Cauvery College for Women (Autonomous)

Programme Structure for Science Departments

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

PROGRAMME EDUCATIONAL OBJECTIVES (PEOs)

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

Department of Information Technology
(For the Candidates admitted from the Academic year 2022-2023 onwards)

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

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

Semester	Part	Course	Course Title	Course Code	Inst. Hrs. /	Credits	Exam Hr	Marks Int.	Marks Ext	Total
I	I	Language Course -I (LC)	இக்கால இலக்கியம்	22ULT1	6	3	3	25	75	100
			Hindi literature and 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 Alakara	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 இலக்கியம்	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)	JAVA Programming	22UIT4CC5	6	6	3	25	75	100
		Core Practical - IV(CP)	JAVA Programming (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

	III	Core Course – VI(CC)	Operating Systems	22UIT5CC6	6	6	3	25	75	100
V		Core Course - VII(CC)	Python Programming & Machine Learning	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						
			B.Big Data	22UIT5DSE1B	5	4	3	25	75	100
			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)	Digital Marketing (P)	22UIT5SEC2P	2	2	3	40	60	100
		Extra Credit Course	SWAYAM	As per UGC Recommendation						
				Total	**30**	**29**				**700**

	III	Core Course – IX(CC)	Computer Networks	22UIT6CC9	6	6	3	25	75	100
		Core Course– X(CC)	Web Technologies	22UIT6CC10	5	5	3	25	75	100
		Core Course– XI(CC)	Cyber Security	22UGCS	5	4	3	25	75	100
VI		Core Practical –VI(CP)	Web Technologies (P)	22UIT6CC6P	3	3	3	40	60	100
		Discipline Specific Elective – II(DSE)	A.Internet of Things	22UIT6DSE2A						
			B.C# Programming	22UIT6DSE2B	5	4	3	25	75	100
			C.Artificial Intelligence	22UIT6DSE2C						
		Project Work	Project Work	22UIT6PW	5	4	-	-	100	100
	V	Gender Studies	Gender Studies	22UGGS	1	1		100	-	100
		Extension activity		22UGEA	0	1	0	-	-	-
	Total				**30**	**28**				**700**
				Grand Total	**180**	**150**				**4400**

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

Syllabus

UNIT	CONTENT	HOURS	COs	COGNITIVE LEVEL
I	**Developing a program in C:** Algorithm-Pseudocode-Flowchart- Planning a C program- Writing a C program- Compile and Run a C Program-**Overview of C:** – 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	**Managing Input and Output Operations:** Reading and Writing a character -Formatted Input and Output. **Decision Making and Branching:** If, Switch, The ?: operator - The GoTo Instruction – **Decision Making and Looping:** Introduction – While, DO, For Statements –Jumps in Loops.	15	CO1, CO2, CO3, CO4, CO5	K1,K2, K3,K4,K5
III	**Array:** One dimensional array – Two and multidimensional array – Character array – String functions – **User-Defined Functions:** 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	**Structures and Unions:** Structure definition – Structure Initialization – Array of structure – Array within structure –Structure within Structure-Union– **Pointers:** 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	**File Management:** 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	**Self Study for Enrichment** (Not included for End Semester Examinations) 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

Textbook

1. Balagurusamy.E. (2017). Programming in ANSI C, 7th 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, 16th Edition, BPB Publications, New Delhi.

2. Ashok N. Kamthane, Amit Ashok Kamthane (2015). Programming in C, 3rd 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**

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

Course Objective

- **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

Course Outcome and Cognitive

co Number	CO Statement On the successful completion of the course, students will be able to	Cognitive Level
COl	Remember and recall the basic concept of essential mathematics.	**Kl**
CO2	Illustrate the various notions in the respective streams .	**K2**
C03	Apply the different terminologies of essential mathematics.	**K3**
C04	Classify the solution of mathematical problems using various techniques.	**K4**
COS	Examine the solution of mathematical problems.	**K4**

Mapping of CO with PO and PSO

cos	PSOl	PS02	PS03	PS04	PSOS	POI	P02	P03	P04	POS
COl	3	2	3	3	3	3	3	3	2	3
CO2	3	3	3	3	3	3	3	3	3	2
COJ	ʓ	2	3	3	3	3	3	ʓ	2	2
C04	3	2	2	3	3	3	3	3	3	2
COS	3	2	_3	3	.3	3	3	ʓ	2	2

"1" - Slight (Low) Correlation--, "2" - Moderate (Medium)

Correlation--, "3" - Substantial (High) Correlation--, "-" indicates there

is no correlation.

UNIT	CONTENT	HOURS	COS	COGNITIVE LEVEL
I	**Matrices** Matrix - Special types of matrices - Scalar multiplication of a matrix - Equality of matrices - Addition of matrices - Subtraction - Multiplication of Matrices - Inverse matrix- Relation between adjoint and inverse matrices - Solution of simultaneous equations - Rank of a matrix - A system of m homogeneous linear equations in n u:rikiiowns - System of non-homogeneous linear equations - Eigen values and Eigenvectors - Similar matrices- Cayley-Hamilton Theorem (proof not needed) - Simple applications only	12	COl, CO2, C03, C04, COS	Kl,K2,K3, K4
II	**Differentiation** Maxima and Minima (Problems Only) -Points of inflexion. **Partial differentiation** Functions of function rule - Total Differential Coefficient - A Special case - Implicit Fun,ctions - Homogeneous functions - Euler's Theorsm- (proof not needed) - Simple problems only.	12	COl, CO2, C03, C04, C05	Kl,K2,K3, K4
III	**Integration** Integration of Rational algebraic_functions - Rule (a) - Rule (b): Type **i:f** $\frac{th}{ax^2+l;.r+c}$ ^{¼} Type 11: $\int \frac{:'t''t-m}{a.;: \ -1-brlc} d¥$ - Integration of Irrational functions : Case (ii) Integration of the form $\int \frac{./ \ P\ ;r+;}{ar-+z:r+c}$ - Type $\int \frac{a.r}{a+lJ\&OS:C}$ - Properties of definite integrals.	12	COl, CO2, C03, C04, C05	Kl,K2,K3, K4
IV	**Differential Equations** Linear Differential Equation with constant coefficients - The Operators D and $n-^1$ - Particular Integral - Special methods of finding P.I.: Xis of the form (a) eox (b) $cosax$ or $sinax,$ where a is a constant (c) xm (a power of x), m being a positive integer (d) $eax:V,$ where Vis any function of $x.$	12	COI, CO2, C03, C04, C05	Kl,K2,K3, K4
V	**Graph Theory** Introduction - Definition of Graphs - Applications of Graphs - Finite and infinite graphs - Incidence and Degree - Isolated Vertex, Pendant Vertex and Null Graph.	12	COl, CO2, C03, C04, COS	Kl,K2,K3, K4

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

Text Books

T.K.Manicavachagom Pillay, T.Natarajan, K.S.Ganapathy.(2015). *Algebra, Volume*

    II. S. Viswanathan (Printers & Publishers) Pvt., Ltd.

1. S.Narayanan, T.K.Manicavachagom *Pillay.(2015).Calculus,Volume I.* S. Viswanathan (Printers & Publishers) Pvt., Ltd.

2. S.Narayanan, T.K.Manicavachagom *Pillay.(2015).Calculus,Volume II.* S. Viswanathan (Printers & Publishers) Pvt., Ltd.

3. S.Narayanan, T.K.Manicavachagom *Pillay.(2015).Calculus,Volume III.* S. Viswanathan (Printers & Publishers) Pvt., Ltd.

4. 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 Vlll: Section 1.2 to 1.6[2]

UNIT-III   Chapter 1: Section 7.1 to 7.3, 8 (CASE II), 9, 11[3]

UNIT-IV   Chapter 2: Section 1 to 4[4]

UNIT-V   Chapter 1: Section 1.1 to 1.5[5]

                   Chapter 2: Section 2.1, 2.2, 2.4 to 2.6[5]

Reference Books

1. A.Singaravelu. (2003). *Allied Mathematics.* AR.Publications

2. P.R.Vittal. (2014). *Allied Mathematics.* Margham Publications, Chennai.

3. S.Arumugam and S.Ramachandran.(2006). *Invitation to Graph Theory.* Sci Tech Publications (India) Pvt Ltd., Chennai

Weblinks

1. https://youtu.be/rowWM-MiiXU
2. https://youtu.be/fOyxWaOnrgl
3. https://youtu.be/pvLi1s7S0tk
4. https://youtu.be/Gxr3AT4NY 0
5. **https://youtu.be/xlbbefbYLzg**
6. **https://youtu.be/bORJkIBhfEM**
7. **https://youtu.be/s5KZw1EpBEo**

Pedagogy

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

Course Designers

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

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

Course Objective

- **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

Course Outcome and Cognitive Level Mapping

CO Number	CO Statement On the successful completion of the course, students will be able to	Cognitive Level
CO1	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	**Solution of Algebraic & Transcendental Equations:** Introduction – The Bisection Method – The Iteration Method – Newton-Raphson Method (Problems Only) **Interpolation:** 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	**Numerical Integration:** Numerical Integration: Simpson's 1/3-Rule – Simpson's 3/8-Rule (proof not needed). **Linear Systems of Equations:** 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	**Numerical solution of Ordinary Differential Equations:** 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	**Measures of Central Tendency:** Arithmetic Mean – Median – Mode – Geometric Mean – Harmonic Mean. **Measures of Dispersion:** Mean Deviation – Standard Deviation (Simple Problems Only)	12	CO1, CO2, CO3, CO4, CO5	K1, K2, K3, K4
V	**Correlation:** 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). **Linear Regression:** Introduction – Linear Regression (Derivation not needed and Simple Problems Only)	12	CO1, CO2, CO3, CO4, CO5	K1, K2, K3, K4

VI	**Self Study for Enrichment:** **(Not included for End Semester Examination)** 　　　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/zPG4NjIkCjc**

Pedagogy

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

Course Designers

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

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

Course Objectives

● To provide the knowledge of basic data structures and their implementations.

● To understand the importance of data structures in the context of writing efficient programs.

● To develop skills to apply appropriate data structures in problem solving.

Course Outcomes and Cognitive Level Mapping

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

CO Number	CO Statement	Cognitive Level
CO1	Understand the abstract data types and basics of Algorithms	K1
CO2	Demonstrate the performance of basic linear and nonlinear data structures	K2
CO3	Implement the basic data structures and Algorithm design techniques	K3
CO4	Analyze the efficiency 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

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

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

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

Syllabus

UNIT	CONTENT	HOURS	COs	COGNITIVE LEVEL
I	Introduction: 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	**Self Study for Enrichment** **(Not included for End Semester Examinations)** 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

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 OBJECTIVE

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

SYLLABUS

UNIT	CONTENT	HOURS	COs	COGNITIVE LEVEL
I	**NUMBER SYSTEMS AND CODES:** 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	**BOOLEAN ALGEBRA AND LOGIC GATES:** 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	**K MAP TECHNIQUES:** 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	**COMBINATIONAL LOGIC CIRCUITS:** 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	**SEQUENTIAL LOGIC CIRCUITS:** 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	**Self Study for Enrichment** **Gray Code – Excess – 3 Code** 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 Book

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 Reference

1. https://archive.org/details/digitalcomputerf00bart 9.

2. https://www.pdfdrive.com/digital-computer-fundamentals-computerarchitecture-e5719965.html

3. https://ocw.mit.edu/courses/6-042j-mathematics-for-computer-science-spring-2015/resources/digital-logic/

Course Designer

Dr.P.Tamilselvi, Assistant 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 Objective

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

Course Outcomes

Course Outcome and Cognitive Level Mapping

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

Mapping of CO with PO and PSO

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

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

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

Syllabus

UNIT	CONTENT	HOURS	COs	COGNITIVE LEVEL

I	**Operations Research**
	        Introduction-Origin and Development of O.R.- Nature and Features of O.R.- Scientific Method in O.R.- Modelling in Operations Research - Advantage and Limitation of Models- General Solution Methods for O.R. Models- Methodology of Operations Research- Operations Research and Decision Making
	Linear Programming Problem- Mathematical Formulation
	         Introduction-Linear programming Problem- Mathematical Formulation of the problem -Illustrations on Mathematical Formulation of LPPs.(simple problems only)
	Linear programming problem-graphical Solution and Extension
	        Introduction- Graphical Solution Method- General Linear Programming Problem- Canonical and Standard Forms of LPP.
		12	CO1,CO2,CO3, CO4,CO5	K1,K2,K3, K4

II	**Linear Programming Problem-Simplex Method** Introduction-Fundamental Properties of Solutions- The computational Procedure- The Simplex Algorithm-Use of Artificial Variables-Big M method.(simple problems only).	12	CO1,CO2,CO3, CO4,CO5	K1,K2,K3, K4

III	**Transportation problem**
	        Introduction-LP Formulation of the Transportation Problem- Existence of Solution in T.P-TheTransportation Table-Loops in Transportation Table-Solution of a Transportation Problem-Finding an Initial Basic Feasible Solution-Test for Optimality-Economic interpretation of $u_j's$ and $v_j's$ - Degeneracy in Transportation Problem-Transportation Algorithm (MODI method), (simple problems only).
	Assignment Problem
	        Introduction-Mathematical Formulation of the Problem- Solution Methods of Assignment Problem- Special Cases in Assignment Problems(simple problems only).
		12	CO1,CO2,CO3, CO4,CO5	K1,K2,K3, K4

IV	**Sequencing problem** Introduction-Problem of Sequencing-Basic Terms Used in Sequencing- Processing n Jobs through Two Machines-Processing n Jobs through k Machines(problems only).	12	CO1,CO2,CO3, CO4,CO5	K1,K2,K3, K4
V	**Network Scheduling by PERT/CPM** Introduction- Network: Basic Components- Logical Sequencing- Rules of Network Construction- Concurrent Activities - Critical Path Analysis -Probability Considerations in PERT.	12	CO1,CO2,CO3, CO4,CO5	K1,K2,K3, K4
VI	**Self-Study for Enrichment** **(Not included for End Semester Examination)** Application of Operations Research. – Two-Phase method – The Travelling Salesman problem – Processing 2 Jobs through k Machines –. Inventory Models(without shortage)	-	CO1,CO2,CO3, CO4,CO5	K1,K2,K3, K4

Text Books

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

Chapters and Sections

UNIT–I   Chapter 1:   Sections 1:1 – 1:9

               Chapter 2:   Sections 2:1 – 2:4

               Chapter 3:   Sections 3:1 – 3:5

UNIT II   Chapter 4:   Sections 4:1 – 4:4

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

               Chapter 11:   Sections 11:1 – 11:4

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

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

Reference Books

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

Web References

1. **https://www.britannica.com/topic/operations-research**
2. **https://byjus.com/maths/linear-programming/**
3. **https://www.gatexplore.com/transportation-problem-study-notes/**
4. **https://youtu.be/rowWM-MijXU**
5. **https://youtu.be/TQvxWaQnrqI**
6. **https://youtu.be/RTX-ik_8i-k**
7. **https://youtu.be/s5KZw1EpBEo**

Pedagogy

Power point presentation, Group discussion, Seminar, Assignment.

Course Designers

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