KANNUR UNIVERSITY
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(Abstract)

FYUG B.Sc. Cyber Security Programme- Scheme (full) and syllabus (1-4 semesters) effective from 2025 admission and Scheme (3-8 semesters) and Syllabus (3-4 semesters) effective from 2024 admission - Approved & Implemented - Orders Issued

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ACADEMIC C SECTION

ACAD C/ACAD C3/8508/2019 Dated: 24.12.2025

Read:-1. U.O. No. FYUGPSC/FYSC-III/9089/2024, dated: 26/03/2025

2. U.O No. ACAD/ACAD C3/8508/2019 dated: 04/07/2025

3. Email dated, 27.10.2025 of Dr .N.S. Sreekanth, Convenor of the Expert Committee

4. Email dated, 05.11.2025 of the Dean, Faculty of Technology

5.Minutes of the meeting of the Standing Committee of Academic Council held on 05/12/2025

6..Orders of Vice Chancellor in the even file dated 24.12.2025

ORDER

1.The Scheme (full) and Syllabus (First & Second Semesters only) of the FYUG B.Sc. Cyber Security Programme was approved and implemented w. e. f 2024 Admission vide the paper read (1) above.

2. As per paper read (2) above, an Expert Committee was constituted for the preparation of syllabi and fixing the eligibility criteria for the FYUG B.Sc. Cyber Security and B.Sc .Data Analytics Programmes.

3.Vide paper read (3) above, Dr .N.S. Sreekanth, Convenor of the Expert Committee constituted for the preparation of syllabi and fixing the eligibility criteria for the FYUG B.Sc. Cyber Security and B.Sc. Data Analytics Programmes, submitted the Scheme (full) and Syllabus (1-4 semesters) of the FYUG B.Sc. Cyber Security Programme (2025 admission), Scheme (3-8 semesters) and Syllabus (3-4 semesters) of the FYUG B.Sc. Cyber Security Programme (2024 admission) for approval and implementation.

4.The submitted Scheme and Syllabi were forwarded to the Dean, Faculty of Technology for remarks and the Dean recommended to approve the same .

5.Considering the matter in detail, the Vice Chancellor has ordered to place the Scheme (full) and Syllabus (1-4 semesters) of the FYUG B.Sc. Cyber Security Programme (2025 admission), Scheme (3-8 semesters) and Syllabus (3-4 semesters) of the FYUG B.Sc. Cyber Security Programme (2024 admission), submitted by the Convenor of the Expert Committee, before the

Iniversity Order of File ACAD C/ACAD C3/8508/2019 Approved by DEPUTY REGISTRAR (ACADEMIC) on 24-Dec-2025 11:54 AM - Page 1

Standing Committee of the Academic Council for consideration .

6.The Standing Committee of the Academic Council held on 05/12/2025 vide paper read (5) above recommended to approve the above Scheme and Syllabi of the FYUG B.Sc. Cyber Security Programme .

7.The Vice Chancellor after considering the recommendation of the Standing Committee of the Academic Council and in exercise of the powers of the Academic Council conferred under Section 11(1) Chapter III of the Kannur University Act, 1996 and all other enabling provisions read together with has approved the scheme (full) and Syllabus (1-4 semesters) of the FYUG B.Sc. Cyber Security Programme (2025 admission), Scheme (3-8 semesters) and Syllabus (3-4 semesters) of the FYUG B.Sc. Cyber Security Programme (2024 admission), subject to reporting to the Academic Council.

8.The approved Scheme and Syllabus are appended with this U.O. and uploaded in the University Website.

9.The U.O read (1) above stands modified to this extent .

Orders are issued accordingly.

Sd/-

Bindu K P G

DEPUTY REGISTRAR (ACADEMIC)

For REGISTRAR

To:
1. The Controller of Examinations (Through PA)
2. The Principals of Affiliated colleges offering the FYUGP Cyber Security programme
3. The Convenor, Expert Committee
4. The Chairperson, Board of Studies in Computer Science (UG)

Copy To:
1. PA to CE (to circulate the same among the sections concerned under Examination Branch)
2. PS to VC/PA to R
3. JR II /EXC I/ EG I/ AR VII (Exam)
4. DR/AR (Academic)
5. Web Manager (to upload on the website)
6. Computer Programmer
7. SF/DF/FC

KANNUR UNIVERSITY CIVIL STATION P.O. KANNUR Pin-670 002 ARA

Forwarded / By Order

SECTION OFFICER

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Kannur University

CURRICULUM

SYLLABUS

OF

FOUR YEARS UNDER GRADUATE PROGRAMME (FYUGP)

BSc CYBER SECURITY

Under the Choice Based Credit and Semester System (CBCSS)

W.E.F 2024 Admission onwards

PROGRAMME OUTCOME

PO1: Critical Thinking and Problem-Solving-Apply critical thinking skills to analyse information and develop effective problem-solving strategies for tackling complex challenges.

PO2: Effective Communication and Social Interaction-Proficiently express ideas and engage in collaborative practices, fostering effective interpersonal connections.

PO3: Holistic Understanding-Demonstrate a multidisciplinary approach by integrating knowledge across various domains for a comprehensive understanding of complex issues.

PO4: Citizenship and Leadership-Exhibit a sense of responsibility, actively contribute to the community, and showcase leadership qualities to shape a just and inclusive society.

PO5: Global Perspective-Develop a broad awareness of global issues and an understanding of diverse perspectives, preparing for active participation in a globalized world.

PO6: Ethics, Integrity and Environmental Sustainability-Uphold high ethical standards in academic and professional endeavours, demonstrating integrity and ethical decision-making. Also acquire an understanding of environmental issues and sustainable practices, promoting responsibility towards ecological well-being.

PROGRAMME SPECIFIC OUTCOME

PSO1: Design, apply and implement computer science knowledge to implement robust software solutions using diverse programming languages and design tools.

PSO2: Utilize advanced techniques for data storage, retrieval, and manipulation across varied computing environments

PSO3: Critically evaluate and apply information technology tools and methodologies with ethical consideration

PSO4: Engage in team-based projects and interdisciplinary research to address complex computer science challenges

PSO5: Ability to analyse a problem, and identify and define the security related issues appropriate to its solution.

PSO6: Ability to design, implement, and evaluate a security system and IoT structures that capable of identify, prevent and protect from malware attack.

PSO7: Expose the students to learn the important of Cyber Security such as Web security, intrusion detection and biometric security so that they can have an opportunity to be a part of industry 5.0applications irrespective of domains.

Eligibility for Admission:

Basic qualifications:

Candidate must possess

1) Pass with 50% marks or equivalent grade at 10+2 level or equivalent

AND

2) Mathematics / Statistics / Computer Science / Computer Application / Informatics Practices as one of the subjects at 10+2 level.

Kannur University

B.Sc Cyber Security

Sl.No.	Categorization of Courses for all Programs	Minimum Number of Credit required	
		3Year UG	4Year UG
1	Major (Core)	68	88*
2	Minor	24	36
3	Multi-disciplinary	9	9
4	Skill Enhancement Courses(SEC)	9	9
5	Ability Enhancement Course(AEC)	12	12
6	Value Added Courses Common for all UG	9	9
7	Summer Internship, field based. Learning etc.	2	2
8	Research Project/Dissertation		12
	Total Credits	**133**	**177**

COURSES	**CREDITS**	**SEMESTERS**
Major / Minor Stream (DSC/DSE)	92 (4 credit courses)	Within all six semesters
Multidisciplinary Courses (MDC)	9 (3 credit three courses)	Semester 1 to 6
Skill Enhancement Courses (SEC)	9 (3 credits three courses)	Semester 1 to 6
Value Addition Courses (VAC)	9 (3 credits three courses)	Semester 1 to 6
Ability Enhancement Courses (AEC)	12 (3 Credits 4 courses)	Semester 1and 2
Internship / Field Visit	2 (2 credit courses)	Semester 1 to 6
Total credits for first six semesters	**133**	
COURSES	**CREDITS**	**SEMESTERS**
Major / Minor Stream (DSC/DSE)	24 (4 credit courses)	Semester 7
Additional DSC / DSE for Honours (in Major discipline)	12 Credits (2DSC and 1DSE in the Major)	Semester 8
Project	12 Credits	Semester 8
MOOC / ONLINE COURSES (Blended Mode)	8 (4 credits 2 courses)	Semester 7 and 8
Total credits for Semester 7 and 8	**44***	

*For Honours with Research 12 Credits Project in Semester 8 and for Honours additional 12 credits DSC / DSE in Semester 8 which should include Capstone level courses

*AEC- Ability Enhancement Course, DSC- Discipline Specific Course, SEC- Skill Enhancement Course, VAC- Value Added Course, DSE- Discipline Specific Elective

Syllabus Index Page Format

Semester: 1

Course Code	Title of the Course	Type of the Course DSC, MDC, SEC etc.	Credit	Hours / week	Hour Distribution /Week			
					L	T	P	O
KU1DSCCSY101	Fundamentals of Programming with C	DSC	4 (3T+1P)	5	3		2	
KU1DSCCSY102	Fundamentals of Computers And Computer Security	DSC	4	4	4		0	
KU1DSCCSY103	Major Trends in Information Technology	DSC	4	4	4		0	
KU1MDCCSY101	Introduction to Cyber Security	MDC	3	3	3		0	

L — Lecture, T — Tutorial, P — Practical/Practicum , O — Others

AEC- Ability Enhancement Course, DSC- Discipline Specific Course, SEC- Skill Enhancement Course, VAC- Value Added Course, DSE- Discipline Specific Elective

Semester: 2

Course Code	Title of the Course	Type of the Course DSC, MDC, SEC etc.	Credit	Hours / week	Hour Distribution /Week			
					L	T	P	O
KU2DSCCSY104	Operating System	DSC	4 (3T+1P)	5	3		2	
KU2DSCCSY105	Object Oriented Programming using C++	DSC	4 (3T+1P)	5	3		2	
KU2MDCCSY102	Digital Empowerment Through Ethical Standards	MDC	3	3	3			

Semester: 3

Course Code	Title of the Course	Type of the Course DSC, MDC, SEC etc.	Credit	Hours / week	Hour Distribution /Week			
					L	T	P	O
KU3DSCCSY201	Data Base Management System	DSC	4 (3T+1P)	5	3		2	
KU3DSCCSY202	Computer Networks	DSC	4	4	4			
KU3DSCCSY203	Programming in Java	DSC	4 (3T+1P)	5	3		2	
KU3VACCSY201	Cyber Laws and Rules	VAC	3	3	3			

Semester: 4

Course Code	Title of the Course	Type of the Course DSC, MDC, SEC etc.	Credit	Hours / week	Hour Distribution /Week			
					L	T	P	O
KU4DSCCSY204	Web Technology And Web Security	DSC	4 (3T+1P)	5	3		2	
KU4DSCCSY205	Fundamentals of Cyber Security	DSC	4 (3T+1P)	5	3		2	
KU4DSCCSY206	Python Programming	DSC	4 (3T+1P)	5	3		2	
KU4DSCCSY207	Information Security	DSC	4	4	4		0	
KU4SECCSY201	Linux System And Network Administration	SEC	3 (2T+1P)	4	3		1	
KU4VACCSY202	Cyber Ethics	VAC	3	3	3			
KU4VACCSY203	FOSS for Cyber Security	VAC	3	3	3			

Semester: 5

Course Code	Title of the Course	Type of the Course DSC, MDC, SEC etc.	Credit	Hours / week	Hour Distribution /Week			
					L	T	P	O
KU5DSCCSY301	Ethical Hacking And Kali Linux	DSC	4 (3T+1P)	5	3		2	
KU5DSCCSY302	Firewall and Internet Security	DSC	4 (3T+1P)	5	3		2	
KU5DSCCSY303	Operating System and Network Security	DSC	4	4	4			
KU5DSECSY301	Social Media Security	DSE	4	5	5			
KU5DSECSY302	Digital Water Marking and Steganography	DSE	4	4	4			
KU5DSECSY303	Biometrics	DSE	4	4	4			
KU5SECCSY304	Basics of Data Mining	SEC	3	3	3			
	INTERNSHIP		2					

Semester: 6

Course Code	Title of the Course	Type of the Course DSC, MDC, SEC etc.	Credit	Hours / week	Hour Distribution /Week			
					L	T	P	O
KU6DSCCSY304	Tools and Techniques for Cyber Security	DSC	4	4	4			
KU6DSCCSY305	Vulnerability Assessment and Penetration Testing	DSC	4	4	4			
KU6DSCCSY306	Project	DSC	4 (3T+1P)	5	3		2	
KU6DSECSY307	Cloud Security	DSE	4	4	4			
KU6DSECSY308	AI for Cyber Security	DSE	4	4	4			
KU6DSECSY309	IoT Security	DSE	4	4	4			
KU6SECCSY305	Digital Forensics	SEC	3	3	3			
KU6SECCSY306	Blockchain Technology	SEC	3	3	3			

Semester: 7

Course Code	Title of the Course	Type of the Course DSC, MDC, SEC etc.	Credit	Hours / week	Hour Distribution /Week			
					L	T	P	O
KU7DSCCSY401	Cryptography	DSC	4	4	4			
KU7DSCCSY402	Cyber Crime & Digital Investigation	DSC	4	4	4			
KU7DSCCSY403	Seminar /Paper Presentation	DSC	4	5	5			
KU7DSECSY404	Intrusion Detection & Incident Response	DSC	4	4	4			
KU7DSECSY405	MOOC ONLINE COURSE	DSC	4	4	4			

SEMESTER 8
DEGREE WITH HONOUR

SI.No.	Course	Offering Departments	Practical	Credit
1	KU8DSECSY406	Seminar		4
2	RESEARCH PROJECT(OPTIONAL)			8
TOTAL CREDIT				12
AND				
Will announce latter				12
Total Credit for semester 8				**24**
Total Credit for semester 1 to 6				**133**
Total Credit for semester 7& 8				**44**
Total Credit for semester1 to semester 8				**177**

SEMESTER 8
DEGREE WITH RESEARCH

SI.No	Course	Offering Departments	Practical	Credit
1	KU8DSECSY407	Research Methodology		4
2	KU8DSECSY408	Research Publication and Ethics		4
3	KU8DSECSY409	Will announce latter		4
TOTAL CREDIT				12
AND				
PROJECT				12
Total Credit for semester 8				**24**
Total Credit for semester 1 to 6				**133**
Total Credit for semester 7& 8				**44**
Total Credit for semester1 to semester 8				**177**

SEMESTER-1

SI.No.	Course	Offering Departments	Practical	Credit
1	AEC1	English Department	Yes	3(2T+1P)
2	AEC2	Languages		3
3	MDC1	Multi-Disciplinary Course1		3
4	Major1	Fundamentals of Programming with C	Yes	4(3T+1P)
5	Minor1	Optional Minor offered by any department.	Yes	4(3T+1P)
6	Minor2	Optional Minor offered by any department.	Yes	4(3T+1P)
Total Hours/Credits				**25/21**

SEMESTER-2

SI.No.	Course	Offering Departments	Practical	Credit
1	AEC3	English Department	Yes	3(2T+1P)
2	AEC4	Languages		3
3	MDC2	Multi-Disciplinary Course2		3
4	Major2	Operating System	Yes	4(3T+1P)
5	Minor3	Optional Minor offered by any department.	Yes	4(3T+1P)
6	Minor4	Optional Minor offered by any department.	Yes	4(3T+1P)
Total Hours/Credits				**25/21**

SEMESTER 3

SI.No.	Course	Offering Departments	Practical	Credit
1	Major3	Database Management System	Yes	4(3T+1P)
2	Major4	Computer Networks		4
3	VAC1	Value Added Course 1		3
4	Minor5	Optional Minor offered by any department.	Yes	4(3T+1P)
5	Minor6	Optional Minor offered by any department.	Yes	4(3T+1P)
6	MDC3	Multi-Disciplinary Course3(KS) Offered by English and language department		3
Total Hours/Credits				**25/22**

SEMESTER 4

SI.No.	Course	Offering Departments	Practical	Credit
1	Major5	Web Technology and Web Security	Yes	4(3T+1P)
2	Major6	Fundamentals of Cyber Security		4
3	Major 7	Application and Data Security		4
4	SEC1	Skill Enhancement Course 1	Yes	3(2T+1P)
5	VAC2	Value Added course 2		3
6	VAC3	Value Added course 3		3
Internship/Field Visit(Any Semester we can do the Internship-Semester 1 to 6)				2
Total Hours/Credits				**25/21**

SEMESTER 5

SI.No.	Course	Offering Departments	Practical	Credit
1	Major8	Ethical Hacking and Kali Linux		4
2	Major9	Operating System and Network Security	Yes	4(3T+1P)
3	Major 10	Firewall and Internet Security	Yes	4(3T+1P)
4	Major11	Discipline Specific Elective		4
5	Major12	Discipline Specific Elective		4
6	SEC2	Skill Enhancement Course 2		3
Total Hours/Credits				**25/23**

SEMESTER -6

SI.No.	Course	Offering Departments	Practical	Credit
1	Major13	Tools and Techniques for Cyber Security	Yes	4(3T+1P)
2	Major14	Vulnerability Assessment and Penetration Testing	Yes	4(3T+1P)
3	Major 15	Project	Yes	4(3T+1P)
4	Major16	Discipline Specific Elective	Yes	4(3T+1P)
5	Major17	Discipline Specific Elective		4
6	SEC3	Skill Enhancement Course 3		3
Total Hours/Credits				**25/23**

SEMESTER 7

SI.No	Course	Offering Departments	Practical	Credit
1	Major	Cryptography		4
2	Major	Cyber Crime & Digital Investigation	Yes	4(3T+1P)
3	Major	Seminar /Paper Presentation		4
4	Major	Intrusion Detection & Incident Response		4(3T+1P)
5	Major	MOOC ONLINE COURSE		4
Total Hours/Credits				**20**

SEMESTER 8

DEGREE WITH HONOURS

SI.No.	Course	Offering Departments	Practical	Credit
1	Major	Seminar		4
2	RESEARCH PROJECT(OPTIONAL)			8
TOTAL CREDIT				12
AND				
Will announce latter				12
Total Credit for semester 8				**24**
Total Credit for semester 1 to 6				**133**
Total Credit for semester 7& 8				**44**
Total Credit for semester1 to semester 8				**177**

SEMESTER 8
DEGREE WITH RESEARCH

SI.No.	Course	Offering Departments	Practical	Credit
1	Major/Minor	Research Methodology		4
2	Major/Minor	Research Publication and Ethics		4
3	Major/Minor	Will announce later		4
TOTAL CREDIT				12
AND				
PROJECT				12
Total Credit for semester 8				**24**
Total Credit for semester 1 to 6				**133**
Total Credit for semester 7& 8				**44**
Total Credit for semester1 to semester 8				**177**

KU1DSCCSY101: FUNDAMENTALS OF PROGRAMMING WITH C

Semester	Course Type	Course Level	Course Code	Credits	Total Hours
1	DSC	100-199	**KU1DSCCSY101**	4 (3T+1P)	75

Learning Approach (Hours/ Week)			Marks Distribution			Duration of ESE (Hours)
Lecture	Practical/ Internship	Tutorial	CE	ESE	Total	
3	2		35	65	100	1.5hrs.

Course Description:

This course introduces the fundamental concepts of programming using C language. Student will learn about data types, control structures, functions, arrays, pointers, and file handling. Emphasis is placed on developing logical thinking and problem solving skills through hands-on programming exercises. By the end of course, students will be able to design, implement, and debug basic C programs.

Course Prerequisite: NIL

Course Outcomes:

CO No.	Expected Outcome	Learning Domains
1	Identify the basic syntax and structure of the C programming language.	U, A
2	Design algorithms and flowcharts to represent simple problems.	U, A
3	Understand and use various program control structures.	U, A
4	Implement arrays and strings using appropriate logic	U, A, E

*****Remember (R), Understand (U), Apply (A), Analyse (An), Evaluate (E), Create (C)***

Mapping of Course Outcomes to PSOs

	PSO 1	PSO 2	PSO 3	PSO 4	PSO 5	PSO 6	PSO 7

CO 1	3			2			
CO 2	3		2				
CO 3	3	3	3	2			
CO 4	3	2	2	2		2	2

COURSE CONTENTS

Contents for Classroom Transaction:

MODULE	UNIT	DESCRIPTION	HOURS
1	**MODULE 1: Introduction to Programming**		
	1	Programming languages, compilers, compiling and executing a program. Representation of Algorithm - Algorithms for finding roots of quadratic equations, finding minimum and maximum numbers of a given set, finding if a number is prime number. Flowchart and Pseudocode with examples, Program design and structured programming.	15
	2	Introduction to C Programming Language: Character set, constants, variables (with data types and space requirements), printf(), scanf()	
	3	Syntax and Logical Errors in compilation, object and executable code, Operators, expressions and precedence, Expression evaluation, Storage classes (auto, extern, static and register), type conversion. The main function and command line arguments. Bitwise operations: Bitwise AND, OR, XOR and NOT operators.	
	4	Conditional Branching and Loops: Writing and evaluation of conditionals and consequent branching with if, if-else, switch-case, ternary operator, goto, Iteration with for, while, do- while loops.	

2	**MODULE 2: Functions and Dynamic Memory Allocation**		
	1	Functions: Designing structured programs, declaring a function, structure of a function, Parameters and return type of a function.	15
	2	Passing parameters to functions, call by value, passing arrays to functions, passing pointers to functions, idea of call by reference,	

	3	Library functions in C, Recursion: Simple programs, such as Finding Factorial, Fibonacci series etc., Limitations of Recursive functions.	
	4	Dynamic memory allocation: Allocating and freeing memory, Allocating memory for arrays of different data types.	

3	**MODULE 3: Arrays, Structures and Pointers**		
	1	Arrays: one and two-dimensional arrays, creating, accessing and manipulating elements of arrays.	15
	2	Strings: Introduction to strings, handling strings as array of characters, basic string functions available in C (strlen, strcat, strcpy, strstr etc.), arrays of strings.	
	3	Structures: Defining structures, initializing structures, unions, Array of structures.	
	4	Pointers: Idea of pointers, Defining pointers, Pointers to Arrays and Structures, Use of Pointers in self-referential structures, usage of self referential structures in linked list (no implementation) ,Enumeration.	

4	**MODULE 4: Preprocessor and File handling in C**		
	1	Preprocessor: Commonly used Preprocessor commands like include, define, undef, if, ifdef, ifndef.	
	2	Files: Text and Binary files, Creating and Reading and writing text and binary files,	
	3	Appending data to existing files, Writing and reading structures using binary files.	
	4	Random access using fseek, ftell and rewind functions.	

5	**Teacher Specific Module**	
	Directions	
	Teachers are expected to select relevant topics within the chosen subject area, giving special emphasis to advanced concepts and recent developments in the field. The content should be enriched with well-chosen case studies that highlight practical applications, contemporary issues, and emerging trends, thereby enabling students to gain both theoretical knowledge and contextual understanding.	15

Essential Readings

1. Balagurusamy, E. *Programming in ANSI C*. Tata McGraw-Hill, 1994.
2. Kanetkar, Yashavant P. *Let Us C*. 16th ed., BPB Publications, 2017.

Suggested Readings

1. Kernighan, Brian W., and Dennis M. Ritchie. *The C Programming Language*. 2nd ed., Prentice Hall, 1988.
2. Gottfried, Byron S. *Schaum's Outline of Programming with C*. 2nd ed., McGraw-Hill, 1996.

Assessment Rubrics:

Evaluation Type		**Marks**
End Semester Evaluation		**50 (Theory)** **15 (Practical)**
Continuous Evaluation		**35**
CE (Theory)		**25**
a)	Test Paper- 1	5
b)	Model Exam	10
c)	Assignment(2 numbers)	5
d)	Seminar	5
e)	Book/ Article Review	
f)	Viva-Voce	
g)	Field Report	
CE (Practical)		**10**
Total		**100**

KU1DSCCSY102: FUNDAMENTALS OF COMPUTERS AND COMPUTER SECURITY

Semester	Course Type	Course Level	Course Code	Credits	Total Hours
1	DSC	100-199	**KU1DSCCSY102**	4	75

Learning Approach (Hours/ Week)			Marks Distribution			Duration of ESE (Hours)
Lecture	Practical/ Internship	Tutorial	CE	ESE	Total	
4	0		30	70	100	2hrs.

Course Description:

This course describes the basic principles, components, and operations of computer systems, covering essential knowledge for using computers effectively, understanding hardware and software, and grasping concepts like data representation, operating systems, and Computer Security.

Course Prerequisite: NIL

Course Outcomes:

CO No.	Expected Outcome	Learning Domains
1	Identify various components of computer system and understand their functions.	U
2	Demonstrate data representation in computer system and various.	U
3	Compare the performance of different types of software.	An
4	Understand the fundamental concepts of Computer Security.	U

****Remember (R), Understand (U), Apply (A), Analyse (An), Evaluate (E), Create (C)***

Mapping of Course Outcomes to PSOs

	PSO 1	**PSO 2**	**PSO 3**	**PSO 4**	**PSO 5**	**PSO 6**	**PSO 7**

CO1	3	2					
CO2	3						
CO3	2		2				
CO4	3		3				2

COURSE CONTENTS

Contents for Classroom Transaction:

MODULE	UNIT	DESCRIPTION	HOURS
1	**MODULE 1: Introduction to Computers**		
	1	Definition and Characteristics of Computers, Brief History and Evolution of Computers. Computer System Overview, Basic Components of a Computer System - Input, Output, Processing, and Storage.	15
	2	**Central Processing Unit (CPU):** Basic Concepts of CPU, Function and Components, Architecture of a CPU - ALU, Registers, and Control Unit.	
	3	Computer Memory: Memory Hierarchy - An Overview, Primary Memory - RAM (Random Access Memory) and ROM (Read-Only Memory), Secondary Memory.	

2	**MODULE 2: Introduction to Data Representation**		
	1	Decimal, Binary, Hexa-Decimal and Octal Number Systems, Conversion Between Number Systems.	15
	2	Binary Arithmetic and Complements: Binary addition, subtraction, Complements of Binary Numbers (1's Complement and 2's Complement).	

	3	Binary Coding Scheme: EBCDIC, ASCII Code, Unicode.	
	4	Logic Gates: AND, OR, NOT, NAND, NOR, XOR, XNOR.	

3	**MODULE 3: Introduction to Software**		
	1	Types of Software - Application Software, System Software.	15
	2	Operating Systems – introduction, Objectives of Operating System, Types of Operating System, Examples.	
	3	Linux Operating System: Features of Linux. Basic Commands – useradd, passwd, ls, mkdir, rmdir, cd, cp, mv, rm, pwd,cat.	

	MODULE 4: Introduction to Computer Security		
4	1	Introduction, Security Threat and Security attack, Malicious Software: Virus- Worms –Trojan Horse.	15
	2	Hacking: Packet Sniffing-Password Cracking – E-mail Hacking, Security Services.	
	3	Users Identification and Authentication: User Name and Password- Smart card- Biometric Techniques. Security Policy.	

5	**Teacher Specific Module**	**15**
	Directions	
	Teachers are expected to select relevant topics within the chosen subject area, giving special emphasis to advanced concepts and recent developments in the field. The content should be enriched with well-chosen case studies that highlight practical applications, contemporary issues, and emerging trends, thereby enabling students to gain both theoretical knowledge and contextual understanding.	

Essential Readings:

1. Goel, Anita. *Computer Fundamentals*. Pearson Education India, 2010.
2. Floyd, Thomas L. *Digital Fundamentals*. 10th ed., Pearson Education India (UBS), 2011.

3. Petzold, Charles. *Code: The Hidden Language of Computer Hardware and Software*. Pearson Education, 2022

4. Kanetkar, Yashavant P. *Unix Shell Programming*. BPB Publications, 1996.

Assessment Rubrics:

Evaluation Type		**Marks**
End Semester Evaluation		**70**
Continuous Evaluation		**30**
a)	Test Paper- 1	5
b)	Model Exam	10
c)	Assignment(2 numbers)	10
d)	Seminar	5
e)	Book/ Article Review	
f)	Viva-Voce	
g)	Field Report	
Grand Total		**100**

KU1DSCCSY103: MAJOR TRENDS IN INFORMATION TECHNOLOGY

Semester	Course Type	Course Level	Course Code	Credits	Total Hours
1	DSC	100-199	**KU1DSCCSY103**	4	75

Learning Approach (Hours/ Week)			Marks Distribution			Duration of ESE (Hours)
Lecture	Practical/ Internship	Tutorial	CE	ESE	Total	
4	0		30	70	100	2hrs.

Course Description:

This course explores the latest trends and innovations in information technology. Students will learn about emerging technologies, their impact on the industry, and how to leverage these technologies in real-world applications. Topics include artificial intelligence, blockchain, cloud computing, cybersecurity, the Internet of Things (IoT), big data analytics, and more.

Course Prerequisite: NIL

Course Outcomes:

CO No.	Expected Outcome	Learning Domains
1	Identify the impact of emerging technologies in the field of IT and real life	U
2	Judge the impact of these technologies on various industries.	An
3	Examine practical applications and case studies of emerging technologies.	A
4	Critically evaluate problem-solving skills in the context of new technological developments.	A/E

****Remember (R), Understand (U), Apply (A), Analyse (An), Evaluate (E), Create (C)***

Mapping of Course Outcomes to PSOs

	PSO 1	PSO 2	PSO 3	PSO 4	PSO 5	PSO 6	PSO 7
CO 1	1	2	2	3			
CO 2	1	2	2	3			
CO 3	1	2	2	3			
CO 4	1	2	2	3			

COURSE CONTENTS

Contents for Classroom Transaction:

MODULE	UNIT	DESCRIPTION	HOURS
1	**MODULE TITLE:** Introduction to Emerging Technologies		15
	1	Overview of current trends in IT The importance of staying updated with technology	
	2	Edge Computing and 5G Technology-Fundamentals of edge computing.	
	3	The impact of 5G on IT infrastructure Examples of edge computing applications	
2	**MODULE TITLE: A**rtificial Intelligence and Machine Learning*		15
	1	Fundamentals of AI and ML	
	2	Applications in various industries	
	3	Ethical considerations and challenges	
3	**MODULE TITLE :** Internet of Things (IoT) &Cloud Computing		15
	1	Overview of IoT and its components Applications in smart homes, healthcare, and industrial automation	

	2	Security and privacy concerns	
	3	Cloud Computing- Introduction and Architecture	
	4	Types of cloud services (IaaS, PaaS, SaaS)	
	5	Benefits and challenges of cloud adoption	

4	**MODULE TITLE: Cybersecurity Trends and Ethical and Social Implications of Emerging Technologies***		**15**
	1	Current cyber security threats and vulnerabilities	
	2	Emerging security technologies and practices- The role of AI in cybersecurity	
	3	Ethical considerations in the development and deployment of new technologies - Social impact and the digital divide	
	4	Regulatory and policy issues	

5	**Teacher Specific Module**	
	Directions	
	Teachers are expected to select relevant topics within the chosen subject area, giving special emphasis to advanced concepts and recent developments in the field. The content should be enriched with well-chosen case studies that highlight practical applications, contemporary issues, and emerging trends, thereby enabling students to gain both theoretical knowledge and contextual understanding.	15

Essential Readings:

1. Russell, Stuart J., and Peter Norvig. *Artificial Intelligence: A Modern Approach*. 4th ed., Pearson, 2020.
2. Erl, Thomas, with Ricardo Puttini and Zaigham Mahmood. *Cloud Computing: Concepts, Technology & Architecture*. Prentice Hall, 2013.
3. Singer, P. W., and Allan Friedman. *Cybersecurity and Cyberwar: What Everyone Needs to Know*. Oxford University Press, 2014.

Assessment Rubrics:

Evaluation Type		Marks
End Semester Evaluation		**70**
Continuous Evaluation		**30**
a)	Test Paper- 1	5
b)	Model Exam	10
c)	Assignment(2 numbers)	10
d)	Seminar	5
e)	Book/ Article Review	
f)	Viva-Voce	
g)	Field Report	
Grand Total		**100**

KU1MDCCSY101: INTRODUCTION TO CYBER SECURITY

Semester	Course Type	Course Level	Course Code	Credits	Total Hours
1	MDC	100-199	**KU1MDCCSY101**	3	45

Learning Approach (Hours/ Week)			Marks Distribution			Duration of ESE (Hours)
Lecture	Practical/ Internship	Tutorial	CE	ESE	Total	
3	0	-	25	50	75	1.5 hrs

Course Description:

This course provides an overview of the principles and practices of cyber security. Students will learn about the fundamental concepts of Networks, common threats and vulnerabilities, and strategies for protecting systems and data.

Course Prerequisite: NIL

Course Outcomes:

CO No.	Expected Outcome	Learning Domains
1	Understand the fundamental concepts of Cyber Security.	U
2	Understand the fundamental concepts of Computer Networks.	U
3	Identify various types of cyber threats and vulnerabilities.	An
4	Implement security measures and best practices.	C

****Remember (R), Understand (U), Apply (A), Analyse (An), Evaluate (E), Create (C)***

Mapping of Course Outcomes to PSOs

	PSO 1	PSO 2	PSO 3	PSO 4	PSO 5	PSO 6	PSO 7
CO 1	3	3	2	2			
CO 2	2	3	2	2			
CO 3	3	3	2	3			

CO 4	2	3	2	3			

COURSE CONTENTS

MODULE	UNIT	DESCRIPTION	HOURS
1	**MODULE TITLE: Introduction to Cyber Security**		
	1	Introduction, Need for Cyber Security, Data and Information.	9
	2	Cyber Security terminology - Cyberspace, Cybercrime, Cyber-attack, Threat, Vulnerability, Malware, Phishing, Botnets, Adware, Denial of Service , Ransomware, Key Logger.	
	3	The CIA Triads- Confidentiality, Integrity and Availability. Consequences of Weak Security, Challenges in Cyber Security.	
2	**MODULE TITLE: Introduction to Computer Security**		
	1	Introduction, Security Threat and Security attack, Malicious Software: Virus- Worms –Trojan Horse.	9
	2	Hacking: Packet Sniffing-Password Cracking – E-mail Hacking, Security Services.	
	3	Users Identification and Authentication: User Name and Password- Smart card- Biometric Techniques. Security Policy.	
3	**MODULE TITLE: Network Fundamentals**		
	1	Understanding networks - LAN, WAN, VPN, MAN, PAN	9
	2	OSI Model, OSI Layer Security, TCP/IP model.	
	3	IP address: Types of IP addresses (private IP address, Public IP address), IP address classification. WWW, Internet.	

	MODULE TITLE: Network Security Fundamentals		
4	1	Need for Network Security, Hacking, stages of Hacking, Ethical hacking.	9
	2	Types of Network attacks- Spoofing, Sniffing, Mapping, Hijacking, Trojans, DoS and DDoS.	
	3	Firewalls- Types of firewalls, intrusion detection/prevention systems (IDS/IPS).	

5	**Teacher Specific Module**	**9**
	Directions	
	Teachers are expected to select relevant topics within the chosen subject area, giving special emphasis to advanced concepts and recent developments in the field. The content should be enriched with well-chosen case studies that highlight practical applications, contemporary issues, and emerging trends, thereby enabling students to gain both theoretical knowledge and contextual understanding.	

Essential Readings:

1. Agrawal, Narmrata. *Cyber Security: A Complete Solution*. Dreamtech Press, 2018.
2. Goutam, Rajesh Kumar. *Cybersecurity Fundamentals*. BPB Publications, 2021.
3. Graham, James, Ryan Olson, and Rick Howard, editors. *Cyber Security Essentials*. Auerbach Publications, 2010.

Assessment Rubrics:

Evaluation Type		**Marks**
End Semester Evaluation		**50**
Continuous Evaluation		**25**
a)	Test Paper- 1	5

b)	Model exam	10
c)	Assignment	5
d)	Seminar	5
e)	Book/ Article Review	
f)	Viva-Voce	
g)	Field Report	
Total		**75**

KU2DSCCSY104: OPERATING SYSTEM

Semester	Course Type	Course Level	Course Code	Credits	Total Hours
2	DSC	100-199	**KU2DSCCSY104**	4 (3T+1P)	75

Learning Approach (Hours/ Week)			Marks Distribution			Duration of ESE (Hours)
Lecture	Practical/ Internship	Tutorial	CE	ESE	Total	
3	2	-	35	65	100	1.5hrs.

Course Description:

This course provides a comprehensive introduction to the fundamental concepts and principles of operating systems. It covers the core components, including process management, memory management, file systems, and I/O systems. The course also includes a practical, hands-on module focused on the Linux operating system, giving students the skills to manage and interact with a real-world OS.

Course Prerequisite: Basic understanding of computer

Course Outcomes:

CO No.	Expected Outcome	Learning Domains
1	Students will understand the fundamental functions and types of operating systems.	U
2	They will be able to explain different process management and CPU scheduling techniques.	U, A
3	Students will understand the principles of memory management and virtual memory.	U
4	They will gain practical skills in using basic Linux commands and	A

	managing the Linux file system.	

**Remember (R), Understand (U), Apply (A), Analyse (An), Evaluate (E), Create (C)*

Mapping of Course Outcomes to PSOs

	PSO 1	PSO 2	PSO 3	PSO 4	PSO 5	PSO 6	PSO 7
CO 1	3						
CO 2	3						
CO 3	3						
CO 4			3				

COURSE CONTENTS

Contents for Classroom Transaction:

MODULE	UNIT	DESCRIPTION	HOURS
1	**MODULE 1: Introduction to Operating System**		
	1	Definition and structure of OS, Functions of OS. Types of Operating Systems. Batch OS, Multi programming OS, Time Sharing OS, Real time OS, Distributed OS. User mode and Kernel mode, System Calls (Introduction only)	15
	2	Process management: process concept, process state, process control block, process scheduling, operations on processes, cooperating processes.	
	3	CPU scheduling, scheduling criteria, CPU scheduling algorithms.	
	4	Deadlocks Characterization, Resource Allocation Graph, Dead lock prevention and avoidance.	

2	**MODULE 2: Memory Management in Operating System**		
	1	Memory management, contiguous memory allocation,	10

	2	Paging, segmentation, segmentation with paging.	
	3	Virtual memory, demand paging, page replacement	

3	**MODULE 3: File System**		
	1	Access Methods: Sequential, Direct, Other access methods. Allocation Methods: Contiguous allocation, Linked Allocation, Indexed Allocation	15
	2	Directory Structure: Single- level Directory, Two- level Directory, Tree -structured directories.	
	3	I/O systems-Kernel I/O subsystem-I/O Scheduling, Buffering, caching, Spooling.	

4	**MODULE 4: Linux Operating System**		
	1	Architecture, Features of Linux OS, Types of Users, add user and delete user.	20
	2	Linux File system, Types of files in Linux, security by file permissions.	
	3	Linux commands: pwd, cp, rm, mv, cat, cd, absolute and relative paths, ls, mkdir, rmdir, chmod. vi editor. Monitoring Processes: Using top, htop, and ps with various flags (-ef, aux)	
	4	Mounting, Linux Installation.	

5	**Teacher Specific Module**	
	Directions	
	Teachers are expected to select relevant topics within the chosen subject area, giving special emphasis to advanced concepts and recent developments in the field. The content should be enriched with well-chosen case studies that highlight practical applications, contemporary issues, and emerging trends, thereby enabling students to gain both theoretical knowledge and contextual understanding.	15

Essential Readings:

1. Silberschatz, Abraham, Peter B. Galvin, and Greg Gagne. *Operating System Concepts*. Wiley, 2018.
2. Frisch, Æleen. *Essential System Administration*. O'Reilly & Associates, 2002.
3. Kerrisk, Michael. *The Linux Programming Interface: A Linux and UNIX System Programming Handbook*. No Starch Press, 2010.

Suggested Readings:

1. Tanenbaum, Andrew S., and Herbert Bos. *Modern Operating Systems*. Pearson, 2015.
2. Gilly, Daniel. *Unix in a Nutshell*. O'Reilly & Associates, 1992.
3. Nemeth, Evi, et al. *Linux Administration Handbook*. Prentice Hall, 2006.
4. Negus, Christopher. *Red Hat Linux Bible*. Wiley, 2010.
5. Thomas, Rebecca, and Jean Yates. *A User Guide to the UNIX System*. Tata McGraw-Hill, 1984.

Assessment Rubrics:

Evaluation Type		**Marks**
End Semester Evaluation		**50 (Theory)** **15 (Practical)**
Continuous Evaluation		**35**
CE (Theory)		**25**
a)	Test Paper- 1	5
b)	Model Exam	10
c)	Assignment(2 numbers)	5
d)	Seminar	5
e)	Book/ Article Review	
f)	Viva-Voce	
g)	Field Report	
CE (Practical)		**10**
Total		**100**

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KU2DSCCSY105: OBJECT ORIENTED PROGRAMMING USING C++

Semester	Course Type	Course Level	Course Code	Credits	Total Hours
2	DSC	100-199	**KU2DSCCSY106**	4 (3T+1P)	75

Learning Approach (Hours/ Week)			Marks Distribution			Duration of ESE (Hours)
Lecture	Practical/ Internship	Tutorial	CE	ESE	Total	
3	2	-	35	65	100	1.5hrs.

Course Description:

This course introduces the fundamentals of C++ programming with a focus on Object-Oriented Programming (OOP) principles such as encapsulation, inheritance, polymorphism, and abstraction. Students will develop skills to design and implement object-oriented applications.

Course Prerequisite: NIL

Course Outcomes:

CO No.	Expected Outcome	Learning Domains
1	Understand the core principles of object-oriented programming.	U, A
2	Learn the syntax and semantics of the C++ programming language	U, A
3	Apply OOP principles to solve real-world programming problems	U, A
4	Develop small to medium-scale C++ applications using classes and objects	U, A, E

****Remember (R), Understand (U), Apply (A), Analyse (An), Evaluate (E), Create (C)***

Mapping of Course Outcomes to PSOs

	PSO 1	PSO 2	PSO 3	PSO 4	PSO 5	PSO 6	PSO 7
CO 1	3			2			
CO 2	3		2				
CO 3	3	3	3	2			
CO 4	3	2	2	2		2	2

COURSE CONTENTS

Contents for Classroom Transaction:

MODULE	UNIT	DESCRIPTION	HOURS
1	**MODULE 1: Introduction to OOP and C++ Basics**		
	1	Procedural vs Object-Oriented Programming	15
	2	OOP Concepts: Encapsulation, Inheritance, Polymorphism, Abstraction	
	3	Structure of a C++ Program	
	4	Data Types, Operators, and Basic Input/Output	

2	**MODULE 2: Input/Output and Branching**		
	1	Control Structures: Branching and Looping	15
	2	Defining Classes and Creating Objects	
	3	Member Functions, Constructors, Destructors	
	4	Introduction to Operator Overloading (Unary and Binary – concepts only)	

3	**MODULE 3: Inheritance and Polymorphism**		
	1	Friend Functions and Friend Classes	15
	2	Control statements: break, continue	

	3	Types of Inheritance: Single, Multiple, Multilevel, Hierarchical, and Hybrid (with programs)	

4	**MODULE 4: Virtual Functions and Polymorphism**		
	1	Compile-Time Polymorphism: Function Overloading, Operator Overloading (with examples)	
	2	Runtime Polymorphism: Virtual Functions, Pure Virtual Functions, Abstract Classes and Interfaces.	

5	**Teacher Specific Module**	
	Directions	
	Teachers are expected to select relevant topics within the chosen subject area, giving special emphasis to advanced concepts and recent developments in the field. The content should be enriched with well-chosen case studies that highlight practical applications, contemporary issues, and emerging trends, thereby enabling students to gain both theoretical knowledge and contextual understanding.	15

Essential Readings:

1. Balagurusamy, E. *Object-Oriented Programming with C++*. McGraw Hill, 2013.

Suggested Readings:

1. Lafore, Robert. *Object-Oriented Programming in C++*. 4th ed., Sams Publishing, 2002.
2. Stroustrup, Bjarne. *The C++ Programming Language*. 4th ed., Addison-Wesley, 2013.
3. Schildt, Herbert. *C++: The Complete Reference*. 4th ed., McGraw Hill, 2003.
4. Kanetkar, Yashavant P. *Let Us C++*. BPB Publications, 2010.

Assessment Rubrics:

Evaluation Type		**Marks**
End Semester Evaluation		**50 (Theory)** **15 (Practical)**
Continuous Evaluation		**35**
CE (Theory)		**25**
a)	Test Paper- 1	5
b)	Model Exam	10
c)	Assignment(2 numbers)	5
d)	Seminar	5
e)	Book/ Article Review	
f)	Viva-Voce	
g)	Field Report	
CE (Practical)		**10**
Total		**100**

KU2MDCCSY102: DIGITAL EMPOWERMENT THROUGH ETHICAL STANDARDS

Semester	Course Type	Course Level	Course Code	Credits	Total Hours
2	MDC	100-199	**KU2MDCCSY102**	3	45

Learning Approach(Hours/Week)			Marks Distribution			Duration of ESE(Hours)
Lecture	Practical/ Internship	Tutorial	CE	ESE	Total	
3	0	-	25	50	75	1.5hrs.

Course Description: This course explores the evolution from pre-digital challenges to the current digital landscape, covering historical milestones, key technologies, and the vision of Digital India. It emphasizes the benefits and importance of digital revolution while addressing ethical and security considerations. Participants engage with digital tools for personal and professional growth and examine case studies on digital infrastructure, missions, and services to understand real-world applications

Course Prerequisite: NIL

Course Outcomes:

CO No.	**Expected Outcome**	**Learning Domains**
CO1	Understand the evolution of digital technologies and their transformative impact on society, economy, and governance.	U
CO2	Analyze the key initiatives of Digital India and the role of Kerala in becoming a digitally empowered society.	An
CO3	Apply various digital tools for effective communication, collaboration, content creation, and professional development.	A
CO4	Evaluate digital security challenges, privacy issues, and ethical considerations in the use of digital technologies.	E

Remember (R), Understand (U), Apply (A), Analyze (An), Evaluate (E), Create (C)

Mapping of Course Outcomes to PSOs

	PSO1	**PSO2**	**PSO3**	**PSO4**	**PSO5**
CO1	**3**	**2**			

CO2	**3**	**2**			
CO3	**3**	**2**			
CO4	**3**	**2**			

COURSE CONTENTS

Contents for Classroom Transaction:

MODULE	UNIT	DESCRIPTION	HOURS
1	**MODULE TITLE: Transition to Digital World**		
	1	Challenges of Pre-Digital Age	**9**
	2	Importance and Benefits of Digital Revolution	
	3	Key concepts: digitization, digitalization, digital transformation	
	4	Introduction to Key Digital Technologies: Cloud Computing, IoT, AI, Block Chain	
2	**MODULE TITLE: Perspective of Digital India & Digital Innovations in Kerala**		
	1	Understanding Digital India: Concept, Objectives, and Evolution	**9**
	2	Overview of Digital Infrastructure: Broadband Connectivity, Digital Literacy, and Access to Information	
	3	Vision of Digital India: DigiLocker, E-Hospitals, ePathshala, BHIM, e-Health Campaigns	
	4	Kerala-Emergence as Digital Society: Internet & Mobile Penetration in Kerala, 4 Pillars of Digital Emergence in Kerala (Akshaya Project, IT@School Project, Digital Infrastructure Availability, State Data Centre & allied Applications)	
	5	Role of K-DISC in Digital Empowerment	
	6	Kerala State IT Mission: Core IT Infrastructure, eGovernance Applications, Service Delivery Platforms	
3	**MODULE TITLE: Digital Tools for Personal and Professional Growth**		
	1	Digital Tools for Data Sharing: Google Drive, Google Sheets	**9**

	2	Digital Tools for Data Sharing: Google Docs, Google Classroom	
	3	Online learning platforms and resources (e.g., Coursera, Khan Academy, MOOCs, Duolingo)	
	4	Networking Tools: LinkedIn	
	5	Content Creation and Management: Canva	
4	**MODULE TITLE: Ethical and Security Considerations in the Digital Age**		
	1	Understanding privacy in the digital age	**9**
	2	Legal and ethical considerations in data collection and processing: Intellectual Property Rights (IPR)	
	3	Key Terminologies: Cyber Security, Cyber Crime, Cyber Attack, Cyber Espionage, Cyber Warfare	
	4	Authentication, Authorisation	
	5	Cyber Crimes and Classification	
	6	Introduction to Cyber Laws in India	
5	**Teacher Specific Module**		**9**
	Directions		
	Teachers are expected to select relevant topics within the chosen subject area, giving special emphasis to advanced concepts and recent developments in the field. The content should be enriched with well-chosen case studies that highlight practical applications, contemporary issues, and emerging trends, thereby enabling students to gain both theoretical knowledge and contextual understanding.		

Essential Readings:

1. S K Kaushal, “Digital India Importance Needs and Values”, N B Publications, 2018.
2. Vipin M. Chaturvedi and Shivani Kapoor, “Cyber Security in India: Government, Law Enforcement and Corporate Sector"
3. R.S. Pressman, G. Sharma, and G. Sridhar, "Information Security: Principles and Practices in Indian Context"
4. Michael Goodrich and Roberto Tamassia, “Introduction to Computer Security”, First Edition, Pearson Education, 2011.

Assessment Rubrics:

Evaluation Type		Marks
End Semester Evaluation		**50**
Continuous Evaluation		**25**
a)	Test Paper- 1	5
b)	Model exam	10
c)	Assignment	5
d)	Seminar	5
e)	Book/ Article Review	
f)	Viva-Voce	
g)	Field Report	
Total		**75**

KU3DSCCSY201: DATABASE MANAGEMENT SYSTEM

Semester	Course Type	Course Level	Course Code	Credits	Total Hours
3	DSC	200-299	**KU3DSCCSY201**	4(3T+1P)	75

Learning Approach (Hours/ Week)			Marks Distribution			Duration of ESE (Hours)
Lecture	Practical/ Internship	Tutorial	CE	ESE	Total	
3	2		35	65	100	1.5 hr

Course Description: This course introduces the basics of Database Management Systems (DBMS).It covers data models, ER diagrams, and database design concepts. Students will learn about keys, relational algebra, and normalization. The course includes hands-on practice with SQL queries and commands. Advanced topics like joins, views, triggers, and functions are also included. By the end, students will be able to design and manage relational databases.

Course Prerequisite: NIL

Course Outcomes:

CO No.	Expected Outcome	Learning Domains
1	Demonstrate a foundational understanding of database systems, data models, and the principles of designing Entity-Relationship (ER) diagrams.	U,A
2	Apply relational algebra operations and normalization techniques to design efficient databases.	U,A
3	Write and execute SQL queries using DDL, DML, and DCL commands for effective data manipulation and control.	U,A,E
4	Use SQL operators, functions, joins, views, triggers, and subqueries for advanced database operations.	U,A,E,C

****Remember (R), Understand (U), Apply (A), Analyse (An), Evaluate (E), Create (C)***

Mapping of Course Outcomes to PSOs

	PSO 1	PSO 2	PSO 3	PSO 4	PSO 5	PSO 6	PSO 7

CO 1	3			2			
CO 2	3		2				
CO 3	3	3	3	2			
CO 4	3	2	2	2		2	2

COURSE CONTENTS

Contents for Classroom Transaction:

MODULE	**UNIT**	**DESCRIPTION**	**HOURS**
1	**MODULE 1: Introduction to Database Management System**		
	1	Introduction- Database System Applications, purpose of database system,	15
	2	View of Data- Data Abstraction, Schemas and Instances, Data Models.	
	3	Database Users and Administrators, Transaction Management-ACID Properties.	
	4	ER Model, Basic concepts, ER Diagram, Specialization and generalization.	

2	**MODULE 2: Relational algebra and Normalization**		
	1	Keys: Candidate key, Super key, Primary key, Foreign Key. Functional Dependency -Basic definitions, Trivial and non-trivial dependencies.	15
	2	Normalization- Introduction, Normal forms- 1NF,2NF,3NF, BCNF	
	3	Relational algebra operations.	

3	**MODULE 3: Structured Query Language**		
	1	Introduction to SQL, Datatypes in SQL, Database languages, Integrity	15

		Constraints.	
	2	DDL Commands- create, alter, and drop.	
	3	DML commands – Insert into, select, delete, update.	
	4	DCL Commands – Grant, Revoke.	

4	**MODULE 4: SQL Operators and Functions**		
	1	SQL Operators – Arithmetic, Relational, Logical, Like Operator	15
	2	Aggregate functions- Sum(),avg(),min(),max(),count()	
	3	Character functions, Order by clause, group by clause, having clause, sub query	
	4	View and Sequence, Join Operations- inner and outer join, Triggers, functions	

5	**Teacher Specific Module**	
	Directions	
	Teachers are expected to select relevant topics within the chosen subject area, giving special emphasis to advanced concepts and recent developments in the field. The content should be enriched with well-chosen case studies that highlight practical applications, contemporary issues, and emerging trends, thereby enabling students to gain both theoretical knowledge and contextual understanding.	15

Essential Readings:

1. Silbersehatz, Korth and Sudarshan, Database system concepts, 6th edition MGH 2011
2. Ramakrishnan and Gehrke, Database Management Systems, 3rd Edn, McGraw Hill, 2003
3. A Leon & M Leon, Database Management Systems , Leon Vikas – 2003.
4. Elmasri and Navathe, Fundementals of Database systems, 5thEdition ,Pearson 2009
5. O'Reilly, Practical PostgreSQL Shroff Publishers(SPD) 2002
6. C J Date, An Introduction to Database systems, Pearson, 2004.

Assessment Rubrics:

Evaluation Type		Marks
End Semester Evaluation		**50 (Theory)** **15 (Practical)**
Continuous Evaluation		**35**
CE (Theory)		**25**
a)	Test Paper- 1	5
b)	Model Exam	10
c)	Assignment(2 numbers)	5
d)	Seminar	5
e)	Book/ Article Review	
f)	Viva-Voce	
g)	Field Report	
CE (Practical)		**10**
Total		**100**

KU3DSCCSY202: COMPUTER NETWORKS

Semester	Course Type	Course Level	Course Code	Credits	Total Hours
3	DSC	200-299	**KU3DSCCSY202**	4	60

Learning Approach(Hours/Week)			Marks Distribution			Duration of ESE(Hours)
Lecture	Practical/ Internship	Tutorial	CE	ESE	Total	
4	0	-	30	70	100	2Hrs

Course Description:

This course introduces the fundamentals of computer networks, covering network types, topologies, protocols, IP addressing, routing, data communication, and emerging technologies like IoT and cloud networking. Students will gain foundational knowledge of how networks function, communicate, and evolve, preparing them for further studies or careers in networking and IT.

Course prerequisite:NIL

CourseOutcomes :

CO No.	Expected Outcome	Learning Domains
1	Describe the fundamental concepts and architecture of computer networks.	U
2	Explain various networking models, protocols, and transmission techniques.	U

3	Apply addressing schemes and routing algorithms in network communication.	U,A
4	Identify and implement basic network mechanisms and practices.	U,A

**Remember(R), Understand (U), Apply (A), Analyse (An), Evaluate (E),Create(C)*

Mapping of Course Outcomes to PSOs

	PSO 1	PSO 2	PSO 3	PSO 4	PSO 5	PSO 6	PSO 7
CO 1	3			2			
CO 2							
CO 3	3		2				
CO 4	3		2				3

COURSE CONTENTS

Contents for Classroom Transaction:

MODULE	UNIT	DESCRIPTION	HOURS
1	**MODULE 1: Fundamentals of Computer Networks**		
	1	Introduction to Computer Networks – Uses, Applications, Types (LAN, WAN, MAN, PAN)	12
	2	Network Topologies – Star, Bus, Ring, Mesh; Advantages and Limitations	
	3	Reference Models – OSI and TCP/IP; Comparison and Layer Functions	
	4	Transmission Media – Twisted Pair, Coaxial, Fiber Optic, Wireless Media,	
	5	Switching Techniques – Circuit, Packet, and Message Switching	
2	**MODULE 2: Network Protocols and Data Communication**		

	1	Data Communication Concepts – Signals, Transmission Modes, Bandwidth	12
	2	Error Detection and Correction – Parity Check, CRC, Hamming Code	
	3	Flow Control and Access Control – Stop-and-Wait, Sliding Window, CSMA/CD, CSMA/CA	
	4	IEEE 802 Standards – Ethernet (802.3), Wi-Fi (802.11) ,	
	5	Protocols and Layer-wise Examples (IP, TCP, UDP, HTTP, FTP, DNS)	

3	**MODULE 3: Addressing In Networks**		**12**
	1	IP Addressing – IPv4 Address Classes, Subnetting, Super netting	
	2	Routing Concepts – Static vs. Dynamic Routing, Table-driven Routing	
	3	Routing Algorithms – Distance Vector, Link State	
	4	ICMP, ARP, DHCP, and NAT	
	5	Introduction to IPv6 – Structure, Benefits, Transition from IPv4.	

4	**MODULE 4: Advanced Concepts of Computer Networks**		
	1	Client-Server and Peer-to-Peer Models – Concepts, Applications	12
	2	Network Devices – Repeaters, Hubs, Switches, Routers, Gateways	
	3	Wireless and Mobile Networks – Wi-Fi, Cellular Networks, Bluetooth	
	4	Cloud Networking Basics – Virtualization, Data Centers, SDN	
	5	Emerging Trends – IoT, 5G Networks, Network Automation	

5	**Teacher Specific Module**	
	Directions	
	Teachers are expected to select relevant topics within the chosen subject area, giving special emphasis to advanced concepts and recent developments in the field. The content should be enriched with well-chosen case studies that highlight practical applications, contemporary issues, and emerging trends, thereby enabling students to gain both theoretical knowledge and contextual understanding.	12

Essential Readings:

1. Tanenbaum, Andrew S., and David J. Wetherall. *Computer Networks*. 5th ed., Pearson, 2011.
2. Stallings, William. *Data and Computer Communications*. 10th ed., Pearson, 2013.
3. Forouzan, Behrouz A. *Data Communications and Networking*. 5th ed., McGraw Hill, 2012.
4. Stallings, William. *Network Security Essentials: Applications and Standards*. 6th ed., Pearson, 2017.

Suggested Readings:

1. KUrose, James F., and Keith W. Ross. *Computer Networking: A Top-Down Approach*. 7th ed., Pearson, 2017.
2. Schneier, Bruce. *Applied Cryptography: Protocols, Algorithms, and Source Code in C*. 2nd ed., Wiley, 1996.

Assessment Rubrics:

Evaluation Type		**Marks**
End Semester Evaluation		**70**
Continuous Evaluation		**30**
a)	Test Paper- 1	5
b)	Model Examination	10
c)	Assignment- 2 Numbers	10
d)	Seminar	5
e)	Book/ Article Review	
f)	Viva-Voce	
g)	Field Report	
Total		**100**

KU3DSCCSY203: PROGRAMMING IN JAVA

Semester	Course Type	Course Level	Course Code	Credits	Total Hours
3	DSC	200-299	**KU3DSCCSY203**	4 (3T+1P)	75

Learning Approach (Hours/ Week)			Marks Distribution			Duration of ESE (Hours)
Lecture	Practical/ Internship	Tutorial	CE	ESE	Total	
3	2	-	35	65	100	1.5Hrs

Course Description:

Java is a multi-platform, object-oriented, and network-centric language that can be used as a platform in itself. It is a fast, secure, reliable programming language for coding everything from mobile apps and enterprise software to big data applications and server-side technologies.

Course Prerequisite: NIL

Course Outcomes:

CO No.	Expected Outcome	Learning Domains
1	Demonstrate proficiency in fundamental Object-Oriented Programming (OOP) concepts.	U, A
2	Implement multithreading, synchronization, and advanced exception handling techniques in Java, showcasing the ability to handle concurrent programming challenges.	U, A
3	Develop AWT applications, applying event handling mechanisms and utilizing appropriate layout managers for effective GUI design	U, A

4	Develop Swing applications with interactive user interfaces	U, A
5	Use Java Database Connectivity (JDBC) to interact with databases	U, A

**Remember (R), Understand (U), Apply (A), Analyse (An), Evaluate (E), Create (C)*

Mapping of Course Outcomes to PSOs

	PSO 1	PSO 2	PSO 3	PSO 4	PSO 5	PSO 6	PSO 7
CO 1	3			2			
CO 2		2					
CO 3	3	3					
CO 4	2	3					3
CO 5	3	3		2			3

COURSE CONTENTS

Contents for Classroom Transaction:

MODULE	**UNIT**	**DESCRIPTION**	**HOURS**
1	**MODULE 1: Introduction to OOP and Java Basics**		
	1	Understanding Object-Oriented Programming (OOP) Concepts - Introduction to Classes and Objects - Encapsulation, Inheritance, Polymorphism, and Abstraction.	15
	2	Introduction to Java - Overview of Java Programming Language – Setting up the Java Development Environment (IDE)-Basic Syntax and Data Types in Java.	
	3	Control Flow and Looping Constructs: if statements, switch statement,	
	4	Looping statements, jumping statements	

2	**MODULE 2: Java Inheritance and interfaces**		
	1	Introducing Classes: Class fundamentals; Introducing methods; Declaring Objects; Constructors	15
	2	This keyword; Garbage collection; the finalize method.	
	3	Inheritance basics - Types of inheritance. using super keyword-Method Overriding; Dynamic method dispatch; Abstract classes.	
	4	Packages and interfaces-creating a package-CLASSPATH-simple program using packages; interfaces-definition-extending interface-implementing interface- simple program using interface	

3	**MODULE 3: GUI Programming with AWT**		
	1	Multithreading in Java -Understanding Threads and Concurrency-Synchronization and Thread Safety-Thread life cycle.	15
	2	Exception Handling: try and catch , multiple catch-finally-nested try-throw-user defined exception.	
	3	Introduction to Abstract Window Toolkit: Basic Classes in AWT: Graphics, Colours, Font, Frame. Scroll bars.	
	4	AWT controls -Labels, Buttons, Checkbox, Radio buttons, Choice control, List, Text box,	

4	**MODULE 4: Advanced GUI Programming with Swing**		
	1	Event handling: event listeners: ActionListener, Item Listener, TextListener, MouseListener, Create a sample GUI application using Frame and AWT controls.	15
	2	Layout Managers: FlowLayout,BorderLayout, GridLayout, CardLayout, Implementing Menus Introduction to Swing: Swing packages, swing components and containers, Creating Swing GUI using JFrame.	
	3	Swing components: JLabel, JButton, JCheckBox, JRadioButton, JList, JComboBox, JTextFiled, JTextArea	

	4	Java Database Connectivity (JDBC)- Connecting to Databases with JDBC- Executing SQL Queries and Handling Result Sets	

5	**Teacher Specific Module**	
	Directions	
	Teachers are expected to select relevant topics within the chosen subject area, giving special emphasis to advanced concepts and recent developments in the field. The content should be enriched with well-chosen case studies that highlight practical applications, contemporary issues, and emerging trends, thereby enabling students to gain both theoretical knowledge and contextual understanding.	15

Essential Readings:

1. Sierra, Kathy, and Bert Bates. *Head First Java*. 3rd ed., O'Reilly Media, 2022.
2. Schildt, Herbert. *Java: The Complete Reference*. 11th ed., Oracle Press/McGraw Hill, 2019.
3. Radha Krishna, P. *Object Oriented Programming through Java*. Universities Press, 2007.

Suggested Readings:

1. Martin, Robert C. *Clean Code: A Handbook of Agile Software Craftsmanship*. Prentice Hall, 2008.
2. Oaks, Scott, and Henry Wong. *Java Threads*. 2nd ed., O'Reilly Media, 1999.

Assessment Rubrics:

Evaluation Type	**Marks**
End Semester Evaluation	**50 (Theory)** **15 (Practical)**
Continuous Evaluation	**35**
CE (Theory)	**25**

a)	Test Paper- 1	5
b)	Model Exam	10
c)	Assignment(2 numbers)	5
d)	Seminar	5
e)	Book/ Article Review	
f)	Viva-Voce	
g)	Field Report	
CE (Practical)		**10**
Total		**100**

KU3VACCSY201: CYBER LAWS AND RULES

Semester	Course Type	Course Level	Course Code	Credits	Total Hours
3	VAC	200-299	**KU3VACCSY201**	3	45

Learning Approach (Hours/ Week)			Marks Distribution			Duration of ESE (Hours)
Lecture	Practical/ Internship	Tutorial	CE	ESE	Total	
3	0	-	25	50	75	1.5 hrs.

Course Description:

Cyber Laws and Rules is an essential course that introduces the legal and regulatory aspects of cyberspace. It focuses on the Information Technology Act, digital evidence, data privacy, cybercrimes, intellectual property rights, and international cyber law frameworks. This course enables students to understand the rights, responsibilities, and legal remedies in the digital environment without needing prior legal expertise.

Course Prerequisite: NIL

Course Outcomes:

CO No.	Expected Outcome	Learning Domains
1	Understand the key concepts and terminologies in cyber law and information technology legislation.	U
2	Identify legal issues related to cybercrime, privacy, and intellectual property in cyberspace.	U, An
3	Analyze the provisions of the IT Act, 2000, and other relevant Indian laws.	An
4	Evaluate legal procedures for handling digital evidence and cybercrime investigations.	E

**Remember (R), Understand (U), Apply (A), Analyse (An), Evaluate (E), Create (C)*

Mapping of Course Outcomes to PSOs

	PSO 1	PSO 2	PSO 3	PSO 4	PSO 5	PSO 6	PSO 7
CO 1	3	3	2	2			
CO 2	3	3	2	2			
CO 3	3	3	2	2			
CO 4	3	3	2	2			

COURSE CONTENTS

Contents for Classroom Transaction:

MODULE	UNIT	DESCRIPTION	HOURS
1	**MODULE 1:** INTRODUCTION		
	1	Origin and meaning of Cyberspace;-Cyberspace vs. Physical space; Legal Issues in Cyberspace;	12
	2	Need of Regulation for Cyberspace; Different Models of Cyberspace Regulation	
	3	Cyber jurisdiction - Concept of Jurisdiction - Jurisdiction in Cyberspace	
	4	Issues and concerns of Cyberspace Jurisdiction in India	
2	**MODULE 2:** INFORMATION TECHNOLOGY ACT		
	1	A brief overview of Information Technology Act, 2000 - IT Act 2000 vs. IT Amendment Act 2008 -	9
	2	Relevant provisions from Indian Penal Code, Indian Evidence Act, Bankers Book Evidence Act, Reserve Bank of India Act.	
	3	Technological Concept of electronic signature and digital signature - Relevance of Signature - Handwritten signature vs Digital Signature Technological Advancement and development of signature -Digital Signature: IT Act, 2000	

	4	UNCITRAL Model Law on Electronic Signature	

3	**MODULE 3:** DATAPROTECTION AND PRIVACY CONCERNS IN CYBERSPACE		
	1	Need to protect data in cyberspace - Types of data - Legal framework of data protection - GDPR	9
	2	Concept of privacy- Privacy concerns of cyberspace- Constitutional framework of privacy - Judicial interpretation of privacy in India.	
	3	Concept of Electronic Records and Electronic Evidence - Recognition of electronic records under the UNCITRAL Model Law & ITAct.	
	4	Types of Electronic Evidence-Sources of electronic evidence Technical Issues in collection of electronic Evidence.	

4	**MODULE 4:** IP PROTECTION ISSUES IN CYBERSPACE		
	1	Copyright issues in cyberspace-Fundamental notions of copyright law - Copyright issues in cyberspace -Indian legal protection of copyright in cyberspace & concept of DRM	9
	2	Trademark issues in cyberspace-Meaning, Purpose and Kinds of Domain Name- Domain Name Vs Trademark - Domain Name Registration, ICANN, - Domain Name dispute and Related Laws	
	3	Patent issues in cyberspace--new emerging issues of cyberspace -	
	4	Cloud Computing, -Big Data - Internet of Things -Artificial Intelligence and Robotics –Blockchain.	

5	**Teacher Specific Module**	
	Directions	
	Teachers are expected to select relevant topics within the chosen subject area, giving special emphasis to advanced concepts and recent developments in the field. The content should be enriched with well-chosen case studies that highlight practical applications, contemporary issues, and emerging trends, thereby enabling students to gain both theoretical knowledge and contextual understanding.	9

Essential Readings:

1. Chris Reed, Internet Law-Text and Materials, Universal Law Publishing Co., New Delhi, 2nd Edition, 2005
2. Ian J Lloyd, Information Technology Law, Oxford University Press, 7th Edition, 2014
3. Nandan Kamath, Law Relating to Computers Internet & E Commerce Universal Law Publisher, 5th Edition, (2012)
4. Aparna Viswanathan, Cyber Law Indian and International Perspectives, Lexis Nexis, 2012
5. Karnika Seth, Computers, Internet and New Technology Laws-A comprehensive reference work with special focus on developments in India. Lexis Nexis, Updated Edition 2016
6. Anirudh Rastogi, Cyber Law, Lexis Nexis, 2014
7. Pavan Duggal Cyber Law 3.0, Universal Law Publishing Company Private Limited, 2014 Edition.
8. Talat Fatima, Cybercrimes, Eastern Book Company, Lucknow, Second Edition, 2016

Assessment Rubrics:

Evaluation Type		**Marks**
End Semester Evaluation		**50**
Continuous Evaluation		**25**
a)	Test Paper- 1	5
b)	Model exam	10
c)	Assignment	5
d)	Seminar	5
e)	Book/ Article Review	
f)	Viva-Voce	
g)	Field Report	
Total		**75**

KU4DSCCSY204: WEB TECHNOLOGY AND WEB SECURITY

Semester	Course Type	Course Level	Course Code	Credits	Total Hours
4	DSC	200-299	**KU4DSCCSY204**	4 (3T+1P)	75

Learning Approach (Hours/ Week)			Marks Distribution			Duration of ESE (Hours)
Lecture	Practical/ Internship	Tutorial	CE	ESE	Total	
3	2		35	65	100	1.5hrs.

Course Description:

Web technology refers to the means by which computers communicate with each other using mark-up languages and multimedia packages. It gives us a way to interact with hosted information, like websites. Web technology involves the use of hypertext mark-up language (HTML).

Course Prerequisite: NIL

Course Outcomes:

CO No.	Expected Outcome	Learning Domains
1	Discuss various components in web technology.	U
2	Use HTML Forms in documents.	U,A
3	Design a web document with server-side scripting using PHP.	U, A,C
4	Identify the basics of Web Application Security.	U

****Remember (R), Understand (U), Apply (A), Analyse (An), Evaluate (E), Create (C)***

Mapping of Course Outcomes to PSOs

	PSO 1	PSO 2	PSO 3	PSO 4	PSO 5	PSO 6	PSO 7
CO 1	3			2			

CO 2	3		2				
CO 3	3	3	3	2			
CO 4	3	2	2	2		2	2

COURSE CONTENTS

Contents for Classroom Transaction:

MODULE	**UNIT**	**DESCRIPTION**	**HOURS**
1	**MODULE 1:Introduction to HTML**		
	1	Introduction to HTML, Editing HTML5, W3C HTML5 Validation Service, Headings, Linking, Images, Special Characters and Horizontal Rules	15
	2	Lists, Tables, Forms, HTML5 Form Input types, input and data list 15 Elements and autocomplete Attribute, Frames and frameset	
	3	Web hosting, Types of web hosting, Hosting Space	
	4	Domain Name Registration, Free Hosting, Responsive Web designing	
2	**MODULE 2:Introduction to JavaScript**		
	1	Introduction to JavaScript , operators	15
	2	Arrays-declaring and allocating arrays, examples using arrays	
	3	Functions-Function Definitions -Defined Functions, scope rules and recursion.	
	4	Document Object Model, Objects-math, string and date objects, dialog boxes.	
3	**MODULE 3: PHP**		
	1	Introduction to PHP , Basic Syntax, Defining variable and Constants, Php Data type, Operator and Expression	15
	2	Function, Define a function, Array -Creating index based and Associative array Accessing array	
	3	Looping with associative array using each () and foreach(), Handling Html Form with Php Capturing Form.	

	4	Working with database.	

4	**MODULE 4: Web Application Security**		
	1	OWASP Top 10 Web Vulnerabilities – SQL Injection, OS Command, XSS, XML Injection	
	2	Cross-Site Request Forgery, Cookie Stealing, Broken Access Control	
	3	Session Hijacking, API Security (with Postman), Data Tampering	
	4	Web Attacks: Application Layer DoS/DDoS, File Path Traversal	

5	**Teacher Specific Module**	
	Directions	
	Teachers are expected to select relevant topics within the chosen subject area, giving special emphasis to advanced concepts and recent developments in the field. The content should be enriched with well-chosen case studies that highlight practical applications, contemporary issues, and emerging trends, thereby enabling students to gain both theoretical knowledge and contextual understanding.	15

Essential Readings:

1. Deitel, Paul J., Harvey M. Deitel, and Abbey Deitel. *Internet & World Wide Web: How to Program*. 5th ed., Pearson, 2011.
2. Meloni, Julie C. *Sams Teach Yourself HTML and CSS in 24 Hours*. 9th ed., Sams Publishing, 2018.
3. Flanagan, David. *JavaScript: The Definitive Guide*. 7th ed., O'Reilly Media, 2020.
4. Nixon, Robin. *Learning PHP, MySQL & JavaScript: With jQuery, CSS & HTML5*. 6th ed., O'Reilly Media, 2021.

Assessment Rubrics:

Evaluation Type		**Marks**
End Semester Evaluation		**50 (Theory)** **15 (Practical)**
Continuous Evaluation		**35**
CE (Theory)		**25**
a)	Test Paper- 1	5
b)	Model Exam	10

c)	Assignment(2 numbers)	5
d)	Seminar	5
e)	Book/ Article Review	
f)	Viva-Voce	
g)	Field Report	
CE (Practical)		**10**
Total		**100**

KU4DSCCSY205: FUNDAMENTALS OF CYBER SECURITY

Semester	Course Type	Course Level	Course Code	Credits	Total Hours
4	DSC	200-299	**KU4DSCCSY205**	4 (3T+1P)	75

Learning Approach (Hours/ Week)			Marks Distribution			Duration of ESE (Hours)
Lecture	Practical/ Internship	Tutorial	CE	ESE	Total	
3	2	-	35	65	100	1.5 hrs.

Course Description:

This course provides an overview of the principles and practices of cyber security. Students will learn about the fundamental concepts of Network securities, common threats and vulnerabilities, and strategies for protecting systems and data.

Course Prerequisite: NIL

Course Outcomes:

CO No.	Expected Outcome	Learning Domains
1	Understand the fundamental concepts of cyber security.	U
2	Identify various types of cyber threats and vulnerabilities.	U
3	Understand the relationship between AI technologies and cyber defense.	An
4	Implement security measures and best practices.	C

****Remember (R), Understand (U), Apply (A), Analyse (An), Evaluate (E), Create (C)***

Mapping of Course Outcomes to PSOs

	PSO 1	**PSO 2**	**PSO 3**	**PSO 4**	**PSO 5**	**PSO 6**	**PSO 7**

CO1	3	2					
CO2	3	3					
CO3	2	3			3		
CO4	3	3		3	3	3	3

COURSE CONTENTS

Contents for Classroom Transaction:

MODULE	UNIT	DESCRIPTION	HOURS
1	**MODULE TITLE: Introduction to Cyber Security**		
	1	Introduction, Need for Cyber Security.	15
	2	Cyber Security terminology - Cyberspace, Cybercrime, Cyber-attack, Threat, Vulnerability, Malware, Phishing, Botnets, Adware, Denial of Service , Ransomware, Key Logger.	
	3	The CIA Triads- Confidentiality, Integrity and Availability. Consequences of Weak Security, Challenges in Cyber Security.	
2	**MODULE TITLE: Data and Information Security**		
	1	Data and Information, Data security concepts: confidentiality, integrity, and availability.	15
	2	Access control and authentication mechanisms, Encryption methods: symmetric vs. Asymmetric	
	3	Data loss prevention (DLP) and secure backups, Privacy and personal data protection (GDPR, Indian IT Act).	
3	**MODULE TITLE: Network Security Fundamentals**		
	1	Need for Network Security, Hacking, stages of Hacking, Ethical hacking.	15

	2	Types of Network attacks- Spoofing, Sniffing, Mapping, Hijacking, Trojans, DoS and DDoS.	
	3	Firewalls- Types of firewalls, intrusion detection/prevention systems (IDS/IPS).	

	MODULE TITLE: Artificial Intelligence and Cyber Security		
4	1	Overview of AI and its applications. Machine Learning Basics: Supervised, Unsupervised, Reinforcement Learning .	15
	2	Deep Learning: Neural Networks, CNNs, RNNs, Transformers.	
	3	AI Tools & Frameworks: Scikit-learn, TensorFlow, Keras, Pytorch.	
	4	Role of AI in threat detection and anomaly analysis, AI-based intrusion detection systems (IDS)	

5	**Teacher Specific Module**	**15**
	Directions	
	Teachers are expected to select relevant topics within the chosen subject area, giving special emphasis to advanced concepts and recent developments in the field. The content should be enriched with well-chosen case studies that highlight practical applications, contemporary issues, and emerging trends, thereby enabling students to gain both theoretical knowledge and contextual understanding.	

Essential Readings:

1. Agrawal, Narmrata. *Cyber Security: A Complete Solution*. Dreamtech Press, 2018.
2. Goutam, Rajesh KUmar. *Cybersecurity Fundamentals*. BPB Publications, 2021.
3. Graham, James, Ryan Olson, and Rick Howard, editors. *Cyber Security Essentials*. Auerbach Publications, 2010.

Assessment Rubrics:

Evaluation Type		**Marks**
End Semester Evaluation		**50 (Theory)** **15 (Practical)**
Continuous Evaluation		**35**
CE (Theory)		**25**
a)	Test Paper- 1	5
b)	Model Exam	10
c)	Assignment(2 numbers)	5
d)	Seminar	5
e)	Book/ Article Review	
f)	Viva-Voce	
g)	Field Report	
CE (Practical)		**10**
Total		**100**

KU4DSCCSY206: PYTHON PROGRAMMING

Semester	Course Type	Course Level	Course Code	Credits	Total Hours
4	DSC	200-299	**KU4DSCCSY206**	4 (3T+1P)	75

Learning Approach (Hours/ Week)			Marks Distribution			Duration of ESE (Hours)
Lecture	Practical/ Internship	Tutorial	CE	ESE	Total	
3	2		35	65	100	1.5hrs.

Course Description:

Python Programming is a foundational course designed to equip students with essential programming skills using Python. Additionally, students will gain hands-on experience in Python database connectivity.

Course Prerequisite: NIL

Course Outcomes:

CO No.	Expected Outcome	Learning Domains
1	Understand and apply the fundamental concepts of Python programming.	U,A
2	Write Python programs using functions, control structures, and file operations.	A
3	Develop Python programs using object-oriented programming and libraries.	A,C
4	Develop the ability to connect Python with SQL databases and perform data operations using cursor methods and query execution.	A, C

**Remember (R), Understand (U), Apply (A), Analyse (An), Evaluate (E), Create (C)*

Mapping of Course Outcomes to PSOs

	PSO 1	PSO 2	PSO 3	PSO 4	PSO 5	PSO 6	PSO 7

CO 1	3			2			
CO 2	3		2				
CO 3	3	3	3	2			
CO 4	3	2	2	2		2	2

COURSE CONTENTS

Contents for Classroom Transaction:

MODULE	**UNIT**	**DESCRIPTION**	**HOURS**
1	**MODULE 1: Python Programming Basics**		
	1	Introduction to Python – Features, Variables, Data Types – int, float, str, bool, type conversion, mutable and immutable data types, Indentation, Comments, keywords.	15
	2	Input/Output, Basic Operators, Expressions.	
	3	Decision control flow statements– if, if-else, if..elif..else, nested if, Loops – while, for, continue and break statements.	
	4	Exception- Syntax error, Exception, Exception handing using try…. except…. Finally.	

2	**MODULE 2: Functions, Strings, Lists, Dictionaries, Tuples and sets**		
	1	Functions and Strings – function definition, calling the function, return statements, parameters, and scope of variables. Strings – Creating and storing strings, accessing characters in string by index number, slicing, string traversing, built-in functions, string Methods.	15
	2	List-List operations - creating, initializing, Indexing and slicing, traversing and manipulating lists, list methods and built-in functions, nested lists, list as argument to a function.	
	3	Dictionaries- Concept of key-value pair, mutability, creating, initializing, traversing, updating and deleting elements; dictionary methods and built-in functions.	

	4	Tuples and Sets- Tuples: Creating, initializing, accessing elements, tuple assignment, operations on tuples, tuple methods and built-in functions, nested tuples, Tuple packing and unpacking, Set methods.	

3	**MODULE 3: Files and Pandas libraries**		
	1	Files- Types of Files, Text file and binary file, open and close files, reading and writing text files, file access modes. File paths, CSV file: import csv module, open / close csv file, write into a csv file using csv. writerow() and read from a csv file using csv.reader( )The pickle module.	15
	2	Introduction to Pandas libraries- Introduction to pandas. Data structures in Pandas - Series and Data Frames.	
	3	Series: Creation of Series from – ndarray, dictionary, scalar value; mathematical operations; Head and Tail functions; Selection, Indexing and Slicing.	
	4	Data Frames: creation - from dictionary of Series, list of dictionaries, Text/CSV files; display; iteration; Operations on rows and columns: add, select, delete, rename; Head and Tail functions; Indexing using Labels, Boolean Indexing.	

4	**MODULE 4: Working with Databases (Database Connection)**		
	1	Interface of python with an SQL database: connecting SQL with Python.	15
	2	Performing insert, update, delete queries using cursor	
	3	Display data by using fetchone(), fetchall(), rowcount,	
	4	Creating database connectivity applications	

5	**Teacher Specific Module**	
	Directions	
	Teachers are expected to select relevant topics within the chosen subject area, giving special emphasis to advanced concepts and recent developments in the field. The content should be enriched with well-chosen case studies that highlight practical applications, contemporary issues, and emerging trends, thereby enabling students to gain both theoretical knowledge and contextual understanding.	15

Essential Readings:

1. Gowrishankar, S., and Veena A. *Introduction to Python Programming*. CRC Press, 2018.
2. Thareja, Reema. *Python Programming*. Oxford University Press, 2017.
3. Kamthane, Ashok Namdev, and Amit Ashok Kamthane. *Programming and Problem Solving with Python*. McGraw Hill, 2017.
4. Balagurusamy, E. *Introduction to Computing and Problem Solving Using Python*. McGraw Hill, 2016.
5. Hameed, Mohd Abdul. *Python for Data Science*. Wiley India Pvt. Ltd., 2018.
6. O'Connor, T. J. *Violent Python: A Cookbook for Hackers, Forensic Analysts, Penetration Testers*. Syngress, 2012.

Assessment Rubrics:

Evaluation Type		**Marks**
End Semester Evaluation		**50 (Theory)** **15 (Practical)**
Continuous Evaluation		**35**
CE (Theory)		**25**
a)	Test Paper- 1	5
b)	Model Exam	10
c)	Assignment(2 numbers)	5
d)	Seminar	5
e)	Book/ Article Review	
f)	Viva-Voce	
g)	Field Report	
CE (Practical)		**10**
Total		**100**

KU4DSCCSY207: INFORMATION SECURITY

Semester	Course Type	Course Level	Course Code	Credits	Total Hours
4	DSC	200-299	**KU4DSCCSY207**	4	75

Learning Approach (Hours/ Week)			Marks Distribution			Duration of ESE (Hours)
Lecture	Practical/ Internship	Tutorial	CE	ESE	Total	
4	0	-	30	70	100	2 hrs.

Course Description:

This course introduces fundamental information security principles, technologies, and practices. Students will learn about core security concepts (confidentiality, integrity, availability), identify modern cyber threats and attack methods, and apply basic cryptographic techniques. The course also covers network protocol security, web application vulnerabilities, and security best practices for operating systems, cloud, and IoT, with an introduction to incident response.

Course Prerequisite: Basic understanding of computer networks and fundamental knowledge of operating systems

Course Outcomes:

CO No.	Expected Outcome	Learning Domains
1	Understand core security principles and identify cyber threats, vulnerabilities, and attack methods.	U
2	Apply basic cryptographic techniques to secure data.	U, A, C
3	Evaluate network protocol security and recognize web application vulnerabilities.	U, A, An
4	Grasp security best practices for operating systems, cloud, and IoT,	U, E

	including incident response basics.	

Remember (R), Understand (U), Apply (A), Analyse (An), Evaluate (E), Create (C)

Mapping of Course Outcomes to PSOs

	PSO 1	PSO 2	PSO 3	PSO 4	PSO 5	PSO 6	PSO 7
CO 1			3		3		2
CO 2	2	1	2			3	
CO 3			3		3		3
CO 4			2		2	3	3

COURSE CONTENTS

Contents for Classroom Transaction:

MODULE	UNIT	DESCRIPTION	HOURS
1	**MODULE 1: Information security Fundamentals & Threats**		
	1	Introduction to Information Security: Why security matters: Core Principles (CIA Triad, Authenticity, Non-repudiation).	15
	2	Modern Cyber Threats: Types of Malware (Viruses, Ransomware).Common Attack Methods (Phishing, DoS/DDoS, Social Engineering).Vulnerabilities.	
	3	Security Basics: Risk Management, Security Policies. Basic Controls (Firewalls, IDS/IPS).	

2	**MODULE 2: Symmetric Crypto & Hashing**		
	1	Traditional Symmetric Key Ciphers: Substitution Ciphers (e.g., Caesar Cipher, Playfair Cipher).Transposition Ciphers (e.g., Rail Fence Cipher).	15
	2	Symmetric Key Cryptography: Stream vs. Block Ciphers. Advanced Encryption Standard (AES): Simplified overview. Block Cipher	

		Modes: Common uses. Key Management basics	
	3	Cryptographic Hash Functions: Properties (One-way, Collision Resistance).Algorithms (SHA-256) and Uses (Data integrity, Password storage).	
	4	Message Authentication Codes (MACs): Purpose and HMAC.	

3	**MODULE 3: Asymmetric Crypto & PKI**		
	1	Asymmetric Key Cryptography (Public Key): • Public/private key concept and uses (Confidentiality, Digital Signatures, Key Exchange). • RSA Algorithm: Simplified overview. • Elliptic Curve Cryptography (ECC): Benefits. • Diffie-Hellman: Secure key exchange.	15
	2	Digital Signatures: How they work (Signing, Verification) and Benefits (Authentication, Integrity, Non-repudiation).	
	3	Public Key Infrastructure (PKI): Components (Digital Certificates, CAs), Certificate Revocation, Trust models.	

4	**MODULE 4: Network & Application Security**		
	1	Network Security Protocols: • Securing web traffic (TLS/SSL). • Securing Internet Protocol communications (IPSec). • Virtual Private Networks (VPNs). • Wireless Security (WPA2, WPA3)	15
	2	Web Application Security: OWASP Top 10 (Key Vulnerabilities): Injection, Broken Authentication, XSS, Security Misconfiguration, Sensitive Data Exposure, CSRF. Basic Secure Coding	
	3	Operating System Security: Access Control (DAC, MAC, RBAC).User authentication, Patching.	

5	**Teacher Specific Module**	

	Directions	
	Teachers are expected to select relevant topics within the chosen subject area, giving special emphasis to advanced concepts and recent developments in the field. The content should be enriched with well-chosen case studies that highlight practical applications, contemporary issues, and emerging trends, thereby enabling students to gain both theoretical knowledge and contextual understanding.	15

Essential Readings:

1. William Stallings, *Cryptography and Network Security - Principles and Practice*, 8th Edition, Pearson. (Referred to as "Stallings")
2. Behrouz A. Forouzan and Debdeep Mukhopadhyay, *Cryptography And Network Security*, 3rd Ed, McGraw Hill. (Referred to as "Forouzan")

Assessment Rubrics:

Evaluation Type		**Marks**
End Semester Evaluation		**70**
Continuous Evaluation		**30**
a)	Test Paper- 1	5
b)	Model Exam	10
c)	Assignment(2 numbers)	10
d)	Seminar	5
e)	Book/ Article Review	
f)	Viva-Voce	
g)	Field Report	
Grand Total		**100**

KU4SECCSY201: LINUX SYSTEM AND NETWORK ADMINISTRATION

Semester	Course Type	Course Level	Course Code	Credits	Total Hours
4	DSC	200-299	**KU4SECCSY201**	3 (2T+1P)	60

Learning Approach (Hours/ Week)			Marks Distribution			Duration of ESE (Hours)
Lecture	Practical/ Internship	Tutorial	CE	ESE	Total	
3	1	-	25	50	75	1.5hrs.

Course Description:

Linux and Network Administration provides foundational knowledge of Linux system internals and basic networking principles. It introduces system boot mechanisms, user and file system administration, TCP/IP networking, and key server configurations. The course also explores process communication and basic socket programming. This practical-oriented subject equips students with essential system and network administration skills needed in modern IT environments.

Course Prerequisite: NIL

Course Outcomes:

CO No.	Expected Outcome	Learning Domains
1	Understand Linux booting processes and system configuration techniques.	U
2	Administer file systems, users, and essential system services securely.	A
3	Configure network settings and deploy basic network services.	A
4	Implement interprocess communication and write basic socket-based applications.	A, C

*****Remember (R), Understand (U), Apply (A), Analyse (An), Evaluate (E), Create (C)***

Mapping of Course Outcomes to PSOs

	PSO 1	PSO 2	PSO 3	PSO 4	PSO 5	PSO 6	PSO 7
CO 1	3			2			
CO 2	3		2				
CO 3	3	3	3	2			
CO 4	3	2	2	2		2	2

COURSE CONTENTS

Contents for Classroom Transaction:

MODULE	**UNIT**	**DESCRIPTION**	**HOURS**
1	**MODULE 1: Boot process and System Configuration**		
	1	Introduction: Important parts of kernel; Major services in a UNIX system: init, login from terminals, syslog , periodic command execution cron and at.	12
	2	**Boot process:** The LILO boot process: /etc/lilo.conf; The GRUB boot process.	
	3	Run levels: /etc/inittab, start-up script /etc/rc.d/rc.sysinit .	
	4	**System Configuration**: The /etc/sysconfig/… files, kernel modules.	
2	**MODULE 2: File system configuration**		
	1	File system types, /etc/fstab layout and meaning; Basic user environment: /etc/skel/… and home directories.	12
	2	**System Security:** Host security: tcp_wrappers and /etc/hosts.allow and /etc/hosts.deny.	
	3	File permissions, users groups and umask; Adding and deleting users- /etc/passwd and /etc/shadow files.	

	4	**System maintenance:** Syslogd, /etc/syslog.conf; The system crontab.	

3	**MODULE 3: Network Configuration**		
	1	TCP / IP Network Configuration: Introduction to TCP / IP network, Protocols, IP address, Hostname.	12
	2	Interface Configuration: loop back interface, Ethernet interface, Configuring Gateway, Network commands: ifconfig, netstat, route.	
	3	Network applications Configuration: File Transfer Protocol (FTP), Network File Systems (NFS) ,Network Information System(NIS),	
	4	Hyper Text Transfer Protocol (HTTP) and Web server, Server Message Block (SMB) Protocol and Samba server, Dynamic Host configuration Protocol (DHCP), Firewalls.	

4	**MODULE 4: DNS, IPC, and Socket Programming**		
	1	DNS Concepts, DNS database: SOA, NS, MX, A and PTR records, configuring DNS, Using nslooKUp.	12
	2	Introduction to IPC Mechanisms – fork(), pipe, message queue, semaphore, shared memory .	
	3	Socket Programming: Overview, Elementary Socket System Calls: socket(), bind(), connect(), listen(), accept(), send(), sendto() , recv() , recvfrom() , close() .	

5	**Teacher Specific Module**	
	Directions	
	Teachers are expected to select relevant topics within the chosen subject area, giving special emphasis to advanced concepts and recent developments in the field. The content should be enriched with well-chosen case studies that highlight practical applications, contemporary issues, and emerging trends, thereby enabling students to gain both theoretical knowledge and contextual understanding.	12

Essential Readings:

1. Nemeth, Evi et al. *UNIX and Linux System Administration Handbook, 4th Edition, Pearson, 2017*
2. Nemeth, Evi, Garth Snyder, Trent R. Hein, and Ben Whaley. *Linux Administration Handbook*. 2nd Edition, PHI Learning, 2009.
3. Hunt, Craig. *Linux DNS Server Administration*. BPB Publications, 2003.
4. Kirch, Olaf, and Terry Dawson. *Linux Network Administrator's Guide*. O'Reilly, 2003.
5. Stevens, W. Richard, Bill Fenner, and Andrew M. Rudoff. *UNIX Network Programming, Volume 1: The Sockets Networking API*. 3rd Edition, Addison-Wesley/PHI Learning, 2004.

Assessment Rubrics:

<table>
<tr><th colspan="2">Evaluation Type</th><th>Marks</th></tr>
<tr><td colspan="2">End Semester Evaluation</td><td>35 (Theory)
15 (Practical)</td></tr>
<tr><td colspan="2">Continuous Evaluation</td><td>25</td></tr>
<tr><td colspan="2">CE (Theory)</td><td>15</td></tr>
<tr><td>a)</td><td>Test Paper- 1</td><td>5</td></tr>
<tr><td>b)</td><td>Model Exam</td><td>10</td></tr>
<tr><td>c)</td><td>Assignment(2 numbers)</td><td>5</td></tr>
<tr><td>d)</td><td>Seminar</td><td rowspan="4">5</td></tr>
<tr><td>e)</td><td>Book/ Article Review</td></tr>
<tr><td>f)</td><td>Viva-Voce</td></tr>
<tr><td>g)</td><td>Field Report</td></tr>
<tr><td colspan="2">CE (Practical)</td><td>10</td></tr>
<tr><td colspan="2">Total</td><td>75</td></tr>
</table>

KU4VACCSY202: CYBER ETHICS

Semester	Course Type	Course Level	Course Code	Credits	Total Hours
4	VAC	200-299	**KU4VACCSY202**	3	60

Learning Approach (Hours/ Week)			Marks Distribution			Duration of ESE (Hours)
Lecture	Practical/ Internship	Tutorial	CE	ESE	Total	
3	0		25	50	75	1.5hrs.

Course Description:

This course explores the ethical issues arising from the use of technology and the internet. It covers fundamental ethical concepts, decision-making frameworks, and the impact of technology on privacy, security, and intellectual property. Students will examine case studies and engage in discussions to develop critical thinking skills in ethical reasoning and apply them to real-world scenarios.

Course Prerequisite: NIL

Course Outcomes

CO No.	Expected Outcome	Learning Domains
1	Explain basic ethical principles and professional codes in cyber ethics.	U
2	Analyze privacy and security issues in the digital world.	An
3	Understand intellectual property rights and digital content usage.	U
4	Evaluate ethical challenges in social media and online behavior.	A, E
5	Assess ethical concerns in emerging technologies like AI	E

**Remember (R), Understand (U), Apply (A), Analyse (An), Evaluate (E), Create (C)*

Mapping of Course Outcomes to PSOs

	PSO 1	PSO 2	PSO 3	PSO 4	PSO 5	PSO 6	PSO 7
CO 1	3			3			

CO 2	3			3		3	
CO 3				3		3	
CO 4				3		3	
CO 5				3	3		3

COURSE CONTENTS

Contents for Classroom Transaction:

MODULE	UNIT	DESCRIPTION	HOURS
1		**INTRODUCTION TO CYBER ETHICS**	**12**
	1	Ethical concepts and principles	
		Introduction to Cyber Ethics and Moral Theories	
		Ethical theories: Utilitarianism, Deontology, Virtue Ethics	
	2	Ethical decision-making frameworks	
		Steps in ethical decision-making, Ethical frameworks	
	3	Professional Ethics in Computing	
		Codes of ethics (ACM, IEEE, etc.)	
		Responsibilities of IT professionals	

2		**PRIVACY, SECURITY, AND SURVEILLANCE**	
	1	Privacy in the digital age: Data Collection, Profiling, and Behavioural Tracking	**12**
	2	Surveillance Technologies: Recording, Tracking, and Monitoring Techniques	
	3	Cybersecurity Threats: Viruses, Phishing, Ransomware	
	4	Ethical Dilemmas in Cybersecurity: Surveillance vs Rights, Whistle blowing	

		INTELLECTUAL PROPERTY	

3	1	Intellectual Property Rights	**12**
	2	Protecting Intellectual Property	
	3	Trade Secrets, Trademarks and Service Marks	
	4	Patents, Copyrights, Open access and open-source software	

4	**SOCIAL MEDIA AND EMERGING TECHNOLOGIES**		
	1	Ethics of Social Media	**12**
		Identity, Cyberbullying, Misinformation, Deepfakes	
	2	Ethics in Emerging Technologies	
		AI Ethics and Algorithmic Bias	
		Ethics in IoT and Cloud Computing	
	3	Ethics in Virtual and Augmented Reality (VR/AR)	
		Psychological Impact, Consent, and Manipulation of Reality	

5	**Teacher Specific Module**	**12**
	Directions	
	Teachers are expected to select relevant topics within the chosen subject area, giving special emphasis to advanced concepts and recent developments in the field. The content should be enriched with well-chosen case studies that highlight practical applications, contemporary issues, and emerging trends, thereby enabling students to gain both theoretical knowledge and contextual understanding.	

Essential Readings:

1. Tavani, H. T. (2018). Ethics and Technology: Controversies, Questions, and Strategies for Ethical Computing (5th ed.) John Wiley & Sons.
2. Quinn, M. J. (2014). *Ethics for the Information Age* (6th ed.). Pearson.
3. Baase, S., & Henry, T. – *A Gift of Fire: Social, Legal, and Ethical Issues for Computing Technology*
4. Himma, K. E., & Tavani, H. T. (2019). The Handbook of Information and Computer Ethics. John Wiley & Sons.

5. Johnson, D. G, Computer Ethics (4th ed.). Prentice Hall.

6. Computer network security and cyber ethics , Joseph Migga Kizza

Assessment Rubrics:

Evaluation Type		**Marks**
End Semester Evaluation		**50**
Continuous Evaluation		**25**
a)	Test Paper- 1	5
b)	Model exam	10
c)	Assignment	5
d)	Seminar	5
e)	Book/ Article Review	
f)	Viva-Voce	
g)	Field Report	
Total		**75**

KU4VACCSY203: FOSS FOR CYBER SECURITY

Semester	Course Type	Course Level	Course Code	Credits	Total Hours
4	VAC	200-299	**KU4VACCSY203**	3	60

Learning Approach (Hours/ Week)			Marks Distribution			Duration of ESE (Hours)
Lecture	Practical/ Internship	Tutorial	CE	ESE	Total	
3	0	-	25	50	75	1.5hrs.

Course Description:

The Free and Open Source Software (FOSS) course is designed to familiarise students with the development process using free and open source software, which includes Linux operating system, service configuration management, application software, and development tools.

Course Prerequisite: NIL

Course Outcomes

CO No.	Expected Outcome	Learning Domains
1	State various FOSS concepts, features.	U
2	Discuss the features of Linux OS.	An
3	Execute Linux commands.	U
4	Demonstrate basic cyber security practices using FOSS platforms.	A, E

****Remember (R), Understand (U), Apply (A), Analyse (An), Evaluate (E), Create (C)***

Mapping of Course Outcomes to PSOs

	PSO 1	PSO 2	PSO 3	PSO 4	PSO 5	PSO 6	PSO 7
CO 1	3			3			
CO 2	3			3		3	
CO 3				3		3	
CO 4				3		3	

COURSE CONTENTS

Contents for Classroom Transaction:

MODULE	UNIT	DESCRIPTION	HOURS
1	**MODULE 1: Open source software**		
	1	concepts, features, benefits over proprietary software, examples,	12
	2	Free software: concepts, features, advantages, Free software Vs Open Source software	
	3	Free and Open Source Software(FOSS), Fou essential freedoms	
	4	Free software movements, free software foundation(FSF),history, policies, GPL, free operating systems	
2	**MODULE 2: Linux**		
	1	Features, history, various Linux distributions,	12
	2	Linux architecture, kernel and shell-Linux desktop environments-GNOME and KDE.	
	3	Linux File System and Directories, types of files, Installing and Configuring Linux, File access permissions.	
3	**MODULE 3: Linux Commands**		
	1	Date, time, who, echo, man, info, cal, pwd, more, less, head, tail, chmod.	12
	2	mkdir, cd, cp, mv, rm, touch, sort, wc, cut, cat with options, ls with options , grep with options,	
	3	Mounting the file system, command line processing etc. Types of editors in Linux, Introduction to vi editor, modes in vi editor.	
	4	Commands for open a file, save a file, delete a file, quit a file etc.	
4	**MODULE 4: FOSS Tools for Cyber Security**		
	1	Network scanning and monitoring tools: Nmap, Wireshark	12
	2	Firewall configuration and security: Iptables, UFW	

	3	Basics of ethical hacking using open-source frameworks (OWASP ZAP, Metasploit Framework)	

5	**Teacher Specific Module**	
	Directions	
	Teachers are expected to select relevant topics within the chosen subject area, giving special emphasis to advanced concepts and recent developments in the field. The content should be enriched with well-chosen case studies that highlight practical applications, contemporary issues, and emerging trends, thereby enabling students to gain both theoretical knowledge and contextual understanding.	12

Essential Readings:

1. Negus, Christopher. *Red Hat Linux 9 Bible.* New Delhi: WILEY-Dreamtech, 2003.
2. Schenk, Thomas. *Red Hat Linux System Administration.* New Delhi: Techmedia, 2003.
3. *Kali Linux Revealed: Mastering the Penetration Testing Distribution.* Offensive Security.
4. Feller, Joseph, et al. *Perspectives on Free and Open Source Software.* MIT Press.

Assessment Rubrics:

Evaluation Type		**Marks**
End Semester Evaluation		**50**
Continuous Evaluation		**25**
a)	Test Paper- 1	5
b)	Model exam	10
c)	Assignment	5
d)	Seminar	5
e)	Book/ Article Review	
f)	Viva-Voce	
g)	Field Report	
Total		**75**