CAUVERY COLLEGE FOR WOMEN(AUTONOMOUS)

Nationally Accredited with 'A' Grade by NAAC

TIRUCHIRAPPALLI

PG AND RESEARCH DEPARTMENT OF COMPUTER SCIENCE

B.Sc. COMPUTER SCIENCE

SYLLABUS

2023 -2024 and Onwards

CAUVERY COLLEGE FOR WOMEN (AUTONOMOUS)

PG AND RESEARCH DEPARTMENT OF COMPUTER SCIENCE

VISION

To create an ambience for a quality academic erudition which drives technologically adept, innovative and globally competent graduates with ethical values

MISSION

- To have a breath of knowledge across the subject areas of Computer Science
- To professionally enrich the students for successful career in Academia, Industry and Research
- To promote and inculcate ethics and code of professional practice among students

PROGRAMME EDUCATIONAL OBJECTIVES (PEOs)

PEOs	Statements
PEO1	**LEARNING ENVIRONMENT** To facilitate value-based holistic and comprehensive learning by integrating innovative learning practices to match the highest quality standards and train the students to be effective leaders in their chosen fields.
PEO2	**ACADEMIC EXCELLENCE** To provide a conducive environment to unleash their hidden talents and to nurture the spirit of critical thinking and encourage them to achievetheir goal.
PEO3	**EMPLOYABILITY** To equip students with the required skills in order to adapt to the changing global scenario and gain access to versatile career opportunities in multidisciplinary domains.
PEO4	**PROFESSIONAL ETHICS AND SOCIAL RESPONSIBILITY** To develop a sense of social responsibility by formulating ethics and equity to transform students into committed professionals with a strong attitude towards the development of the nation.
PEO5	**GREEN SUSTAINABILITY** To understand the impact of professional solutions in societal and environmental contexts and demonstrate the knowledge for an overall sustainable development.

PROGRAMME OUTCOMES FOR B.Sc. Computer Science,

B.Sc. Computer Science with Cognitive Systems, BCA,

B.Sc. Information Technology

PO NO.	On completion of B. Sc Computer Science / B. Sc Computer Science with Cognitive Systems / BCA/ B. Sc Information Technology Programme, the students will be able to
PO 1	**ACADEMIC SKILLS & SOCIAL RESPONSIBILITY** Apply Computing, Mathematical and Scientific Knowledge in Various disciplines by understanding the concerns of the society.
PO 2	**CRITICAL THINKING AND INNOVATIVE PROGRESS** Design the software applications with varying intricacies using programminglanguages for innovative learning in techno world to meet the changing demands.
PO 3	**PERSONALITY DEVELOPMENT** Perceive Leadership skills to accomplish a common goal with effective communication and understanding of professional, ethical, and social responsibilities.
PO 4	**LIFELONG LEARNING** Identify resources for professional development and apply the skills and tools necessary for computing practice to gain real life experiences.
PO 5	**CREATIVITY AND HOLISTIC APPROACH** Create a scientific temperament and novelties of ideas to support research and development in Computer Science to uphold scientific integrity and objectivity.

PROGRAMME SPECIFIC OUTCOMES FOR B.Sc. COMPUTER SCIENCE

PSO NO.	The students of B.Sc. Computer Science will be able to	POs Addressed
PSO 1	Identify, analyze, design an optimized solution using appropriate algorithms of varying complexity using cutting edge technologies	PO 1 PO 2 PO 5
PSO 2	Attain a solid foundation in the Programming languages and to formulate computational solutions to real life problems	PO 1 PO 2 PO 4 PO 5
PSO 3	Equip the skills to utilize tools and technologies in computer science to meet the industrial needs and to communicate effectively among peers	PO 3 PO 4
PSO 4	Develop skills in software and hardware so as to enable them to establish a productive career in industry, research, academia and also as an entrepreneur	PO 1 PO 4 PO 5
PSO 5	Implement independent projects of their own choice using latest tools and also work as an effective team member to attain the predefined goals.	PO 3 PO 4 PO 5

Cauvery College for Women(Autonomous), Trichy
PG & Research Department of Computer Science
B.Sc Computer Science
LEARNING OUTCOMES BASED CURRICULUM FRAMEWORK(CBCS – LOCF)
(For the Candidates admitted from the Academic year 2023-2024 and onwards)

Semester	Part	Course	Course Title	Course Code	Inst. Hrs. /week	Credits	Exam			Total
							Hrs.	Marks		
								Int	Ext	
I	I	Language Course-I (LC)	பொதுத்தமிழ்- I	23ULT1	6	3	3	25	75	100
			Hindi ka Samanya Gyanaur Nibandh	23ULH1						
			Poetry, Grammarand History of Sanskrit Literature	23ULS1						
			Foundation Course: Paper I - French I	23ULF1						
	II	English Language Course - I (ELC)	General English -I	23UE1	6	3	3	25	75	100
	III	Core Course – I (CC)	Python Programming	23UCS1CC1	5	5	3	25	75	100
		Core Practical - I (CP)	Python Programming(P)	23UCS1CC1P	3	3	3	40	60	100
		First Allied Course- I (AC)	Numerical Methods	23UCS1AC1	4	3	3	25	75	100
		First Allied Course- II (AC)	Graph Theory and its Applications	23UCS1AC2	4	3	3	25	75	100
	IV	Ability Enhancement Compulsory Course-I (AECC)	UGC Jeevan Kaushal-Value Education	23UGVE	2	2	-	100	-	100
	Total				**30**	**22**				**700**
II	I	Language Course-II (LC)	பொதுத்தமிழ்- Ⅱ	23ULT2	6	3	3	25	75	100
			Hindi Literature & Grammar - II	22ULH2						
			Prose, Grammar and History of Sanskrit Literature	23ULS2						
			Basic French - II	22ULF2						
	II	English Language Course –II (ELC)	General English- II	23UE2	6	3	3	25	75	100
	III	Core Course – II (CC)	Programming in Java	22UCS2CC2	5	5	3	25	75	100
		Core Practical - II (CP)	Java Programming (P)	22UCS2CC2P	3	3	3	40	60	100
		Core Practical -III (CP)	Data Visualization (P)	23UCS2CC3P	2	2	3	40	60	100
		First Allied Course – III (AC)	Operations Research	22UCS2AC3	4	3	3	25	75	100
	IV	Ability Enhancement Compulsory Course-II (AECC)	Environmental Studies	22UGEVS	2	2	-	100	-	100
		Ability Enhancement Compulsory Course-III (AECC)	Innovation and Entrepreneurship	22UGIE	2	1	-	100	-	100
	Extra Credit Course		SWAYAM	As per UGC Recommendation						
	Total				**30**	**22**				**800**

Semester	Part	Course	Course Title	Course Code	Inst. Hrs. / week	Credits	Exam			Total
							Hrs.	Marks		
								Int	Ext	
III	I	Language Course-III (LC)	பொதுத்தமிழ் - III	23ULT3	6	3	3	25	75	100
			Hindi Literature & Grammar - III	22ULH3						
			Drama, Grammar and History of Sanskrit Literature	23ULS3						
			Intermediate French - I	22ULF3						
	II	English Language Course- III(ELC)	Learning Grammar Through Literature- I	23UE3	6	3	3	25	75	100
	III	Core Course– III(CC)	Data Structures & Algorithms	23UCS3CC3	5	5	3	25	75	100
		Core Practical - IV(CP)	Data Structures (P)	22UCS3CC4P	3	3	3	40	60	100
		Second Allied Course-I (AC)	Digital & Microprocessor Fundamentals	22UCS3AC4	4	3	3	25	75	100
		Second Allied Course- II (AP)	Digital & Microprocessor (P)	22UCS3AC5P	4	3	3	40	60	100
	IV	Generic Elective Course-I (GEC)	Office Automation (P)	22UCS3GEC1P	2	2	3	40	60	100
			Basic Tamil – I	22ULC3BT1				25	75	
			Special Tamil – I	22ULC3ST1						
		Extra Credit Course	SWAYAM	As per UGC Recommendation						
		Total			**30**	**22**	-	-	-	**700**
15 Days INTERNSHIP during Semester Holidays										
IV	I	Language Course - IV (LC)	பொதுத்தமிழ்- IV	23ULT4	6	3	3	25	75	100
			Hindi Literature & Functional Hindi	22ULH4						
			Alankara, Didactic and Modern Literatures and Translation	23ULS4						
			Intermediate French - II	22ULF4						
	II	English Language Course – IV (ELC)	Learning Grammar Through Literature- II	23UE4	6	3	3	25	75	100
	III	Core Course – IV(CC)	Database Management Systems	23UCS4CC4	6	5	3	25	75	100
		Core Practical - V(CP)	SQL & PL/SQL (P)	22UCS4CC5P	4	4	3	40	60	100
		Second Allied Course-III (AC)	Microcontrollers	22UCS4AC6	~~4~~	3	3	25	75	100
		Internship	Internship	22UCS4INT	-	2	-	25	75	100
	IV	Generic Elective Course-II (GEC)	Multimedia (P)	22UCS4GEC2P	2	2	3	40	60	100
			Basic Tamil – II	22ULC4BT2				25	75	
			Special Tamil - II	22ULC4ST2						
		Skill Enhancement Course – I (SEC)	Web Designing (P)	22UCS4SEC1P	2	2	3	40	60	100
		Extra Credit Course	SWAYAM	As per UGC Recommendation						
		Total			**30**	**24**	-	-	-	**800**

Semester	Part	Course	Course Title	Course Code	Inst. Hrs. / week	Credits	Exam			Total
							Hrs.	Marks		
								Int	Ext	
V	III	Core Course – V(CC)	Programming in PHP	23UCS5CC5	6	5	3	25	75	100
		Core Practical – VI(CP)	Programming in PHP(P)	23UCS5CC6P	3	3	3	40	60	100
		Core Course - VI(CC)	Operating Systems	23UCS5CC6	6	5	3	25	75	100
		Core Course – VII(CC)	Computer Networks	23UCS5CC7	6	5	3	25	75	100
		Discipline Specific Elective – I (DSE)	A. Computer Architecture	23UCS5DSE1A	5	3	3	25	75	100
			B. Computer Graphics	23UCS5DSE1B						
			C. Artificial Intelligence	23UCS5DSE1C						
	IV	Ability Enhancement Compulsory Course-IV(AECC)	UGC Jeevan Kaushal - Professional Skills	22UGPS	2	2	-	100	-	100
		Skill Enhancement Course – II(SEC)	CISCO Packet Tracer(P)	22UCS5SEC2P	2	2	3	40	60	100
		Extra Credit Course	SWAYAM	As per UGC Recommendation						
		Total			**30**	**25**	-	-	-	**700**
VI	III	Core Course – VIII(CC)	Cloud Computing and its Applications	22UCS6CC8	6	6	3	25	75	100
		Core Course – IX(CC)	Cyber Security	22UGCS	5	4	3	25	75	100
		Core Practical –VII(CP)	Virtualization in Cloud (P)	22UCS6CC7P	3	3	3	40	60	100
		Core Practical – VIII (CP)	Open Source Technologies (P)	23UCS6CC8P	5	3	3	40	60	100
		Discipline Specific Elective – II(DSE)	A. Software Engineering	23UCS6DSE2A	5	3	3	25	75	100
			B. Fundamentalsof Big data & IoT	23UCS6DSE2B						
			C. Open Source Technologies	23UCS6DSE2C						
		Project	Project Work	22UCS6PW	5	4	-	-	100	100
	IV	Ability Enhancement Compulsory Course-V(AECC)	Gender Studies	22UGGS	1	1	-	100	-	100
	V	Extension activity		22UGEA	0	1	0	-	-	-
		Total			**30**	**25**	-	-	-	**700**
					180	**140**				**4400**

Courses & Credits for B.Sc Computer Science Programme

Part	Course	No. of Courses	Credits	Total Credits
I	Tamil / Other Language	4	12	12
II	English	4	12	12
III	Core (Theory & Practical)	17	69	99
	Project Work	1	4	
	Internship	1	2	
	First Allied	3	9	
	Second Allied	3	9	
	DSE	2	6	
IV	GEC	2	4	16
	SEC	2	4	
	AECC-I-Value Education	1	2	
	AECC-II-Environmental Studies	1	2	
	AECC-III- Innovation and Entrepreneurship	1	1	
	AECC-IV Professional Skills	1	2	
	Gender Studies	1	1	
V	Extension Activities	1	1	1
	Total	**45**	**140**	**140**

The Internal and External marks for theory and practical courses are as follows:

Course	Internal Marks	External Marks
Theory	25	75
Practical	40	60
Project	-	100
Internship	25	75

For Theory Courses:

a) The passing minimum for CIA shall be 40% out of 25 marks (i.e. 10 marks)

b) The passing minimum for End Semester Examinations shall be 40% out of 75 marks (i.e. 30 marks)

For Practical Courses:

a) The passing minimum for CIA shall be 40% out of 40 marks(i.e. 16 marks)

b) The passing minimum for End Semester Examinations shall be 40%out of 60 marks (i.e. 24 marks)

For Project Work:

a) The passing minimum not less than 40% out of 100 marks

For Internship:

a) The passing minimum not less than 40% in the aggregate

Semester I	Internal Marks:25		External Marks: 75	
COURSE CODE	COURSE TITLE	CATEGORY	HRS/ WEEK	CREDITS
23UCA1CC1 / 23UCS1CC1	PYTHON PROGRAMMING	CORE	5	5

Course Objectives

- To make students understand the concepts of Python programming
- To apply the OOPs concept in Python programming
- To make the students learn best practices in Python programming

Course Outcome and Cognitive Level Mapping

CO Number	CO Statement On the successful completion of the course, students will be able to	Cognitive Level
CO1	Recall the fundamental concepts of Python	K1
CO2	Demonstrate the problem-solving approach using Python statements	K2
CO3	Construct the Python programme using functions and modules	K3
CO4	Analyze the Python programming concepts to develop programs	K4
CO5	Develop a Python program to solve real time problems	K5

Mapping of CO with PO and PSO

COs	PSO1	PSO2	PSO3	PSO4	PSO5	PO1	PO2	PO3	PO4	PO5
CO1	2	3	2	1	1	3	3	2	3	2
CO2	3	2	3	1	1	3	2	2	3	3
CO3	3	3	3	2	2	3	3	2	3	2
CO4	3	2	3	2	2	3	3	2	3	2
CO5	3	3	3	2	2	3	3	2	2	3

"1"-Slight (Low) Correlation

"2"-Moderate (Medium) Correlation

"3" –Substantial (High) Correlation

"-" - Indicates there is no Correlation

Syllabus

UNIT	CONTENT	HOURS	COs	COGNITIVE LEVEL
I	**Basics of Python Programming:** Features of Python -History of Python- Literal Constants-Variables and Identifiers–Data Types- Input Operation- Comments– Reserved Words- Indentation- Operators and Expressions –Other Data Types- Type Conversion.	**15**	CO1, CO2, CO3, CO4, CO5	K1, K2, K3, K4, K5
II	**Decision Control Statements:** Selection/Conditional Branching statements: if, if-else, nested if and if-elif-else statements. **Basic Loop Structures / Iterative Statements:** while loop, for loop- Nested Loops- The break Statement- The continue Statement.	**15**	CO1, CO2, CO3, CO4, CO5	K1, K2, K3, K4, K5
III	**Functions and Modules:** Function Definition – **Function Call:** Function Parameters – **Variable Scope and Lifetime:** Local and Global Variables-Using the Global Statement-Resolution of Names. The return Statement. **More on Defining Functions:** Required Arguments, Keyword Arguments, Default Arguments and Variable Length Arguments. **Python Strings**: Strings are Immutable- Built-in String Methods and Functions – Comparing String**s. Modules:** The from…import statement- Name of Module – The dir() function – Modules and Namespace.	**15**	CO1, CO2, CO3, CO4, CO5	K1, K2, K3, K4, K5
IV	**Lists:** Access values in List-Updating values in Lists-Nested lists -Basic list operations-List Methods. **Tuple:** Creating, Accessing, Updating and Deleting Elements in a tuple – Nested tuples. **Dictionaries:** Creating a dictionary, Accessing values, Modifying an Entry -Deleting items – Built-in Dictionary Functions and Methods - Difference between a List and a Dictionary.	**15**	CO1, CO2, CO3, CO4, CO5	K1, K2, K3, K4, K5
V	**File Handling:** Types of files in Python - Opening and Closing files- **Reading and Writing files**: write() and writelines() methods- append() method – read() and readlines() methods – Splitting words –File Positions.	**15**	CO1, CO2, CO3, CO4, CO5	K1, K2, K3, K4, K5
VI	**Self Study for Enrichment** **(Not to be included for End Semester Examination)** Difference between lists and tuples - Defining our own modules- Renaming and deleting files.	**-**	CO1, CO2, CO3, CO4, CO5	K1, K2, K3, K4, K5

Text Book

1. Reema Thareja. (2017), Python Programming using problem solving approach, 1st Edition, Oxford University Press.

References

1. Dr. R. Nageswara Rao. (2017), Core Python Programming, 1st Edition, Dream tech Publishers.
2. VamsiKurama. (2017), Python Programming: A Modern Approach,1st Edition, Pearson Education.
3. Mark Lutz. (2013), Learning Python, Fifth Edition, Orielly.
4. Adam Stewarts. (2017), Python Programming, Online.
5. Fabio Nelli. (2015), Python Data Analytics,1st Edition, APress.
6. Kenneth A. Lambert. (2019), Fundamentals of Python – First Programs,2nd Edition, CENGAGE Publication.

Web References

1. https://www.programiz.com/python-programming
2. https://www.guru99.com/python-tutorials.html
3. https://www.w3schools.com/python/python_intro.asp
4. https://www.geeksforgeeks.org/python-programming-language/
5. https://en.wikipedia.org/wiki/Python_(programming_language)

Pedagogy

Chalk & Talk, PowerPoint Presentation, Discussion, Assignment, Demo, Quiz and Seminar

Course Designer

Dr.K.Akila , Associate Professor, Department of Computer Applications

Semester I	Internal Marks:40		External Marks:60	
COURSE CODE	**COURSE TITLE**	**CATEGORY**	**HRS/WEEK**	**CREDITS**
23UCS1CC1P	**PYTHON PROGRAMMING (P)**	**CORE**	**3**	**3**

Course Objective

- Acquire programming skills in core Python.
- Implement Object-Oriented Programming skills in Python.
- Use functions and represent Compound data using Lists, Tuples and Dictionaries.
- Develop the skill of designing Graphical-User Interfaces (GUI) in Python.

Course Outcomes and Cognitive Level Mapping

CO Number	CO Statement	Cognitive Level
CO1	Understand the problem-solving approaches	K2
CO2	Identify suitable programming constructs for problem solving.	K3
CO3	Analyze various concepts of Python language to solve the problem in an efficient way.	K4
CO4	Examine the various Python programming techniques.	K5
CO5	Develop a python program for a given problem and test for its Correctness.	K6

Mapping of CO with PO and PSO

Cos	PSO1	PSO2	PSO3	PSO4	PSO5	PO 1	PO 2	PO 3	PO 4	PO 5
CO1	2	3	3	1	3	3	3	3	3	3
CO2	3	3	3	3	3	2	3	3	3	3
CO3	3	3	3	3	3	3	3	2	3	3
CO4	3	3	3	3	3	3	3	1	3	3
CO5	3	3	3	3	3	3	3	2	3	3

"1"–Slight (Low) Correlation
"2"–Moderate (Medium) Correlation
"3"–Substantial (High) Correlation
"-"indicates there is no Correlation.

List of Exercises

1. Program using variables, constants and I/O statements.
2. Program using Operators.
3. Program using Conditional Statements.
4. Program using Loops.
5. Program using Jump Statements.
6. Program using Functions and Recursion.
7. Program using Arrays.
8. Program using Strings.
9. Program using Modules.
10. Program using Lists.
11. Program using Tuples.
12. Program using Dictionaries.
13. Program for File Handling.

Web References

1. https://www.w3resource.com/python-excercises/
2. https://www.programiz.com/python-programming/online-compiler/
3. http://www.w3schools.in/python/
4. https://studyglance.in/

Pedagogy

Power Point Presentations, Demo by e-Contents

Course Designer

Ms.R.Ramya

FIRST ALLIED COURSE – I

NUMERICAL METHODS

(For B.Sc Computer Science, BCA, Information Technology &Computer Science with Cognitive Systems)

(2023 – 2024 ONWARDS)

Semester I	Internal Marks:25		External Marks:75	
COURSE CODE	**COURSE TITLE**	**CATEGORY**	**HOURS/ WEEK**	**CREDITS**
23UCG1AC1/ 23UCS1AC1/ 23UCA1AC1/ 23UIT1AC1	**NUMERICAL METHODS**	**ALLIED**	**4**	**3**

Course Objective

- **Learn** the various topics in Numerical methods.
- **Understand** the fundamentals of algebraic equations, interpolation, numerical differentiation and integration.
- **Develop** skills in solving problems of numerical techniques.

Course Outcome and Cognitive Level Mapping

CO Number	CO Statement On the successful completion of the course, students will be able to	Cognitive Level
CO1	Remember the basic concepts of numerical methods.	**K1**
CO2	Illustrate the various notions of computational numerical streams.	**K2**
CO3	Apply the different techniques of numerical problems	**K3**
CO4	Classify the methods of numerical techniques.	**K4**
CO5	Examine the solutions of numerical problems.	**K4**

Mapping of CO with PO and PSO

COs	PSO1	PSO2	PSO3	PSO4	PSO5	PO1	PO2	PO3	PO4	PO5
CO1	3	2	3	3	3	3	3	3	2	3
CO2	3	2	3	3	3	3	3	3	3	2
CO3	3	2	3	3	3	3	3	3	2	2
CO4	3	2	2	3	3	3	3	3	3	2
CO5	3	2	3	3	3	3	3	3	2	2

"1" – Slight (Low) Correlation "2" – Moderate (Medium) Correlation

"3" – Substantial (High) Correlation "-" indicates there is no correlation.

Syllabus

UNIT	CONTENT	HOURS	COs	COGNITIVE LEVEL
I	**Solution of Algebraic and Transcendental Equations**: Introduction – Bisection Method –The Iteration Method – The Method of False Position – Newton Raphson Method. (Simple Problems Only).	12	CO1, CO2, CO3, CO4, CO5	K1 K2, K3, K4
II	**Interpolation:** Finite differences – Forward differences – Backward differences – Central differences – Newton's Formulae for interpolation–Interpolation with Unevenly Spaced Points – Lagrange's Interpolation Formula. (Simple Problems Only)	12	CO1, CO2, CO3, CO4, CO5	K1 K2, K3, K4
III	**Numerical Differentiation and Integration:** Introduction – Numerical Differentiation – Numerical Integration – Trapezoidal Rule – Simpson's 1/3 Rule – Simpson's 3/8 Rule (Simple Problems Only)	12	CO1, CO2, CO3, CO4, CO5	K1 K2, K3, K4
IV	**Numerical Linear Algebra:** Solution of Linear Systems – Direct Methods – Gauss - Elimination – Gauss -Jordan method. Solution of Linear Systems – Iterative Methods. (Simple Problems Only)	12	CO1, CO2, CO3, CO4, CO5	K1 K2, K3, K4
V	**Numerical Solution of Ordinary Differential Equations:** Introduction – Solution by Taylor's Series – Euler's Method – Modified Euler's Method – Runge-Kutta Method–Predictor-Corrector Methods – Adams-Moulton Method – Milne's Method(Simple Problems Only)	12	CO1, CO2, CO3, CO4, CO5	K1 K2, K3, K4
VI	**Self-Study for Enrichment** **(Not included for End Semester Examination)** Ramanujan's Method – Bessel's Formula – Newton-Cotes Integration Formulae –The QR Method – Picard's Method of Successive Approximations	-	CO1, CO2, CO3, CO4, CO5	K1 K2, K3, K4

Text Book

Sastry.S.S (2004), *Introductory Methods of Numerical Analysis* (Third Edition), Prentice Hall of India Private Ltd, New Delhi.

Chapters and Sections

UNIT–I	Chapter 2:	Sections: 2.1 – 2.5 (Omit 2.3.1 & 2.5.1)
UNIT II	Chapter 3:	Sections: 3.3 : 3.3.1 – 3.3.3, 3.6, 3.9 : 3.9.1
UNIT-III	Chapter 5:	Sections: 5.1, 5.2 (only), 5.4 : 5.4.1 – 5.4.3
UNIT-IV	Chapter 6:	Sections: 6.3: 6.3.2, 6.4
UNIT-V	Chapter 7:	Sections: 7.1,7.2, 7.4: 7.4.2, 7.5,7.6

Reference Books

1. Venkataraman, M.K. (2003). *Numerical Methods in Science and Engineering,* The National Publishing Company.
2. Iyengar S.R.K, Jain R.K, (2009). *Numerical Methods,* New Age International Publishers.
3. Subramanian,N. (2007). *Numerical Methods,* SCM Publisher, Erode.

Web References

1. https://tinyurl.com/4y7knvm9
2. https://tinyurl.com/t29njcy5
3. https://www.youtube.com/watch?v=TIWRyzzFUYQ
4. https://www.youtube.com/watch?v=iviiGB5vxLA
5. https://www.youtube.com/watch?v=j_4MVZ3VADU

Pedagogy

Assignment, Seminar, Lecture, Quiz, Group discussion, Brain storming, e-content.

Course Designer

1. Dr. V. Geetha
2. Dr. S. Sasikala

FIRST ALLIED COURSE - II
GRAPH THEORY AND ITS APPLICATIONS
(2023-2024 and Onwards)

Semester I	Internal Marks: 25		External Marks:75	
COURSE CODE	**COURSE TITLE**	**CATEGORY**	**HOURS / WEEK**	**CREDITS**
23UCS1AC2/ 23UIT1AC2	**GRAPH THEORY AND ITS APPLICATIONS**	**ALLIED**	**4**	**3**

Course Objective

- **Introduce** the notion of graph theory and its application.
- **Understand** the fundamental concepts in graph theory.
- **Explore** some of the most important notions of graph theory and develop their skills and solving basic exercise.

Course Outcome and Cognitive Level Mapping

CO Number	CO Statement On the successful completion of the course, students will be able to	Cognitive Level
CO1	Define basic definitions of graphs.	K1
CO2	Describe the concepts and Characterization of Graphs.	K2
CO3	Explain the notion of Spanning Trees.	K2
CO4	Compute the properties of Planar Graphs.	K3
CO5	Analyze the concept of graphs in Matrix Representation.	K4

Mapping of CO with PO and PSO

COs	PSO1	PSO2	PSO3	PSO4	PSO5	PO1	PO2	PO3	PO4	PO5
CO1	3	3	3	3	3	3	3	2	2	3
CO2	3	2	3	3	3	3	3	3	2	3
CO3	3	3	3	3	3	3	3	3	3	3
CO4	3	2	3	3	2	3	3	2	2	3
CO5	3	2	3	3	2	3	3	3	3	2

"1" – Slight (Low) Correlation "2" – Moderate (Medium) Correlation
"3" – Substantial (High) Correlation "-" indicates there is no correlation.

Syllabus

UNIT	CONTENT	HOURS	COs	COGNITIVE LEVEL
I	**INTRODUCTION:** Definition of a Graph – Application of Graphs – Finite and Infinite Graphs – Incidence and Degree – Isolated Vertex, Pendant Vertex and Null Graph. **PATHS AND CIRCUITS:** Isomorphism – Subgraphs – Walks, Paths and Circuits – Connected Graphs, Disconnected Graphs and Components.	12	CO1, CO2, CO3, CO4, CO5	K1, K2, K3, K4
II	**PATHS AND CIRCUITS:** Euler Graphs – Operation on Graphs – More on Euler Graphs – Hamiltonian Paths and Circuits – The Traveling Salesman Problem.	12	CO1, CO2, CO3, CO4, CO5	K1, K2, K3, K4
III	**TREES AND FUNDAMENTAL CIRCUITS:** Trees – Some Properties of Trees – Pendant Vertices in a Tree – Distance and Centers in a Tree – Rooted and Binary Trees – On Counting Trees – Spanning Trees.	12	CO1, CO2, CO3, CO4, CO5	K1, K2, K3, K4
IV	**CUT - SETS AND CUT - VERTICES:** Cut-Sets – Some Properties of a Cut-Set – All Cut-Sets in a Graph – Fundamental Circuits and Cut-Sets – Connectivity and Separability.	12	CO1, CO2, CO3, CO4, CO5	K1, K2, K3, K4
V	**PLANAR GRAPHS:** Planar Graphs – Kuratowski's Two Graphs – Different Representations of a Planar Graph. **MATRIX REPRESENTATION OF GRAPHS**: Incidence Matrix – Submatrices of A(G) – Circuit Matrix.	12	CO1, CO2, CO3, CO4, CO5	K1, K2, K3, K4
VI	**Self Study for Enrichment:** **(Not included for End Semester Examination)** Brief History of Graph Theory – A Puzzle with Multicolored Cubes – Finding All Spanning Trees of a Graph – Network Flows – Combinatorial Vs. Geometric Graphs – An Application to a switching network.	-	CO1, CO2, CO3, CO4, CO5	K1, K2, K3, K4

Text Book

1. Narsingh Deo, "*Graph Theory with Application to Engineering and Computer Science*" Prentice Hall of India 2010(Reprint).

Chapters and Sections

UNIT-I	Chapter 1: Sections 1.1 – 1.5
	Chapter 2: Sections 2.1, 2.2, 2.4, 2.5
UNIT-II	Chapter 2: Sections 2.6 – 2.10
UNIT-III	Chapter 3: Sections 3.1 – 3.7
UNIT- IV	Chapter 4: Sections 4.1 – 4.5
UNIT- V	Chapter 5: Sections 5.2 – 5.4
	Chapter 7: Sections 7.1 – 7.3

Reference Books

1. Arumugam S and Ravichandran S, "Invitation to Graph Theory", Scitech Publications(India) Private Limited.
2. Gary Chartrand and Ping Zhang, "Introduction to Graph Theory", Tata McGraw-Hill Edition, 2004.

Web References

1. https://youtu.be/S1Zwhz-Mhcs
2. https://youtu.be/R5LZIpz-oIE
3. https://youtu.be/X2B_J1ajsIY
4. https://youtu.be/5M7bOXrn54A
5. https://youtu.be/QwX1ncB13B0

Pedagogy

Power point presentations, Group Discussions, Seminar, Quiz, Assignment.

Course Designer

Dr. P. SHALINI

Semester II	Internal Marks: 25		External Marks: 75	
COURSE CODE	**COURSE TITLE**	**CATEGORY**	**HOURS/ WEEK**	**CREDITS**
22UCS2CC2/ 22UCA2CC2	**PROGRAMMING IN JAVA**	**CORE**	**5**	**5**

Course Objectives

- To develop logics which will help them to create programs
- To get a deep knowledge of programming using JAVA language
- To understand the basics of OOPs concepts
- Enhance problem solving skill

Course Outcomes and Cognitive Level Mapping

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

CO Number	CO Statement On the successful completion of the course, the students will be able to	Cognitive Level
CO1	Recite the basic programming skills	K1
CO2	Understand the Java features	K2
CO3	Analyze OOPs concepts	K4
CO4	Apply the programming skills in various domains	K3
CO5	Solve real time problems using Java	K5

Mapping of CO with PO and PSO

CO s	PSO 1	PSO 2	PSO 3	PSO 4	PSO 5	PO 1	PO 2	PO 3	PO 4	PO 5
CO1	**2**	**3**	**2**	**1**	**1**	**2**	**2**	**2**	**2**	**2**
CO2	**3**	**2**	**3**	**1**	**1**	**3**	**3**	**2**	**3**	**2**
CO3	**3**	**3**	**3**	**2**	**2**	**3**	**3**	**2**	**3**	**2**
CO4	**3**	**2**	**3**	**2**	**2**	**3**	**3**	**2**	**3**	**2**
CO5	**3**	**3**	**3**	**2**	**2**	**3**	**3**	**2**	**2**	**3**

"1" – Slight (Low) Correlation
"2" – Moderate (Medium) Correlation
"3" – Substantial (High) Correlation
"-" indicates there is no correlation.

Syllabus

UNIT	CONTENT	HOURS	COs	COGNITIVE LEVEL
I	**Fundamentals of Object-Oriented Programming:** Basic Concepts of Object-Oriented Programming - Benefits and Applications of OOP. **Java Evolution:** Java Features - Java Environment - **Overview of Java Language:** Java Program Structures, Statements – Implementing A Java Program – Java Virtual Machine –. **Constants, Variables and Data Types:** Constants- Variables – Data Types – Declaration of Variables – Giving Values to Variables – Scope of Variables – Symbolic Constants- Type Casting- Getting Values of Variables.	15	CO1, CO2, CO3	K1, K2, K3, K4
II	**Operators and Expressions:** Introduction - Arithmetic Operators- Relational Operator - Logical Operator - Assignment Operator-increment and decrement Operator-Conditional Operator - Bitwise Operator- Special Operator - **Decision Making and Branching:** Introduction - Decision making with if statement- Simple if statement -The if ..else Statement- Nesting of if …else statements- The switch statement - The Conditional Operator(?:Operator) -**Decision Making and Looping :** While, Do, For Statement, Jump In Loops, Return Statement.	15	CO1, CO2, CO3, CO4, CO5	K1, K2, K3, K4, K5
III	**Classes, Objects and Methods**: Defining A Class – Fields and Methods Declaration - Creating Objects – Accessing Class Members – Constructors – Method Overloading – Static Members – Nesting of Methods – Inheritance**:** Extending A Class – Overriding Methods – Final Variables, Methods and Classes – Abstract Methods and Classes – Visibility Control. **Arrays, Strings and Vectors**: Creating Arrays – One and two Dimensional Arrays Strings – Vectors. **Interfaces: Multiple Inheritance:** Introduction - Defining Interfaces - Extending Interfaces- Implementation Interfaces - Accessing Interfaces Variables.	15	CO1, CO2, CO3, CO4, CO5	K1, K2, K3, K4, K5
IV	**Packages**: Introduction - Java Packages - Using System Packages- Naming conventions - Creating packages - Accessing a package - Using a Package - Adding a class to a package - **Multithreaded Programming:** Creating Threads – Extending the Thread Class – Thread- Life Cycle of Thread-Using Thread Method- Thread Priority – Synchronization – **Managing Errors and Exceptions:** Introduction - Types of Errors -Exceptions-Syntax of Exception Handling code-Multiple Catch Statements.	15	CO1, CO2, CO3, CO4, CO5	K1, K2, K3, K4, K5
V	**Graphics Programming using AWT, Swing and Layout Manager:** The Graphics Class- Lines and Rectangles- Circles and Ellipses-Drawing Arcs - Drawing Polygons – Introduction to AWT Package – Window Fundamentals – Layout Managers – Introduction to Swing Package – Components and Containers – AWT versus Swing - **Database Connectivity**: Introduction – JDBC Architecture – Discussion with Example – Overview of JDBC Components.	15	CO1, CO2, CO3, CO4, CO5	K1, K2, K3, K4, K5

VI	**UNIT VI - Self Study for Enrichment** **(Not to be included for External Examination)** Comment Line Arguments – Enumerated Types - Finalizer Methods - **Applet Programming:** Building Applet Code - Applet Life Cycle - Creating and Executable Applet – Designing a Web Page using Applet – **Managing Input/Output Files in Java:** Stream Classes – Byte Stream Classes – Character Stream Classes – Creation of Files – Reading/Writing Characters – Reading/Writing bytes.	-	CO1, CO2, CO3, CO4, CO5	K1, K2, K3, K4, K5

Text Book

E. Balagurusamy,(2019). "*Programming with JAVA*", 6th Edition, Tata McGraw-Hill Publishing Company Limited, New Delhi.

Reference Books

1. S.Sagayaraj, R.Denis, P.Karthik and D.Gajalakshmi,(2017)."*Java programming*", Universities Press.
2. Schildt Herbert,(2011)."*Java :The Complete Reference*", 8th Edition Tata McGraw-Hill.
3. C.Muthu, (2008)."*Programming with JAVA*", Second Edition, McGraw Hill Education
4. Ken Arnold gosling and Davis Holmen,(2005). "*The JAVA Programming Language*",4th Edition, Addison Wesley Pearson Education Publication.

Web References

1. https://www.javatpoint.com/java-tutorial
2. https://www.guru99.com/java-tutorial.html
3. https://www.w3schools.com/java/

Pedagogy

Chalk and Talk, PPT, Discussion, Assignment, Demo, Quiz and Seminar.

Course Designer

Ms. A. Jabeen, Assistant Professor, Department of Computer Applications.

Semester II	Internal Marks:40		External Marks:60	
COURSE CODE	COURSE TITLE	CATEGORY	HOURS/WEEK	CREDITS
22UCS2CC2P	JAVA PROGRAMMING (P)	CORE	3	3

Course Objective

- To demonstrate the basic programming components of Java
- To learn how to apply the object oriented concepts in Java to develop stand-alone applications
- To design and develop GUI applications with appropriate database connectivity

Course Outcomes and Cognitive Level Mapping

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

CO Number	CO Statement	Cognitive Level
CO1	Demonstrate and Implement the fundamentals of Java programming concepts	K2, K3
CO2	Analyze the problem and develop skills on identifying appropriate Programming constructs like looping, branching and functions	K3, K4
CO3	Examine the problem and create a reusable program by combining the features of Java such as Classes, Objects, Packages, Interfaces and Exception handling	K4, K6
CO4	Analyze the complexity of problem in real world and design an event driven and web based interactive programs using Applets	K4, K6
CO5	Build applications with database connectivity to mimic the real world scenarios	K6

Mapping of CO with PO and PSO

CO s	PSO1	PSO2	PSO3	PSO4	PSO5	PO1	PO2	PO3	PO4	PO5
CO1	2	3	3	2	2	2	3	2	3	3
CO2	3	3	3	3	3	2	3	2	3	3
CO3	3	3	3	3	3	2	3	3	3	3
CO4	3	3	3	3	3	2	3	2	3	3
CO5	3	3	3	3	3	2	3	3	3	3

"1"-Slight (Low) Correlation
"2"–Moderate (Medium) Correlation
"3"-Substantial (High) Correlation
"-"-indicates there is no Correlation.

List of Exercises

1. Class and Objects
2. Decision Making using Control Statements and Loop Statements
3. Method Overloading and Method Overriding
4. Inheritance
5. Interface
6. Package
7. Multithread
8. Exception Handling
9. GUI using Swing
10. Database Connectivity using JDBC

Web References

1. http://docs.oracle.com/javase/tutorial/java/
2. http://www.java2s.com/Tutorial/Java/CatalogJava.htm
3. http://www.javatpoint.com/java-swing
4. http://way2java.com/java-versions-2/jdk-1-8-features/
5. https://www.w3schools.com/java/
6. https://www.tutorialspoint.com/java/

Pedagogy

Power Point Presentations, Demo by e-Contents tutorials

Course Designer

Ms.N.Girubagari

Semester II	Internal Marks:40		External Marks:60	
COURSE CODE	**COURSE TITLE**	**CATEGORY**	**HOURS /WEEK**	**CREDITS**
23UCS2CC3P	**DATA VISUALIZATION (P)**	**CORE**	**2**	**2**

Course Objective

- To perform basic calculations and formatting on Data
- To expose the visual representation methods and techniques that increase the understanding of complex data
- To gain knowledge in good design practices for visualization of data

Course Outcomes and Cognitive Level Mapping

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

CO Number	CO Statement	Cognitive Level
CO1	Demonstrate the use of basic Functions, Methods and Formatting	K2
CO2	Identify the different Models for data analysis	K3
CO3	Analyze the data using Graph Function	K4
CO4	Construct the data analysis report with proper validation	K5
CO5	Build Dashboard for data visualization	K6

Mapping of CO with PO and PSO

CO s	PSO 1	PSO 2	PSO 3	PSO 4	PSO 5	PO 1	PO 2	PO 3	PO 4	PO 5
CO1	3	3	3	2	3	2	3	1	3	3
CO2	3	3	3	3	3	3	3	2	3	3
CO3	3	3	3	2	3	2	3	1	3	3
CO4	3	3	3	3	3	3	3	3	3	3
CO5	3	3	3	3	3	3	3	3	3	3

"1"–Slight (Low) Correlation
"2"–Moderate (Medium)Correlation
"3"–Substantial (High) Correlation
"-" indicates there is no Correlation.

List of Exercises:

1. Using Microsoft Excel
   a. Creation and Formatting
   b. Functions and Formulas
   c. Graphs
   d. Lookup and Reference Functions
   e. Data Validation
   f. Pivot table
   g. Data analysis report generation
   h. Working with multiple worksheets

2. Using Power BI
   a. Basic Reports
   b. Filtering Data
   c. Charts
   d. Book marks
   e. Dashboard Creation
   f. Data Visualization

Web References:

1. https://www.tutorialspoint.com/excel_data_analysis/index.htm
2. https://www.udemy.com/course/data-visualization-in-excel-for-business-professionals/
3. https://www.w3schools.com/googlesheets/
4. https://www.smartsheet.com/how-create-dashboard-excel

Pedagogy:

Demo by e-Contents

Course Designer:

Ms.N.Agalya

Semester II	Internal Marks:25		External Marks:75	
COURSE CODE	COURSE TITLE	CATEGORY	HOURS/WEEK	CREDITS
22UCS2AC3/ 22UCG2AC3/ 22UCA2AC3/ 22UIT2AC3	OPERATIONS RESEARCH	ALLIED	4	3

Course Objective

- **Understand** the various features of Operations research.
- **Analyze** the optimum solutions using Operations research.
- **Explore** the concepts of Operations research in real life problems.

Course Outcomes

Course Outcome and Cognitive Level Mapping

CO Number	CO Statement On the successful completion of the course, students will be able to	Cognitive Level
CO1	Define the various techniques of Operations research.	K1
CO2	Illustrate the various notions in the respective streams.	K2
CO3	Identify the different terminologies of Operations research	K3
CO4	Analyze the solutions of mathematical problem using specific techniques.	K4
CO5	Simplify the optimum solutions of a mathematical problem.	K4

Mapping of CO with PO and PSO

CO s	PSO1	PSO2	PSO3	PSO4	PSO5	PO1	PO2	PO3	PO4	PO 5
CO1	3	2	3	3	2	3	3	3	2	3
CO2	3	2	3	3	2	3	3	3	3	2
CO3	3	2	3	3	2	3	2	3	2	2
CO4	3	2	2	2	2	3	3	2	3	2
CO5	3	2	3	2	2	3	3	3	2	2

"1" – Slight (Low) Correlation "2" – Moderate (Medium) Correlation

"3" – Substantial (High) Correlation "-" indicates there is no correlation.

Syllabus

UNIT	CONTENT	HOURS	COs	COGNITIVE LEVEL
I	**Operations Research** Introduction-Origin and Development of O.R.- Nature and Features of O.R.- Scientific Method in O.R.-Modelling in Operations Research - Advantage and Limitation of Models- General Solution Methods for O.R. Models- Methodology of Operations Research- Operations Research and Decision Making **Linear Programming Problem- Mathematical Formulation** Introduction-Linear programming Problem- Mathematical Formulation of the problem -Illustrations on Mathematical Formulation of LPPs.(simple problems only) **Linear programming problem-Graphical Solution and Extension** Introduction- Graphical Solution Method- General Linear Programming Problem- Canonical and Standard Forms of LPP.	12	CO1, CO2, CO3, CO4, CO5	K1, K2, K3, K4
II	**Linear Programming Problem-Simplex Method** Introduction-Fundamental Properties of Solutions- The computational Procedure- The Simplex Algorithm- Use of Artificial Variables-Big Method (simple problems only).	12	CO1, CO2, CO3, CO4, CO5	K1, K2, K3, K4
III	**Transportation problem** Introduction-LP Formulation of the Transportation Problem- Existence of Solution in T.P- The Transportation Table-Loops in Transportation Table- Solution of a Transportation Problem-Finding an Initial Basic Feasible Solution-Test for Optimality- Economic interpretation of u_j's and v_j's - Degeneracy in Transportation Problem-Transportation Algorithm (MODI method), (simple problems only). **Assignment Problem** Introduction-Mathematical Formulation of the Problem- Solution Methods of Assignment Problem- Special Cases in Assignment Problems (simple problems only).	12	CO1, CO2, CO3, CO4, CO5	K1, K2, K3, K4
IV	**Sequencing problem** Introduction-Problem of Sequencing-Basic Terms Used in Sequencing- Processing *n* Jobs through Two Machines- Processing *n* Jobs through *k* Machines (problems only).	12	CO1, CO2, CO3, CO4, CO5	K1, K2, K3, K4
V	**Network Scheduling by PERT/CPM** Introduction- Network: Basic Components- Logical Sequencing- Rules of Network Construction- Concurrent Activities - Critical Path Analysis -	12	CO1, CO2, CO3, CO4, CO5	K1, K2, K3, K4

	Probability Considerations in PERT.			
VI	**Self-Study for Enrichment** **(Not included for End Semester Examination)** Application of Operations Research. – Two-Phase method – The Travelling Salesman problem – Processing 2 Jobs through *k* Machines – Inventory Models (without shortage)	-	CO1, CO2, CO3, CO4, CO5	K1, K2, K3, K4

Text Books

1. Kanti Swarup, P.K. Gupta, Manmohan (2019). *Operations research, Sultan Chand Publications*.

Chapters and Sections

UNIT–I Chapter 1: Sections 1:1 – 1:9
Chapter 2: Sections 2:1 – 2:4
Chapter 3: Sections 3:1 – 3:5

UNIT II Chapter 4: Sections 4:1 – 4:4

UNIT-III Chapter 10: Sections 10:1 – 10:3, 10:5, 10:6, 10:8 – 10:13
Chapter 11: Sections 11:1 – 11:4

UNIT-IV Chapter 12: Sections 12:1 – 12:5

UNIT-V Chapter 25: Sections 25:1 – 25:7

Reference Books

1. Hamdy A.Taha (2017),*Operations Research An Introduction,* Pearson India Education services PVTLtd.
2. Premkumar Gupta, Hira D.S.(2004), *Operations Research*, S.Chand & Company Ltd, New Delhi.
3. Chandrasekhara Rao.K,Shanti Lata Mishra(2008), *Operations Research*, Narosa Publishing HousePVT Ltd, New Delhi.

Web References

1. https://www.britannica.com/topic/operations-research

2.https://byjus.com/maths/linear-programming/

3.https://www.gatexplore.com/transportation-problem-study-notes/

4.https://youtu.be/rowWM-MijXU 5.https://youtu.be/TQvxWaQnrqI

6.https://youtu.be/RTX-ik_8i-k

7.https://youtu.be/s5KZw1EpBEo

Pedagogy

Power point presentation, Group discussion, Seminar, Assignment.

Course Designers

1. Dr. V. Geetha
2. Dr. S. Sasikala

Semester: III	Internal Marks: 25		External Marks: 75	
COURSE CODE	**COURSE TITLE**	**CATEGORY**	**HOURS/ WEEK**	**CREDITS**
23UCS3CC3	**DATA STRUCTURES & ALGORITHMS**	**CORE**	**5**	**5**

Course Objectives

- Understanding basic concepts of various data structures and the different ways of organizing them
- To articulate the essential components and operations of the data structures
- To familiarize knowledge in designing algorithms using the data structures

Course Outcomes and Cognitive Level Mapping

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

CO Number	CO Statement	Cognitive Level
CO1	Define the basic concepts of Data Structure	K1
CO2	Demonstrate the operations of Linear and Non-Linear Structure	K2
CO3	Examine the Data Structure operations	K3
CO4	Analyze the various types of Data Structure	K4
CO5	Solve the problem using Different Structures	K5

Mapping of CO with PO and PSO

CO s	PSO 1	PSO 2	PSO 3	PSO 4	PSO 5	PO 1	PO 2	PO 3	PO 4	PO 5
CO1	3	2	2	1	2	3	3	3	3	2
CO2	2	2	3	2	2	2	2	1	2	2
CO3	3	3	3	2	3	3	3	1	3	3
CO4	3	2	3	2	3	3	3	2	3	3
CO5	3	3	3	2	3	3	3	2	3	3

"1"–Slight(Low) Correlation
"2"–Moderate(Medium)Correlation
"3"–Substantial (High) Correlation
"-"indicates there is noCorrelation.

Syllabus

UNIT	CONTENT	HOURS	COs	COGNITIVE LEVEL
I	**Introduction and Overview:** Definitions - Concept of Data Structures- Overview of Data Structures – Implementation of Data Structures. **Arrays:** Definition-Terminology - One-dimensional Array – Multidimensional Arrays	15	CO1 CO2 CO3	K1 K2 K3
II	**Stacks and Queues:** Fundamentals – Evaluation of Expressions- Multiple Stacks and Queues – **Elementary Data structures** –Priority Queue	15	CO1 CO2 CO3 CO4	K1 K2 K3 K4
III	**Linked Lists:** Singly linked lists - Linked Stacks and Queues - The Storage Pool - Polynomial Addition - Doubly Linked Lists and Dynamic Storage Management	15	CO1 CO2 CO3 CO4 CO5	K1 K2 K3 K4 K5
IV	**Trees:** Basic Terminology – Binary Trees – Binary Tree Representations – Binary Tree Traversal – Threaded Binary Trees – **Graphs:** Terminology and Representations – Traversals, Connected Components and Spanning Trees –	15	CO1 CO2 CO3 CO4 CO5	K1 K2 K3 K4 K5
V	**Introduction:** Algorithm– Algorithm Specification: Pseudocode Conventions **– Divide-and-Conquer:** Binary Search - Merge Sort – Quick Sort – **The Greedy Method:** The General Method – Knapsack Problem – Job sequencing and deadlines.	15	CO1 CO2 CO3 CO4 CO5	K1 K2 K3 K4 K5
VI	**Self Study for Enrichment** **(Not included for End Semester Examinations)** **Backtracking:** The General Method- The 8 Queens Problem – Sum of Subsets – Graph Coloring – Hamiltonian Cycles .	-	CO1 CO2 CO3 CO4 CO5	K1 K2 K3 K4 K5

Text Books

1. Debasis Samanta (2018). Classic Data Structures, Second Edition, PHI Learning Private Limited, New Delhi. (Unit I)
2. Ellis Horowitz, Sartaj Sahni, (2010). Fundamentals of Data Structure, Galgotia Publications**.** (Unit II, III, & IV)
3. Ellis Horowitz, Sartaj Sahni and Sanguthevar, (2009). Fundamentals of Computer Algorithms, Universities Press. (Unit II & V)

Reference Books

1. Jean-Paul Tremblay and Paul G. Sorenson, (2001), An Introduction to Data Structures with Applications, Second Edition, Tata McGraw-Hill.
2. Alfred V. Aho, John E. Hopcroft Jeffry D. Ullman (2006). Data Structures and Algorithms, Pearson Education.
3. Seymour Lipshutz (2011),Data Structures with C, 3rd Edition, Tata McGraw Hill Education Pvt. Ltd

Web References

1. www.studytonight.com/data-structures
2. https://lpuguidecom.files.wordpress.com/2017/04/fundamentals-of-data-structures-ellis-horowitz- sartaj-sahni.pdf
3. https://www.slideshare.net/canaokar/fundamentals-of-computer-algorithms-by-horowitz-sahni-rajsekaran
4. https://nptel.ac.in/courses/106102064

Pedagogy

Chalk and Talk, PPT, Discussion, Assignment, Demo, Quiz and Seminar

Course Designer

Ms. R. Sridevi

Semester III	Internal Marks: 40		External Marks: 60	
COURSE CODE	**COURSE TITLE**	**CATEGORY**	**HOURS/WEEK**	**CREDITS**
22UCS3CC4P	**DATA STRUCTURES (P)**	**CORE**	**3**	**3**

Course Objectives:

- To develop and execute high level language programs for various data structures
- To apply the knowledge of programming features
- To implement various sorting , searching Algorithms on real time data
- To understand the efficiency of an algorithm based on the choice of data structure

Course Outcomes and Cognitive Level Mapping

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

CO Number	CO Statement	Cognitive Level
CO1	Recall program execution and Debugging	**K1**
CO2	Demonstrate the ideas of Data structures	**K2**
CO3	Make use of Operations of Linear and Non- linear data structures	**K3**
CO4	Develops the ability to analyze a problem and implement an algorithm to solve it.	**K4**
CO5	Acquire logical thinking, Identify the correct and efficient ways of solving problems	**K5**

Mapping of CO with PO and PSO

CO s	PSO 1	PSO 2	PSO 3	PSO 4	PSO 5	PO 1	PO 2	PO 3	PO 4	PO 5
CO1	3	2	2	1	2	3	2	1	2	2
CO2	3	2	3	1	2	3	2	2	2	2
CO3	3	3	3	2	3	3	3	2	3	3
CO4	3	2	2	2	2	3	3	2	3	3
CO5	3	3	3	2	3	3	3	2	3	3

“

“1”–Slight(Low) Correlation “2”–Moderate(Medium)Correlation

“3”–Substantial (High) Correlation “-”indicates there is no Correlation.

List of Exercises

1. Operations on Stack
2. Operations on Queue
3. Linked list Operations
4. Binary tree traversal
5. Operations on Graph
6. Sorting algorithms
7. Searching algorithms
8. Greedy method

Web References

1. https://www.geeksforgeeks.org/introduction-to-stack-data-structure-and-algorithm-tutorials/
2. https://www.simplilearn.com/tutorials/data-structure-tutorial/stacks-in-data-structures
3. https://www.programiz.com/dsa/
4. https://www.digitalocean.com/community/tutorials/stack-in-c

Pedagogy

Demonstration, e-contents

Course Designer

Ms.N.Agalya

Semester III	Internal Marks: 25	External Marks: 75		
COURSE CODE	**COURSE TITLE**	**CATEGORY**	**HOURS/ WEEK**	**CREDITS**
22UCS3AC4	**DIGITAL & MICROPROCESSOR FUNDAMENTALS**	**SECOND ALLIED COURSE-I (AC)**	**4**	**3**

Course Objectives

- To acquire knowledge on the number system and logic gates.
- To understand the concepts of combinational logic circuits.
- To impart the ideas on microprocessor architecture.
- To design simple microprocessor programme

Pre -requisites

- Basic knowledge on number system.
- A basic understanding of digital circuits.
- Fundamental ideas on microprocessor.

Course Outcome and Cognitive Level Mapping

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

CO Number	CO Statement On the successful completion of the course, students will be able to	Cognitive Level
CO1	Classify and convert one number system to other number systems and to select the most suitable one for specific application.	K1,K2
CO2	Interpret simple logic circuits and its applications	K3
CO3	Analyse Boolean equations for logic circuits and thereby develop equivalent circuits.	K4
CO4	Demonstrate complete architecture of microprocessor	K5
CO5	Develop assembly language programming using intel 8085.	K5

Mapping of CO with PO and PSO

COs	PSO1	PSO2	PSO3	PSO4	PSO5	PO1	PO2	PO3	PO4	PO5
CO1	2	3	3	3	3	3	2	3	3	3
CO2	2	2	3	3	3	3	2	3	3	3
CO3	2	2	3	3	3	3	2	3	3	3
CO4	2	3	2	3	3	3	1	2	1	2
CO5	2	3	3	3	3	3	3	3	3	3

"1" – Slight (Low) Correlation "2" – Moderate (Medium) Correlation

"3" – Substantial (High) Correlation "-" – indicates there is no correlation

Syllabus

UNIT	CONTENT	HOURS	COs	COGNITIVE LEVEL
I	**INTRODUCTION TO NUMBER SYSTEM:** Introduction-Binary, Decimal, Octal and Hexadecimal-Conversion of number system – Binary Addition and Subtraction - Binary Multiplication and Division - 1's complement and 2's complement - BCD code- Excess-3 code -Gray code- ASCII code.	12	CO1, CO2, CO3, CO4, CO5	K1, K2, K3, K4, K5
II	**BOOLEAN ALGEBRA AND LOGIC GATES:** Boolean Algebra: Definitions - Rules and Laws of Boolean Algebra - Simplification of Boolean expressions - Demorgan's Theorems - The Basic Gates - NOT, OR, AND - Universal Logic Gates – NOR, NAND - Karnaugh Map - Sum of Products method(SOP) - Pairs, Quads, Octets – Don't Care Conditions- Product of sums method(POS) - Product of sums Simplifications	13	CO1, CO2, CO3, CO4, CO5	K1, K2, K3, K4, K5
III	**COMBINATIONAL AND SEQUENTIAL LOGIC CIRCUITS** Half and Full Adders - Half and Full Subtractors - Multiplexer (4:1 line) – 1 to 4 line Demultiplexer - Encoders - Decoders - Introduction to Flip Flops -RS Flip Flop – Clocked RS Flip Flop - D Flip Flop - JK Flip Flop - T Flip Flop - Triggering of Flip Flops	10	CO1, CO2, CO3, CO4, CO5	K1, K2, K3, K4, K5
IV	**MICROPROCESSOR (INTEL 8085)** Evolution of microprocessor - Components of microprocessor - Architecture of Intel 8085 - Pin configuration - Flags - Instruction set - Addressing modes - Types of instructions - Data Transfer - Arithmetic- Logical- Branch Control- Stack I/O and Machine Control	13	CO1, CO2, CO3, CO4, CO5	K1, K2, K3, K4, K5
V	**PROGRAMMING OF INTEL 8085** Assembly language programming - 8 bit Addition- 8-bit Subtraction - Multibyte Addition- Multiplication- Division- Sum of series- Finding Largest and smallest number in a data array- Arranging numbers in ascending and descending order - Decimal to hexadecimal conversion – Hexadecimal to Decimal Conversion.	12	CO1, CO2, CO3, CO4, CO5	K1, K2, K3, K4, K5
VI	**SELF STUDY FOR ENRICHMENT:** (**Not included for End Semester Examinations**) Application of binary number system in coding - Solving Boolean Expressions using Karnaugh Map– Developing basic understanding of higher order microprocessor- Writing program for Complement, Shifting and other conversions	-	CO1, CO2, CO3, CO4, CO5	K1, K2, K3, K4, K5

Text Books

1. Vijayendran. V, (2003). *Digital fundamentals*. (1st edition) S. Viswanathan Printers and Publishers Pvt. Ltd., Chennai.
2. Virendra Kumar, (2007). *Digital electronics Theory and Experiments*. (2nd edition). New Age International Publishers, Chennai.
3. Ram.B, (1986), *Fundamentals of Microprocessor and Microcomputers* (1st edition) Dhanpat Rai Publications, New Delhi.

Reference Books

1. Anand Kumar A, (2016). *Fundamentals of Digital Electronics*. (1st edition) PHI Learning Pvt. Ltd., New Delhi.
2. Godse.D.A, Godse.A.P, (2008). *Digital Electronics*. (1st edition) Technical publications, Maharashtra.
3. Ramesh S.Gaonkar, (1984). *Microprocessor Architecture Programming, and Applications with the 8085*. (5th Edition) Pearson Education, UK.

Web References

1. https://www.educba.com/digital-computer-fundamentals/
2. https://collegedunia.com/exams/number-system-mathematics-articleid-3097
3. https://www.tutorialspoint.com/difference-between-half-adder-and-full-adder
4. https://electronicsdesk.com/8085-microprocessor.html
5. https://www.digimat.in/nptel/courses/video/108105102/L01.html

Pedagogy

Chalk and Talk, Assignment, Group discussion and quiz

Course Designer

Dr.D.Devi

Semester III	Internal Marks: 40		External Marks: 60	
COURSE CODE	**COURSE TITLE**	**CATEGORY**	**HOURS/ WEEK**	**CREDITS**
22UCS3AC5P	**DIGITAL & MICROPROCESSOR(P)**	**SECOND ALLIED COURSE-II (AP)**	**4**	**3**

Course Objectives

- To enable the student to gain practical knowledge
- To acquire basic understanding of laboratory technique
- To understand the theory and develop practical application skills

Pre -requisites

- Basic knowledge on usage of logic gates

Course Outcome and Cognitive Level Mapping

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

CO Number	CO Statement On the successful completion of the course, students will be able to	Cognitive Level
CO1	Recall the principles of electronics.	K1
CO2	Interpret findings using the correct physical scientific framework.	K2
CO3	Analyze working principles of logic circuits.	K4
CO4	Design electronic circuits.	K5
CO5	Design simple program using microprocessor	K5

Mapping of CO with PO and PSO

COs	PSO1	PSO2	PSO3	PSO4	PSO5	PO1	PO2	PO3	PO4	PO5
CO1	3	3	2	2	2	3	2	1	2	2
CO2	1	3	2	3	2	3	3	2	3	3
CO3	2	3	2	3	3	3	3	3	3	3
CO4	2	3	3	3	3	3	3	3	3	2
CO5	3	3	3	3	3	3	2	3	3	3

"1" – Slight (Low) Correlation "2" – Moderate (Medium) Correlation

"3" – Substantial (High) Correlation "-" – indicates there is no correlation.

Syllabus

LIST OF EXPERIMENTS (Any 8)

Digital Electronics

1. Verification of Logic gates.
2. Construction of Half and Full adder.
3. Construction of Half and Full subtractor
4. Solving K-Map.
5. Excess-3 to BCD Conversion using gates
6. Construction of RS Flip Flop

Microprocessor 8085

1. 8-bit addition and 8-bit subtraction.
2. 8-bit multiplication and 8-bit division.
3. Conversion from decimal to hexadecimal.
4. Conversion from hexadecimal to decimal system.
5. Finding the largest number in a data array
6. Finding the smallest number in a data array

Text Books

1. Ouseph, C.C., Rao, U.J., Vijayendran, V., (2016). *Practical Physics and Electronics*. S.Viswanathan,Printers & Publishers Pvt Ltd., Chennai.
2. Vijayendran.V, (2009). *Introduction to Integrated Electronics: Digital and Analog* (Revised Edition). Viswanathan S., Printers & Publishers Pvt Ltd., Chennai.
3. Ram.B, (2013). *Fundamental of Microprocessor and microcontrolle*r (8th Edition). Dhanpat Rai Publications(P) Ltd., New Delhi.

Reference Books

1. Anand Kumar.A, (2016). Fundamentals of Digital Electronics. (4th Edition). PHI Learning Pvt. Ltd., New Delhi.

Web References

1. https://de-iitr.vlabs.ac.in/
2. http://vlabs.iitkgp.ernet.in/dec/
3. https://www.vlab.co.in/
4. https://de-iitr.vlabs.ac.in/exp/truth-table-gates/simulation.html
5. https://de-iitr.vlabs.ac.in/exp/half-full-adder/simulation.html

Pedagogy

Demonstration and practical sessions.

Course Designer

Dr.D.Devi

Semester III	Internal Marks: 40		External Marks: 60	
COURSE CODE	**COURSE TITLE**	**CATEGORY**	**HOURS/WEEK**	**CREDITS**
22UCS3GEC1P	**OFFICE AUTOMATION (P)**	**GENERIC ELECTIVE**	**2**	**2**

Course Objective

- To have a hands on experience in the Microsoft Office package
- To familiarize the students in the preparation of documents and presentations with officeautomation tools
- To inculcate the knowledge of Macros

Course Outcome and Cognitive Level Mapping

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

CO Number	CO Statement	Cognitive Level
CO1	Describe the concepts of Office Package.	K1
CO2	Recognize when to use each of the Office programs to create professional and academic documents.	K2
CO3	Use Office programs to create personal, academic and Business documents following current professional and/or industry standards.	K3
CO4	Test the working knowledge of advanced concepts of Office Software.	K4
CO5	Assess oneself to get employment with this practical hands on training.	K6

Mapping of CO with PO with PSO

Cos	PSO1	PSO2	PSO3	PSO4	PSO5	PO 1	PO 2	PO 3	PO 4	PO 5
CO1	2	3	3	3	3	3	3	3	3	3
CO2	3	3	3	3	3	2	3	2	3	3
CO3	3	3	3	3	3	3	3	2	3	3
CO4	3	3	3	3	3	3	3	2	3	3
CO5	3	3	3	3	3	3	3	2	3	3

"1"–Slight(Low) Correlation "2"–Moderate(Medium) Correlation

"3"–Substantial (High) Correlation "-"indicates there is no Correlation.

List of Exercises

1. Open a new office document and perform the following operations in it
    i. Text Alignment
    ii. Change line spacing to1.5
    iii. Place a box to the entire text
    iv. Add the bullets and numbering
    v. Change type of font types and sizes
    vi. Insert the symbols
2. Prepare an advertisement to accompany with the following specifications
    i. Attractive Page Border
    ii. Design the name of company using WordArt
    iii. Use Clip Art
3. Design a Visiting Card for a company with the following specifications
    i. Size of the Visiting card is 4" x 3"
    ii. Name of the company with a WordArt
4. Perform Table Creation, Formatting and Conversion.
5. Perform mail merge and letter preparation.
6. Data sorting-Ascending and Descending (both numbers and alphabets)
7. Mark list preparation for a student
8. Individual Pay Bill preparation.
9. Invoice Report preparation.
10. Draw a line, XY, bar and pie chart for a given user data
11. Create a Presentation using wizard.
12. Create a presentation on Tourism of a place using different template, color schema andtext Formats.
13. Create a slide show presentation for a seminar.
14. Preparation of Organization Charts
15. Use different presentation templates and transition effects for each slide

Web References

1. https://www.tutorials.com/
2. https://www.computer-pdf.com/
3. https://support.microsoft.com/en-us/office/add-sound-effects-to-an-animation-or-hyperlink
4. https://www.smartdraw.com/organizational-chart/organizational-chart-tips.htm

Pedagogy

Power point Presentation, Demonstration

Course Designer

Ms.R.Rita Jenifer

Semester: IV	Internal Marks:25		External Marks:75	
COURSE CODE	**COURSE TITLE**	**CATEGORY**	**HOURS/ WEEK**	**CREDITS**
23UCA3CC4/ 23UCS4CC4	**DATABASE MANAGEMENT SYSTEMS**	**CORE**	**6**	**5**

Course Objective

- To understand the basic concepts and the applications of database systems
- To provide the basics of SQL and construct queries using SQL, E-R model and Normalization

Course Outcomes and Cognitive Level Mapping

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

CO Number	CO Statement	Cognitive Level
CO1	Define the basic concepts of database design, architecture and its data model	K1
CO2	Illustrate the structure of Relational database	K2
CO3	Apply the various queries in the database	K3
CO4	Examine the database design and E-R model	K4
CO5	Explain the concepts of Relational Database Design	K2, K5

Mapping of CO with PO and PSO

COs	PSO1	PSO2	PSO3	PSO4	PSO5	PO1	PO2	PO3	PO4	PO5
CO1	2	3	2	1	1	3	3	2	3	2
CO2	3	2	3	1	1	3	2	2	3	3
CO3	3	3	3	2	2	3	3	2	3	2
CO4	3	2	3	2	2	2	3	2	3	2
CO5	3	3	3	2	2	3	3	2	2	3

"1"–Slight (Low) Correlation
"2"–Moderate (Medium) Correlation
"3"–Substantial (High)Correlation
"-"indicates there is no Correlation.

Syllabus

UNIT	CONTENT	HOURS	COs	COGNITIVE LEVEL
I	**Introduction to Database System Concepts**: Introduction – Database- System Applications – Purpose of Database Systems – View of Data: Data Abstraction – Instances and Schemas – Data Models – **Relational Databases:** Tables – Data- Manipulation Language –Data-Definition Language – Database Design: Design Process– The Entity– Relationship Model– Normalization– **Data Storage and Querying:** Storage Manager–The Query Processor– Transaction Management–Database Architecture-**Database Users and Administrators:** Database Users and User Interfaces –Database Administrator	18	CO1 CO2 CO3 CO4 CO5	K1 K2 K3 K4 K5
II	**Introduction to Relational Model and SQL:** Structure of Relational Databases–Database Schema– Keys – Schema Diagrams – Relational Query Languages–Relational Operations-**Introduction to SQL:** Overview of the SQL Query Language – **SQL Data Definition:** Basic Types– Basic Schema Definition–Basic Structure of SQL Queries: Queries on Single Relation–Queries on Multiple Queries – The Natural Join	18	CO1 CO2 CO3 CO4 CO5	K1 K2 K3 K4 K5
III	**Introduction to SQL: Additional Basic Operations:** The Rename Operation –String Operations – Attributes Specification in Select Clause – Ordering the Display of Tuples–Where clause Predicates– Set Operations: The Union Operation– The Intersect Operation-Except Operation– Null Values– **Aggregate Functions:** Basic Aggregation– Aggregation with Grouping- The Having Clause- Nested Subqueries: Set Membership–Set Comparison– Modification of the Database	18	CO1 CO2 CO3 CO4 CO5	K1 K2 K3 K4 K5
IV	**Database Design and E-R Model: The Entity – Relationship Model:** Entity Sets –Relationship Sets – Attributes – Constraints: Mapping Cardinalities – Keys – **Entity-Relationship Diagrams:** Basic Structure–Mapping Cardinality – Complex Attributes- Weak Entity Sets–**Design Alternative:** Smaller Schemas-Atomic Domains and First Normal Form Decomposition using Functional Dependencies: Keys and Functional Dependencies- Boyce-Codd Normal Form- BCNF and Dependency Preservation – Third Normal Form	18	CO1 CO2 CO3 CO4 CO5	K1 K2 K3 K4 K5
V	**Relational Database Design: Functional Dependency Theory:** Closure of a set of Functional Dependencies-Closure of Attribute Sets-Canonical Cover– Lossless Decomposition–Dependency Preservation. Transaction Management: **Transaction Concepts**-A Simple Transaction Model-Storage Structure- Transaction Atomicity & Durability- Transaction Isolation.	18	CO1 CO2 CO3 CO4 CO5	K1 K2 K3 K4 K5

Text Book

1. Abraham Sliberschatz, Henry F Korth & Sudharsan (2013) *Database System Concepts*, 6th Edition, McGraw Hill Education (India) Private Limited.

Reference Books

1. Alexis Leon, Mathews Leon (2009). *Essentials of Database Management Systems*, McGraw Hill Education India Pvt Ltd.

2. Peter Rob, Carlos Coronel (2009). *Database System Concepts*, Cengage Learning

Web References

1. https://beginnersbook.com/2015/04/dbms-tutorial/
2. https://www.studytonight.com/dbms/
3. https://www.tutorialspoint.com/dbms/
4. https://archive.nptel.ac.in/courses/106/105/106105175/

Pedagogy

Chalk and Talk, PPT, Discussion, Assignment, Demo, Quiz and Seminar.

Course Designer

Dr. Lakshna Arun, Associate Professor, Department of Computer Applications

Semester IV	Internal Marks:40		External Marks:60	
COURSE CODE	COURSE TITLE	CATEGORY	HOURS / WEEK	CREDITS
22UCS4CC5P	SQL & PL/SQL(P)	CORE	4	4

Course Objective

- To provide the depth programming knowledge of SQL
- Apply the fundamentals of DDL, DML, DCL and TCL
- Implement new developments and trends in developing a database

Course Outcomes and Cognitive Level Mapping

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

CO Number	CO Statement	Cognitive Level
CO1	Recall and demonstrate basic commands and functions in SQL and PL/SQL	K1, K2
CO2	Apply the knowledge of SQL concepts to develop a database system	K3
CO3	Examine the problem and provide a solution using SQL concepts	K4
CO4	Evaluate various concepts to develop simple applications using SQL	K5, K6
CO5	Solve the various types of online applications using SQL	K6

Mapping of CO with PO and PSO

CO s	PSO1	PSO2	PSO3	PSO4	PSO5	PO1	PO2	PO3	PO4	PO5
CO1	2	3	3	2	2	2	3	2	3	3
CO2	3	3	3	3	3	2	3	2	3	3
CO3	3	3	3	3	3	2	3	3	2	3
CO4	3	3	3	3	3	2	3	2	1	2
CO5	3	3	3	3	3	2	3	3	1	1

"1"-Slight (Low) Correlation "2"–Moderate (Medium) Correlation
"3"-Substantial (High) Correlation "-"-indicates there is no Correlation.

List of Exercises

USING SQL

1. DDL operations
2. DML operations
3. Set operations
4. Aggregate functions
5. Join operations
6. Nested subqueries
7. String operations
8. Report generation

USING PL/SQL

9. Raise an exception
10. Using Cursors
11. Using procedures
12. Using Triggers

Web References

1. https://www.w3resource.com/
2. https://www.ntu.edu.sg/home/ehchua/programming/sql/
3. https://www.tutorialride.com/

Pedagogy

Power Point Presentations, Demo by e-Contents tutorials

Course Designer

Ms. R. Sridevi

Semester IV	Internal Marks: 25			External Marks: 75
COURSE CODE	**COURSE TITLE**	**CATEGORY**	**HOURS/ WEEK**	**CREDITS**
22UCS4AC6	**MICROCONTROLLERS**	**SECOND ALLIED COURSE -III**	4	**3**

Course Objectives

- To study the basics of 8051 microcontroller
- To differentiate microprocessor and microcontroller applications.
- To gain the knowledge for programming of 8051 microcontroller
- To study the interfacing techniques of 8051microcontroller
- To design different application circuits using 8051microcontroller

Pre-requisites

- Knowledge about the concepts of microprocessors.
- Fundamental knowledge of difference between microprocessor and microcontroller.
- Basic knowledge of writing simple programs.

Course Outcome and Cognitive Level Mapping

CO Number	CO Statement On the successful completion of the Course, the Students will be able to	Cognitive Level
CO 1	Understand the basic principles of microcontroller based design and development	K1, K2
CO 2	Analyze the characteristics of interfacing technologies and their potential applications	K3
CO 3	Classify different kinds of programming techniques	K4
CO 4	Apply the concepts to design small microcontroller based projects	K3, K5
CO 5	Develop the idea to design and build functional prototype for real world applications	K4

Mapping of CO with PO and PSO

Cos	PSO 1	PSO 2	PSO 3	PSO 4	PSO 5	PO 1	PO 2	PO 3	PO 4	PO 5
CO 1	3	3	3	2	3	3	3	2	3	3
CO 2	3	2	3	3	3	3	2	1	3	3
CO 3	3	3	3	3	3	3	3	1	3	3
CO 4	3	3	3	3	3	3	3	2	3	3
CO 5	3	3	3	3	3	3	3	2	3	3

"1" – Slight (Low) Correlation
"2" – Moderate (Medium) Correlation
"3" – Substantial (High) Correlation
"-" – indicates there is no correlation

Syllabus

UNIT	CONTENT	HOURS	COs	COGNITIVE LEVEL
I	**MICROCONTROLLER INTEL 8051 ARCHITECTURE** Introduction to microcontrollers – Comparison between microprocessor and controller – Types of microcontroller-Architecture of 8051- Internal block diagram - Pin Configuration of 8051- Internal RAM organization – External Memory Interfacing.	12	CO1, CO2, CO3, CO4, CO5	K1, K2, K3, K4, K5
II	**INSTRUCTION SET OF 8051** Addressing Modes: Immediate- register- Direct- Indirect – Relative – Absolute - Long- Indexed-Inherent – Bit inherent - Bit direct-Instruction timings -8051 Instruction –Data Transfer- Arithmetic-Logical-Branch-Subroutine-Bit manipulation	12	CO1, CO2, CO3, CO4, CO5	K1, K2, K3, K4, K5
III	**PROGRAMMING OF 8051** Introduction - Assembly language program –Conversion of 8-bit binary number to its equivalent BCD – Addition of two 16-bit numbers - Subtraction of two 16- bit numbers – Finding the largest number from the given set of numbers – Arranging a set of numbers in ascending order – Finding the average of N numbers -Finding the number of positive and negative number.	12	CO1, CO2, CO3, CO4, CO5	K1, K2, K3, K4, K5
IV	**INTERRUPTS AND TIMER /COUNTER,** **Interrupts:** Introduction to interrupt- Interrupt structure types and their vector addresses- Interrupt enable register and interrupt priority register (IE, IP) **Timer / counter:** TMOD –TCON- SCON- SBUF-PCON Registers- Timer modes- programming for time delay using mode 1 and mode 2.	12	CO1, CO2, CO3, CO4, CO5	K1, K2, K3, K4, K5
V	**INTERFACING AND SERIAL COMMUNICATION** Interfacing: Parallel and Serial ADC-DAC- Liquid Crystal Display - Stepper motor. Serial Communication: Synchronous and asynchronous serial communication- Use of timer to select baud rate for serial communication	12	CO1, CO2, CO3, CO4, CO5	K1, K2, K3, K4, K5
VI	**SELF STUDY FOR ENRICHMENT:** (Not to be included for External Examination) Advantages of microcontrollers- microcontroller programming using the 'C ' programming language - -Keyboard interfacing – Different types of microcontroller – Applications of microcontrollers in automobiles.	-	CO1, CO2, CO3, CO4, CO5	K1, K2, K3, K4, K5

Text Books

1. Atul P. Godse, Dr. Deepali A. Godse,(2020).*Microcontrollers* (1st Edition), Technical Publications, Pune, India.
2. **Padmanabhan T.R, (2020).** ***Introduction to Microcontrollers and their Applications (Reprint),*** **Narosa Publications,** New Delhi, India.
3. Muhammad Ali Mazidi, Rolin McKinlayJanice, Gillispie Mazidi, (2007). *The 8051 Microcontrollers & Embedded Systems* (2nd edition), Pearson publications, New Delhi, India.

Reference Books

1. Uma Rao K and Andhe Pallavi, (2011).*The 8051 microcontroller – Architecture, programming and applications* (3rd edition), Pearson publications, New Delhi.
2. Rajkamal, (2011). *Microcontrollers: Architecture, Programming, Interfacing and System Design* (2nd edition), Pearson publications, New Delhi.

Web References

1. https://www.electronicwings.com/8051/introduction-to-8051-controller
2. https://nptel.ac.in/courses/117104072
3. https://www.digimat.in/nptel/courses/video/108105102/L28.html
4. https://archive.nptel.ac.in/courses/108/105/108105102/
5. https://www.bipom.com/applications/micro_interfacing.pdf

Pedagogy

Chalk and Talk, Assignment, Power Point Presentation, E-content, Group discussion and quiz.

Course Designer

Dr.D.Devi

Semester IV	Internal Marks: 25		External Marks: 75	
COURSE CODE	**COURSE TITLE**	**CATEGORY**	**HOURS / WEEK**	**CREDITS**
22UCS4INT	**INTERNSHIP**	**INTERNSHIP**	**-**	**2**

- At the end of Semester I, the students should undergo an internship in a reputed IT company or IT division of reputed company
- Minimum number of days for the internship is 15 days
- A project report and a certificate of attendance are to be submitted after completing the internship

EVALUATION PATTERN FOR INTERNSHIP

Internal Components	Marks	External Components	Marks
Institution Profile	5	Regularity	10
Presentation skill	10	Problem solving	10
Report Evaluation	10	Participation and Hands – on training	20
		Professional Attitude	15
		Report Writing	20
Total	25	Total	75

Semester IV	Internal Marks: 40		External Marks: 60	
COURSE CODE	COURSE TITLE	CATEGORY	HOURS / WEEK	CREDITS
22UCS4GEC2P	MULTIMEDIA (P)	GENERIC ELECTIVE	2	2

Course Objective

- To learn and understand technical aspect of Multimedia Systems
- To give an overall view of multimedia tools
- To explore various photo editing features, animation techniques and demonstrate proficiency in developing the multimedia presentations

Course Outcomes and Cognitive Level Mapping

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

CO Number	CO Statement	Cognitive Level
CO1	Identify the basic tools and components of a multimedia	K1
CO2	Understand the use of graphical tools for various templates	K2
CO3	Apply basic elements and principles of photo editing software to achieve a great photo effect	K3
CO4	Discover layers, rotation and overlapping of an image	K4
CO5	Design a brochure for different situations and assess it	K5, K6

Mapping of CO with PO and PSO

CO s	PSO 1	PSO 2	PSO 3	PSO 4	PSO 5	PO 1	PO 2	PO 3	PO 4	PO 5
CO1	2	3	3	3	3	3	3	3	3	3
CO2	3	3	3	3	3	3	3	3	3	3
CO3	3	3	2	3	3	2	2	3	3	3
CO4	3	2	3	3	3	3	3	3	3	3
CO5	3	3	3	3	3	3	3	3	3	3

"1"–Slight(Low) Correlation "2"–Moderate(Medium) Correlation "3"–Substantial (High) Correlation "-"indicates there is no Correlation.

List of Exercises

USING FLASH

1. Create an animation to represent the Growing Moon
2. Create an animation for bouncing a ball
3. Change a Circle into a Square
4. Display the Background image given through your name using mask

USING PHOTOSHOP

5. Prepare a Booklet for a Seminar and apply the concept of feather effects
6. Design an Award certificate and organize with text and image tools
7. Design an invitation for Annual Sports Meet with creative colors and text.
8. You are given a picture of a garden as background. Extract the image of a butterfly from another picture and organize it on the background.
9. Given a picture, make three copies of this picture. On one of these pictures, adjust the brightness and contrast, so that it gives an elegant look. On the second picture, changeit to grayscale and the third is the original one.
10. Convert the given image to a pencil sketch.
11. Import two pictures. Morph, Merge and Overlap the images.

Web References:

1. http://tutorials4computer.blogspot.com/2015/02/procedure-to-create-animation-to.html
2. http://dte.kar.nic.in/STDNTS/CS%20IS/multimedia%20lab%20programs.pdf
3. https://www.adorama.com/alc/how to-edit-your-photos-5-photoshopediting-steps-for-beginners

Pedagogy:

Power Point Presentations, Demo by e-Contents

Course Designer:

Ms.R.Rita Jenifer

Semester IV	Internal Marks:40		External Marks:60	
COURSE CODE	COURSE TITLE	CATEGORY	HOURS / WEEK	CREDITS
22UCS4SEC1P	WEB DESIGNING (P)	SKILL ENHANCEMENT	2	2

Course Objective

- To acquire knowledge and Skills for creation of Web Site
- To implement modern web pages with HTML, CSS and Javascript
- To develop static and dynamic web pages

Course Outcomes and Cognitive Level Mapping

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

CO Number	CO Statement	Cognitive Level
CO1	Recognize the usage of tags and styles in web designing	K2
CO2	Plan to build a web site	K3
CO3	Analyze the various tags, styles and scripting in html and CSS and apply them in web page designing	K4
CO4	Assess the web page with different validation test cases	K5
CO5	Design dynamic web pages that apply various dynamic effects on the web site for real time applications.	K6

Mapping of CO with PO and PSO

CO s	PSO 1	PSO 2	PSO 3	PSO 4	PSO 5	PO 1	PO 2	PO 3	PO 4	PO 5
CO1	3	3	3	3	3	3	3	2	3	3
CO2	3	3	3	2	3	3	3	2	3	3
CO3	3	2	3	2	3	3	3	2	3	3
CO4	3	3	3	3	3	3	3	1	3	3
CO5	3	3	3	3	3	3	3	3	3	3

"1"–Slight(Low) Correlation "2"–Moderate(Medium) Correlation "3"–Substantial (High) Correlation "-"indicates there is no Correlation.

List of Exercises

USING HTML

1. Create a webpage using
   - Structure tag to display sample message
   - Different types of list.
   - Table tag
2. Insert a picture on the webpage using various attributes
3. Create a web page to link
   - A web page of same site
   - A specific location on a web page of same site
   - An external web page from a different website
4. Create a web page using frame
5. Embed Audio and Video into a web page.

USING CSS

6. Develop a style sheet
7. Create a form to accept inputs like name, age, address and favorite subject, movie and hobbies

USING JAVASCRIPT

8. Display current date and time
9. Create an interactive calculator
10. Create a form having the input type elements like checkbox, radio button, select option, text area and submit button, and validate the content
11. Write a program to display information box as soon as page loads.

CASE STUDY : Create a website

Web References

1. https://aits-tpt.edu.in/wp-content/uploads/2022/06/Web_Design_MANUAL-min.pdf
2. https://www.coursera.org/specializations/webdesign?utm_medium=institutions&utm_source=umich&utm_campaign=adwordswebdesignforeverybody&utm_term=%2Bbasic%20%2Bweb%20%2Bdesign%20%2Bcourse&gad=1&gclid=#about
3. https://www.rgmcet.edu.in/assets/img/departments/CSE/materials/R15/3-2/WT%20LAB.pdf
4. https://www.jnec.org/labmanuals/cse/se/sem1/HTML-SY-PART-I.pdf
5. https://www.w3schools.com/js/js_intro.asp

Pedagogy

Power point Presentations, Demo, E-Contents

Course Designer

Ms.S.Saranya

Semester V	Internal Mark: 25		External Mark: 75	
COURSE CODE	**COURSE TITLE**	**CATEGORY**	**Hrs/Week**	**CREDITS**
23UCA5CC6/ 23UCS5CC5	**PROGRAMMING IN PHP**	**CORE**	**6**	**5**

Course Objectives

- To understand the fundamentals of web programming for design a web page using PHP
- The students shall be able to develop a simple webpage using PHP with MySQL

Course Outcomes and Cognitive Level Mapping

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

CO Number	CO Statement	Knowledge Level
CO1	Outline the basic concepts in PHP Programming	K1
CO2	Describe the logical structure of PHP Programming	K2
CO3	Construct the web page using PHP Programming	K3
CO4	Analyze the PHP Programming concepts to develop Website	K4
CO5	Develop a real-time website using PHP Programming	K5

Mapping of CO with PO and PSO

	PSO1	PSO2	PSO3	PSO4	PSO5	PO1	PO2	PO3	PO4	PO5
CO1	**3**	**3**	**3**	**3**	**3**	**3**	**3**	**3**	**3**	**3**
CO2	**3**	**3**	**3**	**3**	**3**	**3**	**3**	**3**	**3**	**2**
CO3	**3**	**2**	**3**	**3**	**3**	**3**	**3**	**3**	**2**	**2**
CO4	**3**	**2**	**2**	**2**	**2**	**3**	**3**	**2**	**2**	**2**
CO5	**3**	**2**	**2**	**2**	**2**	**3**	**3**	**2**	**2**	**2**

"1" – Slight (Low) Correlation
"2" – Moderate (Medium) Correlation
"3" – Substantial (High) Correlation
"-" indicates there is no correlation.

Syllabus

UNIT	CONTENT	HOURS	COS	COGNITIVE LEVEL
I	**Essential PHP** Essential PHP: Creating your Development Environment - Creating a First PHP Page-Mixing HTML and PHP - Printing Some Text- Printing Some HTML- More Echo Power- Using PHP "Here" Documents - Adding Comments to PHP - Variables - Constants - Data Types, Operators and Flow Control.	18	CO1 CO2 CO3 CO4 CO5	K1 K2 K3 K4 K5
II	**PHP Basics** Strings and Arrays - Creating Functions- Reading Data in Web Pages: Setting Up Web Pages to Communicate with PHP - Handling Text Fields and Text AreasHandling Check Boxes and Radio Buttons - Handling List Boxes, Password Controls, Hidden Controls, Image Maps, File Uploads and Buttons.	18	CO1 CO2 CO3 CO4 CO5	K1 K2 K3 K4 K5
III	**OOPS Concepts** Object-Oriented Programming: Creating Classes and Objects - Setting Access to Properties and Methods - Using Constructors and Destructors - Inheritance - Overriding, Overloading Methods, Autoloading Classes. Advanced Object-Oriented Programming: Creating Static Methods, Abstract Classes, Interfaces and Class Constants, Supporting Object Iteration - Using Final Keyword - Cloning Objects - Reflection	18	CO1 CO2 CO3 CO4 CO5	K1 K2 K3 K4 K5
IV	**Browser-Handling, Session, Cookies and FTP** PHP Browser-Handling Power – Session, Cookies and FTP: Setting, Reading, Deleting Cookies - Working with FTP - Downloading, Uploading, and Deleting a File with FTP - Creating and Removing Directories with FTP - Working with E-mail- Storing Data and Writing a Hit Counter using Sessions	18	CO1 CO2 CO3 CO4 CO5	K1 K2 K3 K4 K5
V	**File Handling and MySQL using PHP** File Handling - Working with Databases: Accessing the Database in PHP -Update Data into the Database- Insert Data into the Database - Delete Data from Database.	18	CO1 CO2 CO3 CO4 CO5	K1 K2 K3 K4 K5
VI	**Self-Study for Enrichment (Not to be included for End Semester Examination)** History of PHP – Getting PHP – PHP's Internal Data Types – Working with Database: What is Database? – Some Essential SQL – Creating a MySQL Database and Table – Putting data into the New Database.	-	CO1 CO2 CO3 CO4 CO5	K1 K2 K3 K4 K5

Textbook

1. Steven Holzner. (2012), The Complete Reference PHP, Tata McGraw Hill Pvt.Ltd.

References

1. Rasmus Lerdorf, Kevin Tatroe, Peter MacIntyre. (2013), Programming PHP, 3rdEdition, O'Reilly.

2. Luke Welling, Laura Thomson. (2017), PHP and MySQL Web Development, 5thEdition, Pearson India Education Services Pvt. Ltd.

Web References

1. https://www.phptutorial.net/
2. https://www.javatpoint.com/php-tutorial
3. https://www.w3schools.com/php/
4. https://www.geeksforgeeks.org/php-examples/
5. https://www.tutorialspoint.com/php/index.htm

Pedagogy

Chalk &Talk, PowerPoint Presentation, Discussion, Assignment, Demo, Quiz and Seminar.

Course Designers

Ms. V. Yasodha, Assistant Professor, Department ofComputer Applications.

Semester V	Internal Mark: 25		External Mark: 75	
COURSE CODE	**COURSE TITLE**	**CATEGORY**	**Hrs/Week**	**CREDITS**
23UCS5CC6P	**PROGRAMMING IN PHP (P)**	**CORE PRACTICAL**	**3**	**3**

Course Objectives

- To inculcate the PHP web programming knowledge
- To create a basic knowledge about developing web page.

Course Outcomes and Cognitive Level MappSing

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

CO Number	CO Statement	Knowledge Level
CO1	Recall the syntax and semantics of PHP.	K1
CO2	Identify suitable techniques to construct a web page.	K2
CO3	Implement the PHP concepts to develop a website	K3
CO4	Analyze the logical structures which are used to the real-time applications.	K4
CO5	Develop a real-time application using PHP programming	K5

Mapping of CO with PO and PSO

	PSO1	PSO2	PSO3	PSO4	PSO5	PO1	PO2	PO3	PO4	PO5
CO1	**3**	**3**	**3**	**3**	**3**	**3**	**3**	**3**	**3**	**3**
CO2	**3**	**3**	**3**	**3**	**3**	**3**	**3**	**3**	**3**	**2**
CO3	**3**	**2**	**3**	**3**	**3**	**3**	**3**	**3**	**2**	**2**
CO4	**3**	**2**	**2**	**2**	**2**	**3**	**3**	**2**	**2**	**2**
CO5	**3**	**2**	**2**	**2**	**2**	**3**	**3**	**2**	**2**	**2**

"1" – Slight (Low) Correlation
"2" – Moderate (Medium) Correlation
"3" – Substantial (High) Correlation
"-" indicates there is no correlation.

List of Practical S

1. Basic HTML tags.
2. get() and post() methods.
3. Validation.
4. String Handling functions.
5. Arrays.
6. COOKIES.
7. SESSIONS.
8. FILE Handling.
9. Database Connection

Web References

1. https://www.phptutorial.net/
2. https://www.javatpoint.com/php-tutorial
3. https://www.w3schools.com/php/
4. https://www.geeksforgeeks.org/php-examples/
5. https://www.tutorialspoint.com/php/index.htm

Pedagogy

PowerPoint Presentations, Demonstrations and Practical Sessions.

Course Designer

Ms. V. Yasodha, Assistant Professor, Department of Computer Applications

Semester V	Internal Mark: 25		External Mark: 75	
COURSE CODE	**COURSE TITLE**	**CATEGORY**	**Hrs/Week**	**CREDITS**
23UIT5CC6/ 23UCS5CC6	**OPERATING SYSTEMS**	**CORE COURSE – (CC)**	**6**	**5**

Course Objectives

- To understand the basic concepts of operating system
- To know the responsibilities of the operating system
- To get in depth knowledge of various scheduling algorithm for efficient resource management
- To acquire the knowledge of file management

Course Outcomes and Cognitive Level Mapping

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

CO Number	CO Statement	Knowledge Level
CO1	Understand the conceptual view of Operating systems	K1,K2
CO2	Comprehend how an operating system provides an abstracted interface to the hardware resources	K3
CO3	Apply various scheduling algorithms for efficient resource utilization.	K3
CO4	Analyze the role of synchronization to improve system performance	K4
CO5	Implement the functionalities pertaining with process, File and I/O Management.	K5

Mapping of CO with PO and PSO

	PSO1	PSO2	PSO3	PSO4	PSO5	PO1	PO2	PO3	PO4	PO5
CO1	**2**	**2**	**3**	**3**	**2**	**3**	**3**	**1**	**3**	**3**
CO2	**3**	**3**	**2**	**3**	**3**	**3**	**3**	**1**	**3**	**2**
CO3	**3**	**3**	**3**	**2**	**3**	**2**	**2**	**3**	**2**	**3**
CO4	**3**	**2**	**2**	**3**	**3**	**3**	**2**	**2**	**3**	**3**
CO5	**3**	**3**	**2**	**3**	**3**	**3**	**3**	**2**	**2**	**3**

"1" – Slight (Low) Correlation "2" – Moderate (Medium) Correlation
"3" – Substantial (High) Correlation "-" indicates there is no correlation.

Syllabus

UNIT	CONTENT	HOURS	COS	COGNITIVE LEVEL
I	**Introduction to Operating System:** Operating System-Operating System Software -A Brief History of Machine Hardware -Types of Operating Systems -Brief History of Operating System Development Object-Oriented Design of Operating System	16	CO1 CO2 CO3 CO4 CO5	K1 K2 K3 K4 K5
II	**Memory Management:** Early Systems: Single-User Contiguous Scheme - Fixed Partitions-Dynamic Partitions- Best-Fit versus First-Fit Allocation - Deallocation - Relocatable Dynamic Partitions. **Virtual Memory:** Paged Memory Allocation-Demand Paging-Page Replacement Policies and Concepts - Segmented Memory Allocation-Segmented/Demand Paged Memory Allocation – **Virtual Memory – Cache Memory**	20	CO1 CO2 CO3 CO4 CO5	K1 K2 K3 K4 K5
III	**Processor Management:** Overview-About Multi-Core Technologies-Job Scheduling Versus Process Scheduling-Process Scheduler-Process Scheduling Policies-Process Scheduling Algorithms – Interrupts **Deadlock**-Seven Cases of Deadlock -Conditions for Deadlock-Modeling Deadlock- Strategies for Handling Deadlocks –Starvation	18	CO1 CO2 CO3 CO4 CO5	K1 K2 K3 K4 K5
IV	**Concurrent Processes:** What is Parallel Processing? – Introduction to Multicore processors – Typical Multiprocessor configuration **– Process Synchronization Software** **Device Management:** Types of Devices-Sequential Access Storage Media-Direct Access Storage Devices- Magnetic Disk Drive Access Times	20	CO1 CO2 CO3 CO4 CO5	K1 K2 K3 K4 K5
V	**File Management:** The File Manager -Interacting with the File Manager -File Organization - Physical Storage Allocation -Access Methods-Levels in a File Management System - Access Control Verification Module –Data Compression	16	CO1 CO2 CO3 CO4 CO5	K1 K2 K3 K4 K5
VI	**Self-Study for Enrichment** **(Not included for End Semester Examinations)** OS Design Considerations for Multiprocessor and Multicore – Windows, Unix and Linux Installation- 7 UNIX SVR4 Process Management, Buddy System, – Windows 7 Thread and SMP Management - Linux Process and Thread Management -Traditional UNIX Scheduling – Windows File system – Linux File system	-	CO1 CO2 CO3 CO4 CO5	K1 K2 K3 K4 K5

Textbook

1. Understanding Operating Systems (2017), Ann McIver McHoes, Ida M. Flynn, 8th Edition,Course Technology, Cengage Learning

References

1. Operating Systems Internals and Design Principles (2018), William Stallings, 9th Edition, Prentice Hall,
2. Andrew S.Tanenebaum (2011), Operating Systems and Design Implementation, 3rd Edition, Pearson Education
3. sAbraham Silberschatz , Perter Baer Galvin, Greg, (2010), Operating System Concepts, 8th Edition John Wiley & Sons.

Web References

1. https://www.geeksforgeeks.org/what-is-an-operating-system
2. https://www.gatevidyalay.com/operating-system/
3. https://www.javatpoint.com/operating-system

Pedagogy

Chalk and Talk, PPT, Discussion, Assignment, Demo, Quiz and Seminar.

Course Designers

1. Dr. P.Tamilselvi, Associate professor, Department of Information Technology

Semester: V	Internal Marks: 25		External Marks: 75	
COURSE CODE	COURSE TITLE	CATEGORY	HOURS/ WEEK	CREDITS
23UCS5CC7	COMPUTER NETWORKS	CORE	6	5

Course Objective

- To introduce the fundamental types of computer networks
- To demonstrate the TCP/IP & OSI model merits & demerits
- To know the role of various protocols in Networking

Course Outcome and Cognitive Level Mapping

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

CO Number	CO Statement	Cognitive Level
CO1	Understand and recall the basics of computer Networks	K1, K2
CO2	Explain network architecture using protocols and interfaces.	K2
CO3	Apply the network concepts in problem solving	K3
CO4	Analyzing key networking protocols and their hierarchical relationship	K4
CO5	Determine the need of data link, network and transport layers on real time applications	K5

Mapping of CO with PO and PSO

COs	PSO1	PSO2	PSO3	PSO4	PSO5	PO1	PO2	PO3	PO4	PO5
CO1	3	3	3	3	3	2	3	3	2	3
CO2	3	2	2	2	2	3	3	3	3	3
CO3	3	3	3	3	3	3	3	3	3	3
CO4	3	3	3	3	3	3	2	3	3	3
CO5	3	3	3	3	3	3	3	3	3	3

"1" – Slight (Low) Correlation
"2" – Moderate (Medium) Correlation
"3" – Substantial (High) Correlation
"-" –indicates there is no Correlation.

Syllabus

UNIT	CONTENT	HOURS	COs	COGNITIVE LEVEL
I	**Introduction:** Data Communications – Networks - Network Types – Internet History – Standards and Administration**. Network Models:** Protocol Layering – TCP/IP Protocol Suite – The OSI Model.	17	CO1 CO2 CO3 CO4 CO5	K1 K2 K3 K4 K5
II	**Physical Layer:** Guided Transmission Media. Wireless Transmission – From Waveforms to Bits: Multiplexing - The Public Switched Telephone Network: Switching - Data and Signals – **Digital Transmission: Transmission Modes**.	17	CO1 CO2 CO3 CO4 CO5	K1 K2 K3 K4 K5
III	**Data-Link Layer:** Design Issues**–** Error Detection and Correction **– Medium Access Control Sublayer:** Multiple Access Protocols: Career Sense Multiple Access Protocols, Collision-Free Protocols - Bluetooth**:** Bluetooth Architecture, Bluetooth Applications - Data Link Layer Switching: Uses of Bridges, Learning Bridges, Repeaters, Hubs, Bridges, Switches, Routers and Gateways	18	CO1 CO2 CO3 CO4 CO5	K1 K2 K3 K4 K5
IV	**Network Layer:** Design Issues - Routing Algorithm in a Single Network: Shortest Path Algorithm, Distance Vector Algorithm, Link State Routing **–** Traffic Management at the Network Layer - Quality of Service and Application QOE: Application QoS Requirements - Internetworking: Internetwork Routing: Routing Across Multiple Networks **–** Supporting Different Packet Sizes**:** Packet Fragmentation**. The Network Layer in the Internet:** The IP Version4 Protocol – IP Addresses	18	CO1 CO2 CO3 CO4 CO5	K1 K2 K3 K4 K5
V	**Transport Layer:** Services – Connectionless and Connection-Oriented Protocols., Stop-and-Wait Protocol, Go-Back-N Protocol (GBN). **Transport Layer Protocols:** User Datagram Protocol – Transmission Control Protocol: TCP Services, TCP Features, Flow Control, Error Control, TCP Congestion Control	20	CO1 CO2 CO3 CO4 CO5	K1 K2 K3 K4 K5
VI	**Self-Study for Enrichment:** **(Not included for End Semester Examinations)** Ethernet – The Domain Name System – Electronic Mail – File Transfer Protocol – The World Wide Web – Hypertext Mark-up Language - Cryptography and Network Security	-	CO1 CO2 CO3 CO4 CO5	K1 K2 K3 K4 K5

Text Books

1. Behrouz A.Forouzan.(2021). *Data Communications and Networking*. 5th Edition, McGraw Hill Education.
   Unit 1: Chapter 1 & 2
   Unit 2: Chapter 3: 3.1 & Chapter 4: 4.3
   Unit 5: Chapter 23: 23.1, 23.2.2, 23.2.3 &
   Chapter 24: 24.2, 24.3.1, 24.3.2, 24.3.7, 24.3.8, 24.3.9

2. Andrew S Tanenbaum, Nick Feamster, David Wetherall. (2021). *Computer Networks.* 6th Edition, Pearson Education.
   Unit 2: Chapter 2: 2.1, 2.2, 2.4.4, 2.5.4
   Unit 3: Chapter 3: 3.1, 3.2 & Chapter 4: 4.2.2, 4.2.3, 4.5.1, 4.5.2, 4.7.1, 4.7.2, 4.7.4
   Unit 4: Chapter 5: 5.1, 5.2.2, 5.2.4, 5.2.5, 5.3, 5.4.1, 5.5.5, 5.5.6, 5.7.1, 5.7.2

Reference Books

1. James F Kurose and Keith W. Ross. (2017). *Computer Networking A Top-Down Approach.* 6th Edition, Pearson Education
2. Larry L. Peterson and Bruce S. Davie. (2020). *Computer Networks: A Systems Approach.* 6th Edition, Morgan Kaufmann.

Web References

1. https://www.coursera.org/courses?query=computer%20network
2. https://www.geeksforgeeks.org/basics-computer-networking/
3. https://www.javatpoint.com/computer-network-tutorial
4. https://www.tutorialspoint.com/computer_fundamentals/computer_networking.htm
5. https://www.youtube.com/playlist?list=PLxCzCOWd7aiGFBD2-2joCpWOLUrDLvVV
6. https://archive.nptel.ac.in/courses/106/105/106105080/
7. https://archive.nptel.ac.in/courses/106/105/106105183/

Pedagogy

Chalk and Talk, PPT, Discussion, Assignment, Quiz, Seminar

Course Designers

1. Dr. V. Sinthu Janita Prakash
2. Ms. R. Sangeetha

Semester V	Internal Marks: 25		External Marks: 75	
COURSE CODE	**COURSE TITLE**	**CATEGORY**	**HOURS/ WEEK**	**CREDITS**
23UCS5DSE1A	**COMPUTER ARCHITECTURE**	**DISCIPLINE SPECIFIC ELECTIVE**	**5**	**3**

Course Objective

- To conceptualize the basics of organizational and architectural issues of a digital computer
- To analyze performance issues in processor and memory design of a digital computer
- To demonstrate various data transfer techniques in digital computer
- To evaluate processor performance improvement using instruction level parallelism

Outcomes and Cognitive Level Mapping

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

CO Number	CO Statement	Cognitive Level
CO1	Define the basics of digital computer	K1
CO2	Explain the various concepts of digital computer	K2
CO3	Utilize the numerous digital computer tools to address the issue	K3
CO4	Examine the digital computer's performance	K4
CO5	Solve the real-time problem using digital computer	K5

Mapping of CO with PO and PSO

CO s	PSO1	PSO2	PSO3	PSO4	PSO5	PO1	PO2	PO3	PO4	PO5
CO1	2	3	2	1	1	2	2	2	2	2
CO2	3	2	3	1	1	3	3	2	3	2
CO3	3	3	3	2	2	3	3	2	3	2
CO4	3	2	3	2	2	3	3	2	3	2
CO5	3	3	3	2	2	3	3	2	2	3

"1" – Slight (Low) Correlation
"2" – Moderate (Medium) Correlation
"3" – Substantial (High) Correlation
"-" indicates there is no correlation.

Syllabus

UNIT	CONTENT	HOURS	COs	COGNITIVE LEVEL
I	**Basic Computer Organization and Design:** Instruction Codes- Computer Registers- Computer Instructions- - Timing and Control -Instruction Cycle- Memory Reference Instructions – Input – Output and Interrupt.	15	CO1, CO2, CO3, CO4, CO5	K1, K2, K3, K4, K5
II	**Central Processing Unit:** General Register Organization - Stack Organization - Instruction Formats - Addressing Modes- Data Transfer and Manipulation - Program control.	15	CO1, CO2, CO3, CO4, CO5	K1, K2, K3, K4, K5
III	**Memory Organization:** Memory Hierarchy- Main Memory- Auxiliary Memory- Associative Memory- Cache Memory- Virtual Memory	15	CO1, CO2, CO3, CO4, CO5	K1, K2, K3, K4, K5
IV	**Introduction to Parallel Processing:** Parallelism in Uniprocessor Systems – Parallel Computer Structures- Architectural Classification Schemes- Parallel Processing Applications – Predictive Modeling and Simulations- Engineering Design and Automation.	15	CO1, CO2, CO3, CO4, CO5	K1, K2, K3, K4, K5
V	**Pipeline and Vector Processing:** Parallel Processing- Pipelining- Arithmetic Pipelines – Instruction Pipeline – RISC Pipeline- Vector Processing- Array Processors	15	CO1, CO2, CO3, CO4, CO5	K1, K2, K3, K4, K5
VI	**UNIT VI - Self Study for Enrichment** **(Not to be included for External Examination)** Bus organization – Design of Basic Computers - Reduced Instruction Set Computer- Memory Management Hardware	-	CO1, CO2, CO3, CO4, CO5	K1, K2, K3, K4, K5

Text Books

1. M. Morris Mano,(2011). *"Computer System Architecture"*, 3rd Edition, Pearson. **(Unit I-III, V)**
2. Kai Hwang,Faye A Briggs,(2017). *" Computer Architecture and Parallel Processing"*, McGraw Hill Education (India) Private Limited. **(Unit IV)**

Reference Books

1. Carl Hamacher,(2011).*"Computer Organization"*, 3rd Edition, Tata McGraw Hill.
2. John P Hayes,(2017).*"Computer Architecture andOrganization"*, 5th Edition Tata McGraw Hill.
3. William Stallings,(2016). *"Computer Organization andArchitecture"*, 5th Edition, Pearson Education.

Web References

1. https:// en.wikipedia.org
2. https:// home.ustc.edu.cn
3. https:// ict.iitk.ac.in
4. www.geeksforgeeks.org
5. https://archive.nptel.ac.in/courses/106/105/106105163/
6. https://www.youtube.com/playlist?list=PLeUP77TwO-u4983ut7fFLjgBfKXL-YTeA

Pedagogy

Chalk and Talk, PPT, Discussion, Assignment, Demo, Quiz and Seminar.

Course Designers

1. Dr.V.Sinthu Janita Prakash
2. Ms. R. Sridevi

Semester V	Internal Marks: 25		External Marks:75	
COURSE CODE	COURSE TITLE	CATEGORY	HOURS/ WEEK	CREDITS
23UCS5DSE1B	COMPUTER GRAPHICS	DISCIPLINE SPECIFIC ELECTIVE	5	3

Course Objective

- To understand the basics of Graphical Mechanisms
- To provides the fundamentals of computer graphics and Augmented Reality
- To focuses on 2D, 3D transformations & viewing

Course Outcomes and Cognitive Level Mapping

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

CO Number	CO Statement	Cognitive Level
CO1	Recall the fundamentals of computer graphics and augmented reality	K1
CO2	Provide a insight of computer graphics and algorithms	K2
CO3	Apply computer graphic algorithms to solve problems	K3
CO4	Illustrate the steps to perform 2D & 3D graphic representation in applications	K4
CO5	Discuss various algorithms for scan conversion and filling of basic objects and their comparative analysis.	K5

Mapping with Programme Outcomes

COs	PSO1	PSO2	PSO3	PSO4	PSO5	PO1	PO2	PO3	PO4	PO5
CO 1	3	2	3	3	2	3	3	1	3	2
CO 2	3	3	3	3	3	3	3	3	3	3
CO 3	3	3	3	3	3	3	3	2	3	3
CO 4	3	3	3	3	3	3	3	3	3	3
CO 5	3	2	3	3	3	3	3	2	3	3

"1"– Slight(Low) Correlation
"2"– Moderate(Medium) Correlation
"3"– Substantial (High) Correlation
"-" – indicates there is no Correlation

Syllabus

UNIT	CONTENT	HOURS	COs	COGNITIVE LEVEL
I	**Computer Graphics Hardware**: Video Display Devices – Raster Scan Systems – Graphics Workstations and Viewing Systems - Input Devices – Hardcopy Devices. **Computer Graphics Software -** Coordinate Representations - Graphics Functions - Software Standards - Other Graphics Packages - Introduction to OpenGL	15	CO1, CO2, CO3, CO4, CO5	K1, K2, K3, K4, K5
II	**Attributes of Graphics Primitives:** Color and Grayscale –Line Attributes - OpenGL Line-Attribute Functions - Curve Attributes - Fill-Area Attributes - OpenGL Fill-Area Attribute Functions - Character Attributes - OpenGL Character-Attribute Functions - OpenGL Antialiasing Functions - OpenGL Query Functions - OpenGL Attribute Groups. **Implementation Algorithms for Graphics Primitives and Attributes:** Line-Drawing Algorithms - Setting Frame-Buffer Values -Circle-Generating Algorithms	15	CO1, CO2, CO3, CO4, CO5	K1, K2, K3, K4, K5
III	**Two-Dimensional Geometric Transformations**: Basic Two-Dimensional Geometric Transformations – Matrix Representations and Homogeneous Coordinates - Two-Dimensional Composite Transformations – Other Two-Dimensional Transformations. Two-Dimensional Viewing - Normalization and Viewport Transformations - Clipping Algorithms- Two-Dimensional Point Clipping - Two-Dimensional Line Clipping: Cohen-Sutherland Line Clipping- Polygon Fill-Area Clipping: Sutherland-Hodgman Polygon Clipping - Curve Clipping - Text Clipping	15	CO1, CO2, CO3, CO4, CO5	K1, K2, K3, K4, K5
IV	**Three Dimensional Geometric Transformations:** Three-Dimensional Translation - Three-Dimensional Rotation - Three-Dimensional Scaling - Other Transformation. **Visible Surface Detection Methods:** Classification of Visible Surface Detection Algorithm - Backface Detection – Depth-Buffer Method – A-Buffer Method – Scan-Line Method - Applications of Computer Graphics.	15	CO1, CO2, CO3, CO4, CO5	K1, K2, K3, K4, K5
V	**Augmented Reality**: Definition - Components of Augmented Reality - History of Augmented Reality - Augmented Reality - Differences between Augmented Reality and Virtual Reality - Difference between AR and QR Codes - Challenges with AR - Opportunities for Augmented Reality - Types of Augmented Reality - Augmented Reality Working - Augmented Reality Methods - AR Display Technology - Interaction in AR Applications	15	CO1, CO2, CO3, CO4, CO5	K1, K2, K3, K4, K5
VI	**Self Study for Enrichment** **(Not included for End Semester Examinations)** **Value of Augmented Reality**: Next User Interface - Uses of Augmented Reality: Sports, Gaming, and Entertainment, Education - Maintenance and Repair - Medicine - Business and Commerce	-	CO1, CO2, CO3, CO4, CO5	K1, K2, K3, K4, K5

Text Books

1. Donald Hearn, Pauline Baker, Warren Carithers. (2014), *Computer Graphics with Open GL*, 4th Edition, Pearson Education. Limited. **(Units I -IV)**
2. Gregory Kipper, Joseph Rampolla. (2012), Augmented Reality: *An Emerging Technologies Guide to AR*, Elsevier Science. **(Unit-V)**

Reference Books

1. Shalini Govil-pai. (2010), *Principles of Computer Graphics: Theory and Practice Using OpenGL and Maya*, Ist edition, Springer-Verlag.
2. F.S. Hill, Jr, Stephen M.Kelley. (2007), *Computer Graphics Using OpenGL*, 3rd Edition, Pearson Education
3. Jay David Bolter, Morya Engberg, Blair Maclntyre. (2021), *Reality Media Augmented & Virtual Reality*, The MIT Press, Cambridge.
4. Jonathan Linowes. (2021), *Augmented Reality with Unity AR Foundations*, Packt Publishing

Web References

1. https://nptel.ac.in/courses/106106090
2. https://archive.nptel.ac.in/courses/106/103/106103224/
3. https://doc.lagout.org/programmation/OpenGL/Computer%20Graphics%20with%20OpenGL%20%284th%20ed.%29%20%5BHearn%2C%20Baker%20%26%20Carithers%202013%5D.pdf
4. https://www3.ntu.edu.sg/home/ehchua/programming/opengl/CG_BasicsTheory.html
5. https://www.acsce.edu.in/acsce/wp-content/uploads/2020/03/CG-Module-1.pdf
6. https://dynamics.microsoft.com/en-in/mixed-reality/guides/what-is-augmented-reality-ar/
7. https://www.linkedin.com/pulse/what-value-augmented-reality-filipa-d-orey

Pedagogy

Chalk and Talk, PPT, Discussion, Assignment, Demo, Quiz and Seminar

Course Designers

1. Dr.A.R.Jasmine Begum
2. Ms.A.Sahaya Jenitha
3. Ms.S.Saranya

Semester V	Internal Marks: 25		External Marks:75	
COURSE CODE	**COURSE TITLE**	**CATEGORY**	**HOURS/ WEEK**	**CREDITS**
23UCS5DSE1C	**ARTIFICIAL INTELLIGENCE**	**DISCIPLINE SPECIFIC ELECTIVE**	**5**	**3**

Course Objective

- To understand the need of Artificial Intelligence (AI)
- To study the basic concepts on AI problems and techniques
- To apply the knowledge representation into a new situation
- To build an AI system for the small level house hold activities

Course Outcome and Cognitive Level Mapping

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

CO Number	CO Statement	Cognitive Level
CO 1	Recall the need of AI and the Knowledge representation	K1
CO 2	Understand the AI problems &AI techniques	K2
CO 3	Apply various AI techniques on demand	K3
CO 4	Analyze AI algorithms with use cases	K4
CO 5	Evaluate AI techniques for real time situations	K5

Mapping of CO with PO and PSO

COs	PSO1	PSO2	PSO3	PSO4	PSO5	PO1	PO2	PO3	PO4	PO5
CO1	3	3	3	2	2	3	3	3	2	2
CO2	3	3	2	2	3	3	3	3	3	3
CO3	3	2	3	3	3	3	3	3	3	3
CO4	3	3	3	3	3	3	3	3	3	3
CO5	2	3	3	3	3	3	3	3	3	3

"1"-Slight (Low) Correlation
"2"–Moderate (Medium) Correlation
"3"-Substantial (High) Correlation
"-"- indicates there is no Correlation.

Syllabus

UNIT	CONTENT	HOURS	COs	COGNITIVE LEVEL
I	**Artificial Intelligence:** The AI Problems – AI Technique – Criteria for Success. **Problems, Problem Spaces and Search:** Defining the problem as a State Space Search – Production System- Problem Characteristics.	13	CO1, CO2, CO3, CO4, CO5	K1, K2, K3, K4, K5
II	**Heuristic Search Techniques :** Generate and Test-Hill Climbing – Best-First Search – OR Graph – A * Algorithm – Problem Reduction – AND-OR Graphs-AO* Algorithm- Constraint Satisfaction – Means- Ends Analysis. **Knowledge Representation Issues:** Representation and Mappings – Approaches to Knowledge Representations.	17	CO1, CO2, CO3, CO4, CO5	K1, K2, K3, K4, K5
III	**Using Predicate Logic:** Representing Simple facts in Logic – Representing Instance and ISA Relationships-Computable Functions and Predicates – Resolution. **Representing Knowledge Using Rules:** Procedural versus Declarative Knowledge – Logic Programming – Forward versus Backward Reasoning.	17	CO1, CO2, CO3, CO4, CO5	K1, K2, K3, K4, K5
IV	**Symbolic Reasoning Under Uncertainty:** Introduction to Nonmonotonic Reasoning – Logics for Nonmonotonic Reasoning- Implementation Issues – Augmenting a Problem Solver. **Statistical Reasoning:** Probability and Baye's Theorem – Certainty Factors and Rule Based Systems – Bayesian Network.	13	CO1, CO2, CO3, CO4, CO5	K1, K2, K3, K4, K5
V	**Weak slot and filler structures:** Semantic Nets-Frames -**Strong slot and Filler structures:** Conceptual Dependency-Scripts-CYC **Knowledge Representation Summary:** Syntactic semantic spectrum of representation -Logic and Slot -and - Filler Structures.	15	CO1, CO2, CO3, CO4, CO5	K1, K2, K3, K4, K5
VI	**Self Study for Enrichment** **(Not included for End Semester Examinations)** **Machine Learning :** Introduction – Data Analysis and Machine Learning- Fundamental approaches-Supervised Machine Learning – Reinforcement Machine Learning – Unsupervised Machine Learning – Semi-supervised Learning **Applications of AI :** AI in ecommerce – AI in E-Tourism – AI in industry – AI in medicine	-	CO1, CO2, CO3, CO4, CO5	K1, K2, K3, K4, K5

Text Book

1. Elaine Rich, Kevin Knight, Shivashankar B Nair, (2017), *Artificial Intelligence*, 3rd edition,Tata McGraw Hill.

Reference Books

1. Rajendra Akerkar (2014), *Introduction to Artificial Intelligence*, 2nd edition,PHI Learning Pvt Ltd.
2. Stuart Russell, Peter Norvig (2010), *Artificial Intelligence: A Modern Approach*, 3rd edition ,Pearson Education

Web References

1. http://aimaterials.blogspot.com/
2. http://zsi.tech.us.edu.pl/
3. https://www.tutorialspoint.com/artificial_intelligence/
4. https://www.vssut.ac.in/lecture_notes/lecture1428643004.pdf
5. https://nptel.ac.in/courses/106105077

Pedagogy

Chalk and Talk, Group discussion, PPT, ICT

Course Designers

1. Ms.N.Girubagari
2. Ms.K.Pradeepa

Semester V	Internal Marks:40		External Marks:60	
COURSE CODE	**COURSE TITLE**	**CATEGORY**	**HOURS/ WEEK**	**CREDITS**
22UCS5SEC2P	**CISCO PACKET TRACER (P)**	**SKILL ENHANCEMENT COURSE**	**2**	**2**

Course Objective

- To understand the working principle of CISCO Packet Tracer technology
- To inculcate knowledge in configuration of switching
- To know the concepts of static and dynamic routing

Course Outcomes and Cognitive Level Mapping

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

CO Number	CO Statement	Cognitive Level
CO1	Demonstrate the installation of CISCO Packet Tracer	K2
CO2	Make use of Switch Interface	K3
CO3	Examine the need of VLAN	K4
CO4	Evaluate the router setup and static routing	K5
CO5	Assess the dynamic routing in CISCO Packet Tracer	K5

Mapping of CO with PO and PSO

CO s	PSO1	PSO2	PSO3	PSO4	PSO5	PO1	PO2	PO3	PO4	PO5
CO1	**3**	**3**	**3**	**3**	**3**	**3**	**3**	**3**	**3**	**3**
CO2	**3**	**3**	**3**	**3**	**3**	**3**	**3**	**3**	**3**	**3**
CO3	**3**	**2**	**2**	**3**	**3**	**2**	**2**	**3**	**3**	**3**
CO4	**3**	**3**	**3**	**3**	**3**	**3**	**3**	**3**	**3**	**3**
CO5	**3**	**3**	**3**	**3**	**3**	**3**	**3**	**3**	**3**	**3**

"1"–Slight(Low) Correlation "2"–Moderate(Medium)Correlation

"3"–Substantial (High) Correlation "-"indicates there is no Correlation.

List of Exercises

1. Installation of CISCO Packet Tracer
2. Configuration of CISCO Packet Tracer
3. Basic Switch Setup
4. Configuring Switch Interfaces
5. VLAN and VTP Configuration
6. Basic Router Setup
7. Configuration of Static Routes
8. Configuration of IP Routing using RIP

Web References

1. https://booksite.elsevier.com/9780123850591/Lab_Manual/Lab_04.pdf
2. https://www.networkcomputing.com/data-centers/comparing-dynamic-routing-protocols
3. https://skillsforall.com/course/getting-started-cisco-packet-tracer
4. http://freeciscolab.com/category/lab-scenarios/
5. http://freeccnalab.com/
6. https://virl.scsiraidguru.com/?page_id=858
7. https://www.packettracernetwork.com/labs/lab1-basicswitchsetup.html
8. https://archive.nptel.ac.in/courses/106/101/106101209/

Pedagogy

Power Point Presentation, Demonstration

Course Designers

1. Dr.H.Krishnaveni
2. Ms.R.Rita Jenifer

Semester: VI	Internal Marks: 40		External Marks: 60	
COURSE CODE	**COURSE TITLE**	**CATEGORY**	**HOURS/WEEK**	**CREDITS**
23UCS6CC8P	**OPEN SOURCE TECHNOLOGIES (P)**	**CP**	**5**	**3**

Course Objective

- Able to gain experience in various open source software
- Understand and implement in real time projects
- Gains an insight to develop and implement the methodologies in a project

Course Outcomes and Cognitive Level Mapping

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

CO Number	CO Statement	Cognitive Level
CO1	Understand and gains hands on experience in open source software	K2
CO2	Interpret the concepts in open source software	K3
CO3	Apply the various methodologies for problem solving in open source technology	K4
CO4	Categorize the various platforms in open source software	K5
CO5	Develop a project in open source	K6

Mapping of CO with PO and PSO

Cos	PSO1	PSO2	PSO3	PSO4	PSO5	PO 1	PO 2	PO 3	PO 4	PO 5
CO1	3	3	3	2	3	3	3	3	3	3
CO2	3	3	3	2	3	3	3	3	2	3
CO3	3	3	3	3	3	3	3	3	3	3
CO4	3	3	3	2	3	3	2	3	3	3
CO5	3	3	3	3	3	3	3	3	3	2

"1"- Slight (Low) Correlation
"2"– Moderate (Medium) Correlation
"3"- Substantial (High) Correlation
"-"- Indicates there is no Correlation

List of Exercises

1. PHP
2. Github
3. Perl
4. GIMP
5. Libreoffice

.

Web References

1. https://blog.hubspot.com/website/php-string-functions
2. https://www.w3schools.com/php/php_sessions.asp
3. https://www.geeksforgeeks.org/python-program-to-check-whether-a-number-is-prime-or-not/
4. https://speedysense.com/create-registration-login-system-php-mysql/
5. https://www.geeksforgeeks.org/python-copy-contents-of-one-file-to-another-file/
6. https://code-maven.com/slides/perl/solution-basic-calculator
7. https://www.javatpoint.com/gimp
8. https://help.libreoffice.org/latest/ro/text/sbasic/python/python_session.html

Pedagogy

Power Point Presentations, Demo by e-Contents

Course Designer

Dr. D. Radhika

Semester: VI	Internal Marks: 25		External Marks: 75	
COURSE CODE	**COURSE TITLE**	**CATEGORY**	**HOURS/WEEK**	**CREDITS**
23UCS6DSE2A	**SOFTWARE ENGINEERING**	**DSE**	**5**	**3**

Course Objective

- To provide knowledge of the various phases of Software Engineering Process
- To study the basic concepts of Software Systems, Development process and Planning Structures
- To understand how to estimate cost and its specification Techniques
- To know about risk analysis and the importance of software quality
- To inculcate knowledge on Design, Testing, Verification and Validation techniques

Course Outcomes and Cognitive Level Mapping

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

CO Number	CO Statement	Cognitive Level
CO1	Describe about Software engineering concepts and process	K1
CO2	Identify various software computing cost estimation	K2
CO3	Demonstrate the subject knowledge on coupling, cohesion, risk assessment and the important quality software	K3
CO4	Identify and apply appropriate software architectures for end-user requirements	K2, K4
CO5	Develop a simple testing report	K5

Mapping of CO with PO and PSO

Cos	PSO1	PSO2	PSO3	PSO4	PSO5	PO 1	PO 2	PO 3	PO 4	PO 5
CO1	3	3	3	2	3	3	3	3	3	3
CO2	3	3	3	2	3	3	3	3	2	3
CO3	3	3	3	3	3	3	3	3	3	3
CO4	3	3	3	2	3	3	2	3	3	3
CO5	3	3	3	3	3	3	3	3	3	2

"1"- Slight (Low) Correlation
"2"– Moderate (Medium) Correlation
"3"- Substantial (High) Correlation
"-"- Indicates there is no Correlation

Syllabus

UNIT	CONTENT	HOURS	COs	COGNITIVE LEVEL
I	**SOFTWARE AND SOFTWARE ENGINEERING** The Nature of Software- Software Engineering- The Software Process – **Software Process Models**: The Prescriptive Process Models: The Waterfall Model – Evolutionary Process Models- Prototyping Model- Spiral Model.	12	CO1 CO2 CO3	K1 K2 K3
II	**UNDERSTANDING REQUIREMENTS** Requirement Engineering-Eliciting Requirements - Building the Analysis Model-Elements of Analysis Model – **Requirements Modeling**: Requirements Analysis – Scenario-Based Modeling - **Estimation for Software Projects:** The Software Project Estimation- Decomposition Techniques - Empirical Estimation Models	12	CO1 CO2 CO3 CO4	K1 K2 K3 K4
III	**RISK MANAGEMENT** Software Risks- Risk Identification - Risk Projection - Risk Refinement- The RMMM Plan- **Quality Management**- Quality Concepts – Software Quality- Achieving Software Quality.	18	CO1 CO2 CO3 CO4 CO5	K1 K2 K3 K4 K5
IV	**DESIGN CONCEPTS** The Design Process-Design Concepts - **Architectural Design**: Software Architecture - Refining the architecture into Components - **Component Level Design**: Designing Class-Based Components.	18	CO1 CO2 CO3 CO4 CO5	K1 K2 K3 K4 K5
V	**SOFTWARE TESTING STRATEGIES** Verification and Validation- Testing strategies for conventional software - Unit Testing-Integration Testing- Validation Testing -System Testing- **Testing Conventional Applications**: Software Testing Fundamentals- White-Box Testing – Basis Path Testing- Black-Box Testing.	15	CO1 CO2 CO3 CO4 CO5	K1 K2 K3 K4 K5
VI	**Self-Study for Enrichment** **(Not included for End Semester Examinations)** **TESTING TOOLS -** Tools used for Testing- Manual Testing Vs Automation Testing- Understanding Real-time scenarios and work culture- **Overview on Automation Testing Tools**: Selenium - UFT/QTP - Appium- QTest- Bugzilla- Backlog: Easy bug tracking tool.	-	CO1 CO2 CO3 CO4 CO5	K1 K2 K3 K4 K5

Text Book

1. Roger S. Pressman and Bruce R. Maxim, Ph.D., *Software Engineering: A Practitioner's Approach*, McGraw Hill, 8th edition, 2015

Reference Books

1. Aggarwal, K.K., & Singh, Y., *Software Engineering*, 2nd edition. New Delhi: New Age International Publishers , 2012
2. Ian Sommerville, *Software , Engineering*, 9th Edition, Pearson Education Asia, 2011
3. Pankaj Jalot , *Software Engineering*, A Precise Approach", Wiley India, 2010

Web References

1. https://repository.dinus.ac.id/docs/ajar/Software_Engineering_-_Pressman.pdf
2. http://nptel.ac.in/
3. http://www.ddegjust.ac.in/studymaterial/mca-5/mca-303.pdf
4. https://intranetssn.github.io/www.ssn.net/twiki/pub/CseIntranet/CseBCS6403/PressmanBook.pdf
5. http://bigbluebutton13.unisepe.com.br/cgi/viewcontent.php?article=software.engineering
6. https://www.slideshare.net/slideshow/cs605software-engineering-practitioneru2019s-approach-by-roger-s-pressman-pdf/266523005
7. www.browserstack.com

Pedagogy

Chalk and Talk, PPT, Discussion, Assignment, Demo, Quiz, Seminar

Course Designer

Dr.A.R.Jasmine Begum

Semester: VI	Internal Marks: 25		External Marks: 75	
COURSE CODE	**COURSE TITLE**	**CATEGORY**	**HOURS/WEEK**	**CREDITS**
23UCS6DSE2B	**FUNDAMENTALS OF BIGDATA & IOT**	**DSE**	**5**	**3**

Course Objective

- To provide a strong foundation about basic concepts of Big Data
- To understand the components of Hadoop framework, HDFS and Map Reduce
- To inculcate Big Data Analytics tools
- To understand the application areas of IoT and its levels
- To understand the building blocks of Internet of Things and characteristics

Course Outcomes

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

CO Number	CO Statement	Cognitive Level
CO1	Define the basic concepts of Big Data	K1
CO2	Outline the Hadoop framework	K2
CO3	Design of Algorithms to solve problems using Map Reduce Paradigm	K3
CO4	Elucidate the application areas of the Internet of Things	K4
CO5	Explore the building blocks of IoT	K5

Mapping of CO with PO and PSO

Cos	PSO1	PSO2	PSO3	PSO4	PSO5	PO 1	PO 2	PO 3	PO 4	PO 5
CO1	3	3	3	2	3	3	3	3	3	3
CO2	3	3	3	2	3	3	3	3	2	3
CO3	3	3	3	3	3	3	3	3	3	3
CO4	3	3	3	2	3	3	2	3	3	3
CO5	3	3	3	3	3	3	3	3	3	2

"1"- Slight (Low) Correlation
"2"– Moderate (Medium) Correlation
"3"- Substantial (High) Correlation
"-"- Indicates there is no Correlation

Syllabus

UNIT	CONTENT	HOURS	COs	COGNITIVE LEVEL
I	**Overview of Big Data:** Big Data –Defining Big Data– Big Data Types–Analytics–Industry Examples of Big Data – Big Data and Data Risk – The Evolution of Big Data Architecture - The Benefits of Big Data	12	CO1 CO2 CO3	K1 K2 K3
II	**Basics of Hadoop:** Big Data and Hadoop – Hadoop Architecture – Main Components of Hadoop Framework – Analysing Big Data with Hadoop–Advantages of Hadoop - Hadoop Security Concerns – Ten Big Hadoop Platforms. **Hadoop Distributed File System:** HDFS– Architecture of Apache Hadoop HDFS- HDFS File Blocks – HDFS File Commands	12	CO1 CO2 CO3 CO4	K1 K2 K3 K4
III	**Map Reduce:** Introduction to Map Reduce– Working of Map Reduce–Map operations–A Map Reduce Program-Map Reduce User Interfaces. **HBase and Cassandra:** Introduction to HBase – Row Oriented vs. Column Oriented Data Stores– Hbase Architecture–HBase Data Model– Introduction to Cassandra – Features of Cassandra- Components of Cassandra – Cassandra Query Language – Cqlsh commands	18	CO1 CO2 CO3 CO4 CO5	K1 K2 K3 K4 K5
IV	**Introduction**–Overview of Internet of Things– Characteristics of IoT - IoT Applications- Working and Implementation of IoT – Components of an IoT System- IoT Architecture and Levels	18	CO1 CO2 CO3 CO4 CO5	K1 K2 K3 K4 K5
V	Types of Networks – IoT Technologies and Protocols – **Technologies used in IoT**: Bluetooth – WiFi – Zigbee - LoRaWAN – Communication Protocols – Building Blocks of IoT – Functional Blocks of IoT	15	CO1 CO2 CO3 CO4 CO5	K1 K2 K3 K4 K5
VI	**Self Study for Enrichment** **(Not to be included for External Examination)** IoT Design Methodology – Communication Models – Development Tools used in IoT – SDN and NFV for IoT	-	CO1 CO2 CO3 CO4 CO5	K1 K2 K3 K4 K5

Text Books

1. V.K.Jain, *Big Data and Hadoop*, Khanna Book Publishing, 2019 (Unit I– III)
2. Satish Jain, Shashi Singh, *Internet of Things and its Applications: Made Simple*, BPB Publication, 2020 (Unit IV – V)

Reference Books

1. Bart Baesens, *Analytics in a Big Data world*, Wiley Big Data Series, 2014
2. Thomas Erl Wajid Khattak and Paul Buhler, *Big Data Fundamentals: Concepts, Drivers& Techniques*, Pearson, 2016
3. Arshdeep Bahga, Vijay Madisetti, *Internet of Things A Hands-on Approach*, University Press, 2014
4. Peter Waher, *Learning Internet of Things*, Packet Publishers, 2015

Web References

1. https://www.google.co.in/books/edition/_/i6NODQAAQBAJ?hl=en&gbpv=1
2. https://hadoop.apache.org/
3. https://www.tutorialspoint.com/cassandra/index.html
4. https://www.rfwireless-world.com/IoT/IoT-Architecture-Levels.html
5. https://iotbyhvm.ooo/physical-design-of-iot
6. https://archive.nptel.ac.in/courses/106/105/106105166/

Pedagogy

Chalk and talk, PPT, Discussion, E-Contents

Course Designer

Ms. P. Muthulakshmi

Semester: VI	Internal Marks:25		External Marks:75	
COURSE CODE	**COURSETITLE**	**CATEGORY**	**HRS/WEEK**	**CREDITS**
23UCS6DSE2C	**OPEN SOURCE TECHNOLOGIES**	**DSE**	**5**	**3**

Course Objective

- Acquire the basic idea of open source technology.
- Implement the open source to met out the industry standards.
- Enable to understand the different open source software

Course Outcomes and Cognitive Level Mapping

CO Number	CO Statement	Cognitive Level
CO1	Define the concepts of basic technologies	K1
CO2	Understand the needs and principles of open source software and its impact	K2
CO3	Interpret the ideas and concepts in open source software	K3
CO4	Analyze various software in open source technology	K4
CO5	Examine the design strategies in open source software	K5

Mapping of CO with PO and PSO

Cos	PSO1	PSO2	PSO3	PSO4	PSO5	PO 1	PO 2	PO 3	PO 4	PO 5
CO1	3	3	3	2	3	3	3	3	3	3
CO2	3	3	3	3	2	2	3	3	3	3
CO3	3	3	3	3	3	3	3	2	3	3
CO4	3	3	3	3	3	3	2	3	3	3
CO5	3	3	3	3	3	3	3	2	3	3

"1"- Slight (Low) Correlation
"2"– Moderate (Medium) Correlation
"3"- Substantial (High) Correlation
"-"- Indicates there is no Correlation

Syllabus

UNIT	CONTENT	HOURS	COs	COGNITIVE LEVEL
I	**Introduction to Open-Source**: Open Source- Need and Principles of OSS-Open Source Standards-Requirements for Software- OSS success- Free Software- Examples- Licensing- Free Vs. Proprietary Software- Free Software Vs. Open Source Software-Public Domain. History of free software- Proprietary Vs Open Source Licensing Model- use of Open- Source Software-,FOSS does not mean no cost. History: BSD-The Free Software Foundation and the GNU Project.	15	CO1 CO2 CO3	K1 K2 K3
II	**Open-Source Principles And Methodology**: Open-Source History- Open Source Initiatives- Open Standards Principles- Methodologies-Philosophy-Software freedom- Open-Source Software Development- Licenses- Copyright vs. Copy left-Patents- Zero marginal cost, Income- generation Opportunities- Internationalization. Licensing: License-create your own Licenses- Important FOSS Licenses (Apache, BSD, PL, LGPL)- copyrights and copy lefts, Patent.	15	CO1 CO2 CO3 CO4	K1 K2 K3 K4
III	**Open-Source Projects:** Starting and maintaining own Open-Source Project- Open-Source Hardware- Open-Source Design- Open-source Teaching- Opensource media- Collaboration: Community and Communication-Contributing to Open Source Projects-Introduction to GitHub-interacting with the community on GitHub-Communication and etiquette- testing open-source code-reporting issues- contributing code-Introduction to Wikipedia, contributing to Wikipedia.	15	CO1 CO2 CO3 CO4 CO5	K1 K2 K3 K4 K5
IV	**Open-Source Ethics And Social Impact:** Open source vs. closed source-Open-source Government- Ethics of Open-source- Social and Financial impacts of open-source technology- Shared Software- Shared source-Open Source as a Business Strategy	15	CO1 CO2 CO3 CO4 CO5	K1 K2 K3 K4 K5
V	**Understanding Open-Source Ecosystem:** Open-Source Operating Systems: GNU/Linux- Android- Free BSD- Open Solaris. Open-Source Hardware-Virtualization Technologies-Containerization Technologies: Docker- Development tools-IDEs-Debuggers, Programming languages like PHP-Perl and python- LAMP- Open-Source Database technologies **Case Studies**: Example Projects: Apache Web server-BSD-GNU/Linux- Android-Mozilla (Firefox)-Wikipedia- Drupal- WordPress-Git-GCC- GDB-GitHub- Open Office- LibreOffice	15	CO1 CO2 CO3 CO4 CO5	K1 K2 K3 K4 K5
VI	**Self Study for Enrichment** **(Not to be included for External Examination)** Understanding the developmental models- licensing-mode of funding- commercial/non-commercial use.	-	CO1 CO2 CO3 CO4 CO5	K1 K2 K3 K4 K5

Text Book

1. Kailash Vadera, Bhavyesh Gandhi, *Open Source Technology*, Laxmi Publications Pvt Ltd 2012, 1st Edition. (Unit I-IV)
2. Fadi P. Deek and James A. M. McHugh(2007). *Open Source: Technology and Policy*, Cambridge Universities Press. (Unit-V)

Reference Books

1. Steve Weber(2004).*The Success of Open Source*,1st Edition, Harvard University Press.
2. Vicky Brasseur(2018).*Forge Your Future with Open Source: Build Your Skills. Build Your Network. Build the Future of Technology* ,1stEdition, Pragmatic Bookshelf.

Web References

1. https://www.coursera.org/learn/open-source-software-development-method
2. https://opensource.com/resources/what-open-source
3. https://www.simplilearn.com/top-open-source-technologies
4. https://www.synopsys.com/glossary/what-is-open-source-software.html
5. https://opensource.org/
6. http://www.docker.com.
7. https://help.github.com/

Pedagogy

Chalk and Talk, PPT, Discussion, Assignment, Demo, Quiz and Seminar.

CourseDesigner

Dr. D. Radhika

Semester: VI	Internal Marks: -		External Marks:100	
COURSE CODE	**COURSETITLE**	**CATEGORY**	**HRS/WEEK**	**CREDITS**
22UCS6PW	**PROJECT WORK**	**PROJECT**	**5**	**4**

Course Objective

- To build problem solving ability and technical skills through the application of theoretical concepts for modeling the real world problems using latest technologies

Course Outcomes and Cognitive Level Mapping

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

CO Number	CO Statement	Cognitive Level
CO1	Apply the knowledge gained through various courses in solving a real life problem	K3
CO2	Demonstrate the different phases of software/system development life cycle	K2
CO3	Use time and resource management	K3
CO4	Develop programs accustomed to professional environment and/or style typical of a global IT industry	K3
CO5	Analyze different testing strategies for project evaluation	K4

Mapping of CO with PO and PSO

Cos	PSO1	PSO2	PSO3	PSO4	PSO5	PO 1	PO 2	PO 3	PO 4	PO 5
CO1	3	3	3	2	3	3	3	3	3	3
CO2	3	3	3	3	2	2	3	3	3	3
CO3	3	3	3	3	3	3	3	2	3	3
CO4	3	3	3	3	3	3	2	3	3	3
CO5	3	3	3	3	3	3	3	2	3	3

"1"- Slight (Low) Correlation
"2"– Moderate (Medium) Correlation
"3"- Substantial (High) Correlation
"-"- Indicates there is no Correlation

Project Evaluation

The project work shall be done by either an individual or a group of students. Two components willbe considered in assessing the project work:

- Dissertation
- Viva Voce

The Dissertation/Project work submitted will be evaluated based on the following components:

- Problem Identification
- Domain Knowledge
- Documentation
- Presentation