

## Cauvery College for Women (Autonomous)

### Programme Structure for Science Departments

<b>1</b>	<b>Course</b>	<b>No of Courses</b>	<b>Credits</b>	<b>Total Credits</b>
<b>I</b>	<b>Tamil/ Other Language</b>	<b>4</b>	<b>12</b>	<b>12</b>
<b>II</b>	<b>English</b>	<b>4</b>	<b>12</b>	<b>12</b>
<b>III</b>	<b>Core (Theory&amp; Practical)</b>	<b>17</b>	<b>77</b>	<b>109</b>
	<b>Project Work</b>	<b>1</b>	<b>4</b>	
	<b>Internship</b>	<b>1</b>	<b>2</b>	
	<b>First Allied</b>	<b>3</b>	<b>9</b>	
	<b>Second Allied</b>	<b>3</b>	<b>9</b>	
	<b>DSE</b>	<b>2</b>	<b>8</b>	
<b>IV</b>	<b>GEC</b>	<b>2</b>	<b>4</b>	<b>15</b>
	<b>SEC</b>	<b>2</b>	<b>4</b>	
	<b>AECC-I-Universal Human Values</b>	<b>1</b>	<b>2</b>	
	<b>AECC-II-Environmental Studies</b>	<b>1</b>	<b>2</b>	
	<b>AECC-III- Innovation and Entrepreneurship</b>	<b>1</b>	<b>1</b>	
	<b>AECC-IV- Professional Skills</b>	<b>1</b>	<b>2</b>	
<b>V</b>	<b>Gender Studies</b>	<b>1</b>	<b>1</b>	<b>02</b>
	<b>Extension Activities</b>	<b>-</b>	<b>1</b>	
		<b>44</b>		<b>150</b>



**CAUVERY COLLEGE FOR WOMEN (AUTONOMOUS)**  
**NATIONALLY ACCREDITED (IICYCLE) WITH “A” GRADE BY NAAC**  
**ISO 9001:2015 Certified TIRUCHIRAPPALLI**  
**PROGRAMME EDUCATIONAL OBJECTIVES (PEOs)**

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

**(For the Candidates admitted from the Academic year 2022-2023 onwards)**

PO NO.	Programme Outcome
	On completion of B.Sc-IT Programme, the students will be able to
PO 1	<b>Academic Skills &amp; Social Responsibility</b> Apply Computing, Mathematical and Scientific knowledge in various disciplines by understanding the concerns of the society.
PO 2	<b>Critical Thinking and Innovative Progress</b> Design the software applications with varying intricacies using programming languages for innovative learning in techno world to meet the changing demands.
PO 3	<b>Personality Development</b> Perceive Leadership skills to accomplish a common goal with effective communication and understanding of professional, ethical, and social responsibilities.
PO 4	<b>Lifelong Learning</b> Identify resources for Professional development and apply the skills and tools necessary for computing practice to gain real life experiences.
PO 5	<b>Creativity and Holistic Approach</b> Create a Scientific temperament and novelties of ideas to support research and development in Computer Science to uphold scientific integrity and objectivity.

PSO NO	Programme Specific Outcomes Students of B.Sc information Technology will be able to	POs Addressed
PSO1	To apply the knowledge of Science and Computing in Information Technology	PO1
PSO2	Analyze the local and global impact of computing on individuals, organizations, society and implant lifelong learning for professional development	PO4
PSO3	Improve the capability to apply the knowledge in interrelated domains and solve real world problems with modern technological tools	PO2
PSO4	To strengthen the academic quality, effective communication, good ethics and responsibilities during professional practice	PO5
PSO5	Excel in job oriented skills which are required to meet the current demand in the field of IT industry and to become an entrepreneur with confidence	PO3



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 2022-2023 and onwards)

Semester	Part	Course	Course Title	Course Code	Inst.	Credits	Exam			Total
							Hr	Marks		
								Int.	Ext	
I	I	Language Course -I (LC)	இக்கால இலக்கியம்	22ULT1	6	3	3	25	75	100
			Hindi literature & Grammar-I	22ULH1						
			History of popular Tales literature and Sanskrit story	22ULS1						
			Basic French – I	22ULF1						
	II	English Language Course- I(ELC)	Functional English for Effective Communication- I	22UE1	6	3	3	25	75	100
	III	Core Course – I(CC)	Programming in C	22UIT1CC1	5	5	3	25	75	100
		Core Practical - I (CP)	Programming in C (P)	22UIT1CC1P	3	3	3	40	60	100
		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	75	100
	IV	Ability Enhancement Compulsory Course-I (AECC)	UGC Jeevan Kaushal-Universal Human Values	22UGVE	2	2		100		100
	Total				30	22				700
II	I	Language Course-II(LC)	இடைக்கால இலக்கியமும், புதினமும்	22ULT2	5	3	3	25	75	100
			Hindi Literature & Grammar – II	22ULH2						
			Poetry, Textual Grammar and Alankara	22ULS2						
			Basic French – II	22ULF2						
	II	English Language Course- II(ELC)	Functional English for Effective Communication- II	22UE2	6	3	3	25	75	100
	III	Core Course – II (CC)	Data Structures & Algorithms	22UIT2CC2	5	5	3	25	75	100
		Core Practical - II (CP)	Data Structures using C(P)	22UIT2CC2P	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	23				800

III	I	Language Course-III (LC)	காப்பியமும், நாடகமும்	22ULT3	5	3	3	25	75	100
			Hindi Literature & Grammar - III	22ULH3						
			Prose, Textual Grammar and Vakyarachana	22ULS3						
			Intermediate French - I	22ULF3						
	II	English Language Course-II(ELC)	Learning Grammar Through Literature- I	22UE3	6	3	3	25	75	100
	III	Core Course– IV(CC)	Relational Database Management Systems	22UIT3CC4	6	6	3	25	75	100
		Core Practical - III(CP)	RDBMS (P)	22UIT3CC3P	3	3	3	40	60	100
		Second Allied Course- I(AC)	Financial Accounting	22UIT3AC4	4	3	3	25	75	100
		Second Allied Course-II(AP)	Computer Applications in Business (P)	22UIT3AC5P	4	3	3	40	60	100
	IV	Generic Elective Course-I(GEC)	Web Design	22UIT3GEC1	2	2	3	25	75	100
Basic Tamil - I			22ULC3BT1							
Special Tamil - I			22ULC3ST1							
	Extra Credit Course	SWAYAM		As per UGC Recommendation						
Total					30	23				700

**15 Days INTERNSHIP during Semester Holidays**

IV	I	Language Course IV(LC)	பண்டைய இலக்கியமும் உரைநடையும்	22ULT4	6	3	3	25	75	100
			Hindi Literature & Functional Hindi	22ULH4						
			Drama, History of Drama Literature	22ULS4						
			Intermediate French – II	22ULF4						
	II	English Language Course - IV(ELC)	Learning Grammar Through Literature-II	22UE4	6	3	3	25	75	100
	III	Core Course – V(CC)	Programming in JAVA	22UIT4CC5	6	6	3	25	75	100
		Core Practical - IV(CP)	Programming in JAVA(P)	22UIT4CC4P	4	4	3	40	60	100
		Second Allied Course-III(AC)	Business Communication	22UIT4AC6	4	3	3	25	75	100
		Internship	Internship	22UIT4INT		2	-	-	-	100
	IV	Generic Elective Course II-(GEC)	Web Design (P)	22UIT4GEC2P	2	2	3	40	60	100
			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	25				800

V	III	Core Course – VI(CC)	Operating Systems	22UIT5CC6	6	6	3	25	75	100
		Core Course - VII(CC)	Programming in Python	22UIT5CC7	6	6	3	25	75	100
		Core Practical – V(CP)	Programming in Python (P)	22UIT5CC5P	4	4	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	22UIT5DSE1A	5	4	3	25	75	100
			B) Big Data Analytics	22UIT5DSE1B						
			C) Cloud Computing	22UIT5DSE1C						
	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 ~	SWAYAM	As per UGC Recommendation						
	Total				30	29				700

Semester I	Internal Mark: 25		External Mark: 75	
COURSE CODE	COURSE TITLE	CATEGORY	Hrs/Week	CREDITS
22UCS1CC1/ 22UCA1CC1/ 22UIT1CC1	PROGRAMMING IN C	CORE COURSE – I(CC)	5	5

### Course Objectives

- To understand the basics of C language
- To get the deep knowledge of programming using C language
- To develop logics which will help them to create programs and applications in C
- 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 C Programming	K1
CO2	Illustrate the components of C programming	K2
CO3	Build algorithms and data structures swiftly and faster computation using programs	K3
CO4	Apply the knowledge of programming concepts to develop programs	K4
CO5	Solve real time problems using C	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  
“3” – Substantial (High) Correlation

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

## Syllabus

UNIT	CONTENT	HOURS	COs	COGNITIVE LEVEL
I	<b>Developing a program in C:</b> Algorithm-Pseudocode-Flowchart- Planning a C program- Writing a C program- Compile and Run a C Program- <b>Overview of C:</b> – Structure of C program – Character set-Tokens – Data types – Variables – Declaration of variables - symbolic constant – Operators and Expressions	15	CO1, CO2, CO3, CO4, CO5	K1, K2, K3, K4, K5
II	<b>Managing Input and Output Operations:</b> Reading and Writing a character -Formatted Input and Output. <b>Decision Making and Branching:</b> If, Switch, The ?: operator - The GoTo Instruction – <b>Decision Making and Looping:</b> Introduction – While, DO, For Statements –Jumps in Loops.	15	CO1, CO2, CO3, CO4, CO5	K1, K2, K3, K4, K5
III	<b>Array:</b> One dimensional array – Two and multidimensional array – Character array – String functions – <b>User-Defined Functions:</b> Need for User -Defined Functions –A Multi-Function Program-Elements of User-Defined Functions-Definition of Functions –Return values and Their Types-Function Calls- Function Declaration- Category of Functions – Nesting of Functions - Recursion - Storage Class-The scope and lifetime of variables in functions.	15	CO1, CO2, CO3, CO4, CO5	K1, K2, K3, K4, K5
IV	<b>Structures and Unions:</b> Structure definition – Structure Initialization – Array of structure – Array within structure –Structure within Structure-Union– <b>Pointers:</b> Understanding pointers - Accessing the address of a variable - Declaring and Initializing pointers - Accessing a variable through its pointers - Pointer Expressions - Pointers and Arrays - Pointers and Character strings.	15	CO1, CO2, CO3, CO4, CO5	K1, K2, K3, K4, K5
V	<b>File Management:</b> Defining and Opening File –Closing a File – I/O operations on Files – error handling during I/O operations – Random Access to Files- Command Line Arguments.	15	CO1, CO2, CO3, CO4, CO5	K1, K2, K3, K4, K5
VI	<b>Self Study for Enrichment</b> <b>(Not included for End Semester Examinations)</b> Develop algorithms for real time scenario, Area calculations, and Conversion programs, swapping numbers (with and without using temporary variable). Programs for checking eligibility, Triangle formation, Sum of numbers, sum of series, Array manipulations (Sorting, searching, insert, delete and merging), String handling programs, Dynamic memory management using pointers, Employee pay bill preparation using Files.	-	CO1, CO2, CO3, CO4, CO5	K1, K2, K3, K4, K5



**Textbooks**

1. Balagurusamy.E. (2017). Programming in ANSI C, 7<sup>th</sup> Edition, Mc Graw Hill Education New Delhi.
2. Byron Gottfried. (2018). Programming with C, 4th Edition, Tata McGraw Hill.

**References**

1. Yashavant Kanetkar, (2020). Let Us C, 16<sup>th</sup> Edition, BPB Publications, New Delhi.
2. Ashok N. Kamthane, Amit Ashok Kamthane (2015). Programming in C, 3<sup>rd</sup> Edition, Pearson India Education Services Pvt. Ltd.

**Web References**

1. <https://www.learn-c.org/>
2. <https://www.cprogramming.com/>
3. <https://www.tutorialspoint.com/cprogramming/index.htm>

**Pedagogy**

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

**Course Designers**

1. Dr. M. Anandhi, Associate Professor, Department of Information Technology.
2. Ms. R. Sridevi, Assistant Professor, Department of Computer Applications.

Semester I	Internal Mark: 40		External Mark: 60	
COURSE CODE	COURSE TITLE	CATEGORY	Hrs/Week	CREDITS
22UIT1CC1P	PROGRAMMING IN C (P)	CORE COURSE I(CP)	3	3

#### Course Objectives

- To develop and execute C programs
- To apply the knowledge of control structures, Arrays and functions
- To manipulate C functions

#### Course Outcomes and Cognitive Level Mapping

CO Number	CO Statement	Cognitive Level
CO1	Recall program execution and Debugging	K1
CO2	Demonstrate the ideas of control structures	K2
CO3	Make use of functions, arrays, apply string handling functions and develop files	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	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. Simple Programs
2. Control Structures – Branching statements
3. Control structures – Looping statements
4. Array Manipulations
5. Handling Strings
6. Implementation of functions
7. Applications of Pointers
8. Structures and Files
9. Programs using Graphics functions
10. Simple game programs
11. Special programs

- Ring a bell
- Printing patterns
- String tokenizer
- Use Sleep function

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	PSO 2	PSO 3	PSO 4	PSO5	PO1	PO 2	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><b>Matrices</b></p> <p>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 <math>m</math> homogeneous linear equations in <math>n</math> 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><b>Differentiation</b></p> <p>Maxima and Minima (Problems Only) -Points of inflexion.</p> <p><b>Partial differentiation</b></p> <p>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><b>Integration</b></p> <p>Integration of Rational algebraic functions - Rule (a) - Rule (b): Type <math>\int \frac{ax^2+bx+c}{x^2+px+q} dx</math> Type 11: <math>\int \frac{ax^2+bx+c}{x^2+px+q} dx</math> - Integration of Irrational functions : Case (ii) Integration of the form <math>\int \frac{P(x)}{Q(x)} dx</math> - Type <math>\int \frac{ax^2+bx+c}{x^2+px+q} dx</math> - Properties of definite integrals.</p>	12	CO1, CO2, CO3, CO4, CO5	K1, K2, K3, K4
IV	<p><b>Differential Equations</b></p> <p>Linear Differential Equation with constant coefficients - The Operators <math>D</math> and <math>D^{-1}</math> - Particular Integral - Special methods of finding P.I.: <math>Xis</math> of the form (a) <math>e^{ax}</math> (b) <math>\cos ax</math> or <math>\sin ax</math>, where <math>a</math> is a constant (c) <math>x^m</math> (a power of <math>x</math>), <math>m</math> being a positive integer (d) <math>e^{ax}V</math>, where <math>V</math> is any function of <math>x</math>.</p>	12	CO1, CO2, CO3, CO4, CO5	K1, K2, K3, K4
V	<p><b>Graph Theory</b></p> <p>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

	<b>Path and Circuits</b> Isomorphism - Subgraphs - Walks, Paths and Circuits - Connected Graphs, Disconnected Graphs and Components - Euler graphs.			
VI	<b>Self-Study for Enrichment</b> <b>(Not included for End Semester Examination)</b> 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](https://youtu.be/Gxr3AT4NY_0)
5. <https://youtu.be/xlbbeYbYLzg>
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	<b>Solution of Algebraic &amp; Transcendental Equations:</b> Introduction – The Bisection Method – The Iteration Method – Newton-Raphson Method (Problems Only)  <b>Interpolation:</b> Finite Differences: Forward Differences, Backward Differences – Newton's Formulae for Interpolation – Interpolation with unevenly spaced Points: Lagrange's Interpolation formula	12	CO1, CO2, CO3, CO4, CO5	K1, K2, K3, K4
II	<b>Numerical Integration:</b> Numerical Integration: Simpson's 1/3-Rule – Simpson's 3/8-Rule (proof not needed).  <b>Linear Systems of Equations:</b> Solution of Linear Systems–Direct Methods: Gaussian Elimination Method – Solutions of Linear Systems – Iterative Methods (Problems Only)	12	CO1, CO2, CO3, CO4, CO5	K1, K2, K3, K4
III	<b>Numerical solution of Ordinary Differential Equations:</b> Introduction – Euler's Method – Modified Euler's Method – Runge-Kutta Methods – Predictor - Corrector Methods : Adams-Moulton Method	12	CO1, CO2, CO3, CO4, CO5	K1, K2, K3, K4
IV	<b>Measures of Central Tendency:</b> Arithmetic Mean – Median – Mode – Geometric Mean – Harmonic Mean. <b>Measures of Dispersion:</b> Mean Deviation – Standard Deviation (Simple Problems Only)	12	CO1, CO2, CO3, CO4, CO5	K1, K2, K3, K4
V	<b>Correlation:</b> 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). <b>Linear Regression:</b> Introduction – Linear Regression (Derivation not needed and Simple Problems Only)	12	CO1, CO2, CO3, CO4, CO5	K1, K2, K3, K4
VI	<b>Self Study for Enrichment:</b> <b>(Not included for End Semester Examination)</b> 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).	-	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(3.9.1only) [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/zPG4NjlkCjc>

### Pedagogy

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

### Course Designers

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

<b>Semester II</b>	<b>Internal Mark: 25</b>		<b>External Mark: 75</b>	
<b>COURSE CODE</b>	<b>COURSE TITLE</b>	<b>CATEGORY</b>	<b>Hrs/Week</b>	<b>CREDITS</b>
<b>22UIT2CC2</b>	<b>DATA STRUCTURES &amp; ALGORITHMS</b>	<b>CORE COURSE – II (CC)</b>	<b>5</b>	<b>5</b>

### 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

<b>CO Number</b>	<b>CO Statement</b>	<b>Cognitive Level</b>
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 and proofs of correctness	K4
CO5	Assess, evaluate and choose appropriate data structure and algorithmic technique to solve real-world problems.	K5

### Mapping of CO with PO and PSO

	<b>PSO1</b>	<b>PSO2</b>	<b>PSO3</b>	<b>PSO4</b>	<b>PSO5</b>	<b>PO1</b>	<b>PO2</b>	<b>PO3</b>	<b>PO4</b>	<b>PO5</b>
<b>CO1</b>	3	2	2	1	2	3	2	1	2	2
<b>CO2</b>	2	2	3	2	2	1	2	1	2	2
<b>CO3</b>	3	3	3	2	3	3	3	1	3	3
<b>CO4</b>	3	2	3	2	3	3	3	2	3	3
<b>CO5</b>	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: Data structures-Abstract data types-What is an Algorithm?-Goal of the Analysis of Algorithms-Types of Analysis-Stacks: Stack - Stack ADT- Applications – Simple array Implementation-Problems and solution(Problem 2)- Queue: Queue ADT – Exceptions – Applications – Simple array Implementation-Problems and solutions(Problem 2)	15	CO1, CO2, CO3, CO4, CO5	K1, K2, K3, K4, K5
II	Linked list: Introduction- Linked Lists ADT - Arrays overview - Singly Linked Lists - Doubly Linked Lists - Circular Linked Lists	15	CO1, CO2, CO3, CO4, CO5	K1, K2, K3, K4, K5
III	Trees : Glossary - Binary Trees - Types of Binary Trees - Properties of Binary Trees - Binary Tree Traversals – Problems and Solutions(Problem 3). Graphs: Introduction – Glossary - Applications of Graphs - Graph Representation- Graph Traversals - Topological Sort	15	CO1, CO2, CO3, CO4, CO5	K1, K2, K3, K4, K5
IV	Sorting and searching:Sorting definition-Classification of sorting algorithms-Bubble,Selection and Insertion sort-Searching Definition-Type of searching-Unordered and ordered Linear Search-Binary search	15	CO1, CO2, CO3, CO4, CO5	K1, K2, K3, K4, K5
V	Algorithm design techniques-Greedy algorithm- Greedy strategy-Advantages and Disadvantages - Applications- Problems & Solutions(Problem 1-3)-Divide and Conquer: Introduction-strategy-Advantages and disadvantages-Applications-Problems and solutions(Problem 6)	15	CO1, CO2, CO3, CO4, CO5	K1, K2, K3, K4, K5
VI	<b>Self Study for Enrichment</b> <b>(Not included for End Semester Examinations)</b> Reverse the elements of the stack using only stack operations(push &pop)-Implement one queue efficiently using two stacks- Perform polynomial addition using Linked list-Convert a tree to its mirror-Find shortest path- At a railway station for a schedule of trains arrival and departures find the minimum number of platforms so that all trains can be accommodated using Greedy algorithm	-	CO1, CO2, CO3, CO4, CO5	K1, K2, K3, K4, K5

### **Textbook**

1. Narasimha Karumanchi, N. (2017). Data structures and algorithms made easy, 5th Edition, CareerMonk Publications.

### **Reference Books**

1. T.H. Cormen, C.E. Leiserson, R.L. Rivest and C. Stein (2022), Introduction to Algorithms, 4th Edition, MIT Press
2. ISRD Group, (2009). Data Structures Using, Tata McGraw Hill Education Pvt. Ltd, New Delhi.
3. Ellis Horowitz, Sartaj Sahni and Susan and Rewson-Freed (2008), Fundamentals of Data Structures in C, 2nd Edition, Universities Press

### **Web References**

1. <https://www.geeksforgeeks.org/data-structures>
2. [https://www.tutorialspoint.com/data\\_structures\\_algorithms/index.html](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. M. Anandhi, Associate Professor, Department of Information Technology.

Semester II	Internal Mark: 40		External Mark: 60	
COURSE CODE	COURSE TITLE	CATEGORY	Hrs/Week	CREDITS
22UIT2CC2P	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	3	3
CO5	3	3	3	2	3	3	3	2	3	3

## **Syllabus**

1. Stack implementation
2. Operations on Queue
3. Linked list
4. Binary tree traversal
5. Operations of Graph
6. Sorting
7. Searching
8. Greedy method
9. Divide and Conquer

## **Course Designer**

1. Dr. M. Anandhi, 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	<b>NUMBER SYSTEMS AND CODES:</b> 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.	12	CO1, CO2, CO3, CO4, CO5	K1, K2, K3, K4, K5
II	<b>BOOLEAN ALGEBRA AND LOGIC GATES:</b> 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	12	CO1, CO2, CO3, CO4, CO5	K1, K2, K3, K4, K5
III	<b>K MAP TECHNIQUES:</b> 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	12	CO1, CO2, CO3, CO4, CO5	K1, K2, K3, K4, K5
IV	<b>COMBINATIONAL LOGIC CIRCUITS:</b> Half and Full Adders – BCD Adder - Half and Full Subtractors – Multiplexers (4:1 line) – 1 to 4 line Demultiplexers – Decoders, Encoders	12	CO1, CO2, CO3, CO4, CO5	K1, K2, K3, K4, K5
V	<b>SEQUENTIAL LOGIC CIRCUITS:</b> 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.	12	CO1, CO2, CO3, CO4, CO5	K1, K2, K3, K4, K5
VI	<b>Self Study for Enrichment</b> <b>Gray Code – Excess – 3 Code</b> NAND and NOR Implementation — AND-OR-INVERT Implementation – OR-AND-INVERT Implementation - SISO – SIPO – PIPO – PISO	-	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](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	HO UR S	COs	COGNITIVE LEVEL
I	<b>Operations Research</b> 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 <b>Linear Programming Problem- Mathematical Formulation</b> Introduction-Linear programming Problem- Mathematical Formulation of the problem -Illustrations on Mathematical Formulation of LPPs.(simple problems only) <b>Linear programming problem-graphical Solution and Extension</b> Introduction- Graphical Solution Method- General Linear Programming Problem- Canonical and Standard Forms of LPP.	12	CO1, CO2, CO3, CO4, CO5	K1, K2, K3, K4
II	<b>Linear Programming Problem-Simplex Method</b> Introduction-Fundamental Properties of Solutions- The computational Procedure- The Simplex Algorithm-Use of Artificial Variables-Big M method.(simple problems only).	12	CO1, CO2, CO3, CO4, CO5	K1, K2, K3, K4
III	<b>Transportation problem</b> 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). <b>Assignment Problem</b> Introduction-Mathematical Formulation of the Problem- Solution Methods of Assignment Problem- Special Cases in Assignment Problems(simple problems only).	12	CO1, CO2, CO3, CO4, CO5	K1, K2, K3, K4
IV	<b>Sequencing problem</b> 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	<b>Network Scheduling by PERT/CPM</b> 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	<b>Self-Study for Enrichment</b> <b>(Not included for End Semester Examination)</b> 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](https://youtu.be/RTX-ik_8i-k)
7. <https://youtu.be/s5KZw1EpBEo>

## **Pedagogy**

Power point presentation, Group discussion, Seminar, Assignment.

## **Course Designers**

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

Semester III	Internal Mark: 25		External Mark: 75	
COURSE CODE	COURSE TITLE	CATEGORY	Hrs/Week	CREDITS
22UIT3CC4	Relational Database Management Systems	CORE COURSE – III (CC)	6	6

### 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

“3” – Substantial (High) Correlation

“2” – Moderate (Medium) Correlation

“-” indicates there is no correlation.

## SYLLABUS

UNIT	CONTENT	HOURS	COs	COGNITIVE LEVEL
I	<b>Introduction to Databases:</b> Databases and Database Users - D Database System Concepts and Architecture- <b>Conceptual Data Modeling and Database Design -</b> 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	18	CO1, CO2, CO3, CO4, CO5	K1, K2, K3, K4, K5
II	<b>The Relational Data Model and Relational Database Constraints</b> Relational Model Concepts -Relational Model Constraints and Relational Database Schemas - Update Operations, Transactions, and Dealing with Constraint Violations - <b>The Relational Algebra and Relational Calculus</b> -Unary Relational Operations: SELECT and PROJECT-Relational Algebra Operations from Set Theory-Binary Relational Operations: JOIN and DIVISION - Additional Relational Operation.	18	CO1, CO2, CO3, CO4, CO5	K1, K2, K3, K4, K5
III	<b>Basic SQL:</b> 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 <b>More SQL:</b> 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	18	CO1, CO2, CO3, CO4, CO5	K1, K2, K3, K4, K5
IV	<b>Database Design Theory and Normalization :</b> 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 <b>Relational Database Design Algorithms and Further Dependencies</b> <b>Further Topics in Functional Dependencies:</b> Inference Rules, Equivalence, and Minimal Cover - Properties of Relational Decompositions- Algorithms for Relational Database Schema Design - About Nulls, Dangling Tuples, and Alternative Relational Designs	18	CO1, CO2, CO3, CO4, CO5	K1, K2, K3, K4, K5

V	<b>PL/SQL Concepts:</b> Cursors, Stored Procedures, Stored Function, Database Triggers- <b>Introduction to NOSQL Systems</b>	18	CO1, CO2, CO3, CO4, CO5	K1, K2, K3, K4, K5
VI	<b>Self Study for Enrichment</b> <b>(Not included for End Semester Examinations)</b> <ul style="list-style-type: none"> <li>• Design a ER model for Banking transactions</li> <li>• Write query to Create schemas related to bank</li> <li>• Normalize the schema with applying the normal forms</li> <li>• Perform transactions such as Deposit, Withdraw using sub queries</li> <li>• Apply PL/SQL concept to validate the data</li> </ul>	-	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.

Semester III	Internal Mark:40		External Mark: 60	
COURSE CODE	COURSE TITLE	CATEGORY	Hrs/Week	CREDITS
22UIT3CC3P	RDBMS(P)	CORE COURSE -III (CP)	3	3

### Course Objectives

- Creating and Altering Tables with necessary constraints, keys and data types
- Inserting data and manipulating data as per needs
- Writing SQL Queries to retrieve required information from single/multiple tables.
- Creating views and manipulating them as needed

### Course Outcomes

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

CO Number	CO Statement	Knowledge level
CO1	Design and implement a database schema for a given problem	K1
CO2	Create and maintain tables using PL/SQL	K2
CO3	Populate and query a database	K3
CO4	Prepare reports	K3
CO5	Application development using PL/SQL	K3

### Course Outcomes and Cognitive Level Mapping

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



## **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	CREDITS
22UIT3GEC1	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	<b>Getting started with HTML 5:</b> 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	<b>Introduction to New Elements in HTML 5:</b> 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	<b>Working with Text:</b> 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 - <b>Working with Lists, Tables and Frames:</b> Working with Lists:- Unordered – Ordered – Definition Lists.	6	CO1, CO2, CO3, CO4, CO5	K1, K2, K3, K4
IV	<b>Working with Lists, Tables and Frames:</b> 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	<b>Working with Hyperlinks, Images and Multimedia:</b> – 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	<b>Self Study for Enrichment</b> <b>(Not included for End Semester Examinations)</b> Internet, Uses of Internet, Web pages and Website.	-	CO1, CO2, CO3, CO4, CO5	K1, K2, K3, K4
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#### **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
22UIT4CC5	PROGRAMMING IN JAVA	CORE	6	6

### 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  
Correlation.

“2” – Moderate (Medium) Correlation

“-” indicates there is no

## Syllabus

UNIT	CONTENT	HOURS	COs	COGNITIVE LEVEL
I	<b>Fundamentals of Object-Oriented Programming:</b> Basic Concepts of Object-Oriented Programming - Benefits and Applications of OOP. <b>Java Evolution:</b> Java Features - Java Environment - <b>Overview of Java Language:</b> Java Program Structures, Statements – Implementing A Java Program – Java Virtual Machine –. <b>Constants, Variables and Data Types:</b> 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	<b>Operators and Expressions - Decision Making and Branching:</b> 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) - <b>Decision Making and Looping :</b> While, Do, For Statement, Jump In Loops, Return Statement.	18	CO1 CO2 CO3 CO4 CO5	K1 K2 K3 K4 K5
III	<b>Classes, Objects and Methods:</b> Defining A Class – Fields and Methods Declaration - Creating Objects – Accessing Class Members – Constructors – Method Overloading – Static Members – Nesting of Methods – <b>Inheritance:</b> Extending A Class – Overriding Methods – Final Variables, Methods and Classes – Abstract Methods and Classes – Visibility Control. <b>Arrays, Strings:</b> Creating Arrays – One- and two-Dimensional Arrays - Strings. <b>Interfaces: Multiple Inheritance:</b> Introduction - Defining Interfaces - Extending Interfaces-Implementation Interfaces - Accessing Interfaces Variables.	18	CO1 CO2 CO3 CO4 CO5	K1 K2 K3 K4 K5
IV	<b>Packages:</b> Introduction - Java Packages - Using System Packages- Naming conventions - Creating packages - Accessing a package - Using a Package - Adding a class to a package - <b>Multithreaded Programming:</b> Creating Threads – Extending the Thread Class – Thread- Life Cycle of Thread- Using Thread Method-Thread Priority – Synchronization – <b>Managing Errors and Exceptions:</b> Introduction - Types of Errors -Exceptions-Syntax of Exception Handling - Multiple Catch Statements.	18	CO1 CO2 CO3 CO4 CO5	K1 K2 K3 K4 K5
V	<b>Graphics Programming using AWT, Swing and Layout Manager:</b> 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 - <b>Database Connectivity:</b> Introduction – JDBC Architecture – Discussion with Example – Overview of JDBC Components.	18	CO1 CO2 CO3 CO4 CO5	K1 K2 K3 K4 K5

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

### Text Book

E. Balagurusamy,(2019). "*Programming with JAVA*", 6<sup>th</sup> 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*", 8<sup>th</sup> 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*",4<sup>th</sup> 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](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

“3” - Substantial (High) Correlation

“2” - Moderate (Medium) 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

“3” - Substantial (High) Correlation

“2” - Moderate (Medium) 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
22UIT5CC6 /22UCS5CC6	OPERATING SYSTEMS	CORE COURSE – (CC)	6	6

### 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
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	Explore the architecture, features, and functionalities of various operating systems	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

“3” – Substantial (High) Correlation

“2” – Moderate (Medium) Correlation

“-” indicates there is no correlation.

## SYLLABUS

Unit	CONTENT	HOURS	Cos	COGNITIVE LEVEL
I	<b>Operating System Overview:</b> Operating System Objectives and Functions - Evolution of Operating Systems - Major Achievements Developments Leading to Modern Operating Systems- Microsoft windows overview- Linux – Linux VServer Virtual Machine Architecture	16	CO1 CO2 CO3 CO4 CO5	K1 K2 K3 K4 K5
II	<b>Process:</b> What Is a Process? - <b>Process States:</b> Creation and Termination of Processes - Five-State Model <b>-Process Description:</b> Operating System Control Structures- Process Control Structures - <b>Process Control</b> -Modes of Execution - Process Creation - Process Switching - <b>Threads:</b> Processes and Threads – <b>Types of Threads</b> – User Level and Kernel Level Thread	20	CO1 CO2 CO3 CO4 CO5	K1 K2 K3 K4 K5
III	<b>Uniprocessor Scheduling:</b> Types of Processor Scheduling - <b>Scheduling Algorithms:</b> Short-Term Scheduling Criteria - Use of Priorities - Alternative Scheduling Policies – Linux Scheduling – Windows Scheduling- Principles of Concurrency - Mutual Exclusion - Semaphores – <b>Monitors:</b> Monitor with Signal - Message Passing - <b>Principles of Deadlock</b> - Deadlock Prevention - Deadlock Avoidance Deadlock Detection Deadlock Detection – Unix, Linux, Windows7 Concurrency mechanism.	18	CO1 CO2 CO3 CO4 CO5	K1 K2 K3 K4 K5
IV	<b>Memory Management Requirements</b> - <b>Memory Partitioning:</b> Fixed Partitioning - Dynamic Partitioning - Relocation - Paging – Segmentation – <b>Virtual Memory</b> - <b>Hardware and Control Structures</b> -Locality and Virtual Memory - Paging – Segmentation - Combined Paging and Segmentation - <b>Operating System Software:</b> Fetch Policy - Placement Policy - Replacement Policy – Linux memory management – Windows memory management	20	CO1 CO2 CO3 CO4 CO5	K1 K2 K3 K4 K5
V	<b>Disk Scheduling:</b> Disk Performance Parameters - Disk Scheduling Policies – <b>File Management:</b> Overview - File Organization and Access - File Directories - File Sharing - Record Blocking - File System Security	16	CO1 CO2 CO3 CO4 CO5	K1 K2 K3 K4 K5
VI	<b>Self-Study for Enrichment</b> <b>(Not included for End Semester Examinations)</b> 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. Operating Systems Internals and Design Principles (2018), William Stallings, 9<sup>th</sup> Edition, Prentice Hall,

## **References**

1. Andrew S.Tanenebaum (2011), Operating Systems and Design Implementation, 3<sup>rd</sup> Edition, Pearson Education
2. Abraham Silberschatz , Perter Baer Galvin, Greg, (2010), Operating System Concepts, 8<sup>th</sup> Edition John Wiley & Son
3. Rohit Khurana (2014), Operating Systems, 2<sup>nd</sup> Edition, Vikas Publishing House Ltd.

## **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 Designer**

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
22UIT5CC7	Programming in Python	CORE COURSE (CC)	6	6

### 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

“3” – Substantial (High) Correlation

“2” – Moderate (Medium) Correlation

“-” indicates there is no Correlation.



## Syllabus

UNIT	CONTENT	HOURS	COs	COGNITIVE LEVEL
I	<b>Introduction to Python:</b> Features of Python - How to run Python - Basics of Python - Input, Output and Import Functions – Operators – <b>Data Types and Operations:</b> Numbers – Strings – List – Tuple – Set – Dictionary – Mutable and Immutable Objects – Data Type Conversion - <b>Flow Control:</b> Decision Making – Loops – Nested Loops – Control Statements – Types of Loops – List, Set and Dictionary Comprehensions – Nested Dictionaries	18	CO1 CO2 CO3 CO4 CO5	K1 K2 K3 K4 K5
II	<b>Arrays:</b> 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	18	CO1 CO2 CO3 CO4 CO5	K1 K2 K3 K4 K5
III	<b>Functions:</b> Function Definition and Calling – Function Arguments – Anonymous Functions – Recursive Functions – Function with more than one return value – <b>Modules and Packages:</b> 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	18	CO1 CO2 CO3 CO4 CO5	K1 K2 K3 K4 K5
IV	<b>File Handling:</b> Opening, Closing, Writing, Renaming, Deleting and Reading from a File – File Methods – Directories in Python – <b>Exceptions:</b> Errors in a Python Program – Exceptions – Exception Handling – Types of Exceptions – The Except Block – The assert statement – User-Defined Exceptions – Logging the Exceptions	10	CO1 CO2 CO3 CO4 CO5	K1 K2 K3 K4 K5
V	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	18	CO1 CO2 CO3 CO4 CO5	K1 K2 K3 K4 K5
VI	<b>Self-Study for Enrichment</b> <b>(Not to be included for External Examination)</b> 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

### **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](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
22UIT5CC5P	Programming in Python (P)	Core Practical	4	4

### 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

“3” - Substantial (High) Correlation

“2” - Moderate (Medium) 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

“3” - Substantial (High) Correlation

“2” - Moderate (Medium) Correlation

“-” – Indicates there is no Correlation

## SYLLABUS

Unit	CONTENT	HOURS	Cos	COGNITIVE LEVEL
I	<b>Software and Software Engineering:</b> 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	<b>The Software Process: Process Models:</b> Generic process model- Prescriptive process models <b>Requirements Modeling</b> - 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	<b>Design concepts:</b> Design within the context of software engineering - The Design Process - Design Concepts - The Design model – <b>Component Level Design:</b> Designing Class-Based Components- <b>Quality concepts-</b> What is Quality? - Software Quality: McCall's Quality Factors - Achieving Software Quality	15	CO1 CO2 CO3 CO4 CO5	K1 K2 K3 K4 K5
IV	<b>Testing Approaches:</b> Software Testing Fundamentals - <b>Types of Testing:</b> White Box Testing - Static Testing- Structural Testing - Black Box Testing: What is Black Box testing – How to do? <b>Integration Testing:</b> Integration Testing- Integration Testing as Type of Testing. <b>System and Acceptance Testing:</b> 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	<b>Performance Testing:</b> Factors governing Performance testing- Regression Testing: What is <b>Regression testing-</b> Types of Regression Testing - Best Practices in Regression Testing. <b>Internationalization Testing:</b> Primer on Internationalization - Test Phase for Internationalization – Internationalization Validation – Fake Language Testing – Language Testing – Localization Testing - <b>Ad-hoc Testing:</b> Overview – Buddy Testing – Pair Testing - Exploratory Testing – Iterative Testing – Defect Seeding.	15	CO1 CO2 CO3 CO4 CO5	K1 K2 K3 K4 K5
VI	<b>Self-Study for Enrichment</b> <b>(Not included for End Semester Examinations)</b> 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, 7<sup>th</sup> Edition , McGraw-Hill Education (**Unit 1,2,3**)
2. Srinivasan Desikan, Gopalaswamy Ramesh (2012), Software Testing Principles and Practices, Pearson Education. (**Unit 4,5**)

### **References**

1. Ian Sommerville (2010), Software Engineering, 7<sup>th</sup> Edition, Pearson Education
2. Paul C. Jorgensen (2010), Software Testing: A Craftsman's Approach, Fourth Edition, 4<sup>th</sup> 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
22UIT5DSE1A	Mobile Application Development	Discipline Specific Elective – I (DSE)	5	4

### 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	<b>Getting Started with Android Programming</b> 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	<b>Getting to Know the Android User Interface</b> 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	<b>Data Persistence and Content Providers</b> 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	<b>Messaging and Location Based Services</b> 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	<b>Networking and Developing Android Services</b> 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
22UIT5DSE1B	B. Big Data Analytics	Discipline Specific Elective –I (DSE)	5	4

## 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	K\3
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	<b>Introduction to Big data analytics:</b> 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	<b>Hadoop:</b> 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	<b>NoSQL Big data Management:</b> 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	<b>MapReduce , Hive and Pig :</b> 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	<b>Spark and Big data Analytics:</b> 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) <b>Programming Examples in Analytics and Machine Learning using Hadoop, Spark and Python :</b> 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 Madisetti, "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](https://www.youtube.com/watch?v=n_Krer6YWY4)
2. [https://onlinecourses.nptel.ac.in/noc20\\_cs92/preview](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
22UIT5DSE1C	Cloud Computing	Discipline Specific Elective – I (DSE)	5	4

### 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	<b>Foundation of Cloud Computing:</b> Introduction – History – Fundamentals of Cloud Computing Ecosystem – Cloud computing characteristics – Advantages and disadvantages of cloud computing – Comparison of traditional and cloud computing paradigms – <b>Cloud Services and Deployment Models:</b> Cloud Deployment Models – Cloud Service Models – Cloud infrastructure mechanisms – Cloud Service Management	15	CO1 CO2 CO3 CO4 CO5	K1 K2 K3 K4 K5
II	<b>Cloud Computing Architecture:</b> Design principles – Cloud Computing Life Cycle (CLCC) – Cloud Computing Reference Architecture – Load balancing approach – Mobile Cloud Computing (MCC) – <b>Virtualization Technology</b> – 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	<b>Cloud Security and Privacy:</b> 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	<b>Cloud Computing Service Level Agreements and Applications:</b> Service Level Agreements (SLA) practices – Components of a cloud SLA – Types of SLAs – <b>Cloud Computing Applications:</b> 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	<b>Cloud Computing Technologies, Platforms and Services:</b> 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	<b>Self Study for Enrichment</b> (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.