

CAUVERY COLLEGE FOR WOMEN(AUTONOMOUS)

Nationally Accredited with 'A⁺' Grade by NAAC

TIRUCHIRAPPALLI



PG DEPARTMENT OF INFORMATION TECHNOLOGY

SYLLABUS

2024 - 2025



CAUVERY COLLEGE FOR WOMEN (AUTONOMOUS)

Nationally accredited (III Cycle) with “A” Grade

ISO 9001:2015 Certified

Annamalai Nagar, Tiruchirappalli – 18

DEPARTMENT OF INFORMATION TECHNOLOGY

Vision

The Department of Information Technology envisions to create technically competent, skilled intellectual IT professionals, efficient problem solvers, innovators and entrepreneurs to meet the current challenges of the modern computing industry.

Mission

- To provide quality education and elevate the students towards higher educational programs
- To encourage and guide the students to improve their competency skills in information technology market

To equip the students to cater the industrial demands through providing advance training



UG Programme Structure (Science)

Cauvery College for Women (Autonomous)

Department of Information Technology

B.Sc Information Technology

LEARNING OUTCOME BASED CURRICULUM

FRAMEWORK (CBCS – LOCF)

(For the Candidates admitted from the Academic year 2024-2025 and onwards)

Sem	Part	Course	Course Title	Course Code	Inst. Hrs.	Credits	Exam			Total
							Hrs	Marks		
								Int	Ext	
I	I	Language Course -I (LC)	பொதுத்தமிழ் - I	25ULT1	6	3	3	25	75	100
			Hindi Ka Samanya Gyan aur Nibandh	23ULH1						
			Poetry, Grammar and 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)	Programming in C	23UIT1CC1	5	5	3	25	75	100
				Core Practical - I (CP)	C Programming (P)	23UIT1CC1P	3	3	3	40
		First Allied Course-I(AC)	Essential Mathematics	22UIT1AC1	4	3	3	25	75	100
				First Allied Course-II(AC)	Numerical Analysis and Statistics	22UIT1AC2	4	3	3	25
	IV	Ability Enhancement Compulsory Course-I (AECC)	Value Education	23UGVE	2	2		100		100
Total					30	22				700

Sem	Part	Course	Course Title	Course Code	Inst. Hrs. / week	Credits	Exam			Total	
							Hrs	Marks			
								Int	Ext		
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)	Data Structures and Algorithms	23UIT2CC2	4	4	3	25	75	100	
		Core Practical - II (CP)	Data Structures using C(P)	23UIT2CC2P	2	2	3	40	60	100	
		Core Course-III (CC)	Digital Fundamentals	22UIT2CC3	4	4	3	25	75	100	
		First Allied Course-III (AC)	Operations Research	22UIT2AC3	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

Sem	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							
			Prose, Grammar and History of Sanskrit Literature	23ULS3							
			Intermediate French - I	22ULF3							
	II	English Language Course- II(ELC)	Learning Grammar Through Literature- I	23UE3	6	3	3	25	75	100	
	III	Core Course– IV(CC)	Relational Database Management Systems	23UIT3CC4	6	5	3	25	75	100	
			Core Practical - III(CP)	RDBMS (P)	22UIT3CC3P	3	3	3	40	60	100
		III	Second Allied Course- I(AC)	Financial Accounting	22UIT3AC4	3	3	3	25	75	100
			Second Allied Course-II(AP)	Computer Applications in Business (P)	23UIT3AC5P	3	3	3	40	60	100
	IV	Ability Enhancement Compulsory Course- IV (AECC)	Health and Wellness	24UGHW	2*	1	-	100		100	
			Generic Elective Course- I (GEC)	Introduction to NCC	24UNC3GEC1	2	2	2	-	100	100
		Web Design		22UIT3GEC1	3			25	75		
		Basic Tamil - I		22ULC3BT1							
	Special Tamil - I	22ULC3ST1									
	Extra Credit Course	SWAYAM		As per UGC Recommendation							
Total					30	23				800	

Sem	Part	Course	Course Title	Course Code	Inst. Hrs. / week	Credits	Exam			Total		
							Hrs	Marks				
								Int	Ext			
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 – V(CC)	Programming in JAVA	23UIT4CC5	6	5	3	25	75	100		
				Core Practical – IV(CP)	Programming in JAVA(P)	24UIT4CC4P	4	3	3	40	60	100
				Second Allied Course-III(AC)	Business Communication	22UIT4AC6	4	3	3	25	75	100
	IV	Generic Elective Course II-(GEC)	Specialization in Army	24UNC4GEC2	2	2	3	2	-	100	100	
				Web Design (P)				22UIT4GEC2P	3	40		60
				Basic Tamil – II				22ULC4BT2	25	75		
				Special Tamil – II				22ULC4ST2				
Skill Enhancement Course – I(SEC)		PC Packages (P)	22UIT4SEC1P	2	2	3	40	60	100			
Extra Credit Course	SWAYAM			As per UGC Recommendation								
Total					30	21				700		
30 Days INTERNSHIP during Semester Holidays												

Sem	Part	Course	Course Title	Course Code	Inst. Hrs. / week	Credits	Exam			Total
							Hrs	Marks		
								Int	Ext	
V	III	Core Course – VI(CC)	Operating Systems	23UIT5CC6	6	5	3	25	75	100
		Core Course - VII(CC)	Programming in Python	23UIT5CC7	6	5	3	25	75	100
		Core Practical – V(CP)	Programming in Python (P)	23UIT5CC5P	4	3	3	40	60	100
		Core Course – VIII(CC)	Software Engineering	22UIT5CC8	5	5	3	25	75	100
		Discipline Specific Elective – I(DSE)	A) Mobile Application Development	23UIT5DSE1A	5	3	3	25	75	100
			B) Big Data Analytics	23UIT5DSE1B						
			C) Cloud Computing	23UIT5DSE1C						
	Internship	Internship	24UIT5INT		2	-	-	100	100	
	IV	Ability Enhancement Compulsory Course-IV (AECC)	UGC Jeevan Kaushal - Professional Skills	22UGPS	2	2	-	100	-	100
		Skill Enhancement Course – II(SEC)	Cloud Computing (P)	22UIT5SEC2P	2	2	3	40	60	100
	Extra Credit Course	SWAYAM		As per UGC Recommendation						
Total					30	27				800

Sem	Part	Course	Course Title	Course Code	Inst. Hrs. / week	Credits	Exam			
							Hrs	Marks		
								Int	Ext	
VI	III	Core Course – IX(CC)	Computer Networks	23UIT6CC9	6	5	3	25	75	100
		Core Course– X(CC)	Web Technologies	24UIT6CC10	6	5	3	25	75	100
		Core Course– XI(CC)	Cyber Security	22UGCS	5	4	3	25	75	100
		Core Practical – VI(CP)	Web Technologies (P)	22UIT6CC6P	3	3	3	40	60	100
		Discipline Specific Elective – II (DSE)	A. Internet of Things	23UIT6DSE2A	5	3	3	25	75	100
			B.C# Programming	23UIT6DSE2B						
	C. Artificial Intelligence & Expert Systems		23UIT6DSE2C							
	Project Work	Project Work	24UIT6PW	4	3	-	-	100	100	
	IV	Gender Studies	Gender Studies	22UGGS	1	1	-	100	100	
	V	Extension activity		22UGEA	0	1	0	-	-	-
Total					30	25				700
Grand Total					180	140				4500

Semester I	Internal Mark: 25		External Mark: 75	
COURSE CODE	COURSE TITLE	CATEGORY	Hrs/Week	CREDITS
23UIT1CC1	PROGRAMMING IN C	CORE COURSE – I (CC)	5	5

Course Objectives

- To familiarize the students with the understanding of code organization
- To improve the programming skills
- Learning the basic programming constructs.

Course Outcomes and Cognitive Level Mapping

CO Number	Course Outcome	Cognitive Level
CO1	Outline the fundamental concepts of C programming languages, and its features	K1
CO2	Demonstrate the programming methodology.	K2
CO3	Identify suitable programming constructs for problem solving.	K3
CO4	Select the appropriate data representation, control structures, functions and concepts based on the problem requirement.	K4
CO5	Evaluate the program performance by fixing the errors.	K5

Mapping of CO with PO and PSO

	PSO1	PSO2	PSO3	PSO4	PSO5	PO1	PO2	PO3	PO4	PO5
CO1	2	2	3	2	1	2	2	2	3	2
CO2	3	2	3	2	2	3	3	2	3	2
CO3	3	3	3	2	2	3	3	2	3	3
CO4	3	2	3	2	3	2	2	2	3	3
CO5	3	3	3	2	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	Studying Concepts of Programming Languages- Language Evaluation Criteria - Language design - Language Categories - Implementation Methods – Programming Environments - Overview of C: History of C- Importance of C- Basic Structure of C Programs- Executing a C Program- Constants, Variables and Data types - Operators and Expressions - Managing Input and Output Operations	15	CO1, CO2, CO3, CO4, CO5	K1, K2, K3, K4, K5
II	Decision Making and Branching: Decision making with If, simple IF, IF ELSE, nested IF ELSE , ELSE IF ladder, switch, GOTO statement. Decision Making and Looping: While, Do-While, For, Jumps in loops. Arrays - Character Arrays and Strings	15	CO1, CO2, CO3, CO4, CO5	K1, K2, K3, K4, K5
III	User Defined Functions: Elements of User Defined Functions- Definition of Functions- Return Values and their Types- Function Call- Function Declaration- Categories of Functions- Nesting of Functions-Recursion	15	CO1, CO2, CO3, CO4, CO5	K1, K2, K3, K4, K5
IV	Structures and Unions: Introduction- Defining a Structure- Declaring Structure Variables Accessing Structure Members- Structure Initialization- Arrays of Structures- Arrays within Structures- Unions- Size of Structures	15	CO1, CO2, CO3, CO4, CO5	K1, K2, K3, K4, K5
V	Pointers: Understanding Pointers- Accessing the Address of a Variable- Declaring Pointer Variables- Initializing of Pointer Variables- Accessing a Variable through its Pointer- Chain of Pointers- Pointer Expressions- Pointer and Scale Factor- Pointer and Arrays- Pointers and Character Strings- Array of Pointers- Pointer as Function Arguments- Functions Returning Pointers- Pointers to Functions-Memory model-File Management in C	15	CO1, CO2, CO3, CO4, CO5	K1, K2, K3, K4, K5

VI	<p>Self Study for Enrichment (Not included for End Semester Examinations)</p> <p>Algorithm- Flowchart- Develop algorithms for real time scenario- Simple expressions- Conversion programs- swapping numbers (with and without using temporary variable).</p> <p>Programs for checking eligibility-Triangle formation-Sum of series-Array manipulations (Sorting, searching, insert, delete and merging)-String handling programs- Dynamic memory management using pointers- Employee pay bill preparation, Student mark list using Files.</p>	-	CO1, CO2, CO3, CO4, CO5	K1, K2, K3, K4, K5
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Textbooks

1. Robert W. Sebesta, (2012), —Concepts of Programming Languages, Fourth Edition, Addison Wesley (Unit I : Chapter – 1)
2. E. Balaguruswamy, (2010), —Programming in ANSI C, Fifth Edition, Tata McGraw Hill Publications.

References

1. Ashok N. Kamthane, Amit Ashok Kamthane (2015). Programming in C, 3rd Edition, Pearson India Education Services Pvt. Ltd.
2. Byron Gottfried, (2010), —Programming with C, Schaums Outline Series, Tata McGraw Hill Publications

Web References

1. <https://www.learn-c.org/>
2. <https://www.cprogramming.com/>
3. <https://www.tutorialspoint.com/cprogramming/index.html>
4. <http://www.programiz.com/c-programming>
5. <http://www.programmingsimplified.com/c-program-examples>

Pedagogy

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

Course Designer

1. Dr. M. Anandhi, Associate Professor, Department of Information Technology.

Semester I	Internal Mark: 40		External Mark: 60	
COURSE CODE	COURSE TITLE	CATEGORY	Hrs/Week	CREDITS
23UIT1CC1P	C PROGRAMMING (P)	CORE COURSE- I (CP)	3	3

Course Objectives

- The Course aims to provide exposure to problem-solving through C programming
- It aims to train the student to the basic concepts of the C -Programming language
- Apply different concepts of C language to solve the problem

Course Outcomes and Cognitive Level Mapping

CO Number	CO Statement	Cognitive Level
CO1	Demonstrate the understanding of syntax and semantics of C programs.	K1
CO2	Identify the problem and solve using C programming techniques.	K2
CO3	Identify suitable programming constructs for problem solving.	K3
CO4	Analyze various concepts of C language to solve the problem in an efficient way.	K4
CO5	Develop a C program for a given problem and test for its correctness.	K5

Mapping with Programme Outcomes

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

“1” – Slight (Low) Correlation

“3” – Substantial (High) Correlation

“2” – Moderate (Medium) Correlation

“-” indicates there is no correlation.

Syllabus

1. Programs using Input/ Output functions
2. Programs on conditional structures
3. Command Line Arguments
4. Programs using Arrays
5. String Manipulations
6. Programs using Functions
7. Recursive Functions
8. Programs using Pointers
9. Files
10. Programs using Structures & Unions

Text Book

1. E. Balagurusamy, Programming in ANSI C, Fifth Edition, Tata McGraw-Hill, 2010.

Reference Books

- 1 Byron Gottfried, Schaum's Outline Programming with C, Fourth Edition, Tata McGraw-Hill, 2018.
2. Kernighan and Ritchie, The C Programming Language, Second Edition, Prentice Hall, 1998.
3. Yashavant Kanetkar, Let Us C, Eighteenth Edition, BPB Publications, 2021

Web References

1. <https://www.tutorialspoint.com/cprogramming>
2. <https://www.javatpoint.com/c-programming-language-tutorial>
3. <https://www.w3schools.in/category/c-tutorial>

Course Designer

Dr. M. Anandhi, Associate Professor, Department of Information Technology

Semester I	Internal Marks : 25		External Marks : 75	
COURSE CODE	COURSE TITLE	CATEGORY	Hrs/Week	CREDITS
22UCS1AC1/ 22UCA1AC1/ 22UIT1AC1	ESSENTIAL MATHEMATICS	ALLIED	4	3

Course Objectives

- **Apply** the basic concepts of Differentiation, Integration and their applications.
- **Compute** mathematical quantities using ordinary and partial differential equations.
- **Explore** fundamental concepts in graph theory.

Course Outcomes

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

CO Number	CO Statement	Cognitive Level
CO1	Remember and recall the basic concept of essential mathematics.	K1
CO2	Illustrate the various notions in the respective streams.	K2
CO3	Apply the different terminologies of essential mathematics.	K3
CO4	Classify the solution of mathematical problems using various techniques.	K4
CO5	Examine the solution of mathematical 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	3	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
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	<p>Matrices Matrix - Special types of matrices - Scalar multiplication of a matrix - Equality of matrices - Addition of matrices - Subtraction - Multiplication of Matrices - Inverse matrix- Relation between adjoint and inverse matrices - Solution of simultaneous equations - Rank of a matrix - A system of m homogeneous linear equations in n unknowns - System of non-homogeneous linear equations - Eigen values and Eigenvectors - Similar matrices- Cayley-Hamilton Theorem (proof not needed) - Simple applications only</p>	12	CO1, CO2, CO3, CO4, CO5	K1, K2, K3, K4
II	<p>Differentiation Maxima and Minima (Problems Only) -Points of inflexion. Partial differentiation Functions of function rule - Total Differential Coefficient - A Special case - Implicit Functions - Homogeneous functions - Euler's Theorem- (proof not needed) - Simple problems only.</p>	12	CO1, CO2, CO3, CO4, CO5	K1, K2, K3, K4
III	<p>Integration Integration of Rational algebraic functions - Rule (a) - Rule (b): Type $\int \frac{ax^2+bx+c}{x^2+px+q} dx$ Type 11: $\int \frac{ax^2+bx+c}{x^2+px+q} dx$ - Integration of Irrational functions : Case (ii) Integration of the form $\int \frac{ax^2+bx+c}{x^2+px+q} dx$ - Type $\int \frac{ax^2+bx+c}{x^2+px+q} dx$ - Properties of definite integrals.</p>	12	CO1, CO2, CO3, CO4, CO5	K1, K2, K3, K4
IV	<p>Differential Equations Linear Differential Equation with constant coefficients - The Operators D and D^{-1} - Particular Integral - Special methods of finding P.I.: Xis of the form (a) e^{ax} (b) $\cos ax$ or $\sin ax$, where a is a constant (c) x^m (a power of x), m being a positive integer (d) $e^{ax}V$, where V is any function of x.</p>	12	CO1, CO2, CO3, CO4, CO5	K1, K2, K3, K4
V	<p>Graph Theory Introduction - Definition of Graphs - Applications of Graphs - Finite and infinite graphs - Incidence and Degree - Isolated Vertex, Pendant Vertex and Null Graph.</p>	12	CO1, CO2, CO3, CO4, CO5	K1, K2, K3, K4

	Path and Circuits Isomorphism - Subgraphs - Walks, Paths and Circuits - Connected Graphs, Disconnected Graphs and Components - Euler graphs.			
VI	Self-Study for Enrichment (Not included for End Semester Examination) Symmetric matrix - Skew symmetric matrix - Hermitian and skew Hermitian matrices Concavity and Convexity- Integration by parts - Linear equation - Hamiltonian Paths and Circuits.	-	CO1, CO2, CO3, CO4, CO5	K1, K2, K3, K4

Textbooks

1. T.K.Manicavachagom Pillay, T.Natarajan, K.S.Ganapathy.(2015). Algebra, Volume
2. II. S. Viswanathan (Printers & Publishers) Pvt., Ltd.
3. S.Narayanan, T.K.Manicavachagom Pillay.(2015).Calculus,Volume I.
S. Viswanathan (Printers & Publishers) Pvt., Ltd.
4. S.Narayanan, T.K.Manicavachagom Pillay.(2015).Calculus,Volume II.
S. Viswanathan (Printers & Publishers) Pvt., Ltd.
5. S.Narayanan, T.K.Manicavachagom Pillay.(2015).Calculus,Volume III.
S. Viswanathan (Printers & Publishers) Pvt., Ltd.
6. Narsingh Deo. (2003). *Graph Theory with applications to Engineering and Computer.*
Prentice Hall of India Private Limited

UNIT-I	Chapter 2: Section 1 to 5, 7, 8, 10 to 16[1]
UNIT-II	Chapter V: Section 1.1 to 1.5[2] Chapter VIII: Section 1.2 to 1.6[2]
UNIT-III	Chapter 1: Section 7.1 to 7.3, 8 (CASE II), 9, 11[3]
UNIT-IV	Chapter 2: Section 1 to 4[4]
UNIT-V	Chapter 1: Section 1.1 to 1.5[5] Chapter 2: Section 2.1, 2.2, 2.4 to 2.6[5]

Reference Books

1. A.Singaravelu. (2003). *Allied Mathematics.* AR.Publications
2. P.R.Vittal. (2014). *Allied Mathematics.* Margham Publications, Chennai.
3. S.Arumugam and S.Ramachandran.(2006). *Invitation to Graph Theory.* Sci Tech Publications (India) Pvt Ltd., Chennai

Weblinks

1. <https://youtu.be/rowWM-MiiXU>
2. <https://youtu.be/fOyxWaOnrgl>
3. <https://youtu.be/pvLi1s7S0tk>
4. https://youtu.be/Gxr3AT4NY_0
5. <https://youtu.be/xlbbefbYLzg>
6. <https://youtu.be/bORJkIBhfEM>
7. <https://youtu.be/s5KZw1EpBEo>

Pedagogy

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

Course Designers

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

Semester I	Internal Marks: 25		External Marks:75	
COURSE CODE	COURSE TITLE	CATEGORY	Hrs / Week	CREDITS
22UCS1AC2/ 22UCA1AC2/ 22UIT1AC2	NUMERICAL ANALYSIS AND STATISTICS	ALLIED	4	3

Course Objectives

- **Understand** the implementation of various methods of Numerical Analysis.
- **Organize** and **summarize** the statistical data.
- **Analyze** and **evaluate** the strengths of the conclusions based on data.

Course Outcomes

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

CO Number	CO Statement	Cognitive Level
CO1	Understand the list of basic ideas of Numerical Methods and Statistics.	K1, K2
CO2	Solve the problems using various methods and also classify the given datas.	K2, K3
CO3	Identify the conceptual collection and classification of variables.	K3
CO4	Analyze the accuracy and graphical representation of statistical datas.	K4
CO5	Support the implementation of numerical methods and statistical datas.	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	3	2
CO2	3	3	2	2	2	3	2	3	2	3
CO3	2	3	3	2	2	2	3	3	2	3
CO4	3	2	3	2	2	3	3	2	3	2
CO5	3	3	2	3	3	3	2	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	<p>Solution of Algebraic & Transcendental Equations:</p> <p>Introduction – The Bisection Method – The Iteration Method – Newton-Raphson Method (Problems Only)</p> <p>Interpolation: Finite Differences: Forward Differences, Backward Differences – Newton’s Formulae for Interpolation – Interpolation with unevenly spaced Points: Lagrange’s Interpolation formula</p>	12	CO1, CO2, CO3, CO4, CO5	K1, K2, K3, K4
II	<p>Numerical Integration:</p> <p>Numerical Integration: Simpson’s 1/3-Rule – Simpson’s 3/8-Rule (proof not needed).</p> <p>Linear Systems of Equations: Solution of Linear Systems–Direct Methods: Gaussian Elimination Method – Solutions of Linear Systems – Iterative Methods (Problems Only)</p>	12	CO1, CO2, CO3, CO4, CO5	K1, K2, K3, K4
III	<p>Numerical solution of Ordinary Differential Equations:</p> <p>Introduction – Euler’s Method – Modified Euler’s Method – Runge-Kutta Methods – Predictor - Corrector Methods : Adams-Moulton Method</p>	12	CO1, CO2, CO3, CO4, CO5	K1, K2, K3, K4
IV	<p>Measures of Central Tendency:</p> <p>Arithmetic Mean – Median – Mode – Geometric Mean – Harmonic Mean.</p> <p>Measures of Dispersion: Mean Deviation – Standard Deviation (Simple Problems Only)</p>	12	CO1, CO2, CO3, CO4, CO5	K1, K2, K3, K4
V	<p>Correlation:</p> <p>Introduction – Meaning of Correlation – Scatter Diagram – Karl Pearson’s co-efficient of Correlation – Rank Correlation: Spearman’s Rank Correlation Coefficient (Derivation not needed and Simple Problems Only).</p> <p>Linear Regression: Introduction – Linear Regression (Derivation not needed and Simple Problems Only)</p>	12	CO1, CO2, CO3, CO4, CO5	K1, K2, K3, K4
VI	<p>Self Study for Enrichment: (Not included for End Semester Examination)</p> <p>The method of False Position & Central Differences - Trapezoidal rule - Solution by Taylor’s Series and Milne’s Method - Range – Quartile Deviation - Rank Correlation (Repeated Ranks).</p>	-	CO1, CO2, CO3, CO4, CO5	K1, K2, K3, K4

Text Books

1. Sastry S. S. (1998). Introductory methods of Numerical Analysis, Third Edition. Prentice Hall of India Private Limited.
2. Gupta. S.C & Kapoor, V.K (2007). Fundamentals of Mathematical Statistics. Sultan Chand & sons, New Delhi.

UNIT – I Chapter 2: Sections 2.1 - 2.3(Omit 2.3.1), 2.5(Omit 2.5.1) [1]

Chapter 3: Sections 3.3 (Omit 3.3.4), 3.6, 3.9(3.9.1 only) [1]

UNIT – II Chapter 5: Sections 5.4(5.4.2 & 5.4.3 only) [1]

Chapter 6: Sections 6.3(6.3.2 only) & 6.4 [1]

UNIT – III Chapter 7: Sections 7.1, 7.4- 7.6 (Omit 7.4.1 & 7.6.2) [1]

UNIT – IV Chapter 2: Sections 2.5 - 2.9, 2.13 (Omit 2.13.1 & 2.13.2) [2]

UNIT –V Chapter 10: Sections 10.1 - 10.4, 10.7(10.7.1 Only) [2]

Chapter 11: Sections 11.1 & 11.2 [2]

Reference Books

1. Jain M. K, Iyengar S. R.K. and Jain R.K. (1999). Numerical Analysis Numerical Methods for Scientific and Engineering Computations. New Age International Private Limited.
2. Froberg C.E. (1979). Introduction to Numerical Analysis. II Edition. Addison Wesley

Web Links

1. <https://youtu.be/qCzUXav5Nk>
2. <https://youtu.be/r6MTvrI8SQ4>
3. <https://youtu.be/s05dONL4xAs>
4. <https://youtu.be/XaHFNhHfXwQ>
5. <https://youtu.be/zPG4NjIkCjc>

Pedagogy

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

Course Designers

1. Dr. R. Buvanewari
2. Ms. A. Gowri Shankari

Semester II	Internal Mark: 25		External Mark: 75	
COURSE CODE	COURSE TITLE	CATEGORY	Hrs/Week	CREDITS
23UIT2CC2	DATA STRUCTURES AND ALGORITHMS	CORE COURSE – II (CC)	4	4

Course Objectives

- To provide the knowledge of basic data structures and their implementations.
- To understand the importance of data structures in the context of writing efficient programs.
- To develop skills to apply appropriate data structures in problem solving.

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	Understand the abstract data types and basics of Algorithms	K1
CO2	Demonstrate the performance of basic linear and nonlinear data structures	K2
CO3	Implement the basic data structures and Algorithm design techniques	K3
CO4	Analyze the efficiency of Algorithms	K4
CO5	Assess, evaluate and choose appropriate data structure and algorithmic technique to solve the real-world problems	K5

Mapping of CO with PO and PSO

	PSO1	PSO2	PSO3	PSO4	PSO5	PO1	PO2	PO3	PO4	PO5
CO1	3	2	2	1	2	3	2	1	2	2
CO2	2	2	3	2	2	1	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 no correlation.

Syllabus

UNIT	CONTENT	HOURS	COs	COGNITIVE LEVEL
I	Introduction-Basic Terminology-Data Structures-Data Structures Operation-Abstract Data Types (ADT)- Algorithms: Complexity, Time-Space Tradeoff. Arrays: Representation of Arrays- Linear Arrays - Insertion – Deletion and Traversal of a Linear Array - Array as an Abstract Data Type.	12	CO1 CO2 CO3 CO4 CO5	K1 K2 K3 K4 K5
II	Stacks: Array and Linked Representation of Stack-Prefix-Infix and Postfix Arithmetic Expressions-Conversion-Evaluation of Postfix Expressions. Queues: Definition-Linked Representation of Queue - The Queue Abstract Data Type-Circular Queues.	12	CO1 CO2 CO3 CO4 CO5	K1 K2 K3 K4 K5
III	Linked list: Introduction- Linked Lists – Representation of Linked Lists in Memory – Traversing a Linked List – Searching a Linked List – Insertion into and Deletion from a Linked List. Trees: Introduction - Binary Trees – Representing Binary Trees in Memory - Binary Tree Traversals — Binary Search Tree – Searching, Inserting and Deleting in Binary Search Trees.	12	CO1 CO2 CO3 CO4 CO5	K1 K2 K3 K4 K5
IV	Sorting and Searching: Sorting: Introduction-Insertion Sort- Selection Sort – Merge Sort - Quick Sort. Searching: Linear Search- Binary Search	12	CO1 CO2 CO3 CO4 CO5	K1 K2 K3 K4 K5
V	Graphs: Introduction – Graph Theory Terminology – Sequential Representation of Graphs- Warshall’s Algorithm – Linked Representation of Graphs – Operations on Graph - Graph Traversals.	12	CO1 CO2 CO3 CO4 CO5	K1 K2 K3 K4 K5
VI	Self Study for Enrichment (Not included for End Semester Examinations) Multi Dimensional Array-Recursion - Traversal Algorithms using Stacks Dequeue- Bubble Sort– Topological Sort.	-	CO1 CO2 CO3 CO4 CO5	K1 K2 K3 K4 K5

Textbook

1. Data Structures with C, Seymour Lipschutz (Schaum's Outlines), 2011, McGraw Hill Education Pvt. Ltd.,

Reference Books

1. Ellis Horowitz, Sartaj Sahni and Susan and Rewson-Freed(2008), Fundamentals of Data Structures in C, 2nd Edition, Universities Press

2. ISRD Group, (2009). Data Structures Using, Tata McGraw Hill Education Pvt. Ltd, New Delhi.

Web References

1. <https://www.geeksforgeeks.org/data-structures>
2. https://www.tutorialspoint.com/data_structures_algorithms/index.html
3. <https://ocw.mit.edu/courses/6-006-introduction-to-algorithms-spring-2020/>

Pedagogy

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

Course Designer

1. Dr. A. Bhuvaneshwari, Associate Professor, Department of Information Technology.
2. Dr. P. TamilSelvi, Associate Professor, Department of Information Technology

Semester II	Internal Mark: 40		External Mark: 60	
COURSE CODE	COURSE TITLE	CATEGORY	Hrs/Week	CREDITS
23UIT2CC2P	DATA STRUCTURES USING C (P)	CORE PRACTICAL – II (CP)	2	2

Objectives

- To develop and execute C programs for various data structures
- To apply the knowledge of programming features
- To Implement various Algorithms

Course Outcomes and Cognitive Level Mapping

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 with Programme Outcomes

COs\POs	PSO1	PSO2	PSO3	PSO4	PSO5	PO1	PO2	PO3	PO4	PO5
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	2	2
CO5	3	3	3	2	3	3	3	2	2	2

Syllabus

1. Stack implementation
2. Operations on Queue
3. Linked List
4. Binary Tree Traversal
5. Operations of Graph
6. Sorting
7. Searching

Course Designer

1. Dr. A. Bhuvaneshwari, Associate Professor, Department of Information Technology.
2. Dr. P. Tamil Selvi, Associate Professor, Department of Information Technology.

Semester II	Internal Mark: 25		External Mark: 75	
COURSE CODE	COURSE TITLE	CATEGORY	Hrs/Week	CREDITS
22UIT2CC3	DIGITAL FUNDAMENTALS	CORE COURSE – III (CC)	4	4

COURSE OBJECTIVES

- To provide knowledge on various number systems
- To inculcate the concepts of Boolean algebra
- To make the students learn combinational circuits
- To make the students learn combinational circuits

COURSE OUTCOMES

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

CO Number	CO Statement	Knowledge Level
CO1	Understand the basics of digital logic	K1
CO2	Apply the conversion of number system	K3
CO3	Apply the Boolean algebra to generate digital circuits	K3
CO4	Design combinational circuits using gates	K5
CO5	Construct sequential circuits using registers	K4

Mapping with Programme Specific Outcomes and Programme Outcomes

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

“1” – Slight (Low) Correlation

“3” – Substantial (High) Correlation

“2” – Moderate (Medium) Correlation

“-” indicates there is no correlation.

Syllabus

UNIT	CONTENT	HOURS	COs	COGNITIVE LEVEL
I	<p>NUMBER SYSTEMS AND CODES:</p> <p>Binary Number System – Binary to Decimal Conversion – Decimal to Binary Conversion – Binary Addition and Subtraction – Binary subtraction by 1’s and 2’s complement – 9’s and 10’s complement Binary Multiplication and Division – Octal Numbers – Hexadecimal Numbers – Binary Codes – 8421 code - Error Detecting and Correcting Codes.</p>	12	CO1, CO2, CO3, CO4, CO5	K1, K2, K3, K4, K5
II	<p>BOOLEAN ALGEBRA AND LOGIC GATES:</p> <p>Boolean Algebra – Laws and Theorems – Minterms and Maxterms — DeMorgan’s Theorems. Logic Gates: AND, OR, NOT, NAND, NOR and Exclusive OR Gates – Exclusive NOR Gate – Universal Building Blocks (UBB) – NAND Gate as UBB – NOR Gate as UBB- Simplifying logic circuits- Sum of products and products of sum form</p>	12	CO1, CO2, CO3, CO4, CO5	K1, K2, K3, K4, K5
III	<p>K MAP TECHNIQUES:</p> <p>Simplification of Boolean expression using Karnaugh Map with 2, 3 and 4 variables -Sum of Products - Product of Sum – Don’t Care Conditions – Overlapping Groups – Rolling the Map – Eliminating Redundant Group</p>	12	CO1, CO2, CO3, CO4, CO5	K1, K2, K3, K4, K5
IV	<p>COMBINATIONAL LOGIC CIRCUITS:</p> <p>Half and Full Adders – BCD Adder - Half and Full Subtractors – Multiplexers (4:1 line) – 1 to 4 line Demultiplexers – Decoders, Encoders</p>	12	CO1, CO2, CO3, CO4, CO5	K1, K2, K3, K4, K5
V	<p>SEQUENTIAL LOGIC CIRCUITS:</p> <p>Flip Flops – RS Flip Flop – Clocked RS Flip Flop – D Flip Flop – JK Flip Flop – T Flip Flop – Triggering of Flip Flops – Master Slave Flip Flop – Clock – Counters and Shift Registers: Counters – Asynchronous or Ripple Counter – Ring Counter. Shift Registers.</p>	12	CO1, CO2, CO3, CO4, CO5	K1, K2, K3, K4, K5
VI	<p>Self Study for Enrichment</p> <p>Gray Code – Excess – 3 Code</p> <p>NAND and NOR Implementation — AND-OR-INVERT Implementation – OR-AND-INVERT Implementation - SISO – SIPO – PIPO – PISO</p>	-	CO1, CO2, CO3, CO4, CO5	K1, K2, K3, K4, K5

Text Book

Digital Logic and Computer Design. (2017). M. Morris Mano, India: Pearson India.

Reference Books

1. Principles of Digital Electronics, Dr. K. Meena, PHI Learning Private Limited, New Delhi, 2009.
2. Malvino and Leach –Digital Principles and Application, 2014

Web References

1. <https://archive.org/details/digitalcomputerf00bart 9>.
2. <https://www.pdfdrive.com/digital-computer-fundamentals-computerarchitecture-e5719965.html>
3. <https://ocw.mit.edu/courses/6-042j-mathematics-for-computer-science-spring-2015/resources/digital-logic/>

Course Designer

Dr. P. Tamilselvi, Associate Professor, Department of Information Technology

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

Course Objectives

- **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

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

CO Number	CO Statement	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

Cos	PSO1	PSO2	PSO3	PSO4	PSO5	PO1	PO2	PO3	PO4	PO5
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	<p>Operations Research</p> <p>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</p> <p>Linear Programming Problem- Mathematical Formulation</p> <p>Introduction-Linear programming Problem- Mathematical Formulation of the problem - Illustrations on Mathematical Formulation of LPPs. (simple problems only)</p> <p>Linear programming problem-graphical Solution and Extension</p> <p>Introduction- Graphical Solution Method- General Linear Programming Problem- Canonical and Standard Forms of LPP.</p>	12	CO1, CO2, CO3, CO4, CO5	K1, K2, K3, K4
II	<p>Linear Programming Problem-Simplex Method</p> <p>Introduction-Fundamental Properties of Solutions- The computational Procedure- The Simplex Algorithm-Use of Artificial Variables-Big M method.(simple problems only).</p>	12	CO1, CO2, CO3, CO4, CO5	K1, K2, K3, K4
III	<p>Transportation problem</p> <p>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).</p>	12	CO1, CO2, CO3, CO4, CO5	K1, K2, K3, K4

	Assignment Problem Introduction-Mathematical Formulation of the Problem- Solution Methods of Assignment Problem- Special Cases in Assignment Problems(simple problems only).			
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 -Probability Considerations in PERT.	12	CO1, CO2, CO3, CO4, CO5	K1, K2, K3, K4
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 PVT Ltd.
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 House PVT 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

PowerPoint presentation, Group discussion, Seminar, Assignment.

Course Designers

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

Semester III	Internal Mark: 25		External Mark: 75	
COURSE CODE	COURSE TITLE	CATEGORY	Hrs/Week	CREDITS
23UIT3CC4	Relational Database Management Systems	CORE COURSE – III (CC)	6	5

Course Objectives

- To provide a sound introduction to DBMS
- To present SQL and Procedural interfaces to SQL comprehensively
- To present the concepts and techniques related to query processing by SQL engines
- To provide an overview of the concepts of NoSQL

Course Outcomes and Cognitive Level Mapping

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

CO Number	CO Statement	Knowledge level
CO1	Outline the terminology, features, classifications, characteristics and benefits embodied in database systems	K1
CO2	Formulate using relational algebra solutions to a broad range of query problems	K2
CO3	Demonstrate a broad range of SQL query and its application	K3
CO4	Design an information model expressed in the form of an Entity relation diagram	K3
CO5	Apply normalization in relational database design and demonstrate PL/SQL program interfaces	K3

Mapping of CO with PO and PSO

	PSO1	PSO2	PSO3	PSO4	PSO5	PO1	PO2	PO3	PO4	PO5
CO1	3	2	2	2	2	3	2	2	3	2
CO2	2	2	3	2	3	3	3	2	3	2
CO3	3	3	3	2	3	3	3	2	3	3
CO4	3	3	3	2	3	2	3	2	3	3
CO5	3	3	3	2	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	<p>Introduction to Databases: Databases and Database Users - Database System Concepts and Architecture- Conceptual Data Modeling and Database Design - Data Modeling Using the Entity–Relationship (ER) Model-The Enhanced Entity–Relationship (EER)-Subclasses, Superclasses, and Inheritance- Specialization and Generalization- Constraints and Characteristics of Specialization and Generalization Hierarchies</p>	18	CO1, CO2, CO3, CO4, CO5	K1, K2, K3, K4, K5
II	<p>The Relational Data Model and Relational Database Constraints Relational Model Concepts -Relational Model Constraints and Relational Database Schemas - Update Operations, Transactions, and Dealing with Constraint Violations -The Relational Algebra and Relational Calculus-Unary Relational Operations: SELECT and PROJECT-Relational Algebra Operations from Set Theory-Binary Relational Operations: JOIN and DIVISION - Additional Relational Operation.</p>	18	CO1, CO2, CO3, CO4, CO5	K1, K2, K3, K4, K5
III	<p>Basic SQL: SQL Data Definition and Data Types - Specifying Constraints in SQL - Basic Retrieval Queries in SQL -INSERT, DELETE, and UPDATE Statements in SQL -Additional Features of SQL More SQL: Complex Queries, Triggers, Views and Schema Modification - More Complex SQL Retrieval Queries- Specifying Constraints as Assertions and Actions as Triggers -Views (Virtual Tables) in SQL - Schema Change Statements in SQL</p>	18	CO1, CO2, CO3, CO4, CO5	K1, K2, K3, K4, K5
IV	<p>Database Design Theory and Normalization : Basics of Functional Dependencies and Normalization for Relational Databases- Informal Design Guidelines for Relation Schemas- Functional Dependencies - Normal Forms Based on Primary Keys - General Definitions of Second and Third Normal Forms - Boyce-Codd Normal Form-Multivalued Dependency and Fourth Normal Form -Join Dependencies and Fifth Normal Form Relational Database Design Algorithms and Further Dependencies</p>	18	CO1, CO2, CO3, CO4, CO5	K1, K2, K3, K4, K5

	Further Topics in Functional Dependencies: Inference Rules, Equivalence, and Minimal Cover - Properties of Relational Decompositions- Algorithms for Relational Database Schema Design - About Nulls, Dangling Tuples, and Alternative Relational Designs			
V	PL/SQL Concepts: Cursors, Stored Procedures, Stored Function, Database Triggers- Introduction to NOSQL Systems	18	CO1, CO2, CO3, CO4, CO5	K1, K2, K3, K4, K5
VI	Self Study for Enrichment (Not included for End Semester Examinations) <ul style="list-style-type: none"> • Design a ER model for Banking transactions • Write query to Create schemas related to bank • Normalize the schema with applying the normal forms • Perform transactions such as Deposit, Withdraw using sub queries • Apply PL/SQL concept to validate the data 	-	CO1, CO2, CO3, CO4, CO5	K1, K2, K3, K4, K5

Textbooks

1. Elamsri and Navathe,(2016).Fundamentals of database systems, Pearson Education
2. Ivan Bayross ,SQL & PL/SQL, BPB publications.

References

1. C.J.Date,(2003). An Introduction To Database Systems, Pearson.
2. J.D.Ullaman,(2010).Principles of Database Systems, Mc-Graw Hill Education, Galgotia Publishers
3. Abraham Silberschatz, Henry F. Korth & S. Sudarshan (2011).Database System Concepts Mc-Graw Hill Education.

Web References

1. <https://beginnersbook.com/2015/04/rdbms-concepts>
2. <https://www.javatpoint.com/dbms-tutorial>
3. <https://www.tutorialspoint.com/dbms/>

Pedagogy

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

Course Designer

1. Dr. S. Suguna Devi, Associate Professor, Department of Information Technology.

Syllabus

1. Draw ER diagram for Banking transaction

Using MYSQL execute the following

2. Creation of college database and establish relationships between tables
3. Create a view to extract details from two or more tables
4. To demonstrate Joins
5. To demonstrate Aggregate functions
6. To implement String functions.
7. To demonstrate various nested queries.

With the help of PL/SQL

8. Write a stored procedure and Function to process student's results.
9. Write a program to implement Trigger.
10. Write a program to generate employee pay slip using PL/SQL.

Web References

- <https://www.w3schools.com/mysql/>
- <https://towardsdatascience.com/practical-sql-create-and-query-a-relational-database-8bac84d78703>

Course Designer

1. Dr. S. Suguna Devi, Associate Professor, Department of Information Technology.

Semester III	Internal Marks:25	External Marks: 75		
COURSE CODE	COURSE TITLE	CATEGORY	Hrs. / Week	CREDIT S
22UIT3AC4	FINANCIAL ACCOUNTING	ALLIED	4	3

Course Objective

- To equip the students with fundamental knowledge and acquire analytical skills on the accounting concepts.

Course Outcome and Cognitive Level Mapping

CO Number	CO Statement	Cognitive Level
	On the successful completion of the course, students will be able to	
CO1	Define the basic concepts of Accounting	K1
CO2	Explain the accounting rules required for business enterprise	K2
CO3	Make use of accounting concepts to interpret the performance of business	K3
CO4	Analyze the financial statement of the firm	K4

Mapping of CO with PO and PSO

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

“1”–Slight(Low)Correlation □

“2”–Moderate(Medium)Correlation □

“3”–Substantial (High)Correlation

“-”indicate there is no correlation.

Syllabus

UNIT	CONTENT	HOURS	COs	COGNITIVE LEVEL
I	Accounting Meaning – Definition of Accounting- Need for Accounting – Meaning of Book Keeping – Book Keeping Vs Accounting- Accounting Principles – Accounting Cycle – Accounting Equation. Double Entry: Meaning – Nature and Principle of Double Entry. Journal: Meaning and Need – Steps in Journalizing.	12	CO1, CO2, CO3, CO4	K1, K2, K3, K4
II	Ledger: Meaning – Utility – Format – Posting – Balancing an Account – Preparation of Trial Balance – Total Method – Balance Method.	12	CO1, CO2, CO3, CO4	K1, K2, K3, K4
III	Subsidiary Books – Meaning – Cash Book – Simple cash book – Two Column cash book with Bank and Discount Columns – Three Column cash book – Petty Cash Book – Imprest System – Analytical petty cash book.	12	CO1, CO2, CO3, CO4	K1, K2, K3, K4
IV	Pass Book – need for Bank Reconciliation statement – Methods of Preparation of Bank Reconciliation Statement – Favorable and Unfavorable Balances. Depreciation – Meaning –Straight Line Method, Diminishing Balance Method and Annuity Method. (Simple Problems only)	12	CO1, CO2, CO3, CO4	K1, K2, K3, K4
V	Meaning – Need for Preparation – Components of Final Accounts – Trading Account – Profit and Loss Account – Balance sheet – Adjustments.	12	CO1, CO2, CO3, CO4	K1, K2, K3, K4

VI	Self Study for Enrichment (Not to be included for External Examination)			
	Distinction between Journal and Ledger –		CO1,	K1,
	Objective of Preparing Trial Balance –		CO2,	K2,
	Benefits of subsidiary book System –		CO3,	K3,
	Causes for the differences between cash book and pass book- Differences Between Trial Balance and Balance sheet – Need for Providing Depreciation		CO4	K4

Text Book

1. S.P.Jain and K.L.Narang (2016), Fundamentals of Accounting, Kalyani Publishers, 2017
2. T.S. Reddy & Murthy (2020), Financial Accounting, Margham Publications, 2017

Reference Books

1. Dalston L. Cecil and Jenitra L.Merwin. (2015). Business Accounting. 4th Edition, Learn Tech Publishers.
2. R.L. Gupta & Radhaswamy M. (2018). Financial Accounting. 8th Edition, Sultan Chand Sons
3. Shukla & Grewal. (2018). Advanced Accountancy. Sultan Chand Sons.

Web References

1. www.accountingcoach.com
2. www.accountingstudyguide.com
3. www.futureaccountant.com
4. www.onlinelibrary.wiley.com

Pedagogy

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

Course Designer

Ms. G. Kanagavalli

Semester III	Internal Marks:40	External Marks: 60		
COURSE CODE	COURSE TITLE	CATEGORY	Hrs. / Week	CREDITS
23UIT3AC5P	COMPUTER APPLICATIONS IN BUSINESS (P)	ALLIED	3	3

Course Objective

- The primary objective of this course is to expose the students with the Accounting Software Tally ERP9 with GST

Course Outcome and Cognitive Level Mapping

CO Number	CO Statement	Cognitive Level
	On the successful completion of the course, students will be able to	
CO1	Recall the basic concepts of components of computer	K1
CO2	Understand the basic features of Tally ERP 9	K2
CO3	Prepare different types of financial reports	K3
CO4	Analyze stock group, stock category, stock item and compare stock category summary with godown summary.	K4
CO5	Explain the procedure for GST Registration	K5

Mapping of CO with PO and PSO

COs/ PSOs	PSO1	PSO2	PSO3	PSO4	PSO5	PO1	PO2	PO3	PO4	PO5
CO1	3	3	3	3	2	3	2	3	3	2
CO2	3	3	3	3	2	3	2	3	3	2
CO3	3	3	3	3	3	3	2	3	3	2
CO4	3	3	3	3	2	3	2	3	3	2
CO5	3	3	3	3	3	3	2	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 to computerized Accounting – Features – Advantages –Manual Accounting Vs .Computerized Accounting – Accounting transaction.	9	CO1,CO2, CO3,CO4, CO5	K1, K2, K3, K4, K5
II	Introduction to Tally ERP 9 – Features of Tally – Creation of Company – Selecting a Company – Altering / Modifying existing company – Configuration of Tally – Tally screen and Menu – Accounting Features – Accounting Groups – User defined groups – Ledger creation, alteration and deletion	9	CO1,CO2, CO3,CO4, CO5	K1, K2, K3, K4, K5
III	Accounting vouchers – inventory vouchers – invoicing – optional & non-accounting voucher – order processing – advanced Voucher entry.	9	CO1,CO2, CO3,CO4, CO5	K1, K2, K3, K4, K5
IV	Introduction to Cost – Creation of cost Categories – Creation of Cost Centre– Editing – Deleting – Usage of Cost Category and Cost Centres in voucher entry – Inventory Information: Stock Groups – StockCategories – Godowns – Unit Of Measure – Stock Items – Purchase orders and Sales orders processing.	9	CO1,CO2, CO3,CO4, CO5	K1, K2, K3, K4, K5
V	Goods and Service Tax (GST): GST Concepts – Enabling GST – Configuring Master with GST Details – GST Reports	9	CO1,CO2, CO3,CO4, CO5	K1, K2, K3, K4, K5
VI	Self-Study for Enrichment (Not to be included for End Semester Examination) Journal Entry – Ledgers – Trial Balance – Balance Sheet - Adjustments	-	CO1,CO2, CO3,CO4, CO5	K1, K2, K3, K4, K5

LIST OF PRACTICALS

1. Creation, alteration and deletion of companies and user defined accounting groups.
2. Creation, alteration and deletion of ledger Accounts.
3. Preparation of Final Accounts with adjustments.
4. Voucher entries in double entry mode.
5. Creation, alteration and deletion of inventory masters.
6. Creation of Inventory Reports
7. Creation of GST Registration

Text Books

1. V. SrinivasaVallabhan (2014). *Computer Applications in Business*, SultanChand & Sons
2. A.K. Nadhani(2015), *Computer Application by Implementing Tally ERP*, BPB Publications,Chennai.
3. Mohan Kumar K, Rajkumar.S.(2019). *Computer applications in business*. Revised Edition. Tata McGraw Hill Education

Reference Books

1. Ashok K. Nadhani, “TALLY ERP 9 TRAINING GUIDE - 4TH REVISED & UPDATED EDITION”, January 2018.
2. Official guide to financial accounting using TALLY ERP 9 with GST, TallyEducation P. Ltd.
3. Chadwick, L, “The Essence of Financial Accounting”, PHI, 2nd Edition.

Web References

1. <https://gstcentre.in/gst-in-tally-erp-9.php#collapseOne>
2. <http://www.tallysolutions.com>
3. https://help.tallysolutions.com/docs/te9rel66/Job_Work/#gref
4. <https://www.tallyofficialbooks.com/>
5. <https://ncsmindia.com/wp-content/uploads/2012/04/TALLY-9.0-PDF.pdf>.

Pedagogy

Lecture and Lab demonstration

Course Designer

Ms. S. Praveena

Semester III	Internal Marks: 25		External Marks:75	
COURSE CODE	COURSE TITLE	CATEGORY	HRS /WEEK	CREDITS
22UITGEC1	WEB DESIGN	GEC	2	2

Course Objectives

- To get familiar of basics and commands of HTML
- To acquire knowledge and skills for creation of web page
- To gain ability to develop responsive web applications

Course Outcomes

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

CO Number	CO Statements	Cognitive Level
CO1	Understand the basic commands of HTML	K1
CO2	Illustrate the basic structure of HTML document and the methods to create, save and open it.	K2
CO3	Apply HTML commands to use various events and elements like Text, Media, Tables, Lists, Images in a web page	K3
CO4	Analyze the method of creating a web page with different events and elements including images and hyperlinks.	K4
CO5	Inspect a web page with various commands and interactive elements of HTML	K4

Mapping of CO with PO and PSO

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

“1” - Slight (Low) Correlation

“3” - Substantial (High) Correlation

“2” - Moderate (Medium) Correlation

“-” – Indicates there is no Correlation

Syllabus

UNIT	CONTENT	HOURS	COs	COGNITIVE LEVEL
I	Getting started with HTML 5: Defining HTML Markup – Basic Structure of an HTML Document – Creating and Saving a HTML document – opening the HTML document in a web browser – Modifying the background of HTML web page.	6	CO1, CO2, CO3, CO4, CO5	K1, K2, K3, K4
II	Introduction to New Elements in HTML 5: The Markup Elements – The Media Elements – The Canvas Element – The Form Element - The Input Type Attributes Values – The Window Event Attributes – The Form Events – The Mouse Events – The Media Events.	6	CO1, CO2, CO3, CO4, CO5	K1, K2, K3, K4
III	Working with Text: Adding Plain Text to an HTML Web page – Adding Text in a New line – Creating Headings – Creating Paragraph – Creating Horizontal Rule –Creating Subscript and Superscript – Aligning, Formatting and Grouping the Text - Working with Lists, Tables and Frames: Working with Lists:- Unordered – Ordered – Definition Lists.	6	CO1, CO2, CO3, CO4, CO5	K1, K2, K3, K4
IV	Working with Lists, Tables and Frames: Working with Tables: Creation – Specifying a Caption to a Table – Adding Table Heading – Table Border – Aligning a Table and Cell content – Setting the Width of a Table and Table Columns – Changing the Background Color of a Table - Cell Padding – Cell Spacing – Spanning Rows and Columns.	6	CO1, CO2, CO3, CO4, CO5	K1, K2, K3, K4

V	Working with Hyperlinks, Images and Multimedia: – Hyper links: Creating a Hyperlink – Setting the Hyperlink Color – Linking different Sections of a Web page - Working with Images: Inserting an Image – Displaying Alternate Text from an Image – Aligning an Image – Using Images as Links – Image Maps.	6	CO1, CO2, CO3, CO4, CO5	K1, K2, K3, K4
VI	Self Study for Enrichment (Not included for End Semester Examinations) Internet, Uses of Internet, Web pages and Website.	-	CO1, CO2, CO3, CO4, CO5	K1, K2, K3, K4

Text Book

1. Kogent Learning Solutions , *HTML 5 in Simple Steps*, Dream Tech Press, 2010

Reference Book

1. O. H. U. Heathcote, Basics Of Internet 3rd Edition; Payne Gallway Publisher Limited, 2003

Web References

- <https://www.w3schools.com/html/>
- <https://www.tutorialspoint.com/html/index.htm>

Pedagogy

Chalk and talk, Power Point Presentation, E-Content

Course Designer

Dr. S. Latha, Associate Professor, Department of Information Technology.

Semester IV	Internal Marks: 25		External Marks: 75	
COURSE CODE	COURSE TITLE	CATEGORY	Hrs/Week	CREDITS
23UIT4CC5	PROGRAMMING IN JAVA	CORE	6	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	Cognitive Level
CO1	Identify the basic elements of Java programming, principles of OOP and graphical user interface.	K1
CO2	Infer the program structure, syntax and semantics of the programming language and interactive environment.	K2
CO3	Analyze the variables, data types, OOPs concept, AWT package and database.	K4
CO4	Use the programming skills in OOPs, GUI programming and database connectivity in various domains.	K3
CO5	Solve the real time problems using object-oriented concepts, interactive environment and JDBC connectivity	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	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	2	2
CO4	2	2	3	2	2	2	3	2	2	2
CO5	2	3	2	2	2	3	3	2	2	3

“1” – Slight (Low) Correlation

“3” – Substantial (High) Correlation

“2” – Moderate (Medium) 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.	18	CO1 CO2 CO3 CO4 CO5	K1 K2 K3 K4 K5
II	Operators and Expressions - 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.	18	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: Creating Arrays – One- and two-Dimensional Arrays - Strings. Interfaces: Multiple Inheritance: Introduction - Defining Interfaces - Extending Interfaces-Implementation Interfaces - Accessing Interfaces Variables.	18	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 - Multiple Catch Statements.	18	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 - Database Connectivity: Introduction – JDBC Architecture – Discussion with Example – Overview of JDBC Components.	18	CO1 CO2 CO3 CO4 CO5	K1 K2 K3 K4 K5

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

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. Herbert Schildt, (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/>

NPTEL Online Courses

https://onlinecourses.nptel.ac.in/noc22_cs47/preview

Pedagogy

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

Course Designer

Dr. A. BHUVANESWARI, Associate Professor, Department of Information Technology.

Semester IV	Internal Marks:40		External Marks:60	
COURSE CODE	COURSE TITLE	CATEGORY	HOURS/WEEK	CREDITS
22UIT4CC4P	PROGRAMMING IN JAVA (P)	CORE	4	4

Course Objectives

- 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

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 swing	K4, K6
CO5	Build applications with database connectivity to mimic the real world scenarios	K6

Mapping of CO with PO and PSO

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

“1”-Slight (Low) Correlation
“3”-Substantial (High) Correlation

“2”-Moderate (Medium) Correlation
“-”-indicates there is no Correlation.

Exercises

1. Class and Objects
2. Constructor Overloading
3. Inheritance
4. String Manipulation
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 Virtual Labs, e-Contents tutorials

Course Designer

Dr. A. BHUVANESWARI, Associate Professor, Department of Information Technology.

Semester - IV	Internal Marks: 40		External Marks: 60	
Course Code	COURSE TITLE	CATEGORY	Hrs/Week	CREDITS
22UIT4GEC2P	WEB DESIGN (P)	Generic Elective Course- II (GEC)	2	2

COURSE OBJECTIVES

- To get familiar with commands of HTML
- To develop a web page with Table, Frames and Links
- To create a form with user interaction
- To handle embedding audio and video in HTML

COURSE OUTCOMES

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

CO Number	CO Statement	Knowledge Level
CO1	Develop a simple web page using basic HTML tags	K1
CO2	Create many frames and link them in HTML	K2
CO3	Design a web page using Tables	K3
CO4	Embed audio and video in HTML	K4
CO5	Recommend a form with user interaction	K5

MAPPING OF CO WITH PO AND PSO

COs	PSO 1	PSO 2	PSO 3	PSO 4	PSO 5	PO1	PO2	PO3	PO4	PO5
CO1	3	1	2	2	2	2	2	2	1	1
CO2	3	3	2	3	3	2	3	2	2	2
CO3	3	2	3	2	3	3	3	3	3	3
CO4	3	3	3	2	3	3	3	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

1. Handling different tags available in HTML
2. Create an advertisement in HTML with images and link multiple documents
3. Prepare a Time Table for your class using TABLE tag
4. Create a number of framesets and jump to a specific section within a frame
5. Develop a web page using different types of lists in HTML
6. Embedding audio and video in HTML documents
7. Create an application form for a job (use Text box, Check box, Buttons...)

COURSE DESIGNER

Dr. S. LATHA, Associate Professor, Department of Information Technology

Semester - IV	Internal Marks: 40		External Marks: 60	
Course Code	COURSE TITLE	CATEGORY	Hrs/Week	CREDITS
22UIT4SEC1P	PC Packages (P)	Skill Enhancement Course-I (SEC)	2	2

COURSE OBJECTIVES

- To implement various features of MS word
- To learn about MS Excel and its various Applications
- To create e-content using power point presentation

COURSE OUTCOMES

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

CO Number	CO Statement	Knowledge Level
CO1	Show various formatting operations in MSWord	K1
CO2	Create multiple documents using Mail merge	K2
CO3	Design a table and implement various operations	K2
CO4	Apply various operation and charts in MS-Excel	K3
CO5	Make use of power point features to create E content	K3

Mapping of CO with PO and PSO

COs	PSO 1	PSO 2	PSO 3	PSO 4	PSO 5	PO1	PO2	PO3	PO4	PO5
CO1	3	1	2	2	2	2	2	2	1	1
CO2	3	3	2	3	3	2	3	2	2	2
CO3	3	2	3	2	3	3	3	3	3	3
CO4	3	3	3	2	3	3	3	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

MS WORD

1. Create a document and perform the following operations.
To count the occurrences of the word, find and replace a particular word, set the autocorrect entry and apply various formatting operations
2. Create student table and perform the operation such as Insertion, Deletion, alignment, splitting, merging of cells, sorting and apply autosum formulas.
3. Use Mailmerge concept to create multiple letters
4. Create Table of contents, bibliography and bookmarks.

MS-EXCEL

1. Create a student table for five subjects
 1. Compute the total marks and percentage of each student by entering the appropriate formula.
 2. Compute the grades
 3. Find the maximum and minimum percentage
 4. Generate a column chart to compare data
2. A company records the details of total sales (in Rs.) sector wise and month wise
 1. Using appropriate formula, calculate total sale for each sector
 2. Create a 3-D column chart to show sector wise data for all four months
 3. Create a 3-D pie chart to show sales in Jan in all sectors
3. Create employee paybill for two years with following details
 1. To calculate the total salary as sum of Basic Salary, HRA and DA for each employee for the year 1997.
 2. To calculate the total salary of each employee for the year 1998 as sum of salary for the year 1997 and bonus. Also calculate the percentage increase in the total salary from 1997 to 1998 for each employee.
 3. Create a Bar chart to compare the two years

MS-POWER POINT

1. Design a Birthday Invitation card with music.
2. Design a cover for a book a theme for the page, picture or clipart and Use WordArt
3. Design a poster with customized page set up inviting all students of your department to the IT Fest.
4. Create a 5-slide presentation on any topic. Use Images, Graphs, Chart, Tables, Animation, Time, Bullets, Transition, Sound, Hyperlink, Background template, Header and Footer.
5. Record Audio to the above presentation and convert it to video file

Web References

<https://www.javatpoint.com/ms-word-tutorial>

<https://www.tutorialspoint.com/mastering-microsoft-office-2021-365-word-excel-powerpoint/index.asp>

<https://www.oakland.edu/Assets/Oakland/grad/files-and-documents/Thesis-Dissertations/Microsoft-Office-Tutorials/Microsoft%20Office%20Tutorials.pdf>

Course Designer

1. Dr. S. Suguna Devi, Associate professor, Department of Information Technology

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. Tanenbaum (2011), Operating Systems and Design Implementation, 3rd Edition, Pearson Education
3. Abraham Silberschatz, Peter 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	Hrs/Week	CREDITS
23UIT5CC7	Programming in Python	CORE COURSE (CC)	6	5

Course Objectives

- To understand the fundamentals of Python programming
- To demonstrate the usage of Arrays, Functions, Input and Output statements
- To develop programs with GUI and Regular expressions
- To create files and handle Exceptions

Course Outcomes and Cognitive Level Mapping

CO Number	CO Statement	Cognitive Level
CO1	To define the basics of Python	K1
CO2	To explain the data types, Arrays, Regular expressions and Functions in Python	K2
CO3	To interpret the usage of Operators, Decision making, Control statements and File handling in Python	K3
CO4	To analyze the importance of Exception Handling in Python	K4
CO5	To evaluate the usage of modules and packages in Python	K5

Mapping of CO with PO and PSO

COs	PSO1	PSO2	PSO3	PSO4	PSO5	PO1	PO2	PO3	PO4	PO5
CO1	2	3	2	1	3	3	2	2	2	2
CO2	3	2	3	1	1	3	3	2	3	2
CO3	3	3	3	2	2	3	2	2	3	2
CO4	3	2	3	2	1	3	3	2	3	2
CO5	3	3	3	1	2	2	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	<p>Introduction to Python: Features of Python - How to run Python - Basics of Python - Input, Output and Import Functions – Operators –</p> <p>Data Types and Operations: Numbers – Strings – List – Tuple – Set – Dictionary – Mutable and Immutable Objects – Data Type Conversion - Flow Control: Decision Making – Loops – Nested Loops – Control Statements – Types of Loops – List, Set and Dictionary Comprehensions – Nested Dictionaries</p>	18	CO1 CO2 CO3 CO4 CO5	K1 K2 K3 K4 K5
II	<p>Arrays: Creating an Array – Indexing and Slicing – Types – Numpy arrays – Attributes of an Array – The reshape() Method – The Flatten Method() – Working with Multi-dimensional arrays – Indexing and slicing in multi-dimensional arrays – Matrices in Numpy – Random Numbers - Strings and Characters</p>	18	CO1 CO2 CO3 CO4 CO5	K1 K2 K3 K4 K5
III	<p>Functions: Function Definition and Calling – Function Arguments – Anonymous Functions – Recursive Functions – Function with more than one return value – Modules and Packages: Built-in Modules – Creating Modules – Import Statement – Locating Modules – Namespaces and Scope – The dir() function – The reload() function – Packages in Python – Date and Time Modules</p>	18	CO1 CO2 CO3 CO4 CO5	K1 K2 K3 K4 K5
IV	<p>File Handling: Opening, Closing, Writing, Renaming, Deleting and Reading from a File – File Methods – Directories in Python –</p> <p>Exceptions: Errors in a Python Program – Exceptions – Exception Handling – Types of Exceptions – The Except Block – The assert statement – User-Defined Exceptions – Logging the Exceptions</p>	10	CO1 CO2 CO3 CO4 CO5	K1 K2 K3 K4 K5
V	<p>Regular Expressions: The match() and search() function - Search and Replace – Regular Expressions Modifiers and Patterns – Character and Special Character Classes – Repetition Cases – findall() and compile() method – GUI Programming: Introduction – Tkinter - Widgets – Layout Managers</p>	18	CO1 CO2 CO3 CO4 CO5	K1 K2 K3 K4 K5

VI	Self-Study for Enrichment (Not to be included for External Examination) Function Decorators, Strings and characters, Features of OOPS, Data Structures in Python and Networking in Python	-	CO1 CO2 CO3 CO4 CO5	K1 K2 K3 K4 K5
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Text Books

1. Jeeva Jose, "Taming Python by Programming", 2019, Khanna Book Publishing Co. (P) Ltd
2. Dr. R. Nageswara Rao, "Core Python Programming", 2018, Dreamtech Press

Reference Books

1. Johannes Ernesti, Peter Kaiser "Python 3: The Comprehensive Guide", 2022, SAP Press
2. Sakis Kasampalis Quan Nguyen Dr Gabriele Lanaro Dr. Gabriele Lanaro "Advanced Python Programming", 2019, Packt

Weblinks and Video Lectures (e-Resources)

1. <https://www.youtube.com/watch?v=rfscVS0vtbw>
2. <https://www.youtube.com/watch?v=jcQnTwjttXM>
3. <https://www.youtube.com/watch?v=DmHSwTiD5Tk>
4. https://www.youtube.com/watch?v=-_uNayxaQoU

Pedagogy

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

Course Designer

Dr. M. Thangam, Associate Professor, Department of Information Technology

Semester V	Internal Marks: 40		External Marks: 60	
COURSE CODE	COURSE TITLE	CATEGORY	Hrs/Week	CREDITS
23UIT5CC5P	Programming in Python (P)	Core Practical	4	3

COURSE OBJECTIVES

- To understand and implement Python programs
- To inculcate hands-on experience in developing Python programs
- To perform file operations and exception handling in Python

COURSE OUTCOMES

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

CO Number	COURSE STATEMENT	Knowledge Level
CO1	Develop simple programs in Python using data types and variables	K1
CO2	Demonstrate the concepts of Arrays, Functions and Strings	K2
CO3	Make use of Regular Expressions and Exception handling	K3
CO4	Analyze the usage of Files and its manipulations	K4
CO5	Evaluate the programs using GUI implementations	K5

Mapping of CO with PO and PSO

COs	PSO 1	PSO 2	PSO 3	PSO 4	PSO 5	PO1	PO2	PO3	PO4	PO5
CO1	3	2	2	2	2	3	1	2	2	1
CO2	3	3	2	3	3	2	3	2	2	2
CO3	3	2	3	2	3	3	3	3	3	3
CO4	3	3	3	2	3	3	3	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

LIST OF EXERCISES

1. Simple programs in Python
2. Data types and Operations
3. Array Manipulations
4. Programs using Functions
5. Handling Strings
6. Programs using Lists, Tuples and Dictionaries
7. Executing Regular Expressions in Python
8. GUI programs
9. File Handling

Course Designer

Dr. M. Thangam, Associate Professor, Department of Information Technology

Semester V	Internal Marks: 25		External Marks: 75	
COURSE CODE	COURSE TITLE	CATEGORY	Hrs/Week	CREDITS
22UIT5CC8	SOFTWARE ENGINEERING	CORE	5	5

COURSE OBJECTIVES

- The course is intended to influence the knowledge on constructing reliable software products.
- It also highlights several software testing to improve the quality of the software.

COURSE OUTCOMES

The successful completion of the course will equip the students to

CO Number	CO Statement	Knowledge Level
CO1	Outline the progression in software and software engineering practice.	K1
CO2	Categorize the development phases and life cycle models of a project.	K2
CO3	Build the model in software project design and quality.	K3
CO4	Analyze the Software Engineering Process and types of testing	K4
CO5	Explain the Process Models, Design concepts and Testing approaches	K5

Mapping with Programme Outcomes

COs	PSO1	PSO2	PSO3	PSO4	PSO5	PO1	PO2	PO3	PO4	PO5
CO1	3	2	3	3	3	2	2	1	3	2
CO2	3	3	3	2	3	2	2	1	2	2
CO3	3	3	3	2	2	2	3	2	3	3
CO4	3	3	3	3	3	3	3	2	2	3
CO5	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	Software and Software Engineering: The Nature of Software - The Unique Nature of WebApps – Software Engineering – The Software Process - Software engineering practice - Software myth	15	CO1 CO2 CO3 CO4 CO5	K1 K2 K3 K4 K5
II	The Software Process: Process Models: Generic process model- Prescriptive process models Requirements Modeling - Requirements Analysis: Requirement Modeling Approaches – Data Modeling concepts - Class based modeling -Flow Oriented Modeling	15	CO1 CO2 CO3 CO4 CO5	K1 K2 K3 K4 K5
III	Design concepts: Design within the context of software engineering - The Design Process - Design Concepts - The Design model – Component Level Design: Designing Class-Based Components- Quality concepts- What is Quality? - Software Quality: McCall’s Quality Factors - Achieving Software Quality	15	CO1 CO2 CO3 CO4 CO5	K1 K2 K3 K4 K5
IV	Testing Approaches: Software Testing Fundamentals - Types of Testing: White Box Testing - Static Testing- Structural Testing - Black Box Testing: What is Black Box testing – How to do? Integration Testing: Integration Testing- Integration Testing as Type of Testing. System and Acceptance Testing: System Testing Overview- Functional testing versus Non- functional Testing- Functional testing - Non-functional Testing – Acceptance Testing	15	CO1 CO2 CO3 CO4 CO5	K1 K2 K3 K4 K5
V	Performance Testing: Factors governing Performance testing- Regression Testing: What is Regression testing- Types of Regression Testing - Best Practices in Regression Testing. Internationalization Testing: Primer on Internationalization - Test Phase for Internationalization – Internationalization Validation – Fake Language Testing – Language Testing – Localization Testing - Ad-hoc Testing: Overview – Buddy Testing – Pair Testing - Exploratory Testing – Iterative Testing – Defect Seeding.	15	CO1 CO2 CO3 CO4 CO5	K1 K2 K3 K4 K5
VI	Self-Study for Enrichment (Not included for End Semester Examinations) Agile Process and Agile Process Models – Requirements modelling for Web Apps – Testing Web Applications.		CO1 CO2 CO3 CO4 CO5	K1 K2 K3 K4 K5

Textbooks

1. Roger S. Pressman, 2010, Software Engineering: A Practitioner's Approach, 7th Edition , McGraw-Hill Education **(Unit 1,2,3)**
2. Srinivasan Desikan, Gopaldaswamy Ramesh (2012), Software Testing Principles and Practices, Pearson Education. **(Unit 4,5)**

References

1. Ian Sommerville (2010), Software Engineering, 7th Edition, Pearson Education
2. Paul C. Jorgensen (2010), Software Testing: A Craftsman's Approach, Fourth Edition, 4th Edition Auerbach Publications.
3. Naresh Chauhan (2012), Software Testing- Principles and Practices, Oxford University Press

Web References

1. <https://scai.engineering.asu.edu/wp-content/uploads/sites/31/2022/10/22-23-SoftwareEngineeringHandbookPublish.pdf>
2. <https://www.open.edu/openlearn/science-maths-technology/approaches-software-development/content-section---references>
3. <https://www.tutorialspoint.com/software-testing-complete-reference/index.asp>
4. <https://www.javatpoint.com/software-testing-tools>

Pedagogy

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

Course Designer

1. Dr. S. Latha, Associate Professor, Department of Information Technology.

Semester V	Internal Marks: 25		External Marks: 75	
COURSE CODE	COURSE TITLE	CATEGORY	Hrs/Week	CREDITS
23UIT5DSE1A	Mobile Application Development	Discipline Specific Elective – I (DSE)	5	3

COURSE OBJECTIVES

This course explores the knowledge over Mobile Application Development with its framework, layouts, intents and database connectivity

COURSE OUTCOMES

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

CO Number	CO Statement	Knowledge Level
CO1	Choose the development framework and the need for mobile applications	K1
CO2	Demonstrate the activity and intent usage	K2
CO3	Design applications with intents and broadcast receivers.	K3
CO4	Compile an application with database connectivity	K4
CO5	Develop real time applications to improvise user experience	K5

Mapping of CO with PO and PSO

COs	PSO 1	PSO 2	PSO 3	PSO 4	PSO 5	PO 1	PO2	PO 3	PO4
CO1	2	3	2	1	1	2	2	2	2
CO2	3	2	3	1	1	3	3	2	3
CO3	3	3	3	2	2	3	3	2	3
CO4	3	2	3	2	2	3	3	2	3
CO5	3	3	3	2	2	3	3	2	2

“1” – Slight (Low) Correlation

“3” – Substantial (High) Correlation

“2” – Moderate (Medium) Correlation

“-“ indicates there is no Correlation.

SYLLABUS

UNIT	CONTENT	HOURS	COs	COGNITIVE LEVEL
I	Getting Started with Android Programming Introduction to Android – Obtaining the Required Tools – Launching your First Android Application - Using Android Studio for Android Development – Activities, Fragments and Intents.	15	CO1 CO2 CO3 CO4 CO5	K1 K2 K3 K4 K5
II	Getting to Know the Android User Interface Understanding the Components of a Screen – Designing User Interface with Views: Basic Views – Displaying Pictures and Menus with Views.	15	CO1 CO2 CO3 CO4 CO5	K1 K2 K3 K4 K5
III	Data Persistence and Content Providers Saving and Loading User Preferences – Persisting Data to Files – Creating and Using Databases. Content Providers: Sharing Data in Android – Using a Content Provider.	15	CO1 CO2 CO3 CO4 CO5	K1 K2 K3 K4 K5
IV	Messaging and Location Based Services Messaging: SMS Messaging – Sending Email. Location Based Services: Displaying Maps – Getting Location Data - Monitoring Location	15	CO1 CO2 CO3 CO4 CO5	K1 K2 K3 K4 K5
V	Networking and Developing Android Services Networking: Developing Android Services: Creating your own services - Establishing Communication between a Service and an Activity - Binding Activities to Services – Understanding Threading.	15	CO1 CO2 CO3 CO4 CO5	K1 K2 K3 K4 K5
VI	Self Study for Enrichment (Not to be included for External Examination) Develop a App for maintaining the Home security Develop an App to monitor the health related activity of an individual Create a Tutorial mobile app for a subject	-	CO1 CO2 CO3 CO4 CO5	K1 K2 K3 K4 K5

TEXT BOOK

J. E. DiMarzio(2017),”Beginning Android Programming with Android Studio”,4th Edition, John Wiley & Sons

REFERENCE BOOKS

1. Reto Meier(2012),”Professional Android Application Development”,Wiley
2. Charlie Collins, Michael Galpin and Matthias Kappler((2012),”Android in Practice”, DreamTech

WEB REFERENCES

1. <https://www.tutorialspoint.com/android/index.htm>
2. <https://www.geeksforgeeks.org/android-tutorial/>
3. <https://www.javatpoint.com/android-tutorial>
4. <http://developer.android.com/develop/index.html>

COURSE DESIGNER

Dr. S. Suguna Devi, Associate professor, Department of Information Technology

Semester V	Internal Marks: 25		External Marks: 75	
COURSE CODE	COURSE TITLE	CATEGORY	Hrs / Week	CREDITS
23UIT5DSE1B	B. Big Data Analytics	Discipline Specific Elective –I (DSE)	5	3

COURSE OBJECTIVES

- Understand the Big Data Platform and its Use cases
- Provide an overview of Apache Hadoop
- Understand Map Reduce Jobs
- Provide hands on Hadoop Eco System
- Apply analytics on Structured, Unstructured 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	Identify Big Data and its Business Implications	K1
CO2	List the components of Hadoop and Hadoop Eco-System	K2
CO3	Access and Process Data on Distributed File System	K3
CO4	Manage Job Execution in Hadoop Environment	K4
CO5	Develop Big Data Solutions using Hadoop Eco System	K5

Mapping of CO with PO and PSO

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

“1” – Slight (Low) Correlation

“3” – Substantial (High) Correlation

“2” – Moderate Medium) Correlation

“-” indicates there is no Correlation

Syllabus

UNIT	CONTENT	HOURS	COs	COGNITIVE LEVEL
I	Introduction to Big data analytics: Need of Big data- Classification of Data - Structures, Semi-structured and unstructured - Big data definitions - Characteristics-Data type - Big data Classifications - Big data handling techniques - Defining data architecture-Data Sources, Quality, Preprocessing and storing- Data storage and analysis – Big data analytics applications and case studies.	15	CO1 CO2 CO3 CO4 CO5	K1 K2 K3 K4 K5
II	Hadoop: Hadoop and its ecosystem-Hadoop distributed File system – Map reduce Framework and Programming model - Hadoop YARN-Hadoop ecosystem tools.	15	CO1 CO2 CO3 CO4 CO5	K1 K2 K3 K4 K5
III	NoSQL Big data Management: NoSQL datastore -NoSQL data Architecture patterns - NoSQL to manage Big data – shared – Nothing Architecture for big data tasks- MongoDB Database-Cassandra databases.	15	CO1 CO2 CO3 CO4 CO5	K1 K2 K3 K4 K5
IV	MapReduce , Hive and Pig : MapReduce, Map tasks, Reduce Tasks and MapReduce execution - Composing MapReduce for calculations and algorithms -HIVE - HIVEQL - Pig	15	CO1 CO2 CO3 CO4 CO5	K1 K2 K3 K4 K5
V	Spark and Big data Analytics: Spark-Introduction to data analytics with Spark - Downloading Spark and programming using RDDs and MLIB – Data ETL – Introduction to analytics, Reporting and visualizing	15	CO1 CO2 CO3 CO4 CO5	K1 K2 K3 K4 K5
VI	Self Study for Enrichment (Not to be included for External Examination) Programming Examples in Analytics and Machine Learning using Hadoop, Spark and Python : Installation Steps for Hadoop and Spark - Installation Steps for Hadoop, Hive and Pig - Installation Steps for the Spark on Ubuntu - Computing Platform Configuration - Datasets Used in the Examples, Data Deployment and Exploration - Counting and Sorting of Items in Datasets using MapReduce - Storing CSV Dataset into Hive Database Storing CSV Dataset into the Spark DataFrame -Merge and Join Functions for DataFrame Objects -Analysis and Query-Processing Using UDFs in Hive and Pyspark - Data Visualization using Python Plotting Library	-	CO1 CO2 CO3 CO4 CO5	K1 K2 K3 K4 K5

Text Book

1. Raj Kamal, Preeti Saxena(2019),” Big Data Analytics, Introduction to Hadoop, Spark, and Machine-Learning”, McGraw-Hill Education

Reference Books

1. Tom White(2015), “Hadoop: The Definitive Guide”, 4 th Edition, O’Reilly Media, ISBN-13: 978-9352130672
2. Boris Lublinsky, Kevin T Smith, Alexey Yakubovich, "Professional Hadoop Solutions", 1st Edition, Wrox Press, 2014 ISBN-13: 978-8126551071
3. Eric Sammer(2012), "Hadoop Operations: A Guide for Developers and Administrators", 1st Edition, O'Reilly Media, ISBN-13: 978-9350239261
4. Arshdeep Bahga(2018), Vijay Madiseti, "Big Data Analytics: A Hands-On Approach", 1st Edition, VPT Publications, 2018. ISBN-13: 978-0996025577

Weblinks and Video Lectures (e-Resources)

1. https://www.youtube.com/watch?v=n_Krer6YWY4
2. https://onlinecourses.nptel.ac.in/noc20_cs92/preview
3. <https://www.digimat.in/nptel/courses/video/106104189/L01.html>

Pedagogy

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

Course Designer

Dr. J. SANGEETHA, Associate Professor, Department of Information Technology.

Semester V	Internal Marks: 25		External Marks: 75	
COURSE CODE	COURSE TITLE	CATEGORY	Hrs/Week	CREDITS
23UIT5DSE1C	Cloud Computing	Discipline Specific Elective – I (DSE)	5	3

Course Objectives

- To learn about the basic concepts in Cloud Computing
- To know about Cloud infrastructure mechanisms and cloud service management
- To describe the cloud computing architecture design principles
- To understand the role of virtualization in building an efficient cloud architecture
- To identify and discuss cloud security threats

Course Outcomes and Cognitive Level Mapping

CO Number	Course Outcome	Cognitive Level
CO1	To define the core concepts of cloud computing paradigm, characteristics, advantages, challenges and threats from various cloud computing models and services	K1
CO2	To identify the cloud computing, models, services, techniques and applications with different cloud architectures	K2
CO3	To apply the fundamental concepts of Virtualization in cloud and discuss its types and usage with different cloud models and services	K3
CO4	To analyze the performance of cloud computing with cloud security issues in recent technologies and platforms	K4
CO5	To summarize the importance of cloud computing models, services, usage of virtualization with cloud security issues	K5

Mapping of CO with PO and PSO

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

“1” – Slight (Low) Correlation
“3” – Substantial (High) Correlation

“2” – Moderate (Medium) Correlation
“-” indicates there is no Correlation

SYLLABUS

UNIT	CONTENT	HRS	COs	COGNITIVE LEVEL
I	Foundation of Cloud Computing: Introduction – History – Fundamentals of Cloud Computing Ecosystem – Cloud computing characteristics – Advantages and disadvantages of cloud computing – Comparison of traditional and cloud computing paradigms – Cloud Services and Deployment Models: Cloud Deployment Models – Cloud Service Models – Cloud infrastructure mechanisms – Cloud Service Management	15	CO1 CO2 CO3 CO4 CO5	K1 K2 K3 K4 K5
II	Cloud Computing Architecture: Design principles – Cloud Computing Life Cycle (CLCC) – Cloud Computing Reference Architecture – Load balancing approach – Mobile Cloud Computing (MCC) – Virtualization Technology – Understanding and adopting Virtualization – Techniques of Virtualization – How virtualization works? – XEN, Kernel-based Virtual Machine (KVM), VMware, VirtualBox, Citrix – Types of Virtualization – Virtualization in Cloud	15	CO1 CO2 CO3 CO4 CO5	K1 K2 K3 K4 K5
III	Cloud Security and Privacy: Cloud Security – Cloud CIA security model – Cloud computing security architecture – Data Security in the Cloud: Challenges with Cloud Data – Data Confidentiality and Encryption – Data Availability – Data Integrity – Cloud Data Management Interface – Cloud Service Gateways (CSG) – Cloud Firewall – Virtual Firewall	15	CO1 CO2 CO3 CO4 CO5	K1 K2 K3 K4 K5
IV	Cloud Computing Service Level Agreements and Applications: Service Level Agreements (SLA) practices – Components of a cloud SLA – Types of SLAs – Cloud Computing Applications: Introduction – Google App Engine – Google Apps – Google Cloud Datastore – Dropbox Cloud – Apple iCloud – Microsoft Windows Azure Cloud – Amazon Web Services (AWS)	15	CO1 CO2 CO3 CO4 CO5	K1 K2 K3 K4 K5
V	Cloud Computing Technologies, Platforms and Services: High Performance computing with cloud technologies – Message Passing Interface (MPI) – MapReduce programming model – Dryad and Dryad LINQ – Eucalyptus cloud platform and its components – Open Nebula cloud platform- Features and Layers – OpenStack cloud platform- components and benefits – Nimbus cloud computing platform and its features – Apache Hadoop ecosystem – Architecture and components – Hadoop and cloud	15	CO1 CO2 CO3 CO4 CO5	K1 K2 K3 K4 K5
VI	Self Study for Enrichment (Not to be included for External Examination) Security issues in virtualization – Service Oriented Architecture – Legal issues in cloud computing – Cloud computing certifications – Factors affecting cloud computing adoption	-	CO1 CO2 CO3 CO4 CO5	K1 K2 K3 K4 K5

Text Books

1. Kamal Kant Hiran, Ruchi Dishi, Temitayo Fagbola, Mehul Mahrishi, “Cloud Computing”, 2019, BPB Publications
2. Kailash Jayaswal, Jagannath Kallkurchi, Donald J. Houde, Dr. Deven Shah, “Cloud Computing Black Book”, 2015, DreamTech Press

Reference Books

1. Anthony T. Velte, Toby J. Velte, Robert Elsenpeter, “**Cloud Computing – A Practical Approach**”, McGraw Hill Education, 2017
2. Rajkumar Buyya, James Broberg, Andrzej Goscinski, “**Cloud Computing – Principles and Paradigms**”, 2013, Wiley Publications
3. Dan C. Marinescu, “**Cloud Computing – Theory and Practice**”, Second Edition, Elsevier, 2019

Weblinks and Video Lectures (e-Resources)

1. <https://k21academy.com/cloud-blogs/cloud-computing-deployment-models/>
2. <https://www.mygreatlearning.com/blog/virtualization-in-cloud-computing/>
3. <https://www.simplilearn.com/applications-of-cloud-computing-article>
4. <https://www.youtube.com/watch?v=-8O32k26RWA>
5. <https://www.youtube.com/watch?v=RWgW-CgdIk0>

Pedagogy

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

Course Designer

Dr. M. Thangam, Associate Professor, Department of Information Technology.

Semester V	Internal Marks: 40		External Marks: 60	
COURSE CODE	COURSE TITLE	CATEGORY	Hrs/Week	CREDITS
22UIT5SEC2P	Cloud Computing (P)	Skill Enhancement Course – II(SEC)	2	2

COURSE OBJECTIVES

- To install and create Virtual Machines in Workstation Player
- To apply the knowledge of how to Install and Upgrade VMware Tools
- To implement how to configure various Virtual Machine Hardware Settings
- To implement file transfer from host machines to guest machines

COURSE OUTCOMES

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

CO Number	COURSE STATEMENT	Knowledge Level
CO1	Mention the steps to install and create Virtual Machines	K1
CO2	Demonstrate the workstation Player Preference settings	K2
CO3	Apply the knowledge to install, upgrade and configure on VMware tools	K3
CO4	Examine the knowledge on Virtual Machines	K4
CO5	Implement file transfer from host to guest machines	K5

Mapping of CO with PO and PSO

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

LIST OF EXERCISES

1. Creating Virtual Machines in Workstation Player
2. Changing Workstation Player Color Theme Settings
3. Installing and Upgrading VMware Tools
4. Configure VMware Tools Updates for a Specific Virtual Machine
5. Changing the Display Settings for a Virtual Machine
6. Change the Name, Working Directory, VM Directory and Memory Allocation for a Virtual Machine
7. Configuring and Managing devices like Keyboard, CD-ROM, Floppy Drives
8. Configuring Network Connections
9. Configuring Virtual Machine Hardware Settings
10. Implement File transfer from host to guest machines

Course Designer

Dr. M. Thangam, Associate Professor, Department of Information Technology.

SEMESTER - VI	Internal Mark - 25		External Mark-75	
Course Code	Course Title	Category	Hours/Week	Credits
23UIT6CC9	Computer Networks	Core Course IX(CC)	6	5

Course Objectives

- To understand the fundamentals of networking concepts
- To develop deeper insights of various network architectures
- To learn and familiarize about various network paradigm protocols

Course Outcome

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

CO Number	CO Statement	Cognitive Level
CO1	Understand the basic concepts of reference models and identify the functionality of different layers in computer communications	K1, K2
CO2	Implement error detection and correction mechanisms at the data link layer.	K3
CO3	Design and implement IP addressing schemes and routing protocols in network layer	K4, K5
CO4	Acquire practical knowledge of application layer protocols and their functionalities	K3
CO5	Apply the acquired knowledge and skills in real-world networking scenarios	K3

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	2	2	3
CO2	2	3	2	3	3	2	3	2	3	3
CO3	3	2	3	3	3	3	2	3	2	3
CO4	3	3	3	2	3	2	3	2	3	3
CO5	3	3	3	3	3	2	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: Data Communications-Networks -Network Types – Network Models – Protocol Layering – TCP/IP Protocol Suite – OSI Model	18	CO1 CO2 CO3 CO4 CO5	K1 K2 K3 K4 K5
II	Bandwidth Utilization : Multiplexing - FDM - WDM - TDM - Transmission Media: Guided Media – Unguided Media – Switching – Circuit-Switched Networks – Packet Switching - Structure of a Switch	18	CO1 CO2 CO3 CO4 CO5	K1 K2 K3 K4 K5
III	Data Link Layer : Introduction – Link Layer Addressing : Three Types of Address -Address Resolution Protocol – Error Detection and Correction – Introduction - Block coding – Cyclic Codes – Cyclic Redundancy Check – Check sum – Concept – Forward Error Correction - Data Link Control : DLC Services – Data Link Layer Protocols	18	CO1 CO2 CO3 CO4 CO5	K1 K2 K3 K4 K5
IV	Network Layer : Network-Layer Services – Packetizing – Routing and Forwarding – Packet Switching –Network Layer Performance - IPv4 address – Address space – Classful addressing – Classless Addressing – Unicast Routing – Routing Algorithms	18	CO1 CO2 CO3 CO4 CO5	K1 K2 K3 K4 K5
V	Introduction to Transport Layer: Transport Layer Services – Transport Layer Protocols – User Datagram Protocol -Transmission Control Protocol- Application Layer – Providing Services – Application Layer Paradigms – Standard client Server protocols – World Wide Web and HTTP – FTP – Electronic Mail – Domain Name System	18	CO1 CO2 CO3 CO4 CO5	K1 K2 K3 K4 K5
VI	Self Study for Enrichment (Not included for End Semester Examinations) Bluetooth-Cellular Telephony - Satellite Networks -IPv6 - Routing algorithms Cryptography: Introduction-Symmetric-Key			

Text Books

1. Behrouz A. Forouzan (2017), “Data communication and Networking”, 5th Edition, Tata McGraw-Hill.

Reference Books

1. James F. Kurose and Keith W. Ross (2012), “Computer Networking: A Top-Down Approach Featuring the Internet”, Pearson Education.
2. Larry L. Peterson and Peter S. Davie (2012), “Computer Networks”, Fifth Edition, Harcourt Asia Pvt. Ltd., Second Edition, Publishers.
3. Andrew S. Tanenbaum (2012), “Computer Networks”, 5th Edition, Pearson 2012.
4. William Stallings (2007), “Data and Computer Communication”, Sixth Edition, Pearson Education

Web References

1. https://onlinecourses.nptel.ac.in/noc22_ee61/preview
2. https://www.tutorialspoint.com/data_communication_computer_network/index.htm
3. <https://www.studytonight.com/computer-networks/reference-models-in-computer-networks>

Pedagogy

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

Course Designers

Dr. P. Tamilselvi, Associate Professor, Department of Information Technology.

Semester VI	Internal Mark: 25		External Mark: 75	
COURSE CODE	COURSE TITLE	CATEGORY	Hrs/Week	CREDITS
23UIT6CC10	WEB TECHNOLOGIES	CORE X	5	4

Course Objectives

- To understand the fundamentals of HTML5
- To get the deep knowledge of HTML5 and CSS
- To develop logics using JavaScript with jQuery to create programs and applications in HTML5
- Enhance skill on problem solving by constructing algorithms

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 HTML5, CSS, jQuery and PHP	K1
CO2	Illustrate the usage of new elements and application of CSS with HTML5	K2
CO3	Build JavaScript Objects and jQuery methods to access HTML attributes	K3
CO4	Apply the knowledge of programming concepts to develop programs	K4
CO5	Solve real time problems using Web Technologies	K5

Mapping of CO with PO and PSO

	PSO1	PSO2	PSO3	PSO4	PSO5	PO1	PO2	PO3	PO4	PO5
CO1	2	2	3	2	1	2	2	2	3	2
CO2	3	2	3	2	3	3	3	2	3	2
CO3	3	3	3	2	3	3	3	2	3	3
CO4	3	2	3	2	3	2	2	2	3	3
CO5	3	3	3	2	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	Overview of HTML5 and Other Web Technologies: Introduction to HTML, JavaScript, CSS, PHP – Exploring New Features of HTML5 – Structuring an HTML Document – Exploring editors and browsers supported by HTML5 – Creating, Validating, Viewing and Saving an HTML document – Fundamentals of HTML: Understanding elements – Describing Data Types – Working with Text – Organizing Text in HTML – Working with Links and URLs (75)	15	CO1, CO2, CO3, CO4, CO5	K1, K2, K3, K4, K5
II	HTML5 and CSS: Creating Tables – Working with Images, Colors and Canvas – Working with Forms – Interactive Elements – Working with Multimedia – CSS: Overview – Backgrounds and Color Gradients – Fonts and Text Styles – Creating Boxes and Columns – Displaying, Positioning and Floating an Element – Table Layouts – Pseudo-Classes and Pseudo-Elements - Responsive web design	15	CO1, CO2, CO3, CO4, CO5	K1, K2, K3, K4, K5
III	Introduction to JavaScript and jQuery : Exploring Features, Programming Fundamentals and using JavaScript in HTML Document – JavaScript Functions, Events, Image Maps and Animations – JavaScript Objects – Working with Browser Objects – Validation, Errors, Debugging, Exception Handling and Security – Overview of jQuery : Fundamentals – Selectors – Methods to access HTML Attributes – Methods for Traversing – Manipulators – Events and Effects	15	CO1, CO2, CO3, CO4, CO5	K1, K2, K3, K4, K5
IV	Fundamentals of PHP : Introduction – Types of Information, Variables and Constants, Statements and Expressions – for each statement - Functions - Strings and Arrays	15	CO1, CO2, CO3, CO4, CO5	K1, K2, K3, K4, K5
V	PHP Files: File and Directory Management – Cookies, Session variables and Server variables – Building and Handling Forms in PHP – User Authentication - Database Connectivity using MySQL	15	CO1, CO2, CO3, CO4, CO5	K1, K2, K3, K4, K5
VI	Self Study for Enrichment (Not included for End Semester Examinations) Introduction to Web – Internet Basics – Internet Protocols – Hypertext and Hyperlinks - Web Browsers – Scripting Languages, PHP Operators, Control Structures – Looping and Branching	-	CO1, CO2, CO3, CO4, CO5	K1, K2, K3, K4, K5

Textbook

1. DT Editorial Services (2016). HTML5 Black Book , 2nd Edition, Dream Tech Press, New Delhi.
2. Marty Matthews. (2015). PHP and MYSQL Web Development, Tata McGraw Hill.
3. Steve Suehring, Tim Converse, Joyce Park (2013). PHP6 and MySQL Bible, Wiley

References

1. DT Editorial Services (2015). HTML5 in Simple Steps, 2nd Edition, Dreamtech Press, New Delhi
2. Ben Frain (2020). Responsive Web design with HTML5 and CSS, 3rd Edition, Packt Publishing Ltd. UK
3. Robin Nixon (2018). Learning PHP, MySQL & JavaScript 5e: With jQuery, CSS & HTML5, 5th Edition, O'Reilly Publication

Web References

1. <https://www.tutorialspoint.com/html5/index.htm>
2. <https://www.codecademy.com/learn/introduction-to-javascript>
3. <http://www.bsourcecode.com/php/basic-concepts/>

Pedagogy

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

Course Designers

1. Dr. M. Thangam, Associate Professor, Department of Information Technology

Semester VI	Internal Mark: 40		External Mark: 60	
COURSE CODE	COURSE TITLE	CATEGORY	Hrs/Week	CREDITS
22UIT6CC6P	WEB TECHNOLOGIES (P)	CORE PRACTICAL VI	3	3

Objectives

- To inculcate the basics of HTML5 programs using JavaScript and PHP
- To enable the students to learn and write programs using Web Technologies
- To implement the knowledge of CSS, Selectors and Event Handlers

Course Outcomes and Cognitive Level Mapping

CO Number	CO Statement	Cognitive Level
CO1	Recall program execution and Debugging	K1
CO2	Demonstrate the ideas of applying styles	K2
CO3	Make use of event handlers	K3
CO4	Develop the ability to analyze and design a web page	K4
CO5	Acquire logical thinking to solve real-time problems	K5

Mapping with Programme Outcomes

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

Syllabus

1. Programs using HTML5 and CSS
 - a) Formatting text
 - b) Creating and linking CSS file
 - c) Creating Lists and Tables
 - d) Displaying Images and Forms
 - e) Working with Multimedia and Interactive Elements
2. Programs using JavaScript and jQuery
 - a) Incorporating Script element in HTML
 - b) Working with Image Maps and Animations
 - c) Executing Event Handlers
 - d) Applying jQuery Selectors
3. Programs using PHP
 - a) Simple Programs
 - b) Implementing Server Variables
 - c) PHP programs to access a database
4. Case Study

SEMESTER - VI	Internal Mark - 25		External Mark-75	
Course Code	Course Title	Category	Hours/Week	Credits
23UIT6DSE2A	Internet of Things	Discipline Specific Elective - II(DSE)	5	3

Course Objectives

- To comprehend the foundational principles of the Internet of Things (IoT) and its applications
- To obtain understanding of IoT protocols and layered architecture
- To acquire the knowledge on data analysis and cloud storage in the context of IoT

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	State the basics of IoT and layered architecture	K1
CO2	Understand general concepts of Internet of Things (IoT) also recognize various devices, sensors and applications	K2
CO3	Implement the layered architecture and protocol architecture of IoT	K3
CO4	Examine the data and cloud storage model	K4
CO5	Design the real time data analysis using Hadoop	K5

Mapping of CO with PO and PSO

	PSO1	PSO2	PSO3	PSO4	PSO5	PO1	PO2	PO3	PO4	PO5
CO1	3	2	3	2	2	3	3	3	2	3
CO2	2	3	2	3	3	2	3	3	3	2
CO3	2	2	3	3	3	3	2	3	2	2
CO4	3	3	3	2	2	2	3	2	3	2
CO5	2	2	2	2	2	2	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 IoT: Definition and Characteristics of IoT - Physical Design of IoT: Things in IoT - IoT Protocols - Logical Design of IoT: Function blocks - Communication Models - Communication APIs - IoT Enabled Technologies - IoT Levels and Deployment Templates. Domain Specific IoTs: Home Automation, Cities, Environment, Agriculture, Industry, Health and Lifestyle.	15	CO1, CO2, CO3, CO4, CO5	K1, K2, K3, K4, K5
II	IoT and M2M: M2M - Difference between IoT and M2M - Software Defined Networks - Network Function virtualization - IoT System Management with NETCONF–YANG: Need for IoT systems management - SNMP - Network Operator requirements - IoT systems management Developing IoT: IoT Design Methodology-Case study on IoT for Weather Monitoring	15	CO1, CO2, CO3, CO4, CO5	K1, K2, K3, K4, K5
III	Sensors, Participatory Sensing, RFIDs: Introduction – Sensor Technology – Participatory Sensing, Industrial IoT and Automotive IoT – Actuator – Sensor Data Communication Protocols, RFID. Protocols for IoT: Layered Architecture for IoT – Protocol Architecture of IoT – IEEE802.15.4 – 6LoWPAN – Bluetooth Low Energy – Z-Wave – ZigBee.	15	CO1, CO2, CO3, CO4, CO5	K1, K2, K3, K4, K5
IV	IoT Physical Devices and Endpoints: Building blocks of an IoT Device, Exemplary device: Raspberry Pi, Linux on Raspberry Pi, Raspberry Pi Interfaces - Serial, SPI, I2C, Programming Raspberry Pi with Python - Other IoT Devices. Platform: IoT Physical Servers & Cloud Offerings: Introduction to Cloud Storage Models – WAMP for IoT – Xively Cloud for IoT.	15	CO1, CO2, CO3, CO4, CO5	K1, K2, K3, K4, K5
V	Data Analytics for IoT: Introduction – Apache Hadoop – Using Hadoop MapReduce for Batch Data Analysis – Apache Oozie – Apache Spark – Apache Storm – Using Apache Storm for Real-time data analysis. Tools for IoT: Introduction – Chef – Chef case studies.	15	CO1, CO2, CO3, CO4, CO5	K1, K2, K3, K4, K5
VI	Self Study for Enrichment (Not included for End Semester Examinations) Applications of IoT: Energy, Retail, Logistics, Case Studies Illustrating IoT Design: - Home Automation – Cities – Environment – Agriculture – Productivity Applications.	-	CO1, CO2, CO3, CO4, CO5	K1, K2, K3, K4, K5

Textbooks

1. Internet of Things – A Hands-on Approach – Arshdeep Bahga, Vijay Madiseti – University Press (India) Pvt. Ltd., 2015
2. Internet of Things Architecture and Design Principles – Raj Kamal – McGraw Hill Education (India) Private Limited, 2017
3. The Internet of Things, Enabling Technologies, Platforms, and Use Cases – Pethuru Raj and Anupama C. Raman – CRC Press Taylor & Francis - 2017

References

1. Waltenege Dargie, Christian Poellabauer (2010), “Fundamentals of Wireless Sensor Networks: Theory and Practice”, Wiley-A Wiley and Sons, Ltd., Publications
2. Francis DaCosta (2013), “Rethinking the internet of things-A scalable approach to connecting everything”, Apress Open Publications.
3. Peter Waher (2015), “Learning Internet of Things”, PACKT Publishing-Birmingham-Mumbai.

Web References

NPTEL & MOOC course titled Introduction to Internet of Things

https://onlinecourses.nptel.ac.in/noc22_cs53/preview

Pedagogy

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

Course Designers

Dr. A. Bhuvaneshwari, Associate Professor, Department of Information Technology.

SEMESTER - VI	Internal Mark - 25		External Mark-75	
Course Code	Course Title	Category	Hours/Week	Credits
23UIT6DSE2B	C# PROGRAMMING	Discipline Specific Elective - II(DSE)	5	3

Course Objectives

- To understand C# language constructs, syntax and semantics.
- To obtain a deep knowledge of C# language and enable the students to write interactive program.
- To implement Object-Oriented Programming concepts and database connectivity using C#

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	Understand the basic concepts of C# program	K1
CO2	Apply object oriented programming principles	K2
CO3	Implement Exception handling mechanism	K3
CO4	Interact with databases using C#	K4
CO5	Create dynamic web applications	K5

Mapping of CO with PO and PSO

	PSO1	PSO2	PSO3	PSO4	PSO5	PO1	PO2	PO3	PO4	PO5
CO1	3	2	3	2	2	3	3	3	2	3
CO2	2	3	2	3	3	2	3	3	3	2
CO3	2	2	3	3	3	3	2	3	2	2
CO4	3	3	3	2	2	2	3	2	3	2
CO5	2	2	2	2	2	2	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	Introducing C#- C#'s Defining Features-Visual Studio- Anatomy of a Simple Program-. Basic Coding in C#	13	CO1, CO2, CO3, CO4, CO5	K1, K2 K3, K4, K5
II	Generics-Generic Types-Constraints-Zero like values-Generic methods-Collections-Arrays-Array Initialization-Variable Argument Count with the params Keyword-List-List and Sequence Interfaces-Implementing Lists and Sequences-Collection-Dictionaries-Sets-Queues and Stacks-Linked Lists-Concurrent Collections	17	CO1, CO2, CO3, CO4, CO5	K1, K2 K3, K4, K5
III	Inheritance-Inheritance and Conversions-Interface Inheritance-Generics-System. Object-Virtual Methods-Sealed Methods and Classes-Accessing Base Members-Inheritance and Construction-Object Lifetime	15	CO1, CO2, CO3, CO4, CO5	K1, K2 K3, K4, K5
IV	Exceptions-Delegates, Lambdas, and Events-Delegate Types-Inline Methods-Events	17	CO1, CO2, CO3, CO4, CO5	K1, K2 K3, K4, K5
V	Files and Streams-Multithreading-. Asynchronous Language Features	13	CO1, CO2, CO3, CO4, CO5	K1, K2 K3, K4, K5
VI	Self Study for Enrichment (Not included for End Semester Examinations) LINQ-. Reactive Extensions-XAML	-	CO1, CO2, CO3, CO4, CO5	K1, K2, K3, K4, K5

Textbooks

1. Ian Griffiths(2022) Programming C# 10.0,O'Reilly

References

1. Christian Nagel, Jay Glynn, Morgan Skinner(2014),Professional C# 5.0 and .NET 4.5.1,Wiley
2. John Paul Mueller, Bill Sempf ,C# 7.0 All-in-One For Dummies,Wiley

Web References

<https://www.javatpoint.com/c-sharp-tutorial>

<https://dotnettutorials.net/lesson/csharp-7-new-features/>

Pedagogy

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

Course Designers

Dr. S.Suguna Devi, Associate Professor, Department of Information Technology.

SEMESTER - VI	Internal Mark - 25		External Mark-75	
Course Code	Course Title	Category	Hours/Week	Credits
23UIT6DSE2C	ARTIFICIAL INTELLIGENCE & EXPERT SYSTEMS	Discipline Specific Elective - II(DSE)	5	3

Course Objectives

- Discuss the issues and techniques involved in the creation of intelligent systems.
- To analyze the various knowledge representation schemes, Reasoning and Learning techniques of AI.

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	Design user interfaces to improve human–AI interaction and real time decision-making. Evaluate the advantages, disadvantages, challenges, and ramifications of human–AI augmentation.	K1
CO2	Apply basic principles of AI in solutions that require problem solving, inference, perception, knowledge representation, and learning	K2
CO3	Demonstrate awareness and a fundamental understanding of various applications of AI techniques in intelligent agents, expert systems, artificial neural networks and other machine learning models.	K3
CO4	Extract information from text automatically using concepts and methods from natural deduction	K4
CO5	Compare the Procedural Versus Declarative knowledge, forward and backward reasoning and Matching by Representing the knowledge using Rules	K5

Mapping of CO with PO and PSO

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

“1” – Slight (Low) Correlation

“3” – Substantial (High) Correlation

“2” – Moderate (Medium) Correlation

“-” indicates there is no correlation.

Syllabus

UNIT	CONTENT	HOURS	COs	COGNITIVE LEVEL
I	Introduction: AI Problems – AI techniques – Criteria for success. Problems, Problem Spaces, Search: State space search – Production Systems – Problem Characteristics – Issues in design of Search.	15	CO1, CO2, CO3, CO4, CO5	K1, K2, K3, K4, K5
II	Heuristic Search techniques: Generate and Test – Hill Climbing – Best-Fist, Problem Reduction, Constraint Satisfaction, Means-end analysis.	13	CO1, CO2, CO3, CO4, CO5	K1, K2, K3, K4, K5
III	Knowledge representation issues: Representations and mappings – Approaches to Knowledge representations – Issues in Knowledge representations – Frame Problem	16	CO1, CO2, CO3, CO4, CO5	K1, K2, K3, K4, K5
IV	Using Predicate Logic: Representing simple facts in logic – Representing Instance and Isa relationships – Computable functions and predicates – Resolution – Natural deduction	16	CO1, CO2, CO3, CO4, CO5	K1, K2, K3, K4, K5
V	Representing knowledge using rules: Procedural Vs Declarative knowledge – Logic programming – Forward Vs Backward reasoning – Matching – Control knowledge Brief explanation of Expert Systems Definition- Characteristics-architecture- Knowledge Engineering- Expert System Life Cycle-Knowledge Acquisition Strategies- Expert System Tools	15	CO1, CO2, CO3, CO4, CO5	K1, K2, K3, K4, K5

VI	Self Study for Enrichment (Not included for End Semester Examinations) Natural Language Processing: Introduction, Syntactic Processing, Semantic Analysis, Statistical NLP, Spell Checking. PROLOG-The Natural Language of AI: Prolog facts and rules, variables, control structures, arithmetic operators, matching in Prolog, backtracking.	-	CO1, CO2, CO3, CO4, CO5	K1, K2, K3, K4, K5
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Textbooks

1. Elaine rich, Kevin Knight, Shivashankar B Nair (2017). Artificial Intelligence, Cengage Learning India.

References

1. Saroj Kaushik (2012), Artificial Intelligence, Cengage Learning India
2. Mishra R.B. (2010), An Approach to Knowledge Base Management, Prentice Hall of India

Web References

NPTEL & MOOC courses titled Artificial Intelligence and Expert Systems

<https://nptel.ac.in/courses/106106140/>

<https://nptel.ac.in/courses/106106126/>

Pedagogy

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

Course Designers

Dr. J Sangeetha, Associate Professor, Department of Information Technology.

SEMESTER - VI	Internal Mark - 25		External Mark-75	
Course Code	Course Title	Category	Hours/Week	Credits
22UIT6PW	Project Work	Project Work	5	4

SYLLABUS

Course Objectives

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

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

- Identify and formulate the problem
- Analyze the problem and collect necessary data.
- Design and develop the project using appropriate software by applying the programming skills.
- Implement, evaluate and generate reports

There shall be six components that will be considered in assessing a project work with weightage as indicated. Based on the 6 components internal mark can be awarded

- Submission of the assigned tasks during Periodical review
- Individual involvement, teamwork and adoption of industry work culture
- Quality of project documentation (Precision, stylistics etc)
- Accomplishment of project deliverables
- Effective technical presentation of project work
- Viva-Voce

External Assessment

Dissertation/Project submitted at the end of third year shall be valued by two examiners appointed by the Controller for the conduct of practical exams. The board of examiners shall award 100 marks based on the following components.

- Achievement of project deliverables
- Effective technical presentation of project work
- Project Viva`