KARUPPANNAN MARIAPPAN COLLEGE

(Autonomous)

(Co-Educational Institution, Affiliated to Bharathiar University, Coimbatore
Recognized u/s 2(f) & 12(B) of UGC act 1956 and Accredited by NAAC with "B" Grade)
Chettiarpalayam, Kangayam Road, Muthur -638 105.
Tirupur District, Tamilnadu.

DEPARTMENT OF INFORMATION TECHNOLOGY

B.Sc., (INFORMATION TECHNOLOGY)

SYLLABUS

CONTROLLER OF EXAMINATIONS
Muthur - 638105
Karuppannan Mariappan College (Autonomous)

(Students admitted during the academic year 2024- 2025 and onwards)

(Under CBCS with Outcome Based Education (OBE) Pattern)

DEPARTMENT OF INFORMATION TECHNOLOGY

Vision

Envision to create groomed, technically competent and skilled intellectual IT professionals specifically from the rural area to meet the current challenges of the modern computing industry.

Mission

- To impart quality computer education, to develop students as outstanding computer professionals and responsible citizen.
- To provide students with the tools to become productive, participating global citizens and life-long learners.
- Promote new uses of information technology through exploratory and innovative applications.
- Facilitate student-centred and laboratory-based learning that are relevant in terms of content, competencies and connected to the needs of industry.

Eligibility for Admission:

- H.S.C. Passed and wherever the students have not studied Mathematics knowledge be imparted through Residential/ Bridge Course.

Regulation:

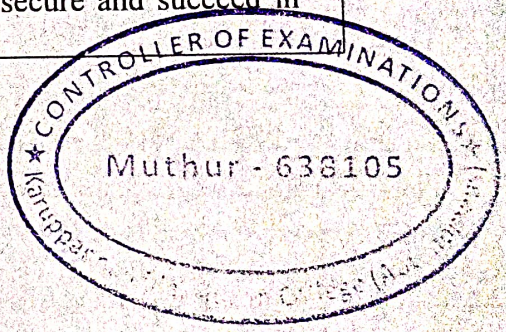
- Regulation 2024-25 framed for the conduct of undergraduate programme is applicable.

Programme Outcomes (POs)	
On successful completion of the **B.Sc, Information Technology** programme, the students will be able to	
PO1	**Disciplinary knowledge:** Capable to apply the knowledge of mathematics, algorithmic principles and computing fundamentals in the modeling and design of computer based systems of varying complexity.
PO2	**Scientific reasoning/ Problem analysis**: Ability to critically analyze, categorizes, formulate and solve the problems that emerges in the field of computer science.
PO3	**Problem solving:** Able to provide software solutions for complex scientific and business related problems or processes that meet the specified needs with appropriate consideration for the public health and safety and the cultural, societal and environmental considerations.
PO4	**Environment and sustainability:** Understand the impact of software solutions in environmental and societal context and strive for sustainable development.
PO5	**Modern tool usage:** Use contemporary techniques, skills and tools necessary for integrated solutions.
PO6	**Ethics:** Function effectively with social, cultural and ethical responsibility as an individual or as a team member with positive attitude.

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PO7	**Cooperation / Team Work:** Function effectively as member or leader on multidisciplinary teams to accomplish a common objective.
PO8	**Communication Skills:** An ability to communicate effectively with diverse types of audience and also able to prepare and present technical documents to different groups.
PO9	**Self-directed and Life-long Learning:** Graduates will recognize the need for self-motivation to engage in lifelong learning to be in par with changing technology.
PO10	Enhance the research culture and uphold the scientific integrity and objectivity

Programme Specific Outcomes (PSOs)	
After the successful completion of **B.Sc, Information Technology** programme, the students are expected to	
PSO1	Develop an ability to communicate effectively with a range of audiences. Develop written and oral presentations of information technology solutions appropriate for a wide range of audiences.
PSO2	Develop and analyze quality computer applications by applying knowledge of software engineering, algorithms, programming, databases and networking.
PSO3	The graduates of the Program will be prepared to achieve their career goals in the software industry or pursue higher studies and enhance their professional knowledge.
PSO4	To identify and utilize the state-of-the-art tools and techniques in the design and development of software products and solutions.
PSO5	Practical experience in shipping real world software, using recent industry standard tools and collaboration techniques will equip to secure and succeed in IT industry



B.Sc., Information Technology Degree Course

(For the students admitted during the academic year 2024-2025 and onwards)

CIA- Continuous Internal Assessment Marks, ESE- End Semester Examination Marks								
S.No	Course Code	Part	Course	Duration Hours	Maximum Marks		Total Marks	Credits
					CIA	ESE		
SEMESTER–I								
1	24U1LT1	I	Language – I	4	25	75	100	4
2	24U1LE1	II	English – I	4	25	75	100	4
3	24U1ITC1	III	CORE-I: Fundamentals of Computing in C Programming	5	25	75	100	4
4	24U1ITC2	III	CORE-II: Computer Organization and Architecture	6	25	75	100	4
5	24U1MAA01	III	ALLIED-I: Mathematics for Computer Science -I	5	25	75	100	4
6	24U1ITPR1	III	CORE-I: Practical I: Programming Lab C	4	40	60	100	4
7	24U1VE1	IV	Foundation Subject - :Environmental Studies	2	-	50	50	2
			Total	**30**	**165**	**485**	**650**	**26**
SEMESTER–II								
1	24U2LT2	I	Language–II	4	25	75	100	4
2	24U2LE2	II	English–II	4	25	25	50	3
3	24U2ITC3	III	CORE-III: Object Oriented Programming with C++	4	25	75	100	4
4	24U2ITC4	III	CORE-IV: Algorithms and Data Structure	4	25	75	100	4
5	24U2MAA02	III	ALLIED-II: : Mathematics for Computer Science -II	4	25	75	100	4
6	24U2ITPR2	III	CORE-III: Practical II :Programming Lab C++	4	40	60	100	4
7	24U2ITPR3	III	Practical III: Office Automation& Internet Basics Lab	2	20	30	50	2
8	24U2VE2	IV	Foundation Subject - B: Human Rights	2	-	50	50	2
9	24U2NM1	IV	Naan Mudhalvan: Effective English-Language proficiency for employability	2	50	-	50	2
			Total	**30**	**235**	**465**	**700**	**29**

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			SEMESTER–III					
1	24U3LT3	I	Language –III	4	25	75	100	3
2	24U3LE3	II	English–III	4	25	75	100	3
3	24U3ITC5	III	CORE-V: Java Programming	5	25	75	100	4
4	24U3ITC6	III	CORE-VI: Operating System	4	25	75	100	4
5	24U3ITPR4	III	CORE-V: Practical–IV: Java Programming Lab	3	40	60	100	4
6	24U3MAA3	III	ALLIED-III: Operation Research	5	25	75	100	4
7	24U3ITSPR1	III	Skill Based Subject Lab-I :Software Project Management	3	20	30	50	2
8	24U3ITN1	IV	Non Major Elective -1:Data Processing through Excel Lab	2	-	50	50	2
			Total	**30**	**235**	**465**	**700**	**26**
			SEMESTER–IV					
1	24U4LT4	I	Language–IV	4	25	75	100	3
2	24U4LE4	II	English–IV	4	25	75	100	3
3	24U4ITC7	III	CORE-VII:RDBMS	6	25	75	100	4
4	24U4ITPR5	III	CORE-VII: Practical V:RDBMS Lab	5	40	60	100	4
5	24U4CMA4	III	ALLIED-IV: Business Accounting	4	25	75	100	4
6	24U4ITSPR2	III	Skill Based Subject Lab II: PHP Programming Lab	3	20	30	50	2
7	24U4ITN2	IV	Non Major Elective -1: Web Designing(Dream Weaver)	2	50	-	50	2
8	24U4NM2	IV	Naan Mudhalvan: Cyber Security	2	30	-	50	2
			Total	**30**	**260**	**390**	**650**	**24**
			SEMESTER–V					
1	24U5ITC8	III	CORE-VIII: Python Programming	6	25	75	100	4
2	24U5ITC9	III	CORE-IX: Software Engineering	6	25	75	100	4
3	24U5ITPR6	III	CORE-VIII: Practical–VI: Python Programming Lab	6	40	60	100	3
4	24U5ITSPR3	III	Skill Based Subject Lab III: Data Science with R Tool	6	20	30	50	2
5	24U5ITE1/01/02/03	III	**Elective-I**	6	25	25	50	2
			Total	**30**	**135**	**265**	**400**	**15**

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SEMESTER–VI								
1	24U6ITC10	III	CORE-X: Android Programming	6	25	75	100	4
2	24U6ITPR7	III	CORE-X :Practical – VII: Android Programming Lab	6	40	60	100	4
3	24U6ITPV1	III	Project Work	6	50	50	100	4
4	24U6ITS1	III	Skill Based Subject I: Mobile App Development using Android	4	20	30	50	2
5	24U6ITE2/01 02/03	III	**Elective–II**	4	25	25	50	2
6	24U6NM4	IV	Naan Mudhalvan: Google Cloud Computing	2	50	-	50	2
7	24U6ITEA1	V	Extension Activities	2	50	-	50	2
			Total	**30**	**260**	**240**	**500**	**20**
			Grand Total	**180**	**1290**	**2310**	**3600**	**140**

List of Elective papers		
Elective - I	**01**	Internet of Things
	02	Distributed Computing
	03	Machine Learning
Elective - II	**01**	Computer Network
	02	Cyber Security
	03	Big Data Analytics

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SEMESTER –I

Semester	Course Code	Course Category	Hours/ Week	Credits	Marks for Evaluation		
					CIA	ESE	Total
I	24U1ITC1	CORE –I	5	4	25	75	100
Course Title		FUNDAMENTALS OF COMPUTING IN C PROGRAMMING					

S.NO.	COURSE OBJECTIVES
1	To provide a comprehensive study of the procedure oriented concept using C programming language.
2	To facilitates the students to elaborately study about C programming techniques.
3	To provides technical skills to design and develop various applications.
4	To understand the concepts behind the pointers and files operations.
5	To exposure the problem-solving skills through programming.

COURSE OUTCOMES (COs):

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

CO Number	Course Outcomes	Knowledge Level
CO1	Remember and understand the basic data types, operators and to write & compile simple programs.	K1
CO2	Understand the loops Structures, arrays &functions to design the application programs.	K1,K2,K5
CO3	Understand and apply the concept of user defined functions and design the application programs.	K1,K3, K5
CO4	Analyze the usage of pointers, structures, unions and make them to efficiently access the memory.	K2, K4,K5
CO5	Understand and evaluate the file operations and write programs to handle the data using files.	K3,K5

K1–Remember; K2–Understanding; K3–Apply; K4–Analyze; K5-Evaluate

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SYLLABUS		
Unit	**Content**	**No.of Hours**
I	**Basic of C:** History of C and its importance – Structure of a C program – Data Types – Constants and Variables – Operators and Expressions – Order of Precedence, Evaluating of Arithmetic Expressions – Type Conversion- Decision Statements: if, if-else, and nested if statements.	15
II	**Loops Structures:** For Loop, While, Do-while loop – Arrays: - One Dimensional Array, Two-dimensional Arrays, Character Arrays and Strings – Functions: Function with arrays- Function with decision and looping statements.	15
III	**User-Defined Functions:** Introduction – Need and Elements of User-Defined Functions -Definition-Return Values and their types - Function Calls – Declarations – Category of Functions- Nesting of Functions - Recursion – Passing Arrays and Strings to Functions - The Scope, Visibility and Lifetime of Variables- Multi file Programs. Structures and Unions.	15
IV	**Pointers: Introduction** – Pointer Expressions – Chain of Pointers –Pointers and Arrays – Array of Pointers – Pointers as function arguments – Functions returning Pointers – Pointers to Functions – Function pointer – Structures - declaration, initialization, Array of Structures – Pointer to structures, Structures and functions – Typed of Enumerated data types, Unions.	15
V	**File Management in C:** Defining and Opening a File - Closing File - I/O Operations on Files - Error Handling During I/O Operations - Random Access to Files - Command Line Arguments. Pre-processors.	15
	TOTAL	75

S.NO.	TEXT BOOKS:
1	Balagurusamy, "Programming in ANSI C", Tata McGraw Hill, New Delhi, 7th Edition, 2016. (Unit I, II& III).
2	Yashwvant Kanetkar," Let us C", BPB Publications 13th Edition, 2014. (Unit IV& V).

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S.NO.	REFERENCE BOOKS:
1	Byron S. Gottfried, "Programming with C", Schaum's Outline Series, Tata- McGraw Hill 2nd Edition, New Delhi, 1996.
2	Jeri R. Hanly, Elliot B. Koffman,"Problem solving and program design in C ", Pearson, 7th Edition, 2012.
3	Stephen G. Kochanm, "Programming in C", Addison-Wesley Professional publisher, 4th Edition, 2014.
4	Herbert Schildt," C: Complete Reference",Mc Graw Hill Education Publisher,4th Edition,2017.
5	Jens Gustedt," Modern C",Inria, France Icube, Strasbourg, France,2nd Edition,2019.

S.NO.	E-REFERENCES:
1	https://www.tutorialspoint.com/cprogramming/index.htm
2	http://www.learn-c.org/

Mapping Course Outcomes with Programme Outcomes:

CO \ PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1	M	S	L	S	M	M	S	L	S	M
CO2	L	S	L	S	S	L	S	L	S	S
CO3	M	S	M	L	S	M	S	M	L	S
CO4	L	M	L	S	S	L	M	L	S	S
CO5	S	S	M	M	M	S	S	M	M	M

S-Strong; M-Medium; L-Low

Prepared By

Dr.P.Kalaiyarasi

Verified By

Approved By

Head Of The Department
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Semester	Course Code	Course Category	Hours/ Week	Credits	Marks for Evaluation		
					CIA	ESE	Total
I	24U1ITPR1	CORE –I,PRACTICAL-I	4	4	40	60	100
Course Title		PROGRAMMING LAB C					

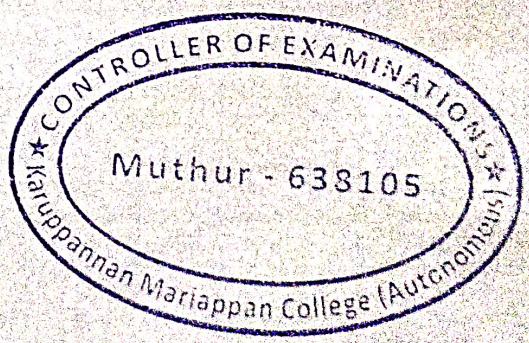
S.NO.	COURSE OBJECTIVES
1	To familiar with programming in C Language
2	To understand various programs using decision making and looping statements
3	To understand simple programs using arrays and functions
4	To implement strings operations using C language.
5	To be familiar with file management in C language.

COURSE OUTCOMES (COs):

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

CO Number	Course Outcomes	Knowledge Level
CO1	Remember and Understand the logic for operators, Formatted I/O operations& **(Program-1,2)**	K1, K2
CO2	Understand the Concepts of Decision making & branching Statements **(Program-3,4)**	K2, K3
CO3	Apply the concepts of arrays ,Strings **(Program-5,6)**	K3&K4
CO4	Analyze the concepts of Structures & union **(Program-7,8)**	K1, K2,K5
CO5	Apply and Analyze the concepts of Pointers and File Management **(Program-9,10)**	K4

K1–Remember; K2–Understanding; K3–Apply; K4–Analyze; K5-Evaluate



PROGRAMS		
S.NO	**Content**	
1	Implement various Operators	
2	Illustrate the concept to manage various formatted input output operations in C	
3	Implement Decision making and branching statements	
4	Implement Looping statements	
5	Illustrate the concept of Arrays	**36 Hours**
6	Implement Character arrays and Strings	
7	Implement User defined function	
8	Implement Structures and Union	
9	Implement Pointers.	
10	Illustrate the concept of files	
	TOTAL	**36**

S.NO.	TEXT BOOKS:
1	E. Balagurusamy, "Programming in ANSI C", Tata McGraw Hill, New Delhi, 7th Edition, 2016.
2	Yashwvant Kanetkar ,"Let us C", BPB Publications, 13th Edition, 2014.

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S.NO.	REFERENCE BOOKS:
1	Byron S. Gottfried, "Programming with C", Schaum's Outline Series, Tata- McGraw Hill 2nd Edition, New Delhi, 1991.
2	Jeri R. Hanly, Elliot B. Koffman "Problem solving and program design in C", 7th edition. Pearson 2012.
3	Stephen G. Kochanm, "Programming in C", Addison-Wesley Professional publisher, 4th Edition, 2014.
4	Herbert Schildt," C: Complete Reference",Mc Graw Hill Education Publisher,4th Edition,2017.
5	Jens Gustedt," Modern C",Inria, France Icube, Strasbourg, France,2nd Edition,2019.

S.NO.	E-REFERENCES:
1	https://www.tutorialspoint.com/cprogramming/index.htm
2	http://www.learn-c.org/

Mapping Course Outcomes with Programme Outcomes:

PO / CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1	S	S	S	M	L	M	S	S	S	L
CO2	S	S	S	M	L	M	S	S	S	M
CO3	S	S	S	L	L	M	S	S	S	L
CO4	S	S	S	M	L	M	S	S	S	M
CO5	M	S	S	M	L	M	S	S	S	L

S-Strong; **M**-Medium; **L**-Low

Prepared By

Dr.G.Jagatheeshkumar

Verified By

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Approved By

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Semester	Course Code	Course Category	Hours/ Week	Credits	Marks for Evaluation		
					CIA	ESE	Total
I	24U1ITC2	CORE –II	6	4	25	75	100
Course Title		COMPUTER ORGANIZATION AND ARCHITECTURE					

S.NO.	COURSE OBJECTIVES
1	To familiarize with different number systems and digital arithmetic &logic circuits.
2	To understand the concepts of Combinational Logic and Sequential Circuits.
3	To impart the knowledge of buses, I/O devices, flip-flops, Memory and bus structure.
4	To understand the concepts of memory hierarchy, memory organization and microprocessor architecture.
5	To gain knowledge about registers and memory.

COURSE OUTCOMES (COs)

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

CO Number	Course Outcomes	Knowledge Level
CO1	Learn the Basic Structure of Number System and Understand the Arithmetic and Logical Operations are Performed by Computers.	K1,K2
CO2	Define the Functions to Simplify the Boolean Equations using Logic Gates.	K2,K3
CO3	Understand Various Data Transfer Techniques in Digital Computer and Control Unit Operations.	K3,K4
CO4	Analyze the memory and I/O organizations	K2,K4,K5
CO5	Evaluate the Architectures and Computational Designs Concepts Related to Architecture Organization and Addressing Modes	K4,K5

K1-Remember; **K2**-Understanding; **K3**-Apply; **K4**- Analyze; **K5**–Evaluate

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SYLLABUS		
Unit	**Content**	**No. of Hours**
I	**Number System and Binary Codes:** Decimal, Binary, Octal, Hexadecimal– Binary addition, Multiplication, Division – Floating point representation, Complements, BCD, Excess3, Gray Code. Arithmetic Circuits: Half adder, Full adder, Parallel binary adder, BCD adder, Half subtractor, Full subtractor, Parallel binary subtractor-Digital Logic: The Basic Gates– NOR, NAND, XOR Gates.	**15**
II	**Combinational Logic Circuits:** Boolean algebra–Karnaugh map– Canonical form Construction and properties–Implementations– Don't care combinations Product of sum, Sum of products, Simplifications. Sequential circuits: Flip- Flops: RS, D, JK, and T-Multiplexers– Demultiplexers– Decoder Encoder – Shift Registers-Counters.	**15**
III	**Input – Output Organization:** Input – output interface – I/O Bus and Interface – I/O Bus Versus Memory Bus – Isolated Versus Memory – Mapped I/O – Example of I/O Interface. Asynchronous data transfer: Strobe Control and Handshaking–Priority Interrupt: Daisy Chaining Priority, Parallel Priority Interrupt. Direct Memory Access: DMA Controller, DMA Transfer. Input – Output Processor: CPU-IOP Communication.	**15**
IV	**Registers:** Serial-In Serial-Out – Serial-In Parallel-Out – Parallel-In Serial-Out – Parallel-In Parallel-Out. Memory: Introduction - Magnetic Memory - Optical Memory - Memory Addressing - ROMs, PROMs, EPROMs and EEPROM –RAMs. A Simple Computer Design.	**15**
V	**CASESTUDY**: Pinout diagram, Architecture, Organization and addressing modes of 80286-80386- 80486-Introduction to micro controllers.	**15**
	TOTAL	**75**

S.NO.	**TEXT BOOKS:**
1	Albert Paul Malvino, Donald P Leach, "Digital principles and applications" MH, 7th Edition 2011. (Unit I &II).
2	M. Morris Mano, "Computer System Architecture", PHI, Revised 3rd Edition, 2017(Unit III).
3	Ramesh. S, Goankar, "Microprocessors and its Applications", 2019 (Unit IV).
4	Pradeep K. Sinha, Priti Sinha, "Computer Fundamentals," 6th Edition, BPB Publications, 2007. (Unit V).

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S.NO.	REFERENCE BOOKS:
1	V.K.Puri "Digital Electronics Circuits and Systems", TMH.2017
2	M.Carter, Schaum soutline series "Computer Architecture",TMH,2002
3	William Stallings, "Computer Organization and Architecture", Prentice Hall of India, Sixth Edition, 2007.
4	A. Tannenbaum, "Structured Computer Organization", Pearson Education, 2002.
5	Patterson & Hennessy, "Computer Organization and Design", Morgan Kaufmann, 2007

S.NO.	E-REFERENCES:
1	http://www.javatpoint.com/computer-organization-and-architecture-tutorial

Mapping Course Outcomes with Programme Outcomes:

PO CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1	L	L	M	M	M	S	S	M	S	S
CO2	L	M	M	M	S	S	M	M	L	S
CO3	L	M	M	S	S	S	S	M	S	M
CO4	M	S	L	S	S	S	S	S	M	M
CO5	M	S	S	M	L	M	M	S	S	S

S-Strong; M-Medium; L-Low

Prepared By

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SEMESTER –II

Semester	Course Code	Course Category	Hours/ Week	Credits	Marks for Evaluation		
					CIA	ESE	Total
II	24U2ITC3	CORE –III	4	4	25	75	100
Course Title	OBJECT ORIENTED PROGRAMMING WITH C++						

S.NO.	COURSE OBJECTIVES
1	To impart knowledge of object oriented programming concepts and implement them in C++.
2	To enable the differentiate procedure oriented and object-oriented concepts.
3	To equip with the knowledge of concept of Inheritance so that learner understands the need of inheritance.
4	To acquire knowledge about overloaded functions and operators in C++.
5	To explain the importance of Pointers and data hiding in object oriented programming.

COURSE OUTCOMES (COs):

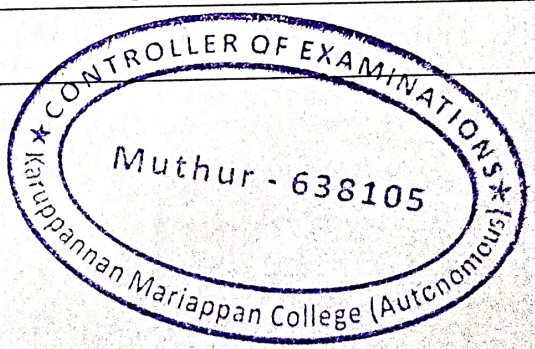
On the successful completion of the course, students will be able to

CO Number	Course Outcomes	Knowledge Level
CO1	Define the different Programming paradigm such as a procedure Oriented and Object Oriented Programming Methodology and Conceptualize elements of OO Methodology.	K1,K2
CO2	Discover the usage of Operators ,Structures and Function	K2,K3,K4
CO3	Illustrate and model real world object and Map it into Programming Objects for a legacy system.	K3,K4
CO4	Identify the Concepts of Inheritance and Its Types and Develop Applications using Overloading Features.	K3,K4,K5
CO5	Explain the Usage of Function template and understand the importance of I/O Operators.	K4,K5

K1-Remember; K2-Understanding; K3-Apply; K4- Analyze; K5–Evaluate

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Syllabus		
Unit	**Content**	**No.of Hours**
I	**Principles of Object-Oriented Programming:** Software evolution – Procedure - oriented programming– Object-oriented programming paradigm – Basic concepts of OOPS – Benefits of OOPS – OOPS languages - Application of OOPS.	**15**
II	**Beginning with C++:** What is C++ - Application of C++- Structure of C++ program–Datatypes– Declaration of variables– dynamic initialization of variables – Reference variables–Operators – Scope resolution operator – Operator Precedence – Control Structures Functions in C++: The main () function - Function prototype – Call by Reference – Return by reference - Inline functions - Default arguments – Function overloading.	**15**
III	**Classes and Objects**: Specifying Class – Defining member functions – Private member functions–Array with class-Static data members – Static member functions - Array of objects – Objects as function arguments – Returning objects- Constant member functions – Friend functions. Constructors and Destructors: Constructors - Types of constructors – Multiple constructors in a class Dynamic constructor –Destructors.	**15**
IV	**Operator Overloading and Type Conversion :** Defining operator overloading function –Overloading unary operators - Overloading binary operators - Overloading Binary operators with friend functions – Rules for overloading operators. Inheritance: Defining derived classes – Types of inheritance – Virtual base classes – Abstract classes– Constructors in derived classes - Nesting of classes. Pointers,	**15**
V	**Virtual functions and polymorphism:** Pointers to objects – this pointer – pointers to derived classes – virtual functions – pure virtual function. Managing Console I/O Operators: C++ streams – Stream classes – Unformatted I/O operations Working with Files: Classes for file stream operations – Opening and Closing a file – Detecting end-of File– File open modes – File pointers and their manipulators Templates: class templates and function templates.	**15**
	Total	**75**



S.NO.	TEXT BOOKS:
1	Balagurusamy.E,"Object Oriented Programming with C++", McGraw Hill Education (India) Private Limited, New Delhi Sixth Edition-2013 (Unit I,II&III)
2	Ashok N.Kamthane,"Object Oriented Programming with ANSI& Turbo C++",Pearson Education ,2006(Unit IV&V)

S.NO.	REFERENCE BOOKS:
1	E.Balagurusamy, "Object-Oriented Programming with C++", 8th Edition, TMH, 2020
2	Maria Litvin&Gray Litvin, "C++for you", Vikas publication, 2002.
3	John Hubbard, "Programming with C++", 2nd Edition, MH publication, 2002.
4	Scott Meyers, "Effective C++",3rd Edition, TMH 2005
5	Bjarne Stroustrup, "C++ Programming Language", 2022

S.NO.	E-REFERENCES:
1	https://www.tutorialspoint.com/cplusplus/index.htm
2	https://www.w3schools.com/cpp/

Mapping Course Outcomes with Programme Outcomes:

PO / CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1	S	S	S	S	S	S	S	M	S	S
CO2	S	M	S	S	S	M	M	M	L	S
CO3	S	M	S	S	S	S	S	M	S	M
CO4	S	S	M	M	S	M	S	S	M	M
CO5	M	S	M	S	M	M	M	M	S	S

S-Strong; M-Medium; L-Low

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Semester	Course Code	Course Category	Hours/ Week	Credits	Marks for Evaluation		
					CIA	ESE	Total
II	24U2ITPR2	CORE –II,PRACTICAL-II	4	4	40	60	100
Course Title		PROGRAMMING LAB C++					

S.NO.	COURSE OBJECTIVES
1	To build C++ classes using appropriate encapsulation and design principles.
2	To program using more advanced C++ features such as composition
3	To understand of objects, operator overloads, dynamic memory allocation, inheritance and polymorphism.
4	To improve creative thinking in friend functions and files.
5	The Student should be able to demonstrate the skills necessary to correctly compile, debug and test programs in C++.

COURSE OUTCOMES (COs):

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

CO Number	Course Outcomes	Knowledge Level
CO1	Define the different programming paradigm such as procedure oriented and object oriented programming methodology and conceptualize elements of OO methodology	K1
CO2	Illustrate and model real world objects and map it into programming objects for a legacy system.	K2
CO3	Identify the concept so find heritance and its types and develop applications using overloading features.	K3
CO4	Discover the usage of pointers with classes	K4
CO5	Explain the usage of Files, templates and understand the importance of exception Handling	K5

K1–Remember; K2–Understanding; K3–Apply; K4–Analyze; K5-Evaluate

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PROGRAMS		
S.NO	Content	
1	Develop C++ programs for Simple array	36 Hours
2	Write a program using Inline Functions	
3	Create a Program to implement Function Overloading concept	
4	Develop C++ programs for Objects and Classes	
5	Develop C++ programs for Constructors and Destructors	
6	Develop C++ programs for Overloading Unary Operators	
7	Create a Program for Overloading Binary Operators Using Friend functions	
8	Develop C++ programs for Multilevel Inheritance	
9	Develop C++ programs for Console I/O Operations	
10	Develop C++ program for File Operations	
	Total	36

S.NO.	TEXT BOOKS:
1	Balagurusamy E, "Object Oriented Programming with C++", McGraw Hill Education (India) Private Limited, New Delhi 6 th Edition-2013
2	Ashok N. Kamthane, "Object Oriented Programming with ANSI & Turbo C ++", Pearson Education, 2006.

S.NO.	REFERENCE BOOKS:
1	E.Balagurusamy, "Object-Oriented Programming with C++", 8th Edition, TMH, 2020
2	Maria Litvin&Gray Litvin, "C++for you", Vikas publication, 2002.
3	John Hubbard, "Programming with C++", 2nd Edition, MH publication, 2002.
4	Scott Meyers, "Effective C++",3rd Edition, TMH 2005
5	Bjarne Stroustrup, "C++ Programming Language", 2022

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S.NO.	E-REFERENCES:
1	https://www.tutorialspoint.com/cplusplus/index.htm
2	https://www.w3schools.com/cpp/

Mapping Course Outcomes with Programme Outcomes:

PO CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1	S	S	S	S	S	S	S	M	S	S
CO2	S	M	S	S	S	M	M	M	L	S
CO3	S	M	S	S	S	S	S	M	S	M
CO4	S	S	M	M	S	M	S	S	M	M
CO5	M	S	M	S	M	M	M	M	S	S

S-Strong; M-Medium; L-Low

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Semester	Course Code	Course Category	Hours/ Week	Credits	Marks for Evaluation		
					CIA	ESE	Total
II	24U2ITC4	CORE –IV	4	4	25	75	100
COURSE TITLE		ALGORITHMS AND DATA STRUCTURE					

S.NO.	COURSE OBJECTIVES
1	To inculcate knowledge on basic data structures and importance of data structures in computer programs.
2	To distinguish the key difference between various data structures and its application purpose.
3	To acquire the knowledge about Various Linked Lists, its Applications and Trees and Graphs.
4	To analyze the problem, properties, to develop an algorithm and determine the use of appropriate data structures in different real world applications
5	To develop skills to apply appropriate data structure in problem solving.

COURSE OUTCOMES (COs):

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

CO Number	Course Outcomes	Knowledge Level
CO1	Understand the basic Concepts of Data Structure and Algorithms.	K1,K2
CO2	Construct and Analyze Stack and Queue Few Operations with illustrations.	K1,K2,K3
CO3	Enhance the Knowledge of Linked List and Polynomials.	K3,K4
CO4	Understand the concepts of tree representations.	K4,K5
CO5	Design and implement Various sorting and searching algorithms for application and understand the concepts of file organization.	K3,K5

K1–Remember; K2–Understanding; K3–Apply; K4–Analyze; K5-Evaluate

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SYLLABUS		
Unit	Content	No.of Hours
I	**Introduction:** Definition, Structure and properties of algorithms, Development of an algorithm, Data Structures and Algorithms, Data Structure - Definition and Classification. Arrays: Introduction, Array operations, Number of elements in an array, Representations of arrays in memory, applications.	15
II	**Stacks:** Introduction -Stack Operations - Stack implementations- Applications: Recursive Programming – Evaluations of Expressions. Queues: Introduction – Queue Operations – Queue implementations - Limitations of Linear Queue - Circular Queues: Operations on a Circular Queue – implementations of insertion and deletion in a Circular Queue - Other types of queues Priority Queues - Dequeue. Applications of Linear queue – Applications of Priority Queue.	15
III	**Linked Lists**: Drawbacks of sequential data structure – Merits of Linked data structures. Singly Linked List: - Representations - Insertion and Deletion in a singly Linked Lists. Circular Linked lists: Representations – Advantages of Circular Linked lists Over singly Linked Lists - Disadvantages of Circularly Linked Lists – Primitive Operations on Circular Linked lists. Doubly linked lists: Representations – Advantages and Disadvantages of Doubly Linked lists - Operations on Doubly Linked lists. Applications: Addition of Polynomials	15
IV	**Trees:** Introduction, Trees-basic terminologies, Representation of Trees. Binary Trees: Basic terminologies and types, representation of Binary Trees, Binary tree Traversals, Threaded Binary Trees, Applications. Graphs: Introduction, Definition and basic terminologies.	15
V	**File organizations**: Introduction, Files, Keys and Basic File Operations. Sequential File Organizations, Indexed Sequential File Organizations, Direct File Organizations. Searching: Linear search, Binary search. Sorting: Merge sort and Quick sort.	15
	TOTAL	75

S.NO.	**TEXT BOOKS:**
1	Gavpai," Data Structures and Algorithms-Concepts, Techniques and Applications", Tata McGraw HILL, 6th Reprint -2011. Unit(I, II& III)
2	Rohit Khurana, "Data And File Structures", Vikas Publishing house ,2nd Edition, 2012 Unit(IV & V)

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S.NO.	REFERENCE BOOKS:
1	Jean-Paul, Tremblay& Paul G.Sorenson, "An Introduction to Data structures with Applications", Tata Mc Graw Hill Company, 2nd Edition,2008
2	Samanta.D,Classic ,"Data Structure", Prentice Hall of India Pvt Ltd , ,9thEdition,2007.
3	Seymour Lipschutz,"Data Structures", Mc Graw Hill Publications, ,1st Edition,2014.
4	E.Horowitz&Sahni,"Fundamental Data Structure",Pearson 5th Edition 2016.
5	Goodrich &Tamassia,"Data Structutre and algorithms in C++",2nd Edition ,John Wiley&Sons 2011.

S.NO.	E-REFERENCES:
1	http://www.mhhe.com/pai/dsa.
2	http://www.learn-c.org/

Mapping Course Outcomes with Programme Outcomes:

CO \ PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1	M	S	L	S	M	S	S	S	S	S
CO2	L	S	L	S	S	S	S	S	S	S
CO3	M	S	M	L	S	S	S	S	S	S
CO4	L	M	L	S	S	S	S	S	M	S
CO5	S	S	M	M	M	M	S	S	S	M

S-Strong; M-Medium; L-Low

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Semester	Course Code	Course Category	Hours/ Week	Credits	Marks for Evaluation		
					CIA	ESE	Total
II	24U21TPR3	PRACTICAL -III	2	2	20	30	50
COURSE TITLE		OFFICE AUTOMATION & INTERNET BASICS LAB					

S.NO.	COURSE OBJECTIVES
1	To understand the fundamentals of Internet and Web functions.
2	To use Google Apps for education more effectively.
3	To understand the concepts of image resizing and Conversion of the document.
4	To design a poster of their own, using Photoshop.
5	To familiarize the students in preparation of documents and presentations with office automation tools.

COURSE OUTCOMES (COs):

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

CO Number	Course Outcomes	Knowledge Level
CO1	Understand the concept of creating Gmail and Google calendar, google class room, google meet, google form.**(Program-1,2,3,4,5,6,7,8)**	K1, K2
CO2	Apply the concepts of image resizing **(Program-9)**	K2, K3
CO3	Apply and Analyze Photoshop design template and invitations **(Program-10)**	K3&K4
CO4	Inspect and utilize the appropriate Google Apps for education effectively **(Program-11)**	K1, K5
CO5	Identify and apply the online information resources **(Program-12)**	K5

K1–Remember; K2–Understanding; K3–Apply; K4–Analyze; K5-Evaluate

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PROGRAMS		
S.NO	Content	
1	Create an email account in Gmail	18 Hours
2	Visit any job portal and upload your resume.	
3	Create a label and upload bulk contacts using import option in Google Contacts	
4	Create a meeting using Google calendar and share meeting id to the attendees.	
5	Create your own Google classroom	
6	Create your own Google form	
7	Create a meet using Google Calendar and record the meet using Google Meet	
8	Create a sheet to illustrate simple mathematical calculations using Google Sheets.	
9	Convert PDF to Doc and Doc to PDF and Minimize image Size	
10	Create template for a seminar certificate using Photoshop	
11	Design an invitation for a family function.	
12	Design a poster for an intercollegiate program of your college	
	Total	**18**

S.NO.	**TEXT BOOK:**
1	Ian Lamont, "Google Drive& Docsin 30 Minutes", 2nd Edition, 2015.

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S.NO.	REFERENCE BOOKS:
1	Sherry Kinkoph, Gunter, "My Google Apps", 2014.
2	Vikas Gupta, "Comdex Information Technology course tool kit", WILEY Dreamtech, 2005.
3	Archana Kumar, "Computer Basics with Office Automation", 2010.
4	Duane K. Fields and Mark A. Kolb, "Web Development with Java Server", 2000
5	Bittu Kumar, "Master in Ms-Office",2008

S.NO.	E-REFERENCES:
1	https://www.youtube.com/watch?v=NzPNk44tdlQ
2	https://www.youtube.com/watch?v=PKuBtQuFa-8
3	https://www.youtube.com/watch?v=hGER1hP58ZE

Mapping Course Outcomes with Programme Outcomes:

PO / CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
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CO2	S	M	S	S	S	S	S	S	S	M
CO3	S	S	S	S	S	S	S	S	S	S
CO4	S	S	S	S	S	S	S	S	S	S
CO5	M	S	M	S	S	M	M	S	S	S

S-Strong; M-Medium; L-Low

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