of the Course in-charge

Signature of the HOD

Programme Code:09		B. Sc., Computer Science		
Title of the Paper :		Core Practical 4 – Visual Basic .Net Programming Lab		
Batch 2026-2027	Hours/Week 5	Total Hours 75	Credits 2	Employability

Course Objectives

- 1.To develop applications using Graphical User Interface tools.
- 2.To understand the design concepts.
- 3.To design and build database systems and demonstrate their competence.

Course Outcomes (CO)

K3 to K5	CO1	Apply the concepts of Visual Basic
	CO2	Examine the various Controls in Visual Basic
	CO3	Analyze how to design and develop the event-driven applications using Visual Basic framework
	CO4	Illustrate the applications using the components of toolbox
	CO5	Evaluate the ideas and concepts using implementation and testing of the programs

LIST OF PRACTICAL PROBLEMS

1. Write a VB.Net program to find the largest element from the array of integers.
2. Write a VB.Net program to compare two strings.
3. Write a VB.Net program to check the palindrome of given string.
4. Write a VB.Net program to check the given number is even or odd.
5. Write a VB.Net program to check leap year.
6. Write a VB.Net program to print the table of given number.
7. Write a VB.Net program to create a simple calculator application.
8. Write VB.Net program for menu editor and Common dialog control.
9. Write a VB.Net program for using checkbox and option button to give the effect of fonts such as Bold, Italic, Underline, Strike through respectively for the text entered in the Rich TextBox.
10. Develop a VB.Net program for Railway reservation system.
11. Develop a VB.Net program for Payroll report generation.

UCS 19

Subject Code : 26UCS4CO

12. Develop a VB.Net program to maintain student attendance.
13. Develop a VB.Net program for student mark statement.
14. Develop a VB.Net program to prepare telephone billing information.
15. Develop a VB.Net program to fill the data into Data Grid View

Guidelines to the distribution of marks for Practical Examinations:

Two Questions will be given for each student. (3Hours/60 marks)

Record: **10 Marks**

Particulars	Program1 (Marks)	Program2 (Marks)
Algorithm	10	10
Program Coding	10	10
Execution	5	5

MAPPING

PSO CO	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	S	S	S	S	M
CO2	S	S	S	S	S
CO3	S	H	S	S	H
CO4	H	S	H	S	M
CO5	S	S	S	S	M

S– Strong

H –High

M–Medium

L–Low

Content prepared by (Based on Inputs)	
Signature of the Course in-charge	Signature of the HOD

Subject Code : 23035414				
Programme Code:09	B.Sc., Computer Science			
Title of the Paper : Allied Paper 4–Digital Principles and Computer System Architecture				
Batch 2026-2027	Hours/Week 5	Total Hours 75	Credits 5	Skill Development

Course Objectives

1. To know the basics of computer hardware and how software interacts with computer hardware.
2. To familiarize with different numbering methods like binary, octal, and hexadecimal.
3. To understand the concepts of memory hierarchy and compare different methods for computer architecture.

Course Outcomes (CO)

K1 to K5	CO1	Remember basic structure of computer, numbering methods, arithmetic and logical operations performed by computers.
	CO2	Understand various data transfer techniques in digital computer and control unit operations.
	CO3	Apply performance issues in processor and memory design of a digital computer various data representations.
	CO4	Analyze architectures and computational designs and computer architecture concepts related to design of modern processors, memories and I/Os.
	CO5	Evaluate the performance of commercially available computers.

Syllabus**UNIT- I****[15 Hours]**

Number Systems and Codes - Binary Number System: Binary to Octal, Decimal, Hexadecimal Conversions – Decimal Number System : Decimal to Binary, Octal, Hexadecimal Conversions – Octal Number System : Octal to Binary, Decimal, Hexadecimal Conversions - Hexadecimal Number System : Hexadecimal to Binary, Octal, Decimal Conversions –ASCII Code – Excess – 3 Code – Gray Code.

UNIT- II**[15 Hours]**

Digital Logic : The Basic Gates – AND, OR, NOT – Universal Logic Gates : NAND and NOR – AND-OR-Invert Gates.

Combinational Logic Circuits : Boolean Laws and Theorems – Sum-of-Products Method - Truth Table to Karnaugh Map – Pairs, Quads and Octets – Karnaugh Simplification - Don't Care Conditions- Product-of-Sums Method.

UNIT – III**[15 Hours]**

Multiplexers - Demultiplexers – 1-of-16 Decoders – BCD-Decimal Decoders - Encoders – Flip-flops: RS Flip-flops- Edge-triggered RS Flip-flops - Edge-triggered D Flip-flops - Edge-triggered JK Flip-flops.

UNIT – IV**[15 Hours]**

Central Processing Unit: General Register Organization - Stack Organization – Instruction Formats – Addressing Modes.

Input–Output Organization: **Peripheral Devices** * - Input-Output Interface – Asynchronous Data Transfer (strobe control & handshaking) – Priority Interrupt – Direct Memory Access – Input – Output Processor – Serial Communication.

UNIT –V**[15 Hours]**

Memory Organization: Memory Hierarchy– Main Memory– Cache Memory – Virtual Memory. Multiprocessors: **Characteristics of Multiprocessors** * - Interconnection Structures.

* -Self Study and Questions for Examinations may be taken from the self study portions also.

Text Books:

1. Albert Malvino, Donald P. Leach (1995), “**Digital Principles and Applications**”, Third Edition, McGrawHill Company [Unit I, II, III].
2. M. MORRIS MANO (1999), “**Computer system Architecture**“, 3rd Edition, Pearson Education Publications, [Unit IV, V].

Reference Books:

1. T.C. Bartee (2003), “**Digital computer Fundamentals**“, Sixth Edition, Tata McGraw Hill.
2. John P. Hayes (1998), “**Computer Architecture and Organization**“, Third Edition, Tata McGraw Hill Publishers Pvt Ltd.

Website Links:

1. <https://www.sctevtservices.nic.in/docs/website/pdf/140294.pdf>
2. <https://herovired.com/learning-hub/blogs/arrays-in-data-structure>
3. <https://byjus.com/jee/basic-logic-gates/>
4. <https://www.geeksforgeeks.org/digital-logic/multiplexers-in-digital-logic/>
5. <https://www.eicta.iitk.ac.in/knowledge-hub/data-structure-with-c/stacks-and-queues-implementation-operations-and-applications>
6. <https://www.electronicsforu.com/technology-trends/learn-electronics/flip-flop-rs-jk-t-d>

UCS 22

Subject Code : 26UCS4A4

MAPPING

PSO CO	PSO 1	PSO 2	PSO 3	PSO 4	PSO 5
CO1	S	S	S	H	H
CO2	S	S	H	S	S
CO3	H	M	S	H	H
CO4	S	S	S	S	M
CO5	S	S	S	H	S

S – Strong

H – High

M – Medium

L – Low

Content prepared by (Based on Inputs)	
Signature of the Course in-charge	Signature of the HOD

UCS 23**Sub Code :26UCS505**

Programme Code:09	B.Sc ., Computer Science			
Title of the Paper : Core Paper 5 – Artificial Intelligence				
Batch 2026-2027	Hours/Week 5	Total Hours 75	Credits 6	Skill development & Employability

Course Objectives

1. To understand the basic concepts of Artificial Intelligence and identify the AI problems and domains.
2. To know appropriate search techniques to solve the problems.
3. To represent and access the domain specific knowledge.

Course Outcomes (CO)

K1 to K5	CO1	Remember the nature of AI problems and task domains of AI.
	CO2	Under stand the appropriate search procedures to solve the problems.
	CO3	Apply the suitable knowledge representation method.
	CO4	Analyze the acquired knowledge and infer new knowledge.
	CO5	Evaluate the AI techniques for encoding and accessing the knowledge in the development of AI systems.

Syllabus**UNIT I****[15 Hours]**

Introduction: AI Problems - AI techniques - Criteria for success. Problems, Problem Spaces, Search: State Space Search - Production Systems - Problem Characteristics - Issues in Design of Search.

UNIT II**[15 Hours]**

Heuristic Search techniques: Generate and Test - Hill Climbing- Best-First Search – OR Graphs – A* Algorithm - Problem Reduction – AND-OR Graph – AO* Algorithm, Constraint Satisfaction, Means-ends Analysis.

UNIT III**[15 Hours]**

Knowledge Representation Issues: Representations and Mappings -Approaches to Knowledge Representations -Issues in Knowledge Representations - Frame Problem.

UNIT IV**[15 Hours]**

Using Predicate Logic: Representing Simple Facts in Logic - Representing Instance and Isa Relationships Computable Functions and Predicates - Resolution - Natural Deduction.

UNIT V**[15 Hours]**

Representing Knowledge using Rules: Procedural Vs Declarative Knowledge – **Logic Programming – Forward Vs Backward Reasoning** * – Matching – Control Knowledge.Expert Systems : Introduction – Characteristic Features of Expert System – Background History– Applications – Importance of Expert Systems.Introduction to Neural Networks, Fuzzy Logic and Genetic Algorithms

* - Self Study and questions for examinations may be taken from the self-study portions also.

Text Books:

1. Elaine Rich and Kelvin Knight (1991), " **Artificial Intelligence**", Tata McGraw Hill Publishers company Pvt Ltd, Second Edition, (chapters 1-6only).
2. Dan.W.Patterson, " **Introduction to Artificial Intelligence and Expert Systems**", Prentice Hall, India Learning Pvt Ltd, 2009.
3. S.Rajasekaran and G.A.Vijayalakshmi Pai, " **Neural Networks, Fuzzy Logic and Genetic Algorithms: Synthesis and Applications**", PHI Learning Pvt.Ltd , New Delhi, 2011 (chapter-1 only)

Reference Books :

1. George F Luger (2002), " **Artificial Intelligence** ", 4th Edition, Pearson Education Publ.
2. V.S.Janakiraman and K.Sarukesi (2001), " **Foundations of AI and Expert System**", Mac Milan India Ltd.

Website Links:

1. <https://cloud.google.com/learn/what-is-artificial-intelligence>
2. <https://www.geeksforgeeks.org/artificial-intelligence/heuristic-search-techniques-in-ai/>
3. <https://www.geeksforgeeks.org/artificial-intelligence/knowledge-representation-in-ai/>
4. <https://www.geeksforgeeks.org/artificial-intelligence/issues-in-the-design-of-search-programs-in-artificial-intelligence/>
5. <https://nareshit.com/blogs/understanding-trees-and-graphs-in-ai-applications>

MAPPING

PSO CO	PSO 1	PSO 2	PSO 3	PSO 4	PSO 5
CO1	S	S	S	H	H
CO2	S	S	H	S	S
CO3	S	H	M	H	H
CO4	S	S	S	S	H
CO5	S	S	S	S	H

S – Strong

H – High

M – Medium

L – Low

Content prepared by (Based on Inputs)	
Signature of the Course in-charge	Signature of the HOD

Programme Code:09	B.Sc., Computer Science			
Title of the Paper : Core Paper 6 – Internet of Things				
Batch 2026-2027	Hours/Week 6	Total Hours 90	Credits 5	Skill development

Course Objectives

1. To understand the fundamentals of IoT
2. To get exposure to Programming Raspberry Pi.
3. To acquire knowledge about IoT Enabling Technologies.

Course Outcomes (CO)

K1 to K5	CO1	Remember the concept of Physical and logical design of IoT
	CO2	Understand the fundamental concepts and architecture of IoT Systems.
	CO3	Apply the various protocols for IoT.
	CO4	Analyze the applications of IoT in real time scenario.
	CO5	Evaluate the concept of Xively and Amazon Cloud.

Syllabus

UNIT I

[18Hours]

Introduction to Internet of Things: Introduction – Physical Design of IoT – Logical Design of IoT – IoT Enabling Technologies – IoT levels & Deployment Templates. Domain specific IoTs: Introduction – Home Automation – Cities – Environment – Energy – Retail – Logistics – Agriculture – Industry – Health & Lifestyle.

UNIT II

[18 Hours]

IoT and M2M: Introduction – M2M – Difference between IoT and M2M – SDN and NFV for IoT – Software Defined Networking – Network Function Virtualization. IoT System Management with NETCONF-YANG: Need for IoT Systems Management – Simple Network Management Protocol (SNMP) – Limitation of SNMP – Network Operator Requirements – NETCONF – YANG – IoT systems management with NETCONF-YANG – NETOPEER..

UNIT III

[18 Hours]

IoT Platforms Design Methodology – Introduction – IoT Design Methodology – Case study on IoT system for weather monitoring. IoT systems – Logical Design using Python: Introduction – Installing Python – Python Data types & data structures – Control flow – Functions – Modules – Packages – File Handling – Date/Time Operations – Classes – Python Packages of Interest for IoT.

UNIT IV**[18 Hours]**

IoT Physical Devices & Endpoints: What is an IoT Device – Basic building blocks of an IoT Device – Exemplary Device: Raspberry Pi – Linux on Raspberry Pi – Raspberry Pi Interfaces: Serial – SPI – I2C – Programming Raspberry Pi with Python – Other IoT Devices.

UNIT V**[18 Hours]**

IoT Physical Servers & Cloud Offerings: Introduction to cloud storage models & Communication APIs – WAMP Autobahn for IoT – Xively Cloud for IoT – Python Web application Framework Django – Designing a RESTful web API – Amazon EC2 – Amazon AutoScaling – Amazon S3 – Amazon RDS – Amazon DynamoDB – Amazon Kinesis – Amazon SQS – Amazon EMR.

* - Self Study and questions for examinations may be taken from the self study portions also.

Text Book:

1. Dr.Rajiv Chopra(2022),”Internet of Things”, 1st edition ,S.K.Kataria and Sons Publications.

Reference Books:

1. Sudip Misra (2021),”Introduction to IoT”, Cambridge University,Press Publication.
2. Raj Kamal (2022) “Internet of Things(IoT): Architecture and Design Principles,” 2nd edition Mcgraw Hill Publication.

Website Links:

1. <https://www.profajaypashankar.com/wp-content/uploads/2020/10/SYIT-FINAL-PYTHON-PROGRAMMING-NOTES.pdf>
2. <https://www.programiz.com/python-programming/type-conversion-and-casting>
3. <https://python4csip.com/files/download/04.%20WORKING%20WITH%20FUNCTIONS-2.pdf>
4. <https://www.geeksforgeeks.org/python/internet-of-things-with-python/>
5. <https://www.coursehero.com/file/91341987/IOT-UNIT-2-1ppt/>

MAPPING

PSO CO	PSO 1	PSO 2	PSO 3	PSO 4	PSO 5
CO1	S	S	M	H	S
CO2	H	S	H	S	S
CO3	S	H	H	S	H
CO4	S	S	S	M	H
CO5	S	S	S	M	S

S – Strong**H – High****M – Medium****L – Low**

Content prepared by (Based on Inputs)	
Signature of the Course in-charge	Signature of the HOD

UCS 27**Sub Code : 26UCS5CP**

Programme Code:09	B.Sc ., Computer Science			
Title of the Paper : Core Practical 5 – Internet of Things - Lab				
Batch 2026-2027	Hours/Week 6	Total Hours 90	Credits 2	Employability

Course Objectives

1. To gain knowledge on the concepts of python programming.
2. To design IoT applications in different domain and be able to analyze their performance
3. To know the various hardware and sensing technologies to build IoT applications.

Course Outcomes (CO)

K3 to K5	CO1	Apply the basic concepts of python programming with IoT.
	CO2	Examine the IoT Enabling Technologies and Domain Specific IoT's.
	CO3	Analyze Programming in Arduino with Python
	CO4	Illustrate the Python Packages for IoT.
	CO5	Evaluate the ideas and concepts using Python with IoT.

LIST OF PRACTICAL PROBLEMS

1. Connect with the Available Wi-Fi Using Arduino.
2. Sense the Available Networks Using Arduino.
3. Write a program to measure the Distance Using Ultrasonic Sensor and Make LED Blink Using Arduino.
4. Familiarize with Arduino and perform necessary software installation.
5. Write a program to turn on and off an LED connected to an Arduino board using Python.
6. Write a program to interface push button/ Digital sensor (IR) with Arduino and turn ON LED when push button is pressed or at a sensor detection.
7. Write a program to interface Bluetooth with Arduino and turn LED ON/OFF when '1'/'0' is received from the smart phone using Bluetooth.
8. Write a program to measure the Soil Moisture using Arduino and Soil Moisture Sensor
9. Write a program to use DHT-11 sensor to measure the Temperature and Humidity using Arduino using Python.

10. Write a program to measure the Distance using Ultrasonic sensor and Arduino
- 11 Detect the Vibration of an Object Using Arduino
- 12 Detect the object Using IR Sensor
- 13 Sense a Finger When it is Placed on Board Using Arduino
- 14 Write a program for Temperature Notification Using Arduino
- 15 Use LDR to Vary the Light Intensity of LED Using Arduino
- 16 Potentiometer and IR Sensor interfacing with Arduino
- 17 TDS Sensor Interfacing with Arduino
- 18 Actuators controlling by mobile using Arduino

Guidelines to the distribution of marks for Practical Examinations:

Two Questions will be given for each student. (3Hours/60 marks)

Record: **10 Marks**

Particulars	Program1 (Marks)	Program2 (Marks)
Algorithm	10	10
Program Coding	10	10
Execution	5	5

MAPPING

PSO CO	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	S	S	M	H	S
CO2	H	S	S	S	H
CO3	S	H	S	H	H
CO4	S	M	S	S	H
CO5	S	S	S	H	S

S– Strong

H –High

M–Medium

L–Low

Content prepared by (Based on Inputs)	
Signature of the Course in-charge	Signature of the HOD

Subject Code : 203 03037				
Programme Code:09	B. Sc., Computer Science			
Title of the Paper : Core Paper 7– Data Communication and Networking				
Batch 2026-2027	Hours/Week 6	Total Hours 90	Credits 5	Skill development

Course Objectives

1. To know the OSI reference model and the TCP/IP reference model and protocols such as TCP, UDP and IP.
2. To familiarize the concepts of protocols, network interfaces, and design/performance issues in local area networks and wide area networks.
3. To understand the concepts of transmission media, routing algorithms and collision control.

Course Outcomes (CO)

K1 to K5	CO1	Remember the organization of computer networks, factors influencing computer network development and the reasons for having variety of different types of networks.
	CO2	Understand the Internet structure and can see how standard problems are solved and the use of cryptography and network security
	CO3	Apply the knowledge of different techniques of error detection and correction to detect and solve error bit during data transmission.
	CO4	Analyze the requirements for a given organizational structure and select the most appropriate networking architecture and technologies
	CO5	Evaluate the different types of network devices and their functions within a network. Identify the different types of network topologies and protocols.

Syllabus**UNIT I****[18 Hours]**

Introduction to Data Communications and Networking: Introduction-Fundamental Concepts - Data Communication – Protocols – **Standards** * – Signal Propagation – Analog and Digital Signals. Information Encoding: Representing Different Symbols – Minimizing Errors - Analog and Digital Transmission Methods – Modes of Data Transmission and Multiplexing. Transmission Errors: Detection and Correction.

UNIT II**[18 Hours]**

Transmission Media: Guided Media - Unguided Media. Network Topologies: Mesh, Star, Tree, Ring, Bus – Switching: Circuit switching, Message switching, Packet switching. Routing Algorithms: Routers and Routing – Factors affecting Routing Algorithms – Routing Algorithms – Approaches to Routing – Network Protocols and OSI Model.

UNIT III**[18 Hours]**

Local Area Networks (LAN), Metropolitan Area Networks (MAN) and Wide Area Networks (WAN): LAN – Ethernet – MAN – Switched Multimegabit Data Services (SMDS) - WAN – WAN Architecture - WAN Transmission Mechanism - WAN Addressing – Packet Forwarding – Aloha - Integrated Services Digital Network (ISDN) – X.25 Protocol – Frame Relay.

UNIT IV**[18 Hours]**

Asynchronous Transfer Mode (ATM) - Internetworking Concepts, Devices, Internet Basics, History and Architecture – An Introduction to TCP / IP, IP, ARP, RARP, ICMP.

UNIT V**[18 Hours]**

TCP: Features of TCP, **Relationship between TCP and IP ***, Ports and Sockets, TCP connections, What makes TCP Reliable, TCP Packet Format – User Datagram Protocol (UDP): UDP Packet, Difference between UDP and TCP – Domain Name System (DNS) – Electronic Mail (Email) – File Transfer Protocol (FTP).

* - Self Study and questions for examinations may be taken from the self study portions also.

Text Book:

1. Achyut S. Godbole, (2007), **Data Communications and Networks**, Ninth reprint, Tata McGraw-Hill Publishing Company Limited.

Reference Books:

1. Behrouz A. Forouzan, (2007), **Data Communications and Networking**, Second Edition Update, Nineteenth reprint, Tata McGraw-Hill Publishing Company Limited.
2. Andrew S. Tanenbaum, (2001), **Computer Networks**, Third Edition, Prentice Hall of India

Website Links:

1. https://nhck.in/wp-content/uploads/2020/06/chapter-1_dcn.pdf
2. <https://www.sathyabama.ac.in/sites/default/files/course-material/2020-10/f>
3. <https://www.geeksforgeeks.org/computer-networks/transmission-modes-computer-networks/>
4. <https://dspmuranchi.ac.in/pdf/Blog/Data%20Encoding%202.pdf>
5. <https://www.geeksforgeeks.org/computer-networks/types-of-errors-in-computer-network/>

MAPPING

CO \ PSO	PSO 1	PSO 2	PSO 3	PSO 4	PSO 5
CO1	S	S	M	H	S
CO2	H	S	S	S	H
CO3	S	H	S	H	H
CO4	S	M	S	S	H
CO5	S	S	S	H	S

S – Strong**H – High****M – Medium****L – Low**

Content prepared by (Based on Inputs)	
Signature of the Course in-charge	Signature of the HOD

Programme Code:09		B .Sc., Computer Science		
Title of the Paper : Core Paper 8 – Data Analytics				
Batch 2026-2027	Hours/Week 5	Total Hours 75	Credits 4	Skill development & Employability

Course Objectives

1. To understand the fundamental concepts in data science.
2. To familiarize Data Classification, Sources of Data, Data Science user- roles and skills.
3. To acquire knowledge in Basics of R tool and statistical measures.

Course Outcomes (CO)

K1 to K5	CO1	Understand data classification, process of big data technology, user roles and skills in data science.
	CO2	Apply the fundamental concepts and techniques of data science in 360 view of Customer
	CO3	Analyze the methodologies of data science
	CO4	Implement the statistical measures using R
	CO5	Evaluate the data analysis techniques for applications handling large data.

Syllabus**UNIT I****[15 Hours]**

Data Evolution: Data Development Time Line – ICT Advancement-a Perspective – Data Growth-a Perspective – IT Components-Business Process – Landscape-Data to Data Science. Understanding data: Introduction – Type of Data: Numeric – Categorical – Graphical – High Dimensional Data — Data Classification – Hot Data – Cold Data – Warm Data – Thick Data – Thin Data - Classification of digital Data: Structured, Semi-Structured and Un-Structured. Sources of Data: Time Series – Transactional Data – Biological Data – Spatial Data – Social Network Data – Data Evolution – **Data Sources***

UNIT II**[15 Hours]**

Big Data Road Map : Digital Data – Characteristics of Big Data – Data Discovery – Big Data technology – Applications of Big Data HADOOP : Why HADOOP - HADOOP Milestones - HADOOP Architecture – Why HDFS (Hadoop Distributed File System) – HDFS Architecture

UNIT III**[15 Hours]**

Data Science: Data Science-A Discipline – Data Science vs Statistics, Data Science vs Mathematics, Data Science vs Programming Language, Data Science vs Database, Data Science vs Machine Learning. Data Analytics – Relation: Data Science, Analytics, Big Data Analytics. Data Science. Components: Data Engineering, Data Analytics-Methods and Algorithm, Data Visualization.

UNIT IV**[15 Hours]**

Exploring R Basics: Introduction – Getting started – R Features – R Studio – Packages and Library –Installing and Loading Packages – Starting R – R Basic Data types - R Basic operators – R Objects – R File formats 0 Importing and Exporting files. Data Visualization in R : Introduction – Exploratory data analytics – Lattice package – Datasets – Histogram – Densityplot – Box plot – Bar chart – Strip plot – Theoretical Quintile plot – **Dot plot***– Scatter plot.

UNIT V**[15 Hours]**

Statistical Measures – Introduction – Understanding data distribution – Usecase: Central tendency measure – Measure of variability – Range – Inter Quartile Range – Variability Analysis using Mean – Median Absolute deviation – Data Standardizing – **Sampling Distribution – Probability distribution** * – Hypothesis Tests.

* - Self Study and questions for examinations may be taken from the self study portions also.

Books for Study

Text Books:

1. V. Bhuvaneshwari, T. Devi (2016) “**Big Data Analytics: A Practitioner’s Approach**”.
2. V. Bhuvaneshwari (2018), “**Data Analytics with R Programming**”, Scitech Publications.

Reference Books:

1. Nina Zumal, John Mount (2014). Practical Data science in R, Managing Publication Company.
2. Bernard Kolman, Robert C. Busby and Sharon Ross (2004). Discrete Mathematical Structures, New Delhi: Prentice Hall.

Website Links:

1. <https://www.techstargroup.com/blog/big-data>
2. <https://www.geeksforgeeks.org/dbms/classification-of-data/>
3. <https://www.ibm.com/think/topics/data-science>
4. <https://www.geeksforgeeks.org/r-language/r-tutorial/>
5. <https://www.geeksforgeeks.org/r-language/central-tendency-in-r-programming/>

MAPPING

PSO CO	PSO 1	PSO 2	PSO 3	PSO 4	PSO 5
CO1	S	S	S	H	H
CO2	S	S	H	S	S
CO3	H	M	S	H	H
CO4	S	S	S	S	M
CO5	S	S	S	S	H

S – Strong**H – High****M – Medium****L – Low**

Content prepared by (Based on Inputs)	
Signature of the Course in-charge	Signature of the HOD

UCS 33**Sub Code: 26UCS609**

Programme Code:09	B. Sc ., Computer Science			
Title of the Paper : Core Paper 9 – PHP Programming				
Batch 2026-2027	Hours/Week 4	Total Hours 60	Credits 5	Skill development & Entrepreneurship

Course Objectives

1. To understand the basic programming techniques using PHP.
2. To gain an insight of creating classes and using functions in PHP.
3. To know the process of developing a PHP application and to work with files and directories.

Course Outcomes (CO)

K1 to K5	CO1	Remember the basic syntax of PHP
	CO2	Understand Arrays and Strings in PHP
	CO3	Apply the concepts of files and directories
	CO4	Analyze the database connectivity using PHP and SQL
	CO5	Evaluate the effectiveness of PHP programming concepts in developed applications.

Syllabus**UNIT - I****[11 Hours]**

Introduction to PHP – Basic development Concepts – Creating first PHP Scripts – Using Variable and Operators – Storing Data in variable – Understanding Data types – Setting and Checking variables Data types – Using Constants – Manipulating Variables with Operators.

UNIT-II**[13 Hours]**

Controlling Program Flow: Writing Simple Conditional Statements – Writing More Complex Conditional Statements – Repeating Action with Loops – **Working with String and Numeric Functions***.

UNIT-III**[12 Hours]**

Working with Arrays: Storing Data in Arrays – Processing Arrays with Loops and Iterations –Using Arrays with Forms – Working with Array Functions – **Working with Dates and Times***.

UNIT-IV**[12 Hours]**

Using functions and classes: Creating user defined functions –Creating classes - Working with Files and Directories: Reading Files – Writing Files – Processing Directories.

UNIT-V**[12 Hours]**

Working with Databases and SQL: Creating and populating a Database with MySQL and MySLi — Working with Cookies, Sessions – IOS and Android services.

* - Self Study and questions for examinations may be taken from the self study portions also.

Text Books:

1. Vikram Vaswani, (2008), **PHP – A Beginner’s Guide**, First Edition, Tata McGraw–Hill publications.
2. J.F. DiMarzio, (2008), **Android: A Programming Guide**, McGraw Hill Education India
3. Matt Neuburg, (2016), **iOS 10 Programming Fundamentals with Swift**, O'Reilly Media Pub

Reference Books:

1. Steven Holzner, (2007), **The PHP Complete Reference**, First Edition, Tata McGraw–Hill publications.
2. Steven Holzner, (2005), **Spring in to PHP5**, Addison Wesley Publications.

Website Links:

1. <https://www.geeksforgeeks.org/php/php-introduction/>
2. <https://medium.com/@julmer526/understanding-php-data-types-and-variables-a-beginners-guide-f8ac478a0599>
3. <https://www.geeksforgeeks.org/php/php-operators/>
4. <https://www.scribd.com/document/865573057/UNIT-II-Controlling-Program-Flow>
5. <https://www.geeksforgeeks.org/php/php-arrays/>

MAPPING

CO \ PSO	PSO 1	PSO 2	PSO 3	PSO 4	PSO 5
CO1	S	S	S	H	H
CO2	S	S	H	S	S
CO3	H	M	S	H	H
CO4	S	S	S	S	M
CO5	S	S	S	S	H

S – Strong

H – High

M – Medium

L – Low

Content prepared by (Based on Inputs)	
Signature of the Course in-charge	Signature of the HOD

Programme Code:09	B. Sc ., Computer Science			
Title of the Paper :		Core Practical 6 – PHP Programming Lab		
Batch 2026-2027	Hours/Week 5	Total Hours 75	Credits 2	Employability

Course Objectives

1. To develop the ability to build efficient web based applications using PHP
2. To learn the basic constructs in PHP Programming.
3. To utilize the concepts of Strings and Array functions in PHP applications.

Course Outcomes (CO)

K3 to K5	CO1	Apply the concepts of PHP programming fundamental features
	CO2	Examine string functions and arrays to develop the applications.
	CO3	Analyze file system functions.
	CO4	Illustrate SESSION and COOKIE concepts in PHP applications.
	CO5	Evaluate the web pages implemented containing PHP and MySQL.

List of Practical Programs

1. Develop a PHP program using controls and functions.
2. Design a simple web page to generate multiplication table for a given number.
3. Develop a PHP program and Check message passing mechanism between pages.
4. Develop a PHP program using String functions and Arrays.
5. Design a web page to compute age for a given date.
6. Develop a PHP program using parsing functions (useTokenizing)
7. Develop a PHP program to find the GCD of two numbers using user defined functions.
8. Develop a PHP program to check File System Functions.
9. Write a program to download a file from the server.
10. Write a program to generate mark statement of a student.
11. Develop a PHP program for mail ID creation.
12. Develop a PHP program to design a college application form using MYSQL table.
13. Design an authentication web page in PHP with MySQL to check username and password.
14. Write a program to store page views count in a SESSION, to increment the count on each refresh and to show the count on web page.
15. Write a PHP program to store current date-time in a COOKIE and display the 'Last visited on' Date- Time on the web page upon reopening of the same page.
16. Create a simple HTML form with fields for name and email. Write a PHP script to handle form submission and display the entered data.
17. Write a php program to check whether given number is Armstrong or not.
18. Write a php program to find largest values of two numbers using nesting of function.

Guidelines to the distribution of marks for Practical Examinations:

Two Questions will be given for each student. (3Hours/60 marks)

Record: **10 Marks**

Particulars	Program1 (Marks)	Program2 (Marks)
Algorithm	10	10
Program Coding	10	10
Execution	5	5

MAPPING

PSO CO	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	S	S	H	S	M
CO2	H	S	S	S	S
CO3	S	H	H	S	S
CO4	S	S	H	S	S
CO5	S	S	S	H	S

S– Strong

H –High

M–Medium

L–Low

Content prepared by (Based on Inputs)	
Signature of the Course in-charge	Signature of the HOD

Programme Code:09	B. Sc., Computer Science			
Title of the Paper:		Core Paper 10 – Information Security		
Batch 2026-2027	Hours/Week 5	Total Hours 75	Credits 5	Employability

Course Objectives

1. To understand the basics of computer security and cyber-crimes.
2. To familiarize the role of security in operations system and databases.
3. To know various types of viruses, attacks and threats in hardware, software and data security.

Course Outcomes (CO)

K1 to K5	CO1	Remember the basics of computer security and its terminology.
	CO2	Understand the various Attacks, Threats and Vulnerabilities in the system.
	CO3	Apply cyber security risk management policies in order to adequately protect critical information and assets.
	CO4	Analyze the needs of the Information security of data.
	CO5	Evaluate the appropriate security technologies and policies to protect computers and digital information.

Syllabus

UNIT I

[15 Hours]

Is there Security Problem in Computing? : What does Security mean? –Attacks-The Meaning of Computer Security-Computer Criminals. Protection in general purpose operating systems: Protected Objects and Methods of Protection-Memory and Address Protection-Control of Access to General Objects-File Protection Mechanisms-User Authentication.

UNIT II

[15 Hours]

Program Security: Secure Programs- Non malicious Program Errors – Viruses and other Malicious Code - Targeted Malicious Code - Controls against Program Threats.

UNIT III

[15 Hours]

Data Mining - Data Mining Vs Query Tools – Data Mining in Marketing – Knowledge Discovery Process Data Warehousing – Why and how to build a Data Warehouse – Data Warehouse Architectural Strategies and Organization Issues – Meta Data – Tools for Data Warehousing – Application of Data warehousing in E- Government.

UNIT IV

[15 Hours]

Security in Networks: **Network Concepts***-Threats in Networks-Firewalls-Intrusion Detection Systems. Web Security: Web Application (In) Security – Mobile Security: Rethinking Mobile Security

UNIT V

[15 Hours]

Legal and Ethical Issues in Computer Security: Protecting Programs and Data- Information and the Law-Computer Crime- Ethical Issues in Computer Security.

Text Books:

1. Charles P Pfleeger and Shai Lawrence Pfleeger, (2007), “**Security in Computing**”, Fourth Edition, Prentice Hall.
2. Dafydd Stuttard and Marcus Pinto, (2011), “**The Web Application Hacker’s Handbook: Finding and Exploiting Security Flaws**”, 2nd Edition, Wiley.
3. Lawrence C. Miller, CIISP , “**Mobile Security for Dummies**”, Palo Alto Networks Edition.
4. C.S.R.Prabhu , “Data Mining introductory and Advanced Topics”, Pearson Education 2003.
5. C.S.R.Prabhu , “**Data Warehousing – Concepts , Techniques , Products and Applications**”, PHI Second Edition , 2007 (Unit – III)

Reference Books:

1. Ross J.Anderson and Ross Anderson (2001), “**Security Engineering: A Guide to Building Dependable Distributed Systems**”, Wiley.
2. Debby Russell and Sr.G.T.Gangemi (2006),”**Computer Security Basics (Paperback)**”, Second Edition, O’Reilly Media.
3. Thomas R.Peltier, Justin Peltier and John Blackley (2001), “**Information Security Fundamentals**”, 2ndEdition, Prentice Hall, Reprint.

Website Links:

1. <https://www.tutorialspoint.com/article/computer-security-and-its-challenges>
2. <https://www.geeksforgeeks.org/computer-science-fundamentals/computer-security-overview/>
3. <https://www.scribd.com/presentation/834379544/GJIMT-UGCA1948-L9>
4. <https://www.geeksforgeeks.org/ethical-hacking/threats-to-information-security/>
5. <https://www.fortra.com/blog/what-data-mining-security-highlighting-its-threats-opportunities-and-benefits>

MAPPING

PSO CO	PSO 1	PSO 2	PSO 3	PSO 4	PSO 5
CO1	S	M	H	H	H
CO2	M	H	H	H	H
CO3	H	H	H	M	M
CO4	S	S	H	M	M
CO5	S	S	H	S	S

S – Strong

H – High

M – Medium

L – Low

Content prepared by (Based on Inputs)	
Signature of the Course in-charge	Signature of the HOD

UCS 39**Subject Code : 26UCS6Z1**

Programme Code:09	B. Sc., Computer Science			
Title of the Paper : Project Work and Viva-Voce				
Batch 2026-2027	Hours/Week 4	Total Hours 60	Credits 5	Employability

Course Objectives

1. To understand and select the task based core skills.
2. To get knowledge about analytical skill for solving the selected task.
3. To get confidence for implementing the task and solving the real time problems.

Course Outcomes (CO)

K3 to K5	CO1	Apply the domain specific knowledge and define the project.
	CO2	Analyze the achievable goals and choose the right software for project development
	CO3	Estimate the resources and create the project schedule
	CO4	Test the deliverables
	CO5	Evaluate the project results.

MARK DISTRIBUTION:

Particulars	Marks
Project Report*	60
Viva-Voce*	20

*Both Internal & External Examiners shall evaluate Project & Viva-Voce jointly.

UCS 40

ProgrammeCode:09	B .Sc .,Computer Science.			
Title of the Paper : Major Elective Paper I–Cloud Computing				
Batch:2026-2027	Hours/Week 5	Total Hours 75	Credits 5	Skill development

Course Objective

1. To understand the basics of cloud computing and its architecture.
2. To acquire the knowledge on accessing the cloud and cloud storage.
3. To familiarize the concepts of cloud applications, cloud services and cloud security.

Course Outcomes (CO)

K1 to K5	CO1	Remember the concepts of cloud Architecture and its services.
	CO2	Understand the different services providers and its services, tools.
	CO3	Apply the various web based applications for collaborating everyone in the cloud computing.
	CO4	Analyze the best service provider for cloud computing in terms of storage, services.
	CO5	Evaluate the appropriate cloud computing solutions and recommendations according to application use

Syllabus**UNIT-I****[14 Hours]**

Cloud Computing Basics: Cloud Computing Overview – Applications – Intranets and the Cloud. Hardware and Infrastructure: Clients– Security– Network - Services.

UNIT-II**[15 Hours]**

Cloud Computing Architecture: Introduction - Cloud Reference Model – Types of Clouds – Organizational aspects.

UNIT – III**[16 Hours]**

Accessing the Cloud: Platforms – Web Applications – Web Browsers. Cloud Storage: Overview –Cloud Storage Providers.

UNIT – IV**[15 Hours]**

Cloud Applications: Scientific Applications: Healthcare, Geosciences – Business and Consumer Applications: CRM and ERP, **Media Applications***, **Multiplayer Online Gaming***.

UNIT – V**[15 Hours]**

Standards: Application – Client – Infrastructure – Service. Software as a Service: Overview – Driving Forces - Industries – Healthcare, Banking.

* - Self Study and questions for examinations may be taken from the self study portions also.

UCS 41

Text Books:

1. Anthony T.Velte ,Toby J.Velte, Robert Elsenpeter (2010), “**Cloud Computing – A Practical Approach**” , TMH (UNIT I, UNIT III, UNIT V).
2. Rajkumar Buyya, Christian vecchiola , Thamarai selvi (2013), “**Mastering Cloud computing**”, Mc Gram Hill Edu, (UNIT II, UNIT IV).

Reference Books:

1. Haley Beard (July 2008), “**Cloud Computing Best Practices for measuring processes for on demand computing, Applications and data centers in the cloud with SLA’s** “ .
2. Judith Hurwitz, Robin Bloon (2009),” **Cloud Computing for Dummies**”.
3. Michael Miller (2009), “ **Cloud computing – Web based application** “ , Pearson Edu Inc, First Impression.

MAPPING

PSO CO	PSO 1	PSO 2	PSO 3	PSO 4	PSO 5
CO1	S	S	S	H	H
CO2	S	S	M	H	S
CO3	S	H	H	M	H
CO4	S	S	S	S	M
CO5	S	S	S	S	H

S – Strong

H – High

M – Medium

L – Low

Content prepared by (Based on Inputs)	
Signature of the Course in-charge	Signature of the HOD

UCS 42

ProgrammeCode:09	B.Sc ., Computer Science			
Title of the Paper : Major Elective Paper II – Software Engineering and Testing				
Batch 2026-2027	Hours/Week 5	Total Hours 75	Credits 5	Skill development & Employability

Course Objectives

1. To understand the basic software engineering methods and practices.
2. To familiarize the techniques for developing software systems.
3. To enrich the knowledge about object oriented design and software testing approaches.

Course Outcomes (CO)

K1 to K5	CO1	Remember the basic concepts of software engineering
	CO2	Understand the software engineering models in developing software applications.
	CO3	Apply the object oriented design in various projects
	CO4	Analyze the various software testing approaches
	CO5	Evaluate the Software testing Plan and Reporting

Syllabus**UNIT I****[15 Hours]**

Introduction – The Evolving Role of Software – Software Crisis – Software Myths – Software Engineering Technology – Software Process Models – Prototyping Model- Requirements Engineering – System Modeling.

UNIT II**[15 Hours]**

Requirements Analysis and Elicitation for Software – Software Prototyping – Specification – Mechanics of Structured Analysis – Data Dictionary –Elements of Analysis Model- Functional Modeling and Information Flow - Transform Mapping – Transaction Mapping.

UNIT III**[15 Hours]**

Object Oriented Design – Design for Object-Oriented Systems - System Design Process.
Introduction: Quality, Quality Assurance and Quality Control - Testing, Verification and Validation. Types of Testing: White-Box Testing- Black-Box Testing.

UNIT IV**[15 Hours]**

Integration Testing: What is Integration Testing-Integration Testing as a Type of Testing-Integration Testing as a Phase Testing - Scenario testing - System and Acceptance Testing: Functional versus Non-functional Testing - Functional Testing – Nonfunctional Testing – Acceptance Testing.

UNIT V

[15 Hours]

Performance Testing: Introduction - Factors Governing Performance Testing-Methodology for Performance Testing- Regression Testing: What is Regression Testing- Types of Regression Testing - **Test Planning*, Execution and Reporting***.

* - Self Study and questions for examinations may be taken from the self study portions also.

Text Books:

1. Roger S Pressman (2001), “**Software Engineering**”, 5th Edition, TMH Publishers [Unit I,II&III].
2. Srinivasan Desikan & Gopalswamy Ramesh (2006),”**Software Testing Principles and Practices**”, Pearson Education. [Unit IV & V]

Reference Books:

1. Ian Somerville (2001), “**Software Engineering**”, 6th Edition, Pearson Education Publication.
2. William E.Perry(2006), “**Effective Methods for Software Testing**”, 3rd Edition, Wiley, India.

Website Links:

1. <https://www.gacwrmd.in/learning/Computer/7MCE1E3-Software%20Engineering.pdf>
2. <https://www.geeksforgeeks.org/software-engineering/software-engineering-software-crisis/>
3. <https://xebrio.com/requirements-engineering/>
4. <https://blog.codingminutes.com/requirement-elicitation-and-analysis>
5. <https://study.com/academy/lesson/video/software-architecture-design-transform-mapping.html>
6. <https://www.geeksforgeeks.org/system-design/oops-object-oriented-design/>

MAPPING

PSO CO	PSO 1	PSO 2	PSO 3	PSO 4	PSO 5
CO1	S	S	H	S	M
CO2	H	S	S	S	S
CO3	S	H	H	S	S
CO4	S	S	S	M	S
CO5	S	S	H	S	H

S – Strong

H – High

M – Medium

L – Low

Content prepared by (Based on Inputs)	
Signature of the Course in-charge	Signature of the HOD

UCS 44

Programme Code:09	B.Sc ., Computer Science			
Title of the Paper : Major Elective Paper III–Embedded Systems				
Batch:2026-2027	Hours/Week 5	Total Hours 75	Credits 5	Employability

Course Objectives

1. To familiarize all aspects of design and development of an embedded System.
2. To understand hardware and software requirements for developing a system.
3. To know the basic concepts of operating systems and embedded system project management.

Course Outcomes (CO)

K1 to K5	CO1	Remember the basics about microcontrollers, embedded processors and their applications.
	CO2	Understand the internal architecture and interfacing of different peripheral devices with Microcontrollers.
	CO3	Apply key concepts of embedded systems like interrupts interaction, drivers, and ports with peripheral devices.
	CO4	Analyze the design concept of embedded systems.
	CO5	Evaluate the requirements of programming Embedded Systems, related software architectures and tool chain for Embedded Systems.

Syllabus

Unit I

[15 Hours]

Introduction to Embedded System: An Embedded System – Processor in the System– Other Hardware units – Software embedded into a system – Exemplary embedded system – Embedded system on chip and in VLSI circuit. Processor and Memory organization: Structural units in a processor – Processor selection – **Memory devices, Memory selection** *- Allocation of memory – DMA.

Unit II

[14 Hours]

Devices and buses for device networks: I/O devices – Device drivers and Interrupts servicing mechanism: Device drivers – Parallel port device drivers – Serial port device drivers– Interrupt servicing mechanism – Context and the periods for context-switching, dead-line and interrupt latency.

Unit III

[16 Hours]

Program modeling concepts in single and multiprocessor systems: Modeling process for software analysis before software implementation – Programming models for event controlled or response time constrained real time programs. Inter-process communication and synchronization of processes, tasks and threads: Multiple processor – Problem of sharing data by multiple tasks and routines – Inter-process communication.

Unit IV

[15 Hours]

Real time operating systems: Operating system services – I/O subsystem – Network operating systems – Real time and embedded operating systems – Interrupt routine in RTOS environment – RTOS task scheduling.

Unit V**[15 Hours]**

Embedded system project management – embedded system design and code design issues in system development process – Uses of target system or its emulator and In circuit emulator – Uses of scopes and logic analysers for system h/w tests – **Issues in embedded system design***.

* - Self Study and questions for examinations may be taken from the self study portions also.

Text Book:

1. RajKamal,(2007), **Embedded Systems – Architecture, Programming And Design**, Second Edition, TMH publications.

Reference Books:

1. David E Simon, (1999), **An Embedded Software Primer**, Thirteenth Reprint, Addison Wesley, Pearson Education Asia.
2. Tammy Noergaard, (2013), **Embedded System Architecture**, Second Edition, Elsevier.

MAPPING

PSO CO	PSO 1	PSO 2	PSO 3	PSO 4	PSO 5
CO1	S	S	S	H	H
CO2	S	S	H	S	S
CO3	S	H	M	H	H
CO4	S	S	S	S	H
CO5	S	H	S	S	S

S – Strong

H – High

M – Medium

L – Low

Content prepared by (Based on Inputs)	
Signature of the Course in-charge	Signature of the HOD

UCS 46

ProgrammeCode:09	B. Sc., Computer Science			
Title of the Paper : Major Elective Paper IV– System Software and Operating Systems				
Batch 2026-2027	Hours/Week 5	Total Hours 75	Credits 5	Employability

Course Objective

1. To understand the design and implementation of language processors, compilers and Linkers.
2. To attain an in-depth understanding of Process Concepts, Memory Management, Job Scheduling
3. To get exposure to seek optimization techniques and File Systems

Course Outcomes (CO)

K1 to K5	CO1	Remember the program generation and program execution activities.
	CO2	Understand the functioning of Assembler, Compiler and Linker
	CO3	Apply various process concepts
	CO4	Analyze job scheduling algorithms
	CO5	Evaluate various storage management strategies

Syllabus

UNIT I

[15 Hours]

Language Processors and Assemblers: Introduction – Language Processing activities – Fundamentals of language processing. Elements of assembly language programming – A simple assembly scheme – Pass structure of assemblers

UNIT II

[15 Hours]

Compilers and Linkers: Aspects of compilation – Compilation of Expressions – A toy code generator for expressions –Intermediate code for expressions – compilation of control structures – Code optimization – Optimizing transformations. Linkers: Execution of a program in language L - relocation and linking concepts.

UNIT III

[15 Hours]

What is an Operating System? – Process Concepts: Definition of Process - Process States – Process States Transition – Interrupt Processing – Interrupt Classes - Storage Management: Real Storage: Real Storage Management Strategies – Contiguous versus Non-contiguous storage allocation – Single User Contiguous Storage allocation- Fixed partition multiprogramming – Variable partition multiprogramming.

UNIT IV**[15 Hours]**

Virtual Storage: Virtual Storage Management Strategies – Page Replacement Strategies – Working Sets – Demand Paging – Page Size. Processor Management: Job and Processor Scheduling: Preemptive Vs Non-preemptive scheduling – Priorities – Deadline scheduling.

UNIT V**[15 Hours]**

Device and Information Management Disk Performance Optimization: Operation of moving head disk storage – Need for disk scheduling – Seek Optimization – File and Database Systems: File System – Functions – Organization – Allocating and freeing space – File descriptor – Access control matrix.

* - Self Study and questions for examinations may be taken from the self-study portions also.

Text Books:

1. D. M. Dhamdhere(2002), “**Systems Programming And Operating Systems**” Tata McGraw-Hill Publishing Company Limited -Second Revised Edition .
2. H.M. Deitel , Operating Systems, 2nd Edition, Person, 2003.

Reference Books:

1. Leland.L.Beck (1997), “**An Introduction to System Programming**”, Addison Wesley, Third Edition.
2. J Achyut S. Godbole, Operating Systems, TMH, 2002.

MAPPING

PSO CO	PSO 1	PSO 2	PSO 3	PSO 4	PSO 5
CO1	S	S	S	H	H
CO2	S	S	H	S	S
CO3	S	S	H	M	H
CO4	S	S	S	S	H
CO5	S	S	H	S	S

S – Strong**H – High****M – Medium****L – Low**

Content prepared by (Based on Inputs)	
Signature of the Course in-charge	Signature of the HOD

UCS 48

Programme Code:09		B.Sc ., Computer Science		
Title of the Paper : Major Elective Paper V– Block Chain Technology				
Batch:2026-2027	Hours/Week 5	Total Hours 75	Credits 5	Employability

Course Objectives

- 1.To introduce the technical aspects of public distributed ledgers, block chain systems, crypto currencies and smart contracts.
2. Students will learn how these systems are built, how to interact with them, how to design and build secure distributed applications.

Course Outcomes (CO)

K1 to K5	CO1	Stating block chain technologies basics are made possible through learning Distributed Database and various types of database.
	CO2	Stating the mining strategies followed in block chain teach the basic architecture behind the perfect building of block chain for industries.
	CO3	Classifying the limitations and proofs are another essential part of block chain technology, which are learned for betterment of creating block chain.
	CO4	Describing the history behind the block chain and learning about vulnerability, attacks and side chain gives an additional support for creating a secured block chain.
	CO5	Design a method for solving a problem case study with different perspective.

Syllabus**UNIT I****[15 Hours]**

Distributed Database, Two General Problem, Byzantine General Problem and Fault Tolerance, Hadoop Distributed File System, Distributed Hash Table, ASIC resistance, Turing Complete, Cryptography, Hash Function, Digital Signature – ECDSA, Memory Hard Algorithm, Zero Knowledge Proof positions.

UNIT II**[15 Hours]**

Introduction, Advantage over conventional distributed database, Block chain Network, Mining Mechanism, Distributed Consensus, Merkle Patricia Tree, Gas Limit, Transactions and Fee, Anonymity, Reward, Chain Policy, Life of Block chain application*, Soft & Hard Fork, Private and Public block chain.

UNIT III**[15 Hours]**

Nakamoto consensus, Proof of Work, Proof of Stake, Proof of Burn, Difficulty Level, Sybil Attack, Energy Utilization and Alternate, History, Distributed Ledger, Bitcoin protocols*, Mining strategy and rewards, Ethereum Construction, DAO, Smart Contract GHOST, Vulnerability, Attacks, Sidechain, Namecoin.

UNIT IV**[15 Hours]**

Stakeholders, Roots of Bitcoin, Legal Aspects – Crypto Currency Exchange, Black Market and Global Economy, Applications, Internet of Things, Medical Record Management System, Domain Name Service and Future of Block chain.

UNIT V**[15 Hours]**

Case Study on Naïve Block chain construction, Memory Hard Algorithm – Hash cash Implementation, Direct Acyclic Graph, Play with Go – Ethereum, Smart Contract Construction, Toy Application using Block Chain, Mining Puzzles.

UCS 49

* Self Study and questions for examinations may be taken from the self study portions also.

Teaching Methods

Smart Class Room/Power point presentation/Seminar/Quiz/Discussion/Flipped Class//Peer learning/Experiential Learning/Blended Learning

Text Book

1.Arvind Narayanan, Joseph Bonneau, Edward Felten, Andrew Miller and Steven Goldfeder, Bitcoin and Cryptocurrency Technologies: A Comprehensive Introduction, Princeton University Press (July 19, 2016).

Reference Books

1.S. Shukla, M. Dhawan, S. Sharma, S. Venkatesan, Blockchain Technology: Cryptocurrency and Application, Oxford University Press, 2019.

2.Josh Thompson, Block chain: The Block chain for Beginnings, Guide to Block chain Technology and Block chain Programming, Create Space Independent Publishing Platform, 2017.

MAPPING

PSO CO	PSO 1	PSO 2	PSO 3	PSO 4	PSO 5
CO1	S	S	H	S	S
CO2	S	H	S	H	M
CO3	M	S	H	H	S
CO4	S	M	S	M	H
CO5	S	S	M	H	S

S – Strong

H – High

M – Medium

L – Low

Content prepared by (Based on Inputs)	
Signature of the Course in-charge	Signature of the HOD

UCS 50

Programme Code:09	B.Sc ., Computer Science			
Title of the Paper : Major Elective Paper VI –Machine Learning				
Batch:2026-2027	Hours/Week 5	Total Hours 75	Credits 5	Skill Development & Employability

Course Objectives

1. To know the basic concepts of machine learning.
2. To apply the appropriate machine learning strategy for any given problem
3. To distinguish between, supervised, unsupervised and semi-supervised learning

Course Outcomes (CO)

K1 to K5	CO1	Remember the basic concepts and techniques of Machine Learning.
	CO2	Understand supervised, unsupervised or semi-supervised learning algorithms
	CO3	Apply the appropriate machine learning strategy for any given problem
	CO4	Analyze the uses of appropriate graph models of machine learning
	CO5	Evaluate the existing machine learning algorithms to improve its efficiency

Syllabus**UNIT I****[16 Hours]**

Learning – Types of Machine Learning – Supervised Learning – The Brain and the Neuron – Design a Learning System – Perspectives and Issues in Machine Learning – Concept Learning Task – Concept Learning as Search – Finding a Maximally Specific Hypothesis – Version Spaces and the Candidate Elimination Algorithm – Linear Discriminants – Perceptron – Linear Separability – Linear Regression.

UNIT II**[15 Hours]**

Multi-layer Perceptron – Going Forwards – Going Backwards: Back Propagation Error – Multi-layer Perceptron in Practice – Examples of using the MLP – Overview – Deriving Back-Propagation – Radial Basis Functions and Splines – Concepts – RBF Network – Curse of Dimensionality – Interpolations and Basis Functions – Support Vector Machines

UNIT III**[14 Hours]**

Learning with Trees – Decision Trees – Constructing Decision Trees – Classification and Regression Trees – Ensemble Learning – Boosting – Bagging – Different ways to Combine Classifiers – Probability and Learning – Data into Probabilities – Basic Statistics – Gaussian Mixture Models – Nearest Neighbor Methods – Unsupervised Learning – K means Algorithms – Vector Quantization – Self Organizing Feature Map

UNIT IV**[15 Hours]**

Dimensionality Reduction – Linear Discriminant Analysis – Principal Component Analysis – Factor Analysis – Independent Component Analysis – Locally Linear Embedding – ISO map – Least Squares Optimization – Evolutionary Learning – Genetic algorithms – Genetic Offspring: - Genetic Operators – Using Genetic Algorithms – Reinforcement Learning – Overview – Getting– Markov Decision Process

Markov Chain Monte Carlo Methods – Sampling – Proposal Distribution – Markov Chain Monte Carlo – Graphical Models – Bayesian Networks – Markov Random Fields – Hidden Markov Models – Tracking Methods

*** Self Study and questions for examinations may be taken from the self study portions also.**

Text Books

1. Stephen Marsland, —Machine Learning – An Algorithmic Perspective, Second Edition, Chapman and Hall/CRC Machine Learning and Pattern Recognition Series, 2014.
2. Tom M Mitchell, —Machine Learning, First Edition, McGraw Hill Education, 2013.

Reference Books

2. Peter Flach, —Machine Learning: The Art and Science of Algorithms that Make Sense of Data, First Edition, Cambridge University Press, 2012.
3. Jason Bell, —Machine learning – Hands on for Developers and Technical Professionals, First Edition, Wiley, 2014

MAPPING

PSO CO	PSO 1	PSO 2	PSO 3	PSO 4	PSO 5
CO1	S	S	S	H	H
CO2	S	S	H	S	S
CO3	S	S	H	M	H
CO4	S	S	S	S	H
CO5	S	S	H	S	S

S – Strong

H – High

M – Medium

L – Low

Content prepared by (Based on Inputs)	
Signature of the Course in-charge	Signature of the HOD

UCS 52

Sub Code: 26UGC3S1

Programme Code:		For B.A., BBA., B.Com., BCA. and B.Sc. Degree Students			
Title of the Paper : Skill Based Subject 1 – Basics of Cyber Security					
Batch 2026 - 2027	Semester: III	Hours / Week 2	Total Hours 30	Credits 3	Skill Development

COURSE OBJECTIVES

1. To provide fundamental knowledge of cyber security concepts and the digital environment.
2. To create awareness about cyber threats, cybercrimes, and common online frauds.
3. To develop the ability to identify risks associated with internet, mobile, and online transactions.
4. To familiarize students with safe practices in email, social media, and digital communication.
5. To introduce basic cyber laws, ethics, and responsible digital behavior.

COURSE OUTCOMES

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

K Level	CO Code	Course Outcome
K1 ↑ ↓ K5	CO1	Apply the fundamental concepts of cyber security and digital safety at appropriate place
	CO2	Identify various cyber threats, cybercrimes, and online frauds
	CO3	Enable safe practices while using internet, mobile, and e-commerce platforms
	CO4	Interpret security issues related to email and social media usage
	CO5	Comprehend cyber laws, ethics, and legal responses to cybercrime

SYLLABUS

UNIT I

6 Hours

Foundations of Cyber Security: Cyberspace and Digital Environment -Evolution of Cyber Security- Basic Concepts and terminology in Cybersecurity –Cybersecurity Threat – Defense in Depth concept in Cyber Security- Information Literacy – Types of False Information — Digital footprint — Cyber Frauds- Basic Safety Practices and Password Awareness - Multi-Factor Authentication (MFA)- Zero Trust Security Model.

UNIT II

6 Hours

Cyber Crimes & Threat Landscape: Introduction to AI in Cyber Security- Cyber Crimes- Important of Cybercrime- Types of Cyber Crime - CIA Triad – Tools for Confidentiality, Integrity, Availability -Cyber Crime & Digital Evidence Indian Perspective- Recent Cyber Crime Incidents-Social Engineering Frauds- Financial Frauds using Social Media Platforms- Ransomware Attacks -Deep fake based frauds –

Cryptocurrency scams -Dark Web basics - Preventive Measures for individuals and Organizations – Awareness and Safe Online Behavior- Incident Response Process.

UNIT III**6 Hours**

Internet, Mobile & Digital Transaction Security: Browser Security Tools – Mobile phone security and privacy settings – E-commerce concepts and risks – UPI Fraud Awareness -QR Code Scams - App permissions & Data Tracking – Malware Types and Cyber Attacks- Secure browsing and Data Theft & Public Wi-Fi Precautions – Symmetric vs Asymmetric Encryption.

UNIT IV**6 Hours**

Communication & Social Media Security: Basics of email usage and Communication – Email threats: Spam, Phishing, Malicious links- Fake News – Fake profiles, Cyber Bullying and Data Misuse –Computer Viruses – Antivirus and Firewall concepts – Safe sharing practices and Digital responsibility. Ethical Hacking.

UNIT V**6 Hours**

Cyber Laws, Ethics & Digital Responsibility: Introduction to Cyber Law – IT Act 2000 and Amendments– Data Protection Laws (India DPDP Act 2023). Intellectual Property in Digital Space- Cybercrime and legal provisions – User rights and responsibilities in cyberspace – Digital footprint and online identity – Personal data protection and privacy – Cyber ethics and responsible usage – Cyber safety awareness programs and best practices.

Case Study: Case studies of cyber law enforcement in India

Work Book

1. *Basics of Cyber Security*, prepared by Kongunadu Arts and Science College, Coimbatore

Reference Books

1. Data Security Council of India (DSCI), in collaboration with Seqrite, presents the second edition of the India Cyber, Threat Report 2025.
2. Green, J., Smith, A., & Brown, T. (2024). Information security management principles. Routledge.
3. Armstrong-Smith, S. (2024). Understand the cyber attacker mindset: Build a strategic security program. Kogan Page.
4. Ismail, Y., Lacy, F., & Belu, R. (Eds.). (2024). Cybersecurity: Threats, technologies, and emerging solutions. IntechOpen.
5. Rais, R., Morillo, C., Gilman, E., & Barth, D. (2023). Zero trust networks: Building secure systems in untrusted networks (2nd ed.). O'Reilly Media.
6. Shapiro, S. J. (2023). Fancy bear goes phishing: The dark history of the information age. Farrar, Straus and Giroux.
7. Tamil Nadu Fact Check Unit, Training Handbook
8. James Graham (2011), Cyber Security Essentials, CRC Press, Auerbach Publications, Taylor & Francis Group.
9. Kathryn Knerler (2022), 11 Strategies of a World-Class Cybersecurity Operations Center, MITRE Corporation.
10. Dr. Jeetendra Pande (2017), Introduction to Cyber Security, Uttarakhand Open University.
11. Rohas Nagpal (2008), Real world cyber crime cases, Cyber Crime & Digital Evidence – Indian Perspective, Asian School of Cyber Laws
12. Prof. (Dr.) Nilesh K. Modi (2021), Cyber Security Techniques, Dr. Babasaheb Ambedkar Open University.
13. Cyber Security Awareness Handbook (2020), Ciso Jil information Technology Limited.

14. Jeff Kosseff (2020), Cybersecurity Law, John Wiley & Sons, Inc.
15. Cyber Crime Law and Practice, The Institute of Company Secretaries of India, 2016
16. Yuri Diogenes (2018), Cybersecurity Attack and Defense Strategies, Packt Publishing.
17. Cybersecurity Handbook, Ministry of Digital Governance, National Cybersecurity Authority, June 2021.
18. Justin Hutchens (2024), The Language of Deception: Weaponizing Next Generation AI– Explores AI in social manipulation, deep fakes, and malware.
19. D.R. Halston (2025), Cyber Security Mastery Covers AI-driven attacks, cloud security, and career preparation.

Web References

1. <https://safety.google/>
2. <https://safety.google/security/security-tips/>
3. <https://www.simplilearn.com/tutorials/cyber-security-tutorial>
4. <https://www.getcybersmart.org/for-students>
5. <https://www.techbuddies.io/cyber-security-basics>

Mapping

CO \ PSO	PSO1	PSO 2	PSO 3	PSO 4	PSO 5
CO1	S	H	M	S	H
CO2	H	S	S	H	S
CO3	M	H	M	S	H
CO4	S	H	H	M	H

S – Strong

H – High

M – Medium

L – Low

UCS 55

Question Paper Pattern

(Internal Only)

Duration: 3hrs

Max: 75Marks

Section- A (10X1=10)

Choose the Correct Answer

Section – B (5X5=25)

Short answer questions, either or type, one question from each unit.

Section – C (5X8=40)

Essay answer questions, either or type,one question from each unit.

CIA EXAMINATION MARK BREAKUP

S.NO	DISTRIBUTION COMPONENT	MARKS
1.	CIA I -75 Marks Converted to 30	30
2.	CIA II-75 Marks Converted to 30	30
3.	Seminar / Objective capacity Testing	10
4.	Seminar / Objective capacity Testing	10
5.	Attendance	5
6.	Any Case Study Related to Cyber Security	15
Total		100

UCS 56

Programme Code:09		B. Sc., Computer Science		
Title of the Paper : Skill Based Subject 2 – RDBMS Lab				
Batch 2026-2027	Hours/Week 2	Total Hours 30	Credits 3	Skill Development & Entrepreneurship

Subject Code: 26UCS4SL

Course Objectives

1. To Understand and Apply core database concepts.
2. To Develop skills in SQL (Structured Query Language)
3. To design and implement databases

Course Outcomes

K3 to K5	CO1	Apply the fundamental concepts of relational database management system
	CO2	Examine the basic SQL for data definition (DDL), data manipulation (DML), and data control operations (DCL)
	CO3	Analyze the normalization techniques to optimize database design and ensure data integrity
	CO4	Illustrate the applications using the components of toolbox
	CO5	Evaluate the ideas and concepts using implementation and testing of the programs

List of Practical Programs

1. Create a table student (stud_id varchar (5), stud _name varchar(20), age number, phone varchar(10))
 - a) Insert 5 records and display it.
 - b) Add new field address with varchar datatype.
 - c) Remove field age.
2. Do the following operations into the student table:
 - a) Change the size of the stud_name to 30.
 - b) Delete all the records from student table.
 - c) Rename the table student to stud_details.
 - d) Drop the table.
3. Create a table hospital with the fields (doctor_id, doctor_name, department, qualification, experience). Write the queries to perform the following:
 - a) Insert 10 records.
 - b) Display the details of doctors.
 - c) Display the details of doctors who have the qualification 'MD'.
4. Do the following operations into hospital table:
 - a) Display all doctors who have more than 5 years experience but do not have the qualification 'MD'.
 - b) Display the doctors in 'Cardio' department.
 - c) Update the experience of doctor.
 - d) Delete the doctor.
5. Create a table sales_man (salesman_no primary key, salesman_name not null, place, phone_no unique)
 - a) Insert 10 records into sales_man table.
 - b) Delete primary key from sales_man table.
 - c) Add a column sno into sales_man and set it as primary key using ALTER statement.

6. Create the following tables:

Customer (accno primary key, cust_name, place)

Deposit (accno foreign key, deposit_no, amount)

Loan (accno foreign key, loan_no, loan_amount)

Write the following queries:

- Display the details of the customers.
 - Display the customers along with deposit amount who have only deposit with the bank.
 - Display the customers along with loan amount who have only loan with the bank.
 - Display the customers they have both loan and deposit with the bank.
 - Display the customer who have neither a loan nor a deposit with the bank.
7. Create a table product with the fields (product_code primary key, product_name, category, quantity, price)
- Display the records in the descending order of product_name.
 - Display product_code, product_name with price between 20 and 50.
 - Display the details of products which belongs to the categories of 'bath soap', 'paste', or 'washing powder'.
8. Do the following operations in product table:
- Display the products whose quantity less than 100 or greater than 500.
 - Display the products whose name starts with 'a'.
 - Display the products which do not belong to the category 'paste'.
 - Display the products whose name starts with 's' and belongs to the category 'washing powder'.

Guidelines to the distribution of marks for Practical Examinations:

Two Questions will be given for each student. (3Hours/60 marks)

Record: 10 Marks

Particulars	Program1 (Marks)	Program2 (Marks)
Algorithm	10	10
Program Coding	10	10
Execution	5	5

MAPPING

PSO CO	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	S	S	S	H	H
CO2	S	S	H	S	S
CO3	S	H	H	S	S
CO4	S	S	S	M	S
CO5	S	S	M	S	S

S– Strong

H –High

M–Medium

L–Low

Content prepared by (Based on Inputs)	
Signature of the Course in-charge	Signature of the HOD

Programme Code :		For B.A., BBA, B.Com, BCA and B.Sc., Degree Students			
Skill Based Subject III - BASICS OF INTELLECTUAL PROPERTY RIGHT'S					
Batch	Semester	Hours /	Total	Credits	Skill
2026-2027	VI	Week	Hours	2	Development
		2	30		

COURSE OBJECTIVES

1. To create awareness about recent trends in IPR and Innovation
2. To explore the basic concepts IPR
3. To focus upon trademarks, copyrights, patents, industrial designs and traditional knowledge.
4. To learn more about managing IP rights and legal aspects.

COURSE OUTCOMES

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

K1 ↑ K5 ↓	CO1	Know about basic concepts of IPR and patent
	CO2	Understand copyrights, industrial designs and geographical indication of goods.
	CO3	Differentiate between trademarks and trade secrets
	CO4	Acquire knowledge on protection of traditional knowledge and plant varieties.
	CO5	Manage and protect IP Rights

UNIT – I

(6 hours)

Introduction -origin and development of Intellectual Property Rights (IPR), need for protecting IP, **Patents:** Foundation of patent law, patent searching process, basic criteria of patentability. Patentable and non - patentable subject matters in India. Patent prior art search, drafting the patent specification and filing procedure

UNIT – II

(6 hours)

Copyrights: Fundamentals of copyright law, originality of material, right of reproduction, right to perform the work publicly, copyright ownership issues, notice of copyright. **Industrial Designs:** Kind of protection provided in Industrial design. **Geographical Indication of Goods:** Basic aspects and need for the registration.

UNIT – III

(6 hours)

Trade Marks: Purpose and function of trademarks, acquisition of trade mark rights, transfer of rights, selecting and evaluating trademark, registration of trademarks, claims. **Trade Secrets:** Trade secret law, determination of trade secret status, liability form is appropriation of trade secrets, trade secret litigation.

UNIT – IV**(6 hours)**

Protection of traditional knowledge - Objectives, concept of traditional knowledge, issues concerning, bioprospecting and biopiracy. **Protection of Plant Varieties** - Objectives, international position, plant varieties protection in India. Rights of farmers, breeders and researchers.

UNIT- V**(6 hours)**

Managing IP Rights: Acquiring IP Rights: letters of instruction, joint collaboration agreement, protecting IP Rights: non-disclosure agreement, cease and desist letter, settlement memorandum. **Transferring IP Rights:** Assignment contract, license agreement, deed of assignment. Infringement and enforcement.

TEXT BOOKS

1. Ramakrishna Chintakunta and M. Geethavani (2022). A Textbook of Intellectual Property Rights. Blue Hills publications.
2. N.K Acharya (2021). Intellectual property rights(8thEdn). Asia Law House.
3. Craig Allen Nard, Michael J. Madison, and Mark P. McKenna. (2017). Law of Intellectual Property (5thEdn). New York Aspen publishers.
4. Barrett and Margreth (2009). Intellectual Property. New York Aspen publishers.
5. Deborah E.Bouchoux(2013). Intellectual property:The Law of Trademarks, Copyrights, Patents, and Trade Secrets. Publisher: Cengage India

REFERENCES

1. B.Ramakrishna and H.S.Anil Kumar (2017). Fundamentals of Intellectual Property Rights: For Students, Industrialist and Patent Lawyers. Notion Press.
2. V. K. Ahuja(2013). Law relating to Intellectual Property rights (2nd Edn). LexisNexis.
2. R. Radhakrishnan and S. Balasubramanian(2008). Intellectual property rights: Text and Cases. Excel Books India.
4. D. Goeland S. Parashar (2013). IPR Biosafety and Bioethics. Pearson Education India.

UCS 60

Sub Code: 26UBI6S3

CIA EXAMINATION MARK BREAKUP

The CIA Examination mark breakup for the course **Basics of IPR** is given below:

S.No.	Distribution Component	Marks
1	CIA I – 75 Marks Converted to 30	30
2	CIA II – 75 Marks Converted to 30	30
3	Seminar / Objective capacity Testing	10
4	Seminar / Objective capacity Testing	10
5	Attendance	05
6	Any Case Study related to IPR (as a Group)	15
	Total	100

QUESTION PAPER PATTERN

The following question paper pattern will be followed for the above said courses:

Section A - Multiple Choice ($10 \times 1 = 10$ Marks)

Section B - Either or Type ($5 \times 5 = 25$ Marks)

Section C - Either or Type ($5 \times 8 = 40$ Marks)

Maximum Marks : 75

Duration : 3 Hours

UCS 61

Sub Code: 26UCS5XL

Programme Code:09		B. Sc ., Computer Science		
Title of the Paper : EDC– Web Designing using HTML				
Batch 2026-2027	Hours/Week 2	Total Hours 30	Credits 3	Employability

Course Objectives

1. To know the basic concepts of the World Wide Web, principles and tools used to develop Web applications.
2. To develop an ability to design and implement static and dynamic website.
3. To design and develop a Web site using text, images, links, lists, and tables for navigation and layout.

Course Outcomes (CO)

K3 to K5	CO1	Apply the internet related concepts that are vital in understanding web site development.
	CO2	Examine the important HTML tags for designing web pages.
	CO3	Analyze the interactive web applications through coding using HTML.
	CO4	Illustrate the creation of static webpage using HTML.
	CO5	Evaluate the results on creativity and innovation of web pages developed using HTML tags.

LIST OF PRACTICAL PROBLEMS

1. Design a web page for a company using HTML formatting tags.
2. Design a web page that illustrate ordered and unordered list.
3. Design a web page with the following components
 - a. Image
 - b. Hyperlink
4. Design a web page for Library system using HTML tags.
5. Design a web page for your college using HTML tags.
6. Create a class Time table using Table tag
7. Design a web page which shows your resume using HTML tags.
8. Design a web page to advertise a product using HTML tags.
9. Design a web page to create Student Mark sheet Entry Form.
10. Create a web service for Currency conversion with the client program.

Guidelines to the distribution of marks for Practical Examinations:

Two Questions will be given for each student.

(3Hours / 60 marks) Record: **10 Marks**

Particulars	Program1 (Marks)	Program2 (Marks)
Algorithm	10	10
Program Coding	10	10
Execution	5	5

MAPPING

PSO CO	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	S	S	H	S	M
CO2	H	S	S	S	S
CO3	S	H	H	S	S
CO4	S	S	S	M	S
CO5	S	S	H	S	S

S– Strong

H –High

M–Medium

L–Low

Content prepared by (Based on Inputs)	
Signature of the Course in-charge	Signature of the HOD

UCS 63

Sub Code: 26EVS101

Programme Code :	For B.A., BBA, B.Com, BCA and B.Sc., Degree Students			
PART IV-ENVIRONMENTAL STUDIES				
Batch 2026-2027	Semester I	Hours/Week 2	Total Hours 30	Credits 2

COURSE OBJECTIVES

1. To provide a fundamental understanding of natural resources, environmental ethics, and the impact of modern practical conservation and sustainability.
2. To inculcate knowledge and create awareness about concepts, components and function of ecosystems
3. To appraise on the importance of biodiversity, its values, threats, indigenous and Traditional knowledge systems, conservation strategies, and modern identification tools, and cultivate conscious responsibility and awareness for biodiversity conservation and sustainability.
4. To understand the environment threats and pollution, its impacts and mitigation strategies
5. To develop an understanding of disasters (natural and man-made) and its preparedness

COURSE OUTCOMES

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

K1 ↑ ↓ K5	CO1	Formulate genetic resource conservation strategies and assess India's SDG performance through AI/ML tools.
	CO2	Evaluate and predict the impact of humans on web of life, global economy and quality
	CO3	Think critically and develop strategies for biodiversity conservation, sustenance and environmental equity through eco conscious approach
	CO4	Demonstrate values and have compassion towards complex environmental issues and take part in mitigating current environmental challenges through sustainable solutions
	CO5	Apply basic safety and preparedness measures in disaster situations in society, household and workplace

**UNIT I MULTIDISCIPLINARY NATURE OF ENVIRONMENT AND ITS SOCIAL ETHICS
AND VALUES**

Introduction to environment; Historical Development of Human – environment interaction; Industrial revolution, Economic development and its impact on the environment; **Overview of resources:** Definition, Classification of natural resources – biotic and abiotic, renewable and non-renewable.

Renewable Resources: Water Resources- Rainwater Harvesting, Reservoirs managements, AI & ML tools for water resource management. Sustainable Development goals - Agriculture and Environment. Revisiting traditional agricultural practices- Biodynamic Farming, Physical and Biological soil factors. **Non-renewable Resources-** fossil fuel, nuclear fuel, Energy Resources: Conventional and non-conventional Resources- solar, wind, clean energy- hydrogen, Biomass energy-coir pith, charcoal; Use of exotic/invasive weed biomass for alternative energy/economy. Eg: *Lantana camara*, *Eichhornia Sp*, Genetic Resources and conservation, strategies.

- *Activity:** (i) Analyze your department and its practices towards compliance to SDG's. List out the compliances towards SDG's with justification.
- (ii) Examine your campus' current resource conservation strategies and provide recommendations to improve its sustainability and resource efficiency.

* Students can take up any one of the above.

UNIT II ECOSYSTEMS

(6 HOURS)

Ecosystem- Definition, Components (producers, consumers and decomposers) and functions- Energy flow, Food chains and its types, food web, Disturbances to food chain and food web due to anthropogenic intrusions Eg: Diclofenac Case, Ecological pyramids: types and importance of ecological pyramids, **Types of Ecosystems:** Natural ecosystem- Aquatic Ecosystem (Pond, River, Marine and Estuarine), Terrestrial Ecosystem (Forest, Grassland and Desert). Artificial Ecosystem (Crop land).

Activity: Develop a working model for an ecosystem through building a Terrarium or Suseum.

UNIT III BIODIVERSITY

(6 HOURS)

Concept of Biodiversity: Definition, Types-Genetic, Species and Ecosystem diversity. Indigenous Knowledge Systems on Biodiversity – Traditional knowledge and legal framework for bioprospecting and Biomimicry. Biodiversity- Values, uses and threats, sustainable use of bioresources for value additions, Conservation strategies of Biodiversity- *In-situ* - National Parks, Wildlife Sanctuaries, Community Reserve and Conservation Reserves, *Ex-situ* – Zoological Park, Aquarium, Botanical garden.

***Case Study-** Nilgiri Tahr Conservation Project.

Activity: (i) Applications for plant and animal identification by software -*iNaturalist* and Merlin Bird ID

(ii) Field observation and documentation of the campus biodiversity.

UNIT IV ENVIRONMENTAL THREATS AND POLLUTION

(6 HOURS)

Introduction and Classification of Pollution- physical, chemical and biological; major types of pollution- air, water, soil/land, noise, thermal, radioactive, solid waste, electronic waste (e-waste), plastic, biomedical waste. **Assessment and Monitoring:** Pollution impact assessment/health risk assessment & monitoring techniques, Biological indicators of pollution – Dissolved Oxygen (DO), Biological Oxygen

Demand (BOD) and Chemical Oxygen Demand (COD). Impact of pollution and incidence of Life style disorders like Diabetes, Cardio Vascular Disease, Cancer, PCOS etc. **Waste Management** – concept of 3R (Reduce, Recycle and Reuse) and sustainability. ***Case studies:** Dye Industrial pollution from tanneries, paper and pulp industrial effluents in Noyyal and Cauvery rivers.

Activity: Prepare an Audit report for:

(i) Water usage in your department/house

(ii) Magnitude of solid waste generation and its management at your department/house.

UNIT V: DISASTER MANAGEMENT AND PREPAREDNESS

(6 HOURS)

Definition and Classification of Disaster (Natural and Man-made disasters). **Natural Disaster:**

Earthquakes, Landslides, Tsunami, Floods, Volcanic eruptions, Cyclones. Wayand- landslides,

Joshimath- The sinking Village, Forest fires: causes, spread, control measures. **Man-made Disasters:**

Industrial and chemical accidents (Bhopal disaster, oil spills), Nuclear hazards (Chernobyl and Fukushima). Kasargod- Impact of Endosulfan spraying on cashew farms. **Preparedness and safety**

measures: Early warning system, response, recovery, mitigation, vulnerability, risk, resilience and capacity building. **Forecasting methods:** Conventional – cloud formation & wind, wave patterns,

behaviours of animals & plants, Modern methods – remote sensing, drone and AI tools for impact assessment. ***Case studies:** Chennai flood 2015, causes and control measures.

Activity: Prepare (i) Personal/Class emergency plan

(ii) Risk identification checklist like loose heavy furniture, poor wiring, blocked exits

(iii) A document using Mobile technology to map local resources or identify safer locations.

Field Study: Visit to eco parks'/conservation sites and report.

* Case studies are not for examination purposes.

Text book

1. Workbook on Environmental Science (2026), published by Kongunadu Arts and Science College, Coimbatore-641029.

Reference Books:

1. Fundamentals of Ecology, Odum E.P, Odum H.T & Andrews- Saunders publications
2. Ecology, Environmental science and Conservation. Singh J.S & Gupta SR, S Chand Publishing (2017).
3. This Fissured Land: An Ecological History of India; Gadgil M & Guha R (1993), University of California Press, 1st Edition.
4. Environment (8th Ed.) by Raven PH, Gift, Bary LR, Hassenzahl DM, 2015, Wiley publishing house.
5. R. S. Ambasht, A Text Book of Plant Ecology, Students Friends & Company, 1990 - Plant ecology - 373 pages
6. A. Ravikrishnan (2019), Environmental Science and Engineering (Forth Edition) by Sri Krishna Hitech Publishing Company Pvt.Ltd, Velappanchavadi, Chennai.
7. Yadav, P. (2021). Applied and Economic Zoology. Kedar Nath Ram Nath

8. Krishnamurthy, K. V. (2023). An advanced textbook on biodiversity: Principles and practice. Oxford and IBH Publishing.
9. Anonymous (2003) Professional's The Wildlife (Protection) Act, 1972. Professional Book Publications.
10. National Disaster Management Guidelines - National Disaster Management Information and Communication System (NDMICS) (2011). A publication of the National Disaster Management Authority, Government of India. ISBN: 978-93-80440-12-5, February 2012, New Delhi.
11. Disaster Risk Management Systems Analysis: A Guide Book, Food and Agriculture Organization of the United Nations, Rome (2008). ISBN 978-92-5106056-8.

Web Reference Sources

1. <https://egyankosh.ac.in/bitstream/123456789/77368/1/Unit-4.pdf>
2. <https://agritech.tnau.ac.in/pdf/sustainableagriculture.pdf>
3. https://www.dev-practitioners.eu/media/key_documents/SDGs_Booklet_Web_En.pdf
4. <https://www.pmfias.com/environment-ecosystem-components-ecosystem/>
5. <https://www.ugc.gov.in/oldpdf/modelcurriculum/Chapter3.pdf>
6. https://mjcollege.kces.in/pdf/download_documents/study_material_env_studies/ch3.pdf
7. [https://www.deshbandhucollege.ac.in/pdf/resources/1587401626_BA\(H\)-Psc-Eco-Eng-BA\(P\)-II-Ecosystem.pdf](https://www.deshbandhucollege.ac.in/pdf/resources/1587401626_BA(H)-Psc-Eco-Eng-BA(P)-II-Ecosystem.pdf)
8. <http://www.tezu.ernet.in/denvsc/IDC/biodiversity.pdf>
9. <https://egyankosh.ac.in/bitstream/123456789/86424/1/Unit-11.pdf>
10. <https://utkaluniversity.ac.in/wp-content/uploads/2022/05/Environmental-Pollution.pdf>
11. https://cdn.visionias.in/value_added_material/d6c24-disaster_management.pdf
12. https://sist.sathyabama.ac.in/sist_coursematerial/uploads/SCIA4001.pdf
13. https://mrcet.com/downloads/MBA/Disaster%20and%20Crisis%20Management_Digital%20Notes.pdf

QUESTION PAPER PATTERN

Maximum Marks : 50

Duration : 3 Hours

Answer all Questions (5×10=50 Marks)

Essay type, Either or type questions from each unit.

UCS 67

Subject Code : 26VED201

For B.A., BBA, B.Com, BCA and B.Sc., Degree Students				
PART IV – VALUE EDUCATION – MORAL AND ETHICS				
Batch 2026-2027	Semester I	Hours / Week 2	Total Hours 30	Credits 2

Course Objectives

1. To impart Value Education in every walk of life
2. To help the students to reach excellence and reap success
3. To impart the right attitude by practicing self introspection
4. To portray the life and messages of Great Leaders
5. To insist the need for universal brotherhood, patience and tolerance
6. To help the students to keep them fit
7. To educate the importance of Yoga and Meditation

Course Outcomes (CO)

After completing the course the students:

K1 to K5	CO1	will be able to recognize Moral values, Ethics, contribution of leaders, Yoga and its practice
	CO2	will be able to differentiate and relate the day to day applications of Yoga and Ethics in real life situations
	CO3	can emulate the principled life of great warriors and take it forward as a message to self and the society
	CO4	will be able to Analyse the Practical outcome of practicing Moral values in real life situation
	CO5	could Evaluate and Rank the outcome of the pragmatic approach to further develop the skills

Syllabus

UNIT I:

4 Hours

Moral and Ethics: Introduction – Meaning of Moral and Ethics – Social Ethics – Ethics and Culture – Aim of Education.

UNIT II:

Life and Teachings of Swami Vivekananda: Birth and Childhood days of Swami Vivekananda – At the Parliament of Religions – Teachings of Swami Vivekananda

UNIT III:

4 Hours

Warriors of our Nation: Subhas Chandra Bose – Sardhar Vallabhbhai Patel – Uddham Singh – V. O. Chidambaram Pillai – Bhagat Singh – Tiruppur Kumaran – Dheeran Chinnamalai – Thillaiaadi Valliammai – Velu Nachiyar – Vanchinathan

UNIT IV:

8 Hours

Fundamentals of Yoga : Introduction to Yoga – Benefits of Yoga - Principles of Yoga Practice– Yoga for Health and Well Being – Yoga for Peace – Yoga for Success – Brain Yoga Benefits – The Science of Yoga - Importance of Yoga in Modern Life

UNIT V:

8 Hours

Yoga Practices : Warm-Up Exercises in Yoga : Neck, Shoulder, Wrist, Hip, Knee and Ankle Rotations - Basic Yoga Asanas: Tadasana, Vrikshasana, Bhujangasana, Vajrasana , Shavasana and Ardhasiddhasana – Surya Namaskar - Pranayama - Meditation and Relaxation

Text Books:

Value Based Education – Moral and Ethics – compiled by Kongunadu Arts and Science College (Autonomous), 3rd Edition (2024).

Reference Books:

1. Swami Vivekananda - A Biography, Swami Nikhilananda, Advaita Ashrama, India, 24th Reprint Edition (2010).
2. Gandhi, Nehru, Tagore and other eminent personalities of Modern India, Kalpana Rajaram, Spectrum Books Pvt. Ltd., revised and enlarged edition(2004).
3. Freedom Fighters of India, Lion M.G. Agrawal, Isha Books Publisher, First Edition (2008).
4. Easy steps to Yoga by Swami Vivekananda, A Divine Life Society Publication(2000).

Web References:

1. <https://youtu.be/4UXFb7Cs3PU?si=6c50D1IfFvxTXdX>
2. <https://youtu.be/zCag6hbDIQw?si=kNWsrIxQXvOKfacp>
3. https://youtu.be/_2GgRQJ9IbU?si=Xp_YEcCSR8mvMEG-
4. <https://youtu.be/ZkyN4Dy4kO0?si=BkctTS1W3jDS886v>
5. https://youtu.be/TWbiDzi-rQc?si=92crHrzoNq_0jrU-

Value Education – Moral & Ethics

Question Paper Pattern

(External only)

Duration: 3 hours

Total Marks: 50

Answer all Questions (5 x 10 = 50 Marks)

Essay type, either or type questions from each unit.

Programme Code :	For B.A., BBA, B.Com, BCA and B.Sc., Degree Students		
PART IV –NON MAJOR ELECTIVE –I HUMAN RIGHTS			
Batch	Hours / Week	Total Hours	Credits
2026-2027	2	30	2

COURSE OBJECTIVES

1. To prepare for responsible citizenship with awareness of the relationship between Human Rights, democracy and development.
2. To impart education on national and international regime on Human Rights.
3. To sensitive students to human suffering and promotion of human life with dignity.
4. To develop skills on human rights advocacy
5. To appreciate the relationship between rights and duties
6. To foster respect for tolerance and compassion for all living creature.

COURSE OUTCOMES

After Completion of the Course the student will be able to

K1 ↑ ↓ K5	CO1	To understand the hidden truth of Human Rights by studying various provisions in the Constitution of India.
	CO2	To acquire overall knowledge regarding the Feminist perspectives in the Liberative Empowerment of Women.
	CO3	To gain knowledge about various gender roles and stereotypes involved in the comprehension of gender equality and women's rights.
	CO4	To comprehend the legal provisions and policies that foreground the safety of children in the society and to promote awareness.
K5	CO5	To gain enhanced knowledge about sexual and gender minorities to recognize, celebrate and acknowledge the diversified forms of gender expressions and rights.

SYLLABUS

UNIT I **[6 Hours]**

Human Rights Humans Rights Constitution Of India: Humans Rights - Constitution Of India

UNIT II **[6 Hours]**

Women Empowerment In India: Feminism And Sexual Violence - Women And Liberation

UNIT III **[6 Hours]**

Gender Equality And Women's Rights: Stereotype Gender Roles - Women's Education, Power And Science

UNIT IV **[6 Hours]**

Rights Of The Child In India: Status of child in contemporary Indian society - Special Laws and Policies for protection of children

UNIT V**[6 Hours]**

Sogiesc Rights: Understanding SOGIESC- basic Definitions- inclusivity of SOGIESC-importance of studying SOGIESC- presence of SOGIESC in Indian Traditions- temples and cultural practices that exemplify SOGIESC in India- Genetics of Sex determination- Genetics of Intersex community- Successful SOGIESC Personalities and achievers – Alan Turing- Sally Ride- Leonardo da vinci- Alan Hart- Virginia -Woolf- Bayard Rustin- Padmini Prakash- Akkai Padmashali- K Prithika Yashini- Laxmi Narayan Tripathi- Madhu Bai Kinnar-Manabi Bandhopadhyay- SOGIESC Rights and laws

Teaching Methods

Smart Class Room/PowerPoint presentation/Seminar/Quiz/Discussion

Books for Study:

1. Human Rights (2024) Compiled by Kongunadu Arts and Science College, Coimbatore –29.

REFERENCES:

1. Human Rights, (2018) by Jaganathan, MA.,MBA.,MMM.,ML.,ML., (Humanitarian Law) and J.P. Arjun Proprietor: Usha Jaganathan, Refugee Law Law series, 1st floor, Narmatha Nanthi Street, Magathma Gandhi Nagar, Madurai – 625014.
2. Country Report on SOGIESC Rights In India: An Unfinished Agenda.
Weblink: <https://www.ilgaasia.org/publications/india-country-report-an-unfinished-agenda>
3. Intersex.
Weblink: <https://my.clevelandclinic.org/health/articles/16324-intersex>
4. SOGIESC Personalities:
<https://www.bbc.com/news/world-asia-india-29357630>
https://en.wikipedia.org/wiki/Laxmi_Narayan_Tripathi
https://en.wikipedia.org/wiki/Akkai_Padmashali
<https://www.indiatoday.in/india/story/prithika-yashini-india-first-transgender-police-officer-tamil-nadu-969389-2017-04-04>
<https://yourstory.com/2018/03/first-transgendre-college-principal-west-bengal>
5. SOGIESC Rights and laws
<https://www.openglobalrights.org/lgbtqia-to-sogiesc-reframing-sexuality-gender-human-rights/>
<https://static1.squarespace.com/static/5a84777f64b05fa9644483fe/t/625ead0484f9005d75b92dd0/1650371887436/ILGA+Asia+India+Report+2021.pdf>

**Question Paper Pattern
(External Only)****Duration: 3 hrs****Max: 75 marks****Section - A (5x5=25 Marks)**

Short answer questions, either or type - one question from each unit.

Section - B (5x10=50 Marks)

Essay answer questions, either or type - one question from each unit.

UCS 72

Subject Code : 26UWR4N2

Programme Code:	For B.A., BBA, B.Com, BCA and B.Sc., Degree Students		
	Part IV -NON- MAJOR ELECTIVE – II WOMEN’S RIGHTS		
Batch 2026-2027	Hours / Week 2	Total Hours 30	Credits 2

COURSE OBJECTIVES

- To know about the laws enacted to protect Women against violence.
- To impart awareness about the hurdles faced by Women.
- To develop a knowledge about the status of all forms of Women to access to justice.
- To create awareness about Women’s rights.
- To know about laws and norms pertaining to protection of Women.
- To understand the articles which enables the Women’s rights.
- To understand the Special Women Welfare laws.
- To realize how the violence against Women puts an undue burden on healthcare services.

COURSE OUTCOMES

After Completion of the Course the student will be able to

K1 ↑ ↓ K5	CO1	Appraise the importance of Women’s Studies and incorporate Women’s Studies with other fields
	CO2	Analyze the realities of Women Empowerment, Portrayal of Women in Media, Development and Communication
	CO3	Interpret the laws pertaining to violence against Women and legal consequences
	CO4	Contribute to the study of the important elements in the Indian Constitution, Indian Laws for Protection of Women
	CO5	Spell out and implement Government Developmental schemes for women and create awareness on modernization and impact of technology on Women

Syllabus

Unit I

(6 Hours)

Women’s Studies: Basic concepts of Women’s studies in Higher education, Women’s studies perspectives- Socialization- Patriarchy- Women’s studies as an academic discipline- Growth and development of Women’s studies as a discipline internationally and in India.

Unit II

(6 Hours)

Socio-Economic Development of Women: Family welfare measures, role of Women in economic development, representation of Women in media, status of Women land rights, Women Entrepreneurs, National policy for the empowerment of women.

Unit III

(6 Hours)

Women’s Rights – Access to Justice: Crime against Women, domestic violence – physical abuse-verbal abuse – emotional abuse - economic abuse – minorities, dowry- harassment and death, code of conduct for work place, abetment of suicide.

Unit IV

(6 Hours)

Women Protective acts: Protective legislation for Women in the Indian constitution- Anti dowry, SITA, PNDT, and Prevention Sexual Harassment at Workplace (Visaka case), Domestic violence (Prevention) Act.

UCS 73

Subject Code : 26UWR4N2

Unit V

(6 Hours)

Women and Child welfare: Safety provisions - various forms of mass media, radio, visual, internet, cyber space, texting, SMS and smart phone usage. Healing measures for the affected Women and child society by private and public sector, NGO and society.

Teaching Methods:

- Smart Class Room / Power point Presentation / Seminar / Quiz / Discussion / Flipped Class

Text Book:

1. **Women's Rights** (2021), compiled by Kongunadu Arts & Science College, Coimbatore – 641 029.

Reference Books:

1. **"Rights of Indian Women"** by Vipul Srivatsava. Publisher: Corporate Law Advisor, 2014.
2. **"Women's security and Indian law"** by Harsharam Singh. Publisher: Aabha Publishers and Distributors, 2015.
3. **"Women's Property Rights in India"** by Kalpaz publications, 2016.

QUESTION PAPER PATTERN

Duration: 3 Hours

Max. Marks: 75

SECTION A

(5 x 5 = 25 marks)

Short answers, either or type, one question from each unit.

SECTION B

(5 x 10 = 50 marks)

Essay type questions, either or type, one question from each unit.

UCS 74

Programme Code :		For B.A., B.Sc., and BCA Degree Students	
PART IV - NON- MAJOR ELECTIVE III - CONSUMER AFFAIRS			
Batch	Hours/Week	Total Hours	Credits
2026-2027	2	30	2

COURSE OBJECTIVES

- To familiarize the students with their rights and responsibilities as a consumer.
- To understand the procedure of redress of consumer complaints.
- To know more about decisions on Leading Cases by Consumer Protection Act.
- To get more knowledge about Organizational set-up under the Consumer Protection Act
- To impart awareness about the Role of Industry Regulators in Consumer Protection
- To understand Contemporary Issues in Consumer Affairs

COURSE OUTCOMES

K1 ↑ ↓ K5	CO1	Able to know the rights and responsibility of consumers.
	CO2	Understand the importance and benefits of Consumer Protection Act.
	CO3	Applying the role of different agencies in establishing product and service standards.
	CO4	Analyse to handle the business firms' interface with consumers.
	CO5	Assess Quality and Standardization of consumer affairs

SYLLABUS

UNIT I (Hours)

(6

Conceptual Framework - Consumer and Markets: Concept of Consumer, Nature of markets: Liberalization and Globalization of markets with special reference to Indian Consumer Markets, E-Commerce with reference to Indian Market, Concept of Price in Retail and Wholesale, Maximum Retail Price (MRP), Fair Price, GST, labeling and packaging along with relevant laws, Legal Metrology. Experiencing and Voicing Dissatisfaction: Consumer buying process, Consumer Satisfaction/dissatisfaction-Grievances-complaint, Consumer Complaining Behaviour: Alternatives available to Dissatisfied Consumers; Complaint Handling Process: ISO 10000suite

UCS 75

UNIT II

(6 Hours)

The Consumer Protection Law in India - Objectives and Basic Concepts: Consumer rights and UN Guidelines on consumer protection, Consumer goods, defect in goods, spurious goods and services, service, deficiency in service, unfair trade practice, restrictive trade practice.

Organizational set-up under the Consumer Protection Act: Advisory Bodies: Consumer Protection Councils at the Central, State and District Levels; Adjudicatory Bodies: District Forums, State Commissions, National Commission: Their Composition, Powers, and Jurisdiction (Pecuniary and Territorial), Role of Supreme Court under the CPA with important case law.

UNIT III

(6 Hours)

Grievance Redressal Mechanism under the Indian Consumer Protection Law - Who can file a complaint? Grounds of filing a complaint; Limitation period; Procedure for filing and hearing of a complaint; Disposal of cases, Relief/Remedy available; Temporary Injunction, Enforcement of order, Appeal, frivolous and vexatious complaints; Offences and penalties.

Leading Cases decided under Consumer Protection law by Supreme Court/National Commission: Medical Negligence; Banking; Insurance; Housing & Real Estate; Electricity and Telecom Services; Education; Defective Products; Unfair Trade Practices.

UNIT IV

(6 Hours)

Role of Industry Regulators in Consumer Protection

- i. Banking: RBI and Banking Ombudsman
- ii. Insurance: IRDA and Insurance Ombudsman
- iii. Telecommunication: TRAI
- iv. Food Products: FSSAI
- v. Electricity Supply: Electricity Regulatory Commission
- vi. Real Estate Regulatory Authority

UCS 76

UNIT V

(6 Hours)

Contemporary Issues in Consumer Affairs - Consumer Movement in India: Evolution of Consumer Movement in India, Formation of consumer organizations and their role in consumer protection, Misleading Advertisements and sustainable consumption, National Consumer Helpline, Comparative Product testing, Sustainable consumption and energy ratings.

Quality and Standardization: Voluntary and Mandatory standards; Role of BIS, Indian

Standards Mark (ISI), Ag-mark, Hallmarking, Licensing and Surveillance; Role of International Standards: ISO an Overview.

Note: Unit 2 and 3 refers to the Consumer Protection Act, 2086. Any change in law would be added appropriately after the new law is notified.

Teaching Methods:

- Smart Class rooms /Power Point Presentations / Seminars/Quiz /Discussion /Flipped Classrooms

SUGGESTED READINGS:

1. Khanna, Sri Ram, Savita Hanspal, Sheetal Kapoor, and H.K. Awasthi. (2007) Consumer Affairs, UniversitiesPress.
2. Choudhary, Ram Naresh Prasad (2005). Consumer Protection Law Provisions and Procedure, Deep and Deep Publications PvtLtd.
3. G. Ganesan and M. Sumathy. (2012). Globalisation and Consumerism: Issues and Challenges, RegalPublications
4. Suresh Misra and Sapna Chadah (2012). Consumer Protection in India: Issues and Concerns, IIPA, NewDelhi
5. Rajyalaxmi Rao (2012), Consumer is King, Universal Law Publishing Company
6. Girimaji, Pushpa (2002). Consumer Right for Everyone Penguin Books.
7. E-books :-www.consumereducation.in
8. Empowering Consumers e-book,www.consumeraffairs.nic.in
9. ebook,www.bis.org
10. The Consumer Protection Act, 1986 and its later versions.

UCS 77

Question paper pattern

Duration: 3 hrs

Max: 75 Marks

Section A (5 x 5=25)

Short notes

Either – or / type – question from each unit.

Section B (5 x 10=50)

Essay type

Either – or / type – question from each unit.

UCS 78

Subject Code : 26UHW401

ALL UG COURSES		
Title of the <u>paper</u> : HEALTH AND WELLNESS		
Batch 2026 – 2027	Semester IV	Credits 2

Skill Areas:

Physical Fitness, Nutrition, Mental Health, Awareness on Drug addiction and its effects

Purpose:

The Health & Wellness course focuses on teaching the elements of physical, mental, emotional, social, intellectual, environmental well-being which are essential for overall development of an individual. The course also addresses the dangers of substance abuse and online risks to promote emotional and mental health.

Learning Outcomes:

Upon completion of the Health & Wellness course, students will be able to:

1. Demonstrate proficiency in sports training and physical fitness practices.
2. Improve their mental and emotional well-being, fostering a positive outlook on health and life.
3. Develop competence and commitment as professionals in the field of health and wellness.
4. Awareness on drug addiction and its ill effects

Focus:

During the conduct of the Health & Wellness course, the students will benefit from the following focus areas:

1. Stress Management.
2. Breaking Bad Habits.
3. Improving Interpersonal Relationships.
4. Building Physical Strength & Inner Strength.

Role of the Facilitator:

The faculty plays a crucial role in effectively engaging with students and guiding them towards achieving learning outcomes. Faculty participation involves the following areas:

1. **Mentorship & Motivation:** The Facilitator mentors students in wellness and self-discipline while inspiring a positive outlook on health. Faculty teach stress management, fitness, and daily well-being.
2. **Promoting a Safe and Inclusive Environment:** The facilitator ensures a safe, inclusive, and respectful learning environment for active student participation and benefit.
3. **Individualised Support and Monitoring Progress:** The facilitator plays a crucial role in providing personalized support, monitoring and guidance to students.

Guided Activities:

In this course, several general guided activities have been suggested to facilitate the achievement of desired learning outcomes. They are as follows:

1. Introduction to Holistic Well-being.
2. Holistic Wellness Program- Nurturing Body and Mind
3. Breaking Bad Habits Workshop.
4. Improving the elements of physical, emotional, social, intellectual, environmental and mental well-being.
5. Creating situational awareness, digital awareness.
6. Understanding substance abuse, consequences and the way out.

Period Distribution

The following are the guided activities suggested for this Audit course.

The Physical Director should plan the activities by the students.

Arrange the suitable Mentor / Guide for the wellness activities.

Additional activities and programs can be planned for Health and Wellness.

S.No	Guided Activities	Period
1	Introduction to Holistic Well-being 1. Introduce the core components of Health & Well-being namely Physical, mental and emotional well-being 2. Provide worksheets on all the four components individually and explain the interconnectedness to give an overall understanding.	
2	Wellness Wheel Exercise (Overall Analysis)	

	• Guide students to assess their well-being in various life dimensions through exercises on various aspects of well – being, and explain the benefits of applying wellness wheel. • Introduce Tech Tools: • Explore the use of technology to support well-being. • Introduce students to apps for meditation, sleep tracking, or healthy recipe inspiration.	
3	Breaking Bad Habits (Overall Analysis) • Open a discussion on bad habits and their harmful effects. • Provide a worksheet to the students to identify their personal bad habits. • Discuss the trigger, cause, consequence and solution with examples. • Guide them to replace the bad habits with good ones through worksheets.	
4	Physical Well-being 1. Fitness Introduce the different types of fitness activities such as basic exercises, cardiovascular exercises, strength training exercises, flexibility exercises, so on and so forth. (Include theoretical explanations and outdoor activity). 2. Nutrition Facilitate students to reflect on their eating habits, their body type, and to test their knowledge on nutrition, its sources and the benefits. 3. Yoga & Meditation Discuss the benefits of Yoga and Meditation for one's overall health. Demonstrate different yoga postures and their benefits on the body through visuals (pictures or videos)	

	4. Brain Health Discuss the importance of brain health for daily life. Habits that affect brain health (irregular sleep, eating, screen time). Habits that help for healthy brains (reading, proper sleep, exercises). Benefits of breathing exercises and meditation for healthy lungs. 5. Healthy Lungs Discuss the importance of lung health for daily life. Habits that affect lung health (smoking, lack of exercises). Benefits of breathing exercises for healthy lungs. 6. Hygiene and Grooming Discuss the importance of hygienic habits for good oral, vision, hearing and skin health. Discuss the positive effects of grooming on one's confidence level and professional growth. <u>Suggested Activities (sample):</u> Nutrition: Invite a nutritionist to talk among the students on the importance of nutrition to the body or show similar videos shared by experts on social media. Organize a 'Stove less/fireless cooking competition' for students where they are expected to prepare a nutritious dish and explain the nutritive values in parallel.	
5	Emotional Well-being 1. Stress Management Trigger a conversation or provide self-reflective worksheets to identify the stress factors in daily life and their impact on students' performance. Introduce different relaxation techniques like deep breathing, progressive muscle relaxation, or guided imagery. (use audio recordings or visuals to guide them through these techniques). After practicing the techniques, have them reflect on how these methods can help manage stress in daily life. 2. Importance of saying 'NO'.	

	Explain the students that saying 'NO' is important for their Physical and mental well-being, Academic Performance, Growth and Future, Confidence, Self-respect, Strong and Healthy Relationships, building reputation for self and their family (avoid earning a bad name). Factors that prevent them from saying 'NO'. How to practice saying 'NO'. 3. Body Positivity and self-acceptance Discuss the following with the students. • What is body positivity and self-acceptance? • Why is it important? • Be kind to yourself. • Understand that everyone's unique. <u>Suggested Activities(Sample):</u> (Importance of saying 'NO') Provide worksheets to self-reflect on... ...how they feel when others say 'no' to them ...the situations where they should say 'no' Challenge students to write a song or rap about the importance of saying no and how to do it effectively. Students can perform their creations for the class.	
6	Social Well-Being 1. Practicing Gratitude Discuss the importance of practicing gratitude for building relationships with family, friends, relatives, mentors and colleagues. Discuss how one can show gratitude through words and deeds. Explain how practicing gratitude can create 'ripple effect'. 2. Cultivating Kindness and Compassion Define and differentiate between kindness and compassion. Explore practices that cultivate these positive emotions. Self-Compassion as the Foundation.	

	The power of small gestures. Understanding another's perspective. The fruits of compassion. 3. Practising Forgiveness Discuss the concept of forgiveness and its benefits. Forgiveness: What is it? and What it isn't? Benefits of forgiveness. Finding forgiveness practices. 4. Celebrating Differences Appreciate the value of individual differences and foster inclusivity. The World: A Tapestry of Differences (cultures, backgrounds, beliefs, abilities, and appearances). Finding strength in differences (diverse perspectives and experiences lead to better problem-solving and innovation). Celebrating differences, not ignoring them (respecting and appreciating the unique qualities). Activities for celebrating differences (share culture, learn about others, embrace new experiences). 5. Digital Detox Introduce the students to: The concept of a digital detox and its benefits for social well-being. How to disconnect from devices more often to strengthen real-world connections. <u>Suggested Activities (sample):</u> (Practicing Gratitude) Provide worksheets to choose the right ways to express gratitude. Celebrate 'gratitude day' in the college and encourage the students to honour the house keeping staff in some way to express gratitude for their service.	
7.	Intellectual Well-being 1. Being a lifelong Learner Give students an understanding on: The relevance of intellectual well-being in this 21st century to meet	

	the expectations in personal and professional well-being The Importance of enhancing problem-solving skills Cultivating habits to enhance the intellectual well-being (using the library extensively, participating in extra-curricular activities, reading newspaper etc.) 2. Digital Literacy Discuss: The key aspects of digital literacy and its importance in today's world. It is more than just liking and sharing on social media. The four major components of digital literacy (critical thinking, communication, problem-solving, digital citizenship). Why is digital literacy important? Boosting one's digital skills. 3. Transfer of Learning Connections between different subjects – How knowledge gained in one area can be applied to others. <u>Suggested Activities(sample):</u> Intellectual Well-being. Provide worksheets to students for teaching them how to boost intellectual well-being. Ask the students to identify a long-standing problem in their locality, and come up with a solution and present it in the classroom. Also organize an event like 'Idea Expo' to display the designs, ideas, and suggestions, to motivate the students to improve their intellectual well-being.	
8	Environmental Well-being 1.The Importance of initiating a change in the environment. The session could be around: Defining Environmental well-being (physical, chemical, biological, social, and psychosocial factors) – People's behaviour, crime, pollution, political activities, infra-structure, family situation etc. Suggesting different ways of initiating changes in the environment (taking responsibility, creating awareness, volunteering,	

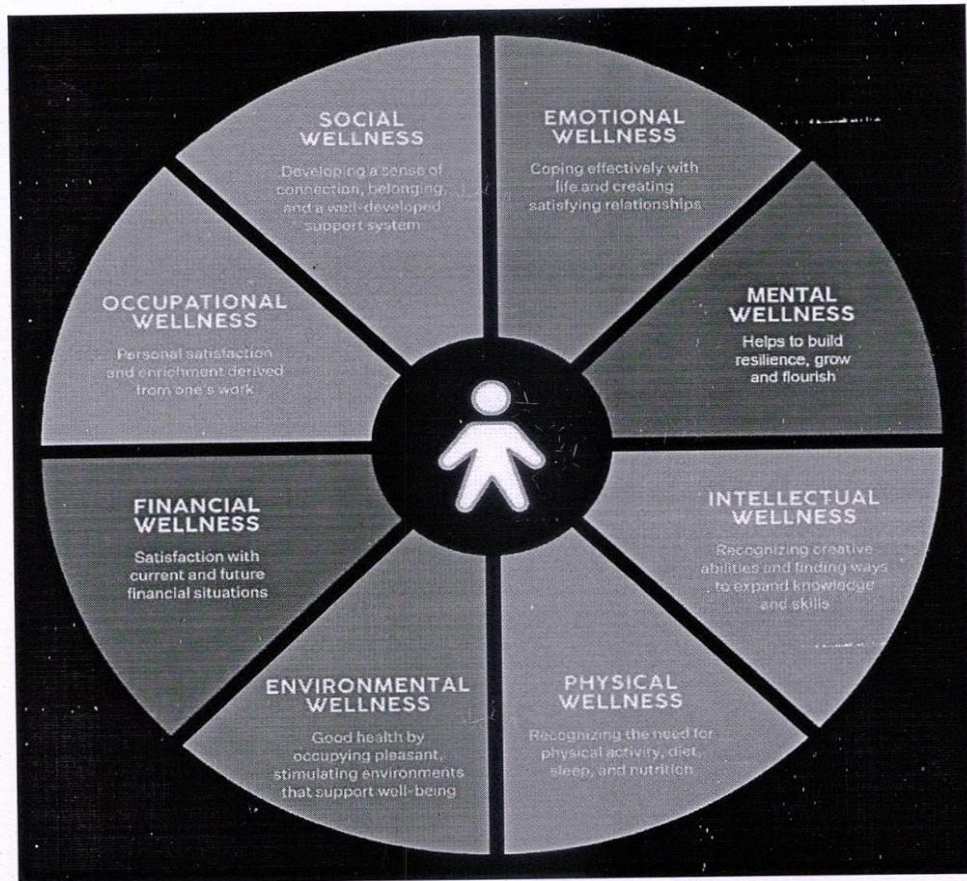
	approaching administration). <u>Suggested Activities (sample):</u> Providing worksheets to self-reflect on how the environment affects their life, and the ways to initiate a change. Dedicate a bulletin board or wall space (or chart work) in the classroom for students to share their ideas for improving environmental well-being. Creating a volunteers' club in the college and carrying out monthly activities like campus cleaning, awareness campaigns against noise pollution, (loud speakers in public places), addressing anti-social behaviour on the campus or in their locality.	
9	Mental Well-being 1. Importance of self-reflection Discuss: Steps involved in achieving mental well-being (self-reflection, self-awareness, applying actions, achieving mental well-being). Different ways to achieve mental well-being (finding purpose, coping with stress, moral compass, connecting for a common cause). The role of journaling in mental well-being. 2. Mindfulness and Meditation Practices Benefits of practicing mindful habits and meditation for overall well-being. 1. Connecting with nature Practising to be in the present moment – Nature walk, feeling the sun, listening to the natural sounds. Exploring with intention – Hiking, gardening to observe the nature. Reflecting on the emotions, and feeling kindled by nature. 2. Serving people Identifying the needs of others. Helping others. Volunteering your time, skills and listening ear. Finding joy in giving. 3. Creative Expressions	

	Indulging in writing poems, stories, music making/listening, creating visual arts to connect with inner selves. <u>Suggested Activities(Sample):</u> (Mindfulness and Meditation) – Conducting guided meditation every day for 10 minutes and directing the students to record the changes they observe.	
10	Situational Awareness (Developing Life skills) 1. Being street smart Discuss: Who are street smart? Why is it important to be street smart? Characteristics of a street smart person: Importance of acquiring life skills to become street smart – (General First-aid procedure, CPR Procedure, Handling emergency situations like fire, flood etc). 2. Digital Awareness Discuss: Cyber Security Information Literacy Digital Privacy Fraud Detection <u>Suggested Activities</u> (sample): (Street Smart) Inviting professionals to demonstrate the CPR Procedure Conducting a quiz on Emergency Numbers	
11	Understanding Addiction Plan this session around: Identifying the environmental cues, triggers that lead to picking up this habit. Knowing the impact of substance abuse – Adverse health conditions, social isolation, ruined future, hidden financial loss and damaging the family reputation. Seeking help to get out of this addiction. <u>Suggested Activities:</u>	

References/Resource Materials:

The course acknowledges that individual needs for references and resources may vary. However, here are some general reference materials and resources that may be helpful:

1. The Well-Being Wheel:



2. Facilities & Spaces: Some activities may require access to specific facilities, resources or spaces. Students may need to coordinate with the college administration to reserve these as required.

3. Online Resources:

1. United Nations Sustainable Development Goals - Goal 3 - Good Health & Well-Being: <https://www.un.org/sustainabledevelopment/health/>
2. Mindfulness and Meditation: Stanford Health Library offers mindfulness and meditation resources: <https://healthlibrary.stanford.edu/books-resources/mindfulness-meditation.html>

3. Breaking Bad Habits: James Clear provides a guide on how to build good habits and break bad ones: <https://jamesclear.com/habits>
4. 6 Ways to Keep Your Brain Sharp
<https://www.lorman.com/blog/post/how-to-keep-your-brain-sharp>
5. What Is Social Wellbeing? 12+ Activities for Social Wellness
<https://positivepsychology.com/social-wellbeing/>
6. How Does Your Environment Affect Your Mental Health?
<https://www.verywellmind.com/how-your-environment-affects-your-mental-health-5093687>
7. How to say no to others (and why you shouldn't feel guilty)
<https://www.betterup.com/blog/how-to-say-no>