Kannur University

Board of Studies Computer Science -UG

CURRICULUM

SYLLABUS

OF

FOUR YEARS UNDER GRADUATE

PROGRAMME(FYUGP)

BACHELOR OF COMPUTER APPLICATION

(BCA)

Under the Choice Based Credit and Semester

System (CBCSS)

W.E.F 2024 Admission onwards

Welcome to the Four-year Integrated UG Computer Science/Computer Application Programme of Kannur University. The Board of Studies of the University has designed this programme on the basis of the National Education Policy 2023 which critically envisions a brand-new holistic education system for the country, hinging on the effective adoption of modern teaching and training methods, application of technology, and imparting practical and contemporary skills, to shape the overall personality of students. Our programme is designed to equip students with a strong foundation in computer science principles while also providing specialized training in Artificial Intelligence and Machine Learning. In today's digital age, these technologies are at the forefront of technological advancements, driving innovation across various industries including healthcare, finance, transportation, and entertainment.

The Programme in Computer Science/Computer Application is designed with the objective of equipping the students to cope with the emerging trends and challenges in the field of computers and interrelated disciplines like computer engineering, computer science, information systems, information technology, and software engineering. This programme involves various courses such as Value-added courses, Skill enhancement courses, multi-disciplinary courses and ability enhancement courses with an attribution of discipline specific core, discipline specific electives and various scholastic and co scholastic domains. This programme aims at helping the students define and recharge their creative, analytical, problem-solving, and critical thinking abilities, topped by actively pursuing digital literacy.

We wish you to have a motivating atmosphere to make use of your extreme potential and caliber to complete this programme and to serve the nation by enriching yourself.

BEST WISHES

(BOS, Computer Science)

PROGRAMME OUTCOME

PO1	**Critical Thinking and Problem-Solving-Apply critical thinking skills to analyze 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 he 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 endeavors, demonstrating integrity and ethical decision-making. Also acquire an understanding of environmental issues and sustainable practices, promoting responsibility towards ecological well-being.**

PROGRAMME SPECIFIC OUT COMES

PSO 1:	**Apply computer science knowledge to solve diverse real-world Challenges**
PSO 2:	**Design and implement robust software solutions using diverse programming languages and design tools**
PSO 3:	**Utilize advanced techniques for data storage, retrieval, and manipulation across varied computing environments**
PSO 4:	**Critically evaluate and apply information technology tools and methodologies with ethical consideration**
PSO 5:	**Engage in interdisciplinary research to address complex computer science challenges**
PSO 6:	**Implementation of professional engineering solutions for the betterment of society keeping the environmental context in mind, be aware of professional ethics and be able to communicate effectively.**
PSO7:	**Demonstrate lifelong learning and adaptability in response to evolving technology trends**

Syllabus Index

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
KU1DSCCAP101	Foundations of Computers and Programming	DSC	4	5	3		2	
KU1DSCCAP102	IT Tools	DSC	4	5	3		2	
KU1DSCCAP103	Design Thinking	DSC	4	5	3		2	
KU1DSCCAP104	Fundamentals of App Development	DSC	4	5	3		2	
KU1DSCCAP105	Fundamentals of Web Development	DSC	4	5	3		2	
KU1MDCCAP101	Basics of IT for all	MDC	3	3	3		0	
KU1MDCCAP102	Digital marketing	MDC	3	3	3		0	

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

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
KU2DSCCAP106	Programming With C and C++	DSC	4	5	3		2	
KU2DSCCAP107	Multimedia and Graphic Designing	DSC	4	5	3		2	
KU2DSCCAP108	Cyber security and Ethics	DSC	4	5	3		2	
KU2DSCCAP109	Introduction to Database Management System	DSC	4	5	3		2	
KU2DSCCAP110	Ethical Hacking	DSC	4	5	3		2	
KU2MDCCAP103	Python Programming for all	MDC	3	3	3		0	
KU2MDCCAP104	Introduction to Data Science	MDC	3	3	3		0	

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
KU3DSCCAP201	OOP through Java	DSC	4	5	3		2	
KU3DSCCAP202	Data Structures	DSC	4	4	4		0	
KU3DSCCAP203	Introduction to stock market prediction and business analytics	DSC	4	5	3		2	
KU3DSCCAP204	Data Visualizations Tools	DSC	4	5	3		2	
KU3DSCCAP205	Introduction to ML through Python	DSC	4	5	3		2	
KU3DSCCAP206	Software Engineering	DSC	4	5	3		2	
KU3VACCAP201	Cyber law and Ethics	VAC	3	3	3		0	
KU3VACCAP202	H/W and networking Essentials	VAC	3	3	3		0	

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
KU4DSCCAP207	Mobile Computing	DSC	4	4	4		0	
KU4DSCCAP208	Software Testing	DSC	4	4	4		0	
KU4DSCCAP209	Advanced DBMS	DSC	4	5	3		2	
KU4SECCAP201	Mobile Computing	SEC	3	4	2		2	
KU4SECCAP202	Gaming and Application	SEC	3	4	2		2	
KU4VACCAP203	Internet of Things	VAC	3	3	3		0	
KU4VACCAP204	Developing Algorithmic Perspective	VAC	3	3	3		0	
KU4VACCAP205	Digital System	VAC	3	3	3		0	
KU4VACCAP206	Medical Coding	VAC	3	3	3		0	

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
KU5DSCCAP301	Python Programming	DSC	4	5	3		2	
KU5DSCCAP302	Web Technology	DSC	4	5	3		2	
KU5DSCCAP303	Operating System and Linux Administration	DSC	4	4	4		0	
KU5DSECAP301	Theory of Computation	DSE	4	4	4		0	
KU5DSECAP302	Network Security and Cryptography	DSE	4	4	4		0	
KU5DSECAP303	Mobile Communication	DSE	4	4	4		0	
KU5DSECAP304	Computer Graphics	DSE	4	4	4		0	
KU5SECCAP301	Introduction to Full stack development	SEC	3	3	3		0	
KU5SECCAP302	Robotics	SEC	3	3	3		0	
KU5SECCAP303	MatLab	SEC	3	3	3		0	

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
KU6DSCCAP304	Data Communication and Networking	DSC	4	4	4		0	
KU6DSCCAP305	Introduction to Data Science	DSC	4	5	3		2	
KU6DSCCAP306	Project	DSC	4	4	4		0	
KU6DSECAP305	Data Mining	DSE	4	5	3		2	
KU6DSECAP306	Pattern Recognition	DSE	4	5	3		2	
KU6DSECAP307	Soft Computing	DSE	4	5	3		2	
KU6DSECAP308	Ethical Hacking	DSE	4	4	4		0	
KU6SECCAP304	Cloud Computing and Big Data	SEC	3	3	3		0	
KU6SECCAP305	System Administration and Maintenance	SEC	3	3	3		0	
KU6SECCAP306	Latex	SEC	3	3	3		0	
KU6DSCCAP307	Internship	DSC	2					

Board of Studies in Computer Science

Kannur University

Bachelor of Computer Application

Sl.No.	Categorization of Coursesforall Programs	Minimum Numberof Credits 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

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	Foundations of Computers and Programming	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**

Optional Minor 1 Courses for other Departments (Level 100)

1. IT Tools
2. Design Thinking

Optional Minor 2 Courses for other Departments (Level 100)

1. Fundamentals of App Development
2. Fundamentals of Web Development

Multi-Disciplinary Course1(Level 100)

1. Basics of IT for all
2. Digital Marketing

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	Programming with C and C++	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**

Optional Minor 3 Courses for other Departments (Level 100)

1. Multimedia and Graphics Designing
2. Cyber Security and Ethics

Optional Minor 4 Courses for other Departments (Level 100)

1. Introduction to Database Management System
2. Ethical Hacking

Multi-Disciplinary Course2(Level 100)

1. Python Programming for all
2. Introduction to Data Science

Major Courses

Semester-1: Major-1

KU1DSCCAP101: Foundations of Computers and Programming

Semester	Course Type	Course Level	Course Code	Credits	Total Hours
1	Major	100-199	KU1DSCCAP101	4	5

Learning Approach (Hours/ Week)			Marks Distribution			Duration of ESE (Hours)
Lecture	Practical/ Internship	Tutorial	CE	ESE	Total	
3	2	-	30	70	100	2Hrs

Course Description: To introduce students to the foundations of computing, programming and problem-solving. It aims to train the student to the basic concepts of the C-programming language. This course involves a lab component which is designed to give the student hands-on experience with the concepts.

Course Prerequisite: NIL

Course Outcomes:

CO No.	Expected Outcome	Learning Domains
1	Understand the basic concepts and fundamental knowledge in the field of Computer Science	U /R
2	Comprehend the different types of number system	U /R
3	Understand the principles and terminology of digital logic.	U
4	Develop efficient algorithms for solving a problem.	A
5	Write the program on a computer, edit, compile, debug, correct, recompile and run it.	A, An, C

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

Mapping of Course Outcomes to PSOs

	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6	PSO7
CO1	3	2		2			
CO2	3						
CO3	2	2					
CO4	2	3		2			
CO5	3	3				2	2

COURSE CONTENTS

Contents for Classroom Transaction:

MODULE	UNIT	DESCRIPTION	HOURS
1	**MODULE 1: Building blocks of Computers**		**12**
	1	**Generation and classification of Computers:** Super, Mainframe, Mini, Personal Computer, Work stations, Parallel machines. **Basic Computer Organization**: Von Neumann Model **Hardware**: Central Processing Unit (CPU), Primary memory and Secondary Storage devices, I/O devices. **Software**: System Software and Application Software, Operating System (definition and functions only)	
	2	**Computer Languages**- Machine language, Assembly Language and High-Level Language **Language Translators**- Compiler, Interpreter and Assembler	
	3	**Basic concept of networking**: LAN, WAN, Internet and its working	
	4	**Artificial Intelligence:** Types of Learning, Applications of AI, Different types of AI Problems (Basic ideas only)	

2	**MODULE 2: Number Systems & Boolean Algebra**		**16**
	1	Weighted and Non - Weighted Codes, Positional, Binary, Octal, Hexadecimal, Binary Coded Decimal (BCD), Gray Codes, Alphanumeric codes, ASCII, EBCDIC, Conversion between bases	
	2	Signed arithmetic, 1's, 2's complement representation	
	3	Logic gates AND, OR, NOT, NAND, NOR, XOR	
	4	Fundamental concepts of Boolean Algebra Logic Circuits, Conversion from expression to logic Circuits	

3	**MODULE 3: Introduction to Algorithms and C Programming**		**16**
	1	Introduction to algorithmic concepts using flowcharts and pseudocode	
	2	Concept of Structured Programming The language of C: Phases of developing and executing a computer program using C. Standard input and output library, header file “stdio.h”	
	3	Data concepts in C: Character set, Constants, literals, Variables, identifier, Keywords, Datatypes, Variables, Declaration of Variables Operators, Expressions and operator precedence in C	
	4	Simple C programs Syntax Errors - Run-Time Errors - Logical Errors	

4	**MODULE 4: Control Structures and Arrays**		**16**
	1	Decision Making statements: if, if-else, if-else-if, Nested if and switch	
	2	Loop control statements - Entry controlled loop (for, while), Exit controlled loop (do-while) Jump statements: goto, break. Continue	
	3	One dimensional array: declaration and initialization, integer and character array	
	4	Two dimensional array: declaration and initialization	

5	**Teacher Specific Module** *Directions* Teacher can implement proper methodologies and evaluation metrics related with the topics	**15**

Essential Readings

1. Digital Fundamentals, 11th Edition by Pearson Eleventh Edition, Thomas L. Floyd.
2. Digital Logic and Computer Design, M Morris Mano, Pearson.
3. Programming in ANSI C, Balagurusamy
4. The C programming Language, Brian Kernighan and Dennis Ritchie
5. Let us C ,YeshwantKanitkar

Suggested Readings:

1. ProgramminginAnsi C, 8th Editionby E Balagurusamy, 25 March 2019

Lab Exercises

1. Safe working with System
2. Hardware familiarisation and PC assembling
3. OS installation
4. Basic Linux commands
5. Familiarise network devices, Set up and configure computer network
6. Familiarise AI tools
7. Familiarise flowchart and diagramming tools *C Programming*
8. Basic program for Input output
9. Programs involving Decision making
10. Iteration Program

Assessment Rubrics:

Evaluation Type		Marks
End Semester Evaluation		50 (Theory) 20 (Practical)
Continuous Evaluation		30
a)	Test Paper- 1	5
b)	Model Examination	10 (Theory) 05 (Practical)
c)	Assignment	5
d)	Seminar	5
e)	Book/ Article Review	
f)	Viva-Voce	
g)	Field Report	
Total		**100**

Semester-2: Major-2

KU1DSCCAP106: Programming using C and C++

Semester	Course Type	Course Level	Course Code	Credits	Total Hours
1	Major	100-199	KU1DSCCAP106	4	5

Learning Approach (Hours/ Week)			Marks Distribution			Duration of ESE (Hours)
Lecture	Practical/ Internship	Tutorial	CE	ESE	Total	
3	2	-	30	70	100	2Hrs

Course Description: This course intends to impart basic and advanced programming skills in C and C++.

Course Prerequisite: Foundations of Computers and Programming

Course Outcomes:

CO No.	Expected Outcome	Learning Domains
1	Discuss fundamental aspects of problem solving and programming concepts in C/ C++ like procedural, structural and object-oriented programming.	U /R
2	Describe the Object-Oriented Paradigm	U /R
3	Analyse given problem statement and develop systematic solutions and create basic program designs in C/ C++	U, An, C
4	Implement programming techniques in C/C++ to solve real life problems	A,C

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

Mapping of Course Outcomes to PSOs

	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6	PSO7
CO1	2						
CO2		2		2			
CO3					2		
CO4			2				

COURSE CONTENTS

Contents for Classroom Transaction:

MODULE	UNIT	DESCRIPTION	HOURS
1	**MODULE 1: Functions and structures in C**		**15**
	1	Functions: function prototype, function definition, function call, Sample program using function	
	2	Recursion and storage classes in C	
	3	Strings, string variable declaration, string handling functions	
	4	Structures: structure definition, creating structure variables, initialization, sample program using structure	
2	**MODULE 2: Advanced Programming concepts in C**		**15**
	1	Pointers: declaration, initialization, accessing a variable through its pointer	
	2	File: Defining a file, opening and closing a file, File handling functions (getc, putc, fscanf, fprintf)	
	3	Pre-processor directives in C (#include, #define), macro	
	4	Dynamic memory allocation in C	

3	**MODULE 3: Introduction to Programming in C++**		**15**
	1	Structure of C++ program, Extraction and insertion operators in C++, Reference variable	
	2	Inline function, Scope Resolution Operator	
	3	Dynamic memory allocation operators in C++: new, delete	
	4	Object Oriented Programming concepts, Defining a class, Define member functions, Object creation	

4	**MODULE 4: Polymorphism and Inheritance**		**15**
	1	Function overloading and operator overloading (unary and binary)	
	2	Friend function	
	3	Constructor: Default constructor, parameterized constructor, copy constructor. Destructors	
	4	Inheritance: definition , Types of inheritance: single level, multilevel, multiple, hierarchical	

5	**Teacher Specific Module**		**15**
	Directions		
	Teacher can implement proper methodologies and evaluation metrics related with the topics		

Essential Readings

1. Programming in ANSI C, Balagurusamy
2. The C programming Language, Brian Kernighan and Dennis Ritchie
3. Let us C ,YeshwantKanitkar
4. Object oriented programming in C++, Balagurusamy
5. The C++ Programming Language, Bjarne Stroustrup

Suggested Readings:

Let us C ++, YeshwantKanetkar

Assessment Rubrics:

Evaluation Type	Marks
End Semester Evaluation	50 (Theory)

		20 (Practical)
Continuous Evaluation		30
a)	Test Paper- 1	5
b)	Model Examination	10 (Theory) 5 (Practical)
c)	Assignment	5
d)	Seminar	5
e)	Book/ Article Review	
f)	Viva-Voce	
g)	Field Report	
Total		**100**

Minor Courses

Semester-1: Optional Minor-1.1

KU1DSCCAP102: Design Thinking

Semester	Course Type	Course Level	Course Code	Credits	Total Hours
1	Minor	100-199	KU1DSCCAP102	4	5

Learning Approach (Hours/ Week)			Marks Distribution			Duration of ESE (Hours)
Lecture	Practical/ Internship	Tutorial	CE	ESE	Total	
3	2	-	30	70	100	2Hrs

Course Description: This course equips aspiring students with the design thinking principles and innovative problem-solving tools to solve business challenges. Thus, they will be able to address, identify and solve problems creatively in any field or specialization.

Course Prerequisite: NIL

Course Outcomes:

CO No.	Expected Outcome	Learning Domains
1	Create Awareness and a sense of Discovery to drive innovation.	U
2	Create innovative solutions to the most challenging problems	U/A
3	Create prototypes to test your idea early, before making a big investment of time and money	C
4	Apply design thinking to your problems in order to generate innovative and user-centric solutions	A

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

Mapping of Course Outcomes to PSOs

	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6	PSO7
CO1	3	2		3		2	2
CO2	2	3		3	2	2	
CO3	3	2		3		2	
CO4	3	3		3	2	3	2

COURSE CONTENTS

Contents for Classroom Transaction:

MODULE	UNIT	DESCRIPTION	HOURS
1	**MODULE 1:**		**15**
	1	Design Thinking and innovation: History and Introduction, challenges	
	2	The 5 stages in design thinking process: Empathise, Define, Ideate, Prototype, Test	
	3	How to Build Empathy with the People You Design For: Techniques to get empathy with your users: Ask what, how, and why, Empathy interviews, observation	
	4	How to Define the Problem: Point Of View – Problem Statement, Empathy maps The four Ws : Who, what, where, and why?, persona	
	5	Activity: 1) Problem Framing: Reframe problems from various perspectives (deep, emotional, broad, and dynamic) to identify new pain points and make new solutions possible 2) Practice researching the innovation context and empathizing with users through structured tools. 3) Create Empathy map to an innovation problem of your own choosing, or a provided scenario 4) Create persona to an innovation problem of your own choosing, or a provided scenario	

2	**MODULE 2:**		**15**
	1	How to Ideate for innovative solutions	
	2	Ideation Methods: Brainstorm, Mindmap, Storyboard, Scamper	
	3	Ideation Methods to Select Ideas: Post-it Voting or Dot Voting, Six Thinking Hats	
	4	**Activity** 1. Start with a problem statement, point of view, possible questions create a mindmap to an innovation problem of your own choosing, or a provided scenario 2. Start with a problem statement, point of view, possible questions to an innovation problem of your own choosing, or a provided scenario 3. Start with a problem statement, point of view, possible questions create a storyboard to an innovation problem of your own choosing, or a provided scenario 4. Practice Six thinking hats to an innovation problem of your own choosing, or a provided scenario	

3	**MODULE :3**		**10**
	1	Prototyping Your Ideas, prototyping by creating critical questions related to a concept's desirability, feasibility, and viability.	
	2	Different kinds of prototype: Sketches, Storyboards, Role-Playing, Fidelity	
	3	**Activity** Organize all information about an innovation concept to identify critical questions for prototyping	

4	**MODULE 4:**		**15**
	1	Testing Design Solutions: Desirable, Feasible and Viable Solutions	
	2	Guidelines for Conducting a Test : Users analyse multiple prototypes. Ask Participants to Talk Through Their Experience, Observe Your Participants, Ask Follow-Up Questions	
	3	**Activity** You have an idea for your innovation problem. Perform Testing • Go out, meet people and engage them with your concept. Ideally you will have an experiential prototype. So let the testers experience that for themselves. If you have a more visual prototype, such as a storyboard, show it to them, but do as little explanation as possible.	

		• Let them express their thoughts. Use the interviewing techniques such as the 80/20 rule. Listen carefully and take notes. Observe how the testers are dealing with your prototype. Ask open questions that leave space for the tester to really tell their opinion	

5	**Teacher Specific Module** *Directions* s Teacher can implement proper methodologies and evaluation metrics related with the topics	**15**

Case study:

Apply the tools learnt to an innovation problem of your own choice, or a scenario provided.

Essential Readings

1. Creative Confidence, Unleash the creative potential within us all, Tom Kelley and David Kelley
2. Design Thinking for Training and Development, Sharon Boller, Laura Fletcher
3. "The Design Thinking Toolbox: A Guide to Mastering the Most Popular and Valuable Innovation Methods" by Michael Lewrick, Patrick Link, and Larry Leifer

Suggested Readings:

1. A practical guide to design thinking, A collection of methods to re-think social change, Moritz Gekeler © 2019 Friedrich-Ebert-Stiftung India Offic
2. Design Thinking:The Handbook, Falk Uebernickel, Li Jiang, Walter Brenner, Britta Pukall, Therese Naef, Bernhard Schindlholzer

Online course

1. https://www.interaction-design.org/courses/design-thinking-the-ultimate-guide
2. https://online.hbs.edu/courses/design-thinking-innovation/

Assessment Rubrics:

Evaluation Type	Marks
End Semester Evaluation	**30 (Theory)** **40 (Practical)**

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

Sample Questions to test Outcomes.

1.) Task is to Implement FYUGP . Try to come up with many different ways to solve it. There are no correct solutions or even one best solution that are trying to find; rather, they are simply using their imaginations to generate as many possibilities as they can and in the end, vote for the 2 or 4 that they are most excited about. Apply the ideation techniques.

2) The marketing team at a tech company need to Generate innovative marketing campaign ideas for a new product launch. Perform brain storming for ideation and create a storyboard

3) The marketing team at a tech company need to Generate innovative marketing campaign ideas for a new product launch. Illustrate six hat method for the secenario.

4. Illustrate the design thinking approach for designing a bag for college students within a limited budget. Describe each stage of the process and the iterative procedure involved. Use hand sketches to support your arguments**.**

Employability for the Course / Programme

* **Entrepreneurs**
* **Apply creative concepts in any field of specialization**

Semester-1: Optional Minor-1.2

KU1DSCCAP103: Essential IT Tools

Semester	Course Type	Course Level	Course Code	Credits	Total Hours
1	Minor	100-199	KU1DSCCAP103	4	5

Learning Approach (Hours/ Week)			Marks Distribution			Duration of ESE (Hours)
Lecture	Practical/ Internship	Tutorial	CE	ESE	Total	
2	3	-	30	70	100	2Hrs

Course Description: This course aims to impart skills related to e-mail creation, using google services, document processing, spreadsheet handling and creating attractive presentations.

Course Prerequisite: NIL

Course Outcomes:

CO No.	Expected Outcome	Learning Domains
1	Explain and apply the proficiency in using Google Drive, Docs, Sheets, Slides, and Forms to create, collaborate, and manage documents efficiently in the Google Workspace suite.	U,A
2	Develop proficiency in Microsoft Word to create, format, and edit documents effectively.	U, A
3	Create, analyse, and manipulate spreadsheet data.	U, A, C
4	Develop effective presentation skills using Microsoft PowerPoint	U, 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
CO 2	3	3		2			2
CO 3	2	3				2	2
CO 4	3	3				2	2

COURSE CONTENTS

Contents for Classroom Transaction:

MODULE	UNIT	DESCRIPTION	HOURS
	MODULE 1:Creating a google account and accessing related services		
1	1	Overview of Information Technology and its Tools: Basic concepts and terminology related to IT tools and their role in supporting business operations and personal productivity.	9
	2	Google Essentials: Introduction to Google Services Overview of Google Workspace, Creating and managing a Google account, Navigating the Google interface	
	3	Gmail for Communication: Managing emails in Gmail, Organizing and labelling emails, Using filters and settings effectively	
	4	Google Drive for File Management, Uploading and organizing files in Google Drive, Collaborative document editing and sharing, Version history and document recovery	

	5	Google Calendar for Time Management: Creating events and appointments Managing multiple calendars, Integrating Google Calendar with other services	

2	**MODULE 2:Document Processing Techniques**		
	1	Text Creation and manipulation, Document Creation, Editing Text, Text Selection, Cut, Copy and Paste, Font, Color, Style and Size selection, Alignment of Text, Undo & Redo, AutoCorrect, Spelling & Grammar, Find and Replace.	12
	2	Table Manipulation, Insert & Draw Table, changing cell width and height, Alignment of Text in cell, Delete / Insertion of Row, Column and Merging & Splitting of Cells, Border and Shading, Mail Merge, Table of Contents, Indexes, Adding Comments, tracking changes, Macros, Creating Headers, Footers, and Page Numbers	
	3	Formatting the Text, Creating and using user defined Styles, Paragraph Indentation, Bullets and Numbering, change case, Header & Footer, Page Setup, Page Layout, Borders, Using the Help, Watermark, Print Preview, Printing of Documents, PDF file and Saving a Document as PDF file.	
	4	Referencing and Citations, Document Security and Protection	
	5	Google Docs for Document Creation: Creating and formatting documents in Google Docs, Real-time collaboration features, Inserting media and links	

3	**MODULE 3: Introduction to Spreadsheets**		
	1	Concept of Cell Address: [Row and Column] and selecting a Cell, Entering Data [text, number, date] in Cells, Page Setup, Printing of Sheet, Saving Spreadsheet, Opening and Closing	15

	2	Manipulation of Cells & Sheet, Modifying / Editing Cell Content, Formatting Cell (Font, Alignment, Style), Cut, Copy, Paste & Paste Special, Changing Cell Height and Width, Inserting and Deleting Rows, Column, AutoFill, Sorting & Filtering, Freezing panes	
	3	Formulas, Functions a) Formulas for Numbers b) AutoSum functions c) Logical Functions d) Text Functions e) Statistical Functions f) Date & Time Functions	
	4	Creating Charts and Graphs, Working with Large Datasets - Filtering & Sorting, Data Analysis Tools (e.g., PivotTables), Creating Macros and Automation	
	5	Google Sheets for Data Management:Introduction to Google Sheets for spreadsheets,Data entry, formatting, and basic formulas,Collaborative data analysis and sharing	

4	**MODULE 4: Creating presentations**		
	1	Creating a Presentation Using a Template, Creating a Blank Presentation, Inserting & Editing Text on Slides, Inserting and Deleting Slides in a Presentation, Saving a Presentation	9
	2	Inserting Table, Adding Pictures, Inserting Other Objects, Resizing and Scaling an Object Creating & using Master Slide.	
	3	Choosing a Set Up for Presentation, Playing a Slide Show, Transition and Slide Timings, Automating a Slide Show, Providing Aesthetics to Slides & Printing	
	4	Enhancing Text Presentation, Working with Color and Line Style, Adding Movie and Sound,Adding Headers, Footers and Notes, Printing Slides and Handouts	

	5	Google Slides for Presentations:Creating and designing, presentations in Google Slides,Collaborative editing and commenting,Adding multimedia elements	

5	**Teacher Specific Module**	
	Directions	
	Teacher can implement proper methodologies and evaluation metrics related with the topics	9

Essential Readings:

1. "Microsoft Office 2019 Step by Step": by Joan Lambert and Curtis Frye:
2. Google Apps for Seniors: A Practical Guide to Google Drive Google Docs, Google Sheets, Google Slides, and Google Forms: By Scott La Counte
3. Introduction to Information Technology" by Pearson Education
4. https://workspace.google.com/learning-center/

Software:

- Access to a computer with word processing and spreadsheet software (e.g., Microsoft Word and Excel, Google Docs and Sheets) is required. .

Suggested Readings:

- Look for online resources that are compatible with your software version (e.g., Word 2021, Excel 2023, etc.).
- Consider your learning style - some resources offer video tutorials, while others focus on text-based explanations. Choose what works best for you.

Assessment Rubrics:

End Semester Evaluation		**70**
a)	End Semester Exam	**20**
b)	End Semester Practical Exam	**50**
Continuous Evaluation		**30**
a)	Test Paper- 1	6
b)	Assignment	4
c)	Practical Skills	20
Total		**100**

Semester-1: Optional Minor-2.1

KU1DSCCAP104: Fundamentals of App Development

Semester	Course Type	Course Level	Course Code	Credits	Total Hours
1	Minor	100-199	KU1DSCCAP104	4	5

Learning Approach (Hours/ Week)			Marks Distribution			Duration of ESE (Hours)
Lecture	Practical/ Internship	Tutorial	CE	ESE	Total	
2	3	-	30	70	100	2

Course Description: This course aims to impart skills related to android application development.

Course Prerequisite: NIL

Course Outcomes:

CO No.	Expected Outcome	Learning Domains
1	Evaluate and Deploy advanced mobile applications.	U, A
2	Explain Android SDK	U
3	Construct intuitive interfaces and optimizing user experiences	U, A
4	Develop and formulate code for mobile applications	U, 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	3					2
CO 2	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:**		
	1	Overview of mobile app development: Mobile Computing, History of application development	12
	2	Understanding different mobile platforms (iOS, Android), Why Android, iOS-Execution Environment	
	3	Introduction to development environments (Xcode, Android Studio) a) Theory of application development for mobile platforms b) Understanding basics of application development software	
	4	Setting up your Android development environment a) Setting up your Android development environment b) Creating an android development environment Hello, Android c) Starting new android application: Hello World	

2	**MODULE 2:**		
	1	Introduction to interface elements	15
	2	Design tools and wireframing	
	3	MVC (Model-View-Controller) architecture	

	4	Understanding app components	
	5	Activities, fragments, view controllers	

3	**MODULE 3:**		
	1	Android User Interface Design Essentials	12
	2	Designing User Interfaces with Layouts, Drawing and Working with Animation.	
	3	Architecture of android based services	
	4	Building basic application	
	5	Designing user interface	

4	**MODULE 4:**		
	1	iOS Application development a) History of iOS platform	15
	2	Architecture of Apple devices a) Understanding basics of swift b) Application development using swift	
	3	Understanding basics of Objective - C a) App development using objective - C	

5	**Teacher Specific Module**	
	Directions	
	Teacher can implement proper methodologies and evaluation metrics related with the topics	

Essential Readings:

1. Lauren Darcey and Shane Conder, "Android Wireless Application Development", Pearson Education, 2nd ed. (2011)
2. Reto Meier, "Professional Android 2 Application Development", Wiley India Pvt Ltd
3. Mark L Murphy, "Beginning Android", Wiley India Pvt Ltd
4. Android Application Development All in one for Dummies by Barry Burd, Edition: I
5. Android application development-O'REILLY

Assessment Rubrics:

End Semester Evaluation		**70**
a)	End Semester Exam	**20**
b)	End Semester Practical Exam	**50**
Continuous Evaluation		**30**
a)	Test Paper- 1	6
b)	Assignment	4
c)	Practical Skills	20
Total		**100**

Semester-1: Optional Minor-2.2

KU1DSCCAP105: Fundamentals of Web Development

Semester	Course Type	Course Level	Course Code	Credits	Total Hours
1	Minor	100-199	KU1DSCCAP105	4	5

Learning Approach (Hours/ Week)			Marks Distribution			Duration of ESE (Hours)
Lecture	Practical/ Internship	Tutorial	CE	ESE	Total	
3	2	-	30	70	100	2 Hrs

Course Description:

This course will cover the creation of Web pages and sites using HTML, CSS, and graphical applications as well as the client and server architecture of the Internet and related web technologies.

Course Prerequisite: NIL

Course Outcomes:

CO No.	Expected Outcome	Learning Domains
1	Understand different components in web technology and WWW	U, A
2	Design interactive Web pages	U, A
3	Understand HTML Forms and CSS Styling	U, A
4	Understand HTML Frames and its applications	U, A, E
5	Develop skills to design a web page using HTML	A, An, 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			
CO 3	3	3					
CO 4	3	3					
CO 5	3	3		3			3

COURSE CONTENTS

Contents for Classroom Transaction:

MODULE	**UNIT**	**DESCRIPTION**	**HOURS**
1	MODULE 1: **Introduction to Web Development Basics**		
	1	Introduction to Internet	15
		a) Evolution of the Internet	
		b) World Wide Web	
		c) Web Browsers, URL, http	
	2	Web Basics	
		a) Static Vs Dynamic web pages	
		b) Client-Side Scripting versus Server-Side Scripting	
	3	W3C & Web hosting	
		a) World Wide Web Consortium (W3C)	
		b)Web hosting, types of web hosting, Free hosting	
	4	Domain Name Registration	

2	**MODULE 2: HTML**		
	1	Introduction to HTML	15
		a) Creating HTML document	
		b) Tags & attributes, syntax of tag	
		c) Starting and ending tag, tag without end, building a webpage	
	2	Text formatting	
		a) Division	
		b) Paragraphs & heading	
		c) Physical style tags, text alignment, fonts	
	3	Hyperlink and loading images	
		a) Linking to other web pages	
		b) Images and <img> tag	
		c) Line breaks, comments	
	4	List: types of list, nested list	

3	**MODULE 3: HTML Tables and Forms**		
	1	HTML Tables: creating a table, table tags and attributes, formatting the table: width, height, align, border, padding & spacing, colspan&rowspan	15
	2	HTML Forms: Form elements (input, select, textarea, button, datalist), Input types (text, password, submit, radio, checkbox, date, email, number)	
	3	Input type attributes (value, readonly, disabled, maxlength, autocomplete, list, min, max, placeholder)	
	4	HTML5 form validation (required and pattern attribute of input type)	

4	**MODULE 4: HTML Frames and CSS**		
	1	Frames: <frame>tag, frame attributes: src, name, frameborder and scrolling	15
	2	Frameset tag and its important attributes, <iframe>, <noframe>	
	3	Applying style to HTML using CSS: Inline, internal and external CSS	
	4	CSS Colours, Fonts, Borders, padding, Applying style using class and id attribute	

5	**Teacher Specific Module**		
	Directions		15
		Teacher can implement proper methodologies and evaluation metrics related with the topics Space to fill the selected area/ activity	

Essential Readings:

1. Internet and World Wide Web How to program, P.J. Deitel& H.M. Deitel Pearson

2. An Introduction to WEB Design and Programming –Wang-Thomson **Technologies**, Black Book, Dream tech Press

3. Internet & World Wide Web How to Program, 5/e – Paul J Deitel, Harvey M Deital, AbbaeyDeital

4. Julie C. Meloni, HTML and CSS in 24 Hours, Sams Teach Yourself (Updated for HTML5 and CSS3), Ninth Edition

Suggested Readings:

1. Mastering HTML, CSS &Javascript Web Publishing Paperback,2016 - by Laura Lemay, Rafe Colburn & Jennifer Kyrnin , BPB Publications

2. HTML & CSS: The Complete Reference, Fifth Edition - Thomas a Powell, Tata McGraw Hill

Assessment Rubrics:

End Semester Evaluation	**70**

a)	End Semester Exam	**20**
b)	End Semester Practical Exam	**50**
Continuous Evaluation		**30**
a)	Test Paper- 1	6
b)	Assignment	4
c)	Practical Skills	20
Total		**100**

Semester-2: Optional Minor-3.1

KU2DSCCAP107: Multimedia and Graphics Designing

Semester	Course Type	Course Level	Course Code	Credits	Total Hours
2	Minor	100-199	KU2DSCCAP107	4	5

Learning Approach (Hours/ Week)			Marks Distribution			Duration of ESE (Hours)
Lecture	Practical/ Internship	Tutorial	CE	ESE	Total	
3	2	-	30	70	100	2 Hrs

Course Description:

The Graphic Design and Multimedia Arts program of study explores the occupations and educational opportunities associated with designing or creating graphics to meet specific commercial or promotional needs, such as packaging, displays, or logos.

Course Prerequisite: NIL

Course Outcomes:

CO No.	Expected Outcome	Learning Domains
1	Describe the media software	U
2	Design digital publications using Photoshop	U, A, C
3	Understand and analyse editing software	U, A
4	Understand the basic idea of audio and video editing	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					3
CO 3	3	3	3				
CO 4	3	3	3				

COURSE CONTENTS

Contents for Classroom Transaction:

MODULE	UNIT	DESCRIPTION	HOURS
1	MODULE 1: Multimedia & Media software		
	1	Introduction to Multimedia a) Definition b) Building blocks of multimedia (Text, Graphics, Audio, Video, Animation)	15
	2	Multimedia System, desirable Features of multimedia System	
	3	Data Compression, Multimedia Applications, Virtual reality	
	4	Introduction to Media Software Application, System Software, Application Software	

2	**MODULE 2:** Photo Editing Software Applications		
	1	Photoshop, light room, highlights, midtones and shadows, levels, balance, cure	15
	2	Histogram, basic tools, crop, lasso tool, pen tool, text	
	3	Keyboard short cuts, layers, masking,	

	4	Effects, photo manipulation and editing, raw, jpeg, tiff, Exploring Formats	

3	**MODULE 3:** Video Editing		
	1	Software for Video Editing, Premier Pro or FCP, ratio, resolution	15
	2	Introduction to software interface, creating project and sequence,	
	3	Timeline, basic cuts, transitions and effects, LUTs, effect window, title graphics	
	4	Nesting, stabilizer, video formats and extensions.	

4	**MODULE 4: Audio and Animation**		
	1	Software for Audio: Adobe Audition, software interface, wave and multi-track view, basic tools	15
	2	Applying audio effects, effect adjustments, audio recording, mixing, gain, pitch, volume, pan, file formats.	
	3	Software for Basic Animation: An Introduction to Adobe after Effects, The basics of creating projects. compositions, and layers	
	4	Importing footage, including video, audio, and still images, creating special effects using the Effects menu	

5	**Teacher Specific Module**	
	Directions	
	Teacher can implement proper methodologies and evaluation metrics related with the topics	15

Essential Readings:

1. Introduction to Information Technology (Second Edition) by ITL Education Solutions Limited, Pearson
2. Adobe Photoshop CC Classroom in a Book (2018 Release) Book by Andrew Faulkner and Conrad Chavez

3. https:lihelpx.adobe.com/in/photoshop/tutorials.html
4. Adobe After Effects CS6 Digital Classroom Book by Jerron Smith
5. Adobe Premiere Pro Classroom in a Book (2020 release) by Maxim Jago
6. https:/lhelpx.adobe.com/prerniere-pro/vierv-all-tutorials.html
7. https://helpx.adobe.com/in/audition/tutorials.html

Suggested Readings:

1. Adobe After Effects CC Classroom Book 2018 | First Edition I By Pearson
2. Adobe Audition CC Classroom 2013 by Adobe Creative
3. https://helpx.adobe.com/in/indesign/tutorials.html

Assessment Rubrics:

End Semester Evaluation		**70**
a)	End Semester Exam	**20**
b)	End Semester Practical Exam	**50**
Continuous Evaluation		**30**
a)	Test Paper- 1	6
b)	Assignment	4
c)	Practical Skills	20
Total		**100**

Semester-2: Optional Minor-3.2

KU2DSCAPC108: Cyber Security and Ethics

Semester	Course Type	Course Level	Course Code	Credits	Total Hours
2	Minor	100-199	KU2DSCCAPC108	4	5

Learning Approach (Hours/ Week)			Marks Distribution			Duration of ESE (Hours)
Lecture	Practical/ Internship	Tutorial	CE	ESE	Total	
3	2	-	30	70	100	2 Hrs

Course Description:

Cyber Security is the field of study that focuses on methods required to prevent computer systems and networks from leaking information, vandalising hardware, software, or electronic data, and misdirecting the services they provide.

Course Prerequisite: NIL

Course Outcomes:

CO No.	Expected Outcome	Learning Domains
1	Students will demonstrate a comprehensive understanding of various aspects of digital security, including cybercrimes, social media privacy, end-point device security, and cyber security fundamentals	U, A
2	Students will grasp the concept of cyber security, including its associated issues and challenges	U, A
3	Students will be equipped to comprehend cybercrimes, including their characteristics, legal recourse, and procedures for reporting via available platforms	U, A
4	Students will comprehend the privacy and security implications of social media, grasp the reporting protocols for inappropriate	U, A, E

	content, recognize the legal framework surrounding online platforms, and adopt best practices for their usage.	
5	Students will possess a comprehensive understanding of fundamental security principles concerning both computers and mobile devices.	A, An, 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			3
CO 2	3			3			2
CO 3	3			3			2
CO 4	3		2	3			3
CO 5	3		2	3			3

COURSE CONTENTS

Contents for Classroom Transaction:

MODULE	UNIT	DESCRIPTION	HOURS
1	MODULE 1: Introduction to Cyberspace and Web Technology		
	1	Introduction to Cyberspace	15
		a) Definition of Cyberspace	
		b) Basic concepts of computer and web technology	
		c) Architecture of Cyberspace	
		d) Communication in Cyberspace	
	2	Communication and Web Technology	
		a) Internet and World Wide Web	
		b) Advent of the Internet	

		c) Internet Infrastructure for Data Transfer and Governance	
		d) Internet Society	
	3	Regulation of Cyberspace	
		a) Laws Governing Cyberspace	
		b) International Regulations	
		c) Data Protection and Privacy Laws	
		d) Intellectual Property Rights	
	4	Cyber security	
		a) Understanding Cyber security	
		b) Principles of Cyber security	
		c) Cyber security Challenges	

	MODULE 2: Cybercrime and Cyber law		
	1	Introduction to Cyber Crimes	
		a) Definition of cyber crimes	
		b) Types of cyber crimes	
		c) Common Cyber Crimes	
2	2	Cyber Attacks	15
		a) Zero-day and zero-click attacks	
		b) Social engineering attacks	
		c) Malware and ransomware attacks	
	3	Cybercriminal Modus Operandi	
		a) Methods used by cybercriminals	
		b) Reporting and Mitigation	
		c) Reporting procedures for cyber crimes	
		d) Remedial and mitigation measures	
	4	Organizations and Cyber Security	

	5	Cybercrime and offences according to Indian law	

3	**MODULE 3:** Social Media Overview and Security		
	1	Introduction to Social Networks	15
	2	Social Media	
		a) Types of Social Media	
		b) Social Media Features	
		c) Social Media Marketing	
		d) Social Media Privacy	
	3	Challenges, Opportunities, and Pitfalls	
	4	Flagging and Reporting of Inappropriate Content	

4	**MODULE 4:** Digital Devices Security , Tools and Technologies for Cyber Security		
	1	Introduction to End-Point Device Security	15
		a)Mobile Phone Security	
		b)Password Policy	
	2	Security Patch Management	
	3	Data Backup	
	4	Third-Party Software Management	
	5	Cyber Security Best Practices	
	6	Host Firewall and Anti-virus	
		a)Management of Host Firewall and Anti-virus	
		b)Wi-Fi Security	

5	**Teacher Specific Module**		
	Directions		
	Teacher can implement proper methodologies and evaluation metrics related with the topics		15

Essential Readings:

1. Praveen Kumar Shukla, Surya PrakashTripathi, RitendraGoel"Introduction to Information Security and Cyber Laws" Dreamtech Press.

2. Cyber Crime Impact in the New Millennium, by R. C Mishra ,Auther Press. Edition 2010.

3. Cyber Security Understanding Cyber Crimes, Computer Forensics and Legal Perspectives by SumitBelapure and Nina Godbole, Wiley India Pvt. Ltd. (First Edition, 2011)

4. Security in the Digital Age: Social Media Security Threats and Vulnerabilities by Henry A. Oliver, Create Space Independent Publishing Platform. (Pearson , 13th November, 2001)

5. Cyber Laws: Intellectual Property & E-Commerce Security by Kumar K, Dominant Publishers.

6. Network Security Bible, Eric Cole, Ronald Krutz, James W. Conley, 2nd Edition, Wiley India Pvt. Ltd.

7. Fundamentals of Network Security by E. Maiwald, McGraw Hill.

Suggested Readings:

1. M. Stamp, "Information Security: Principles and Practice", Wiley.
2. David J. Loundy, "Computer Crime, Information Warfare, And Economic Espionage", Carolina Academic Press

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	
Total		**100**

Semester-2: Optional Minor-4.1

KU2DSCCAP109: Introduction to Database Management System

Semester	Course Type	Course Level	Course Code	Credits	Total Hours
2	Minor	100-199	KU2DSCCAP109	4	5

Learning Approach (Hours/ Week)			Marks Distribution			Duration of ESE (Hours)
Lecture	Practical/ Internship	Tutorial	CE	ESE	Total	
3	2	-	30	70	100	2 Hrs

Course Description:

This course introduces the core principles and techniques required in the design and implementation of database systems. This course focus on relational database management systems, including database design theory: E-R modeling, data definition and manipulation languages, database security and administration.

Course Prerequisite: NIL

Course Outcomes:

CO No.	Expected Outcome	Learning Domains
1	Understand the concept of database management system and identify its advantages over manual file keeping	U
2	Understand the need of data modelling and identify the advantages and disadvantages among the models	U
3	Construct queries using SQL to manipulate data	A
4	Apply the knowledge of data types and other functions in data storage and retrieval	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	2			
CO 2	3	3	2				2
CO 3	2	3					
CO 4	2	3	3			3	2

COURSE CONTENTS

Contents for Classroom Transaction:

MODULE	UNIT	DESCRIPTION	HOURS
1	**MODULE 1: DBMS introduction**		
	1	Overview of Databases - Definition and purpose of databases –Types of database management system	15
	2	Significance of databases in modern applications and industries- Transaction management	
	3	View of Data, Data Models-relational-hierarchical-network and E-R model	
	4	Database architecture – Storage manager-Query Processor. Database users	
2	**MODULE 2: Data representation**		
	1	Entity-Relationship Model - Understanding entities, attributes, and relationships - Designing Entity-Relationship Diagrams (ERDs) - Cardinality and participation constraints in ER modelling	15
	2	Entity-Relationship Model - Understanding entities, attributes, and relationships - Designing Entity-Relationship Diagrams (ERDs) - Cardinality and participation constraints in ER modelling	

	3	Creating Tables and Relationships - Implementing ER model into relational tables	
	4	Defining key and constraints in a relation. Primary and foreign keys - Establishing relationships between tables - Enforcing referential integrity	

3	**MODULE 3: Relational algebra and SQL**		
	1	Relational Algebra -Fundamental operations	15
	2	SQL: database languages; DDL- create, alter, drop, truncate; DML- Insert , Select, update, Delete; DCL ,TCL	
	3	Functions, Data types in SQL; Creation and deletion of database and user	
	4	Pattern matching, views and sequence.	

4	**MODULE 4:** SQL Join Operations and emerging trends IN DBMS		
	1	INNER,OUTER AND CROSS JOIN	15
	2	Case Studies and Projects - Applying database and SQL skills to real-world scenarios - Designing and implementing a database project - Presenting and documenting the project results	
	3	Professional Development and Emerging Trends- Career Opportunities in Database Management	
	4	Emerging Technologies (e.g., NoSQL, NewSQL)	

5	**Teacher Specific Module**	
	Directions	
	Teacher can implement proper methodologies and evaluation metrics related with the topics	15

Essential Readings:

1. Database System Concepts by Abraham Silberschatz, Henry F. Korth, and S. Sudarshan
2. Fundamentals of Database Systems by RamezElmasri and Shamkant B. Navathe

3. SQL Performance Explained by Markus Winand
4. Learning SQL by Alan Beaulieu

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	
Total		**100**

Semester-2: Optional Minor-4.2

KU2DSCCAP110: Ethical Hacking

Semester	Course Type	Course Level	Course Code	Credits	Total Hours
2	Minor	100-199	KU2DSCCAP110	4	5

Learning Approach (Hours/ Week)			Marks Distribution			Duration of ESE (Hours)
Lecture	Practical/ Internship	Tutorial	CE	ESE	Total	
3	2	-	30	70	100	2 Hrs

Course Description:

Ethical hacking is a process of detecting vulnerabilities in an application, system, or organization's infrastructure that an attacker can use to exploit an individual or organization. They use this process to prevent cyberattacks and security breaches by lawfully hacking into the systems and looking for weak points.

Course Prerequisite: NIL

Course Outcomes:

CO No.	Expected Outcome	Learning Domains
1	Understand the fundamental concepts of ethical hacking, including its principles and methodologies.	U
2	Demonstrate proficiency in using various ethical hacking tools and techniques for information gathering, scanning, and enumeration.	U
3	Apply ethical hacking principles to identify and exploit vulnerabilities in systems and networks.	U, A

4	Analyze and evaluate legal and ethical considerations in ethical hacking practices.	U, A, An

**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	2				
CO 4	2	3	2				

COURSE CONTENTS

Contents for Classroom Transaction:

MODULE	**UNIT**	**DESCRIPTION**	**HOURS**
1	MODULE 1 : Introduction to Ethical Hacking		
	1	Ethical hacking definition, Hacker types, **t**hreats and attacks, vulnerabilities	15
	2	Terminologies in hacking	
	3	Ethics and laws in hacking	
	4	Need of Ethical hacking, Roles and responsibilities	

2	**MODULE 2:**		
	1	Information Gathering :Information gathering techniques	15
	2	Foot printing and reconnaissance: definitions and techniques	
	3	Tools and methodologies for information gathering	
	4	Legal and ethical considerations	

3	**MODULE 3:**		
	1	Scanning and Enumeration: Port Scanning Techniques, Service Enumeration	15
	2	Vulnerability Scanning	
	3	Network Mapping	
	4	Enumerating Systems and Services	

4	**MODULE 4:**		
	1	Password Cracking Techniques	15
	2	Privilege Escalation	
	3	Executing applications	
	4	Hacking operating systems, Trojans and backdoors	

5	**Teacher Specific Module**	
	Directions	
	Teacher can implement proper methodologies and evaluation metrics related with the topics	15

Essential Readings:

1. The Basics of Hacking and Penetration Testing: Ethical Hacking and Penetration Testing Made Easy, Patrick Engebretson

2. Gray Hat Hacking: The Ethical Hacker's Handbook, Allen Harper, Daniel Regalado, Ryan Linn, Stephen Sims, BrankoSpasojevic, and Linda Martinez.

3. Penetration Testing: A Hands-On Introduction to Hacking" by Georgia Weidman

Suggested Readings:

1. The Web Application Hacker's Handbook: Finding and Exploiting Security Flaws", DafyddStuttard and Marcus Pinto.
2. The Hacker Playbook 3: Practical Guide To Penetration Testing, Peter Kim

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	
Total		**100**

Multi-Disciplinary Courses

Semester-1: MDC-1.1

KU1MDCCAP101: Basics of IT for all

Semester	Course Type	Course Level	Course Code	Credits	Total Hours
1	MDC	100-199	**KU1MDCCAP101**	3	3

Learning Approach (Hours/ Week)			Marks Distribution			Duration of ESE (Hours)
Lecture	Practical/ Internship	Tutorial	CE	ESE	Total	
3	0	1	25	50	75	

Course Description: This course is intended for students with little or no background in information technology. This course introduces students to major areas of computer science discipline. It covers the concepts of working principle of computer, basics of operating system, networks. number system, problem solving and security.

Course Prerequisite: NIL

Course Outcomes:

CO No.	Expected Outcome	Learning Domains
1	Discuss the basic concepts and fundamental knowledge in the field of Computer Science	
2	Comprehend the different types of number system	
3	Develop problem solving skills	
4	Understand the basics of data communication and network	
5	Understand the basic concepts of cyber Security	

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

COURSE CONTENTS

Contents for Classroom Transaction:

MODULE	UNIT	DESCRIPTION	HOURS
1	**MODULE TITLE: Introduction to Computer**		12
	1	History, Generations of Computer	
		Basic block diagram, Functions of various components of computer	
		Hardware, Software, Types of software	
	2	Basic Computer Organization: Von Neumann Model	
		Operating System, Functions of OS	
	3	**Number Systems :** Weighted and Non - Weighted Codes, Binary, Decimal, Octal, Hexadecimal, Binary Coded Decimal (BCD), Gray Codes, Alphanumeric codes, ASCII	
		Conversion of bases, 1's, 2's complement representation	

2	**MODULE TITLE: Introduction to Programming**		12
	1	Procedure oriented language, Object oriented language	

	2	Computer Languages, Machine language, Assembly Language and High-Level Language	
	3	Language Translators, Compiler, Interpreter and Assembler	
	4	Flowchart, Algorithm	

3	**MODULE TITLE: NETWORKING ESSENTIALS**		
	1	Fundamental computer network concepts	12
	2	Types of computer networks	
		Network layers , TCP/IP model	
		Wireless Local Area Network, Ethernet, WiFi	
	3	Network Routing, Switching, Network components	

4	**MODULE TITLE**		
	1	An Overview of Computer Security	12
		Security: Vulnerabilities, Attacks, and Countermeasures	
		Cryptography, Basic Techniques, Cryptanalysis	
		Digital Signatures	
	2	Applications of computer science	
		AI, Types of Learning, Applications of AI,Different types of AI Problems (Basic ideas only)	

5	**Teacher Specific Module**	
	Directions	12
	Teacher can implement proper methodologies and evaluation metrics related with the topics	

Essential Readings:

1. Digital Fundamentals, 11th edition Published by Pearson (July 14, 2021) © 2015 Thomas L. Floyd
2. . Goel, Anita (2010). Computer fundamentals. Pearson Education India

3. Forouzan, B. A., &Fegan, S. C. New York: “Data communications and networking”, McGraw-Hill Higher Education, 2007.
4. Kernighan, Brian W (2011). *D is for Digital: What a well-informed person should know about computers and communications*. CreateSpace Independent Publishing Platform

Assessment Rubrics:

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

Semester-1: MDC-1.2

KU1MDCCAP102: Digital Marketing

Semester	Course Type	Course Level	Course Code	Credits	Total Hours
1	MDC	100-199	KU1MDCCAP102	3	3

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

Course Description:

In today's digital age, mastering the art of digital marketing is crucial for businesses to thrive. This course provides a comprehensive understanding of the core principles and strategies involved in promoting a brand or product online. Students will explore various digital channels, gain hands-on experience with essential tools, and develop the skills to create and manage effective digital marketing campaigns

Course Prerequisite: NIL

Course Outcomes:

CO No.	Expected Outcome	Learning Domains
1	Analyze the digital marketing landscape and its impact on consumer behavior.	U, An
2	Develop and implement a comprehensive digital marketing strategy aligned with business objectives.	U, A
3	Utilize various digital channels (SEO, SEM, Social Media, Email Marketing) to reach target audiences effectively.	U, E

4	Create engaging content that resonates with target audiences and drives conversions.	U, A, C
5	Measure and analyze campaign performance using key metrics and data insights.	U, An

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

COURSE CONTENTS

Contents for Classroom Transaction:

MODULE	UNIT	DESCRIPTION	HOURS
1	**MODULE 1: Foundations of Digital Marketing**		
	1	Introduction to Digital Marketing - Terminology & Landscape Overview	12
	2	Understanding Customer Behavior in the Digital Age	
	3	Developing a Buyer Persona and Targeting Strategies	
	4	Setting SMART Goals and Measuring Success in Digital Marketing	

2	**MODULE 2 : Content Marketing & SEO**		
	1	Content Strategy & Development - Creating Engaging Content Across Channels	12
	2	Search Engine Optimization (SEO) Principles - Optimizing Websites for Search Visibility	
	3	Keyword Research & Content Planning for Improved Ranking	
	4	Content Marketing Platforms and Tools	

3	**MODULE 3: Social Media Marketing & Paid Advertising**		
	1	Social Media Marketing Strategies - Building Brand Communities on Key Platforms	12
	2	Engaging Content Creation for Social Media Channels	
	3	Paid Advertising Fundamentals - Introduction to PPC (Pay-Per-Click) Advertising	
	4	Social Media Advertising Platforms and Campaign Management	

4	**MODULE 4: Email Marketing & Analytics**		
	1	Effective Email Marketing Strategies - Building Email Lists and Segmentation	12
	2	Crafting Compelling Email Campaigns - Design & Copywriting Techniques	
	3	Email Marketing Automation Tools and Best Practices	
	4	Data Analysis for Digital Marketing - Key Performance Indicators (KPIs) & Tracking Tools	

5	**Teacher Specific Module**	

	Directions	
	Teacher can implement proper methodologies and evaluation metrics related with the topics	12

Essential Readings:

- Choose a recent edition textbook that covers the core concepts and strategies of digital marketing. Here are some examples:
    - "Digital Marketing: A Practical Approach" by Philip Kotler and Kevin Lane Keller ([Publisher Year])
    - "Social Media Marketing: The Complete Idiot's Guide" by Lisa Guernsey ([Publisher Year]) (This is a good option for beginners)
    - "Search Engine Optimization (SEO): The Complete Guide" by Eric Enge, Stephan Spencer, and Jessie Stricchiola ([Publisher Year]) (Focuses on SEO aspects)

E-Sources (Websites/Weblinks):

- **Industry Blogs and Articles:**
    - Search Engine Land (https://searchengineland.com/) - Provides news and insights on SEO and SEM.
    - Social Media Today (https://www.socialmediatoday.com/) - Covers trends and best practices in social media marketing.\
    - Moz Blog (https://moz.com/blog) - Offers valuable resources on SEO and content marketing.
- **Official Resources:**
    - Google Digital Garage (https://learndigital.withgoogle.com/digitalgarage) - Free online courses from Google on various digital marketing topics.
    - Facebook Blueprint (https://www.facebook.com/business/learn) - Learning resources from Facebook for advertising and marketing on their platform.

Important Note:

- While web links can be useful, they can become outdated. In your syllabus, you can mention the suggested websites and encourage students to explore reputable industry blogs and articles for the latest trends.

Additional Considerations:

- Case studies: Include a selection of real-world case studies that showcase successful

digital marketing campaigns. These can be found online or in industry publications.

- **Academic Journals:** While not always compulsory, scholarly articles from marketing journals can provide deeper insights into specific digital marketing topics. Your library might offer access to relevant databases.

Suggested Readings:

In addition to the core textbook required for your digital marketing course, here are some suggested readings to broaden your knowledge and stay updated on the ever-evolving digital marketing landscape:

Books:

- **General Digital Marketing:**
  - "Marketing in the Digital Age" by Thomas C. Duncan ([Publisher Year]) - Explores the impact of digital technologies on marketing strategies.
  - "Digital Marketing Strategy: An Integrated Approach" by Simon P. Wood ([Publisher Year]) - Provides a framework for developing and implementing a comprehensive digital marketing strategy.
- **Specific Areas of Digital Marketing:**
  - "The Art of SEO: Mastering Search Engine Optimization" by Eric Enge, Stephan Spencer, and Jessie Stricchiola ([Publisher Year]) - An in-depth exploration of Search Engine Optimization (SEO) strategies.
  - "Jab, Jab, Jab, Right Hook: How to Tell Your Story in a Noisy Social World" by Gary Vaynerchuk ([Publisher Year]) - Offers practical advice on content marketing and social media engagement.
  - "Paid Advertising: Strategies for Search Engine Marketing, Display Advertising, Social Media Marketing and More" by Kenneth C. Laudon ([Publisher Year]) - Focuses on paid advertising strategies across various digital channels.

E-Sources (Websites/Weblinks):

- **Industry News and Reports:**
  - WordStream Blog (https://www.wordstream.com/blog) - Offers data-driven insights and marketing advice.
  - Marketing Land ([invalid URL removed]) - Covers a wide range of digital marketing topics with daily news updates.

- eMarketer (https://www.emarketer.com/) - Provides in-depth market research reports on various aspects of digital marketing (subscription required).

- **Social Media Marketing Resources:**
  - Hootsuite Social Media Blog (https://blog.hootsuite.com/) - Focused on social media management and marketing strategies.
  - Social Media Examiner (https://www.socialmediaexaminer.com/) - Provides social media marketing news, tips, and case studies.

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**

SAMPLE QUESTIONS TO TEST OUTCOMES:

1. Understanding SEO (Multiple Choice):

Which of the following is NOT a factor that search engines consider when ranking websites?

a) Keyword relevance in website content b) Mobile-friendliness of the website c) The number of social media followers a brand has d) Backlinks from high-authority websites

2. Social Media Marketing Strategy (Short Answer):

You are developing a social media marketing strategy for a new clothing brand targeting young adults (18-25 years old). Briefly outline two key social media platforms you would focus on and explain your reasoning for each choice.

3. Content Marketing (Essay):

Discuss the importance of creating high-quality content in a digital marketing strategy. Explain two different content formats (e.g., blog posts, infographics) that can be used for content marketing and how they can benefit businesses.

4. Digital Marketing Analytics (True/False):

Website traffic is the only key metric to measure the success of a digital marketing campaign. (True/False)

5. Paid Advertising (Short Answer):

Describe two different paid advertising models commonly used in digital marketing (e.g., Pay-Per-Click, Cost-Per-Acquisition). Briefly explain the advantages and disadvantages of each model for businesses.

EMPLOYABILITY FOR THE COURSE:

The digital marketing landscape is booming, and the demand for skilled professionals is high. Taking a course in Digital Marketing can significantly boost your employability in several ways:

- **High Demand & Growth:** The digital marketing field is experiencing rapid growth, creating a constant need for qualified individuals.
- **Diverse Job Opportunities:** Digital marketing skills are applicable across various industries. You could find work in marketing agencies, e-commerce businesses, social media management firms, or even manage your own freelance digital marketing services.

- **Adaptable Skillset:** The knowledge you gain in this course equips you with a versatile skillset. You'll learn about SEO, social media marketing, content creation, and data analysis, all valuable for various digital marketing roles.
- **Competitive Advantage:** Standing out in a competitive job market is crucial. A strong understanding of digital marketing showcases your knowledge of current marketing trends and demonstrates your ability to reach target audiences effectively in the digital age.

Semester-2: MDC-2.1

KU1MDCCAP103: Python Programming for All

Semester	Course Type	Course Level	Course Code	Credits	Total Hours
2	MDC	100-199	KU1MDCCAP103	3	4

Learning Approach (Hours/ Week)			Marks Distribution			Duration of ESE (Hours)
Lecture	Practical/ Internship	Tutorial	CE	ESE	Total	
2	2	-	25	50	75	

Course Description:

This course introduces the learner to how to develop an algorithm, then progress to reading code and understanding how programming concepts relate to algorithms. This is done using Python language.

Course Prerequisite: NIL

Course Outcomes:

CO No.	Expected Outcome	Learning Domains
1	Understand Fundamentals of Computers	U, R
2	Interpret the fundamental Python syntax and semantics and be fluent in the use of Python control flow statements.	U, A
3	Determine the methods to create and manipulate Python programs by utilizing the data structures like lists, dictionaries, tuples and sets.	U,A
4	Express proficiency in the handling of strings and functions.	U, A
5	Develop basic programs using Python	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						
CO 2	3	2					
CO 3	2	3		2			
CO 4	2	3		2			
CO5	2	3				2	2

COURSE CONTENTS

Contents for Classroom Transaction:

MODULE	UNIT	DESCRIPTION	HOURS
1	**MODULE 1: Introduction to Programming**		
	1	Basic block diagram and functions of various components of a computer	12
	2	Concept of Programming, Flow charts and Algorithms	
	3	Basic Difference between Procedure Oriented Language and Object-Oriented Language	
	4	Concepts of Machine level, Assembly level and High-level programming	
	5	Language translators-Compiler, Interpreter, Assembler	

2	**MODULE 2:Introduction to Python language**		
	1	Introduction to Python and features of Python	12
	2	Python Interpreter and program execution	
	3	Python Environment Setup, Python IDE	

	4	Python variable declaration, Keywords, Indents in Python, Python input/output operations	

3	**MODULE 3: Operators and Datatypes in Python**		
	1	Arithmetic Operators, Comparison Operators, Assignment Operators, Logical Operators, Bitwise Operators.	12
	2	Membership Operators, Identity Operators, Ternary Operator, Operator precedence	
	3	Declaring and using Numeric datatypes: int, float, complex	
	4	Using string data type and string operation	
	5	List, Tuple, Set, Dictionary	

4	**MODULE 4: Conditional and Looping Statements in Python**		
	1	Conditional Statements a) If, If-else, If-elif-else, Nested-if etc.	12
	2	loop control statements a) for, while, Nestedloops, Break, Continue, Passstatements	

5	**Teacher Specific Module**	
	Directions	
	Teacher can implement proper methodologies and evaluation metrics related with the topics	12

Essential Readings:

1. Computer Fundamentals Goel, Anita Pearson
2. Core Python Programming Wesley J. Chun Publisher: Prentice Hall PTR First Edition
3. Python Tutorial/Documentation www.python.or 2010

4. Allen Downey, Jeffrey Elkner, Chris Meyers , How to think like a computer scientist : learning with Python , Freely available online.2015
5. Web Resource: http://interactivepython.org/courselib/static/pythonds

Suggested Readings:

1. T. Budd, Exploring Python, TMH, 1st Ed, 2011

Sample Lab Questions:

1. Write a program for checking the given number is even or odd.
2. Calculate the multiplication and sum of two numbers
3. Write python program to print Hello World
4. Write a python program to get string, int, float input from user
5. Write a python program to find the length of list?

Assessment Rubrics:

Evaluation Type		**Marks**
End Semester Evaluation		**30 (Theory)** **20 (Practical)**
Continuous Evaluation		**25**
a)	Test Paper- 1	5
b)	Model exam	5 (Theory) 5 (Practical)
c)	Assignment	5
d)	Seminar	5
e)	Book/ Article Review	
f)	Viva-Voce	
g)	Field Report	
Total		**75**

Semester-2: MDC-2.2

KU1MDCCAP104: Introduction to Data Science

Semester	Course Type	Course Level	Course Code	Credits	Total Hours
2	MDC	100-199	KU1MDCCAP104	3	3

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

Course Description:

This course introduces the fundamental concepts, techniques, and tools used in data science. Students will learn how to collect, clean, analyze, and visualize data using various programming languages and libraries. The course will cover topics such as data manipulation, exploratory data analysis, statistical modeling, machine learning, and data visualization.

Course Prerequisite: NIL

Course Outcomes:

CO No.	Expected Outcome	Learning Domains
1	Analyse data using statistical methods to draw meaningful conclusions.	U, An
2	Apply machine learning algorithms to real-world datasets for problem-solving	U, A
3	Understand data characteristics and patterns through exploratory data analysis (EDA).	U

4	Demonstrate proficiency to collect, clean, and preprocess data using Python and relevant libraries.	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		3	3		3	
CO 2	3	2		2		3	2
CO 3	3		2			3	
CO 4	3	2	3	2		3	2

COURSE CONTENTS

Contents for Classroom Transaction:

MODULE	UNIT	DESCRIPTION	HOURS
1	**MODULE 1:Introduction to Data Science**		
	1	Overview of data science and its applications	12
	2	Introduction to Python programming for data science	
	3	Introduction to data types, data structures, and libraries (NumPy, Pandas)	
	4	Data collection methods and sources	

2	**MODULE 2 :Exploratory Data Analysis and Statistical Analysis**		
	1	Descriptive statistics and data summarization	12
	2	Data cleaning and preprocessing techniques	
	3	Handling missing data and outliers	

	4	Data visualization techniques (Matplotlib, Seaborn)	
	5	Hypothesis testing, confidence intervals, and correlation analysis	

3	**MODULE 3: Machine Learning Fundamentals**		
	1	Introduction to machine learning	12
	2	Supervised vs. unsupervised learning	
	3	Model evaluation and validation	
	4	Regression analysis (linear regression, multiple regression)	
	5	Classification algorithms (logistic regression, decision trees)	

4	**MODULE 4: Advanced Topics in Data Science**		
	1	Clustering algorithms (K-means, hierarchical clustering)	12
	2	Dimensionality reduction techniques (PCA, t-SNE)	
	3	Introduction to deep learning and neural networks	
	4	Natural Language Processing (NLP) basics	
	5	Data visualization principles and techniques	

5	**Teacher Specific Module**	
	Directions	
	Teacher can implement proper methodologies and evaluation metrics related with the topics	12

Essential Readings:

2. "Introduction to Data Science", Jeffrey Stanton, Chapman and Hall/CRC in 2013.

3. **"Data Science from Scratch: First Principles with Python", Joel Grus, O'Reilly Media.**
4. **"Python for Data Analysis", Wes McKinney, O'Reilly Media**

Suggested Readings:

1. "Data Science for Business: What You Need to Know about Data Mining and Data-Analytic Thinking", Foster Provost and Tom Fawcett**,** O'Reilly Media, 1st Edition (2013)

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**

Sample Questions to test Outcomes.

1. What Python library is commonly used for data manipulation and analysis?
2. Explain the purpose of exploratory data analysis (EDA) in the data science process.
3. How would you determine the correlation between two variables in a dataset?
4. When would you use a classification algorithm versus a regression algorithm?
5. Explain the steps involved in creating a data analysis pipeline for a classification task.
6. How would you interpret a high RMSE value in a regression model?

Employability for the Course / Programme:

The course enhances employability by equipping students with sought-after data science skills, opening doors to roles like data analyst, data scientist, and machine learning engineer across various industries.