

K.S.Rangasamy College of Arts and Science(Autonomous),

Tiruchengode-637 215

Department of Mathematics –PG

Courses focus on Employability /Entrepreneurship/Skill Development

i. Employability

a. MATLAB

ii. Entrepreneurship

a. Mathematical Text Editor Latex

b. Optimization Techniques.

iii. Skill Development


a. Programming language in C++

Encls:

1.Copy of Scheme of Examination.

2.Syllabus copy of courses highlighting the focus on Employability/Enterpreneurship/Skill Development along with courses outcomes.

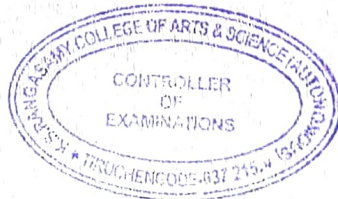
3.Mapping of courses to Employability/Enterpreneurship/Skill Development.



HOD –PG Mathematics

Head, P.G. Department of Mathematics,
K.S.Rangasamy College of Arts and Science
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Tiruchengode - 637 215.


COE

Mr. M. PRASAD, M.Sc., M.B.A., M.Phil.
Coordinator of Centres for
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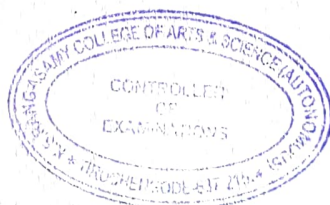



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Namakkal-Dt. Tamil Nadu.

SCHEME OF EXAMINATION

First Semester							
Subject Code	Subject	Hrs of Instruction	Exam. Duration (Hours)	Max.marks			Credit Points
				CA	CE	Total	
Part A							
18PMAM101	Core I: Linear Algebra	6	3	25	75	100	5
18PMAM102	Core II: Real Analysis	5	3	25	75	100	4
18PMAM103	Core III: Mechanics	6	3	25	75	100	4
18PMAM104	Core IV: Ordinary Differential Equations	5	3	25	75	100	4
18PMAM105	Core V: Graph Theory	5	3	25	75	100	4
18PMAMP101	Core Practical I: Mathematical Text Editor Latex	2	3	40	60	100	2
Non - Credit							
18PLS101	Career Competency Skills I	1	---	---	---	---	---
Total		30				600	23
Second Semester							
Part A							
18PMAM201	Core VI: Algebra	6	3	25	75	100	5
18PMAM202	Core VII: Topology	6	3	25	75	100	5
18PMAM203	Core VIII: Measure Theory and Integration	5	3	25	75	100	4
18PMAM204	Core IX: Partial Differential Equations	5	3	25	75	100	4
	Elective I	5	3	25	75	100	4
Part B							
18PVE201	Value Education: Human Rights	2	3	25	75	100	2
Non - Credit							
18PLS201	Career Competency Skills II	1	---	---	---	---	---
Total		30				600	24

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M.Sc., Mathematics (Students admitted from 2018 - 2019 onwards)

Third Semester							
Subject Code	Subject	Hours/ week	Exam. Duration (Hours)	Max.marks			Credit Points
				CA	CE	Total	
Part A							
18PMAM301	Core X: Complex Analysis	6	3	25	75	100	5
18PMAM302	Core XI: Fluid Dynamics	6	3	25	75	100	5
18PMAM303	Core XII: Optimization Techniques	6	3	25	75	100	4
	Elective II	5	3	25	75	100	4
18PCSMAI301	IDC: Programming in C++	4	3	25	75	100	2
18PCSMaip301	IDC Practical: Programming in C++	3	3	40	60	100	2
Total		30				600	22
Fourth Semester							
Part A							
18PMAM401	Core XIII: Functional Analysis	6	3	25	75	100	5
18PMAM402	Core XIV: Integral Equations and Calculus of Variations	6	3	25	75	100	4
18PMAM403	Core XV: Numerical Analysis	6	3	25	75	100	4
18PMAM404	Core XVI: Fuzzy Sets and Fuzzy Logic	5	3	25	75	100	4
18PMAM405	Core XVII: MATLAB	4	3	25	75	100	2
18PMAMP401	Core Practical II: MATLAB	3	3	40	60	100	2
Total		30				600	21
Grand Total						2400	90

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ELECTIVE SUBJECTS:

Students shall opt an elective subject from the list of ELECTIVE I (SEMESTER II)

ELECTIVE I (SEMESTER II)

S.No	Subject Code	Subject
1	18PMAEL201	Design Theory
2	18PMAEL202	Stochastic process
3	18PMAEL203	Difference Equations

Students shall opt an elective subject from the list of ELECTIVE II (SEMESTER III).

ELECTIVE II (SEMESTER III)

S.No	Subject Code	Subject
1	18PMAEL301	Control Theory
2	18PMAEL302	Neural Networks
3	18PMAEL303	Number Theory

FOR PROGRAMME COMPLETION

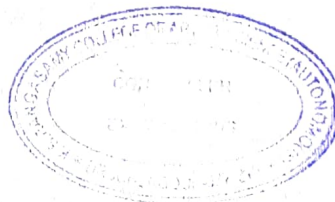
Students shall

- Opt any one Elective Subject in each of Second and Third semester.
- Complete one value education in Second semester.
- Complete one IDC in Third semester.

TOTAL CREDIT DISTRIBUTION

Components	Total Marks		Credits
Core	100X17 PAPERS	1700	71
Elective	100X2 PAPERS	200	8
IDC	100X1 PAPER	100	3
Core Practical	100X2 PAPERS	200	4
IDC Practical	100X1 PAPER	100	2
Value Education	100X1 PAPER	100	2
Total	No. of papers 24	2400	90

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18PMAM405	CORE XV: MATLAB	SEMESTER - IV
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Course Objectives:

The Course aims

- To familiarize the student in introducing and exploring MATLAB software
- To provide a foundation in use of this software for real time applications.

Credits: 2

Total Hours: 40

UNIT	CONTENTS	Hrs.	CO
I	Introduction: Basics of MATLAB: MATLAB Windows - Online help - Input-Output File Types - Platform Dependence - General Commands. (Chapter - 1 Sections: 1.6.1 - 1.6.6)	08	CO 1
II	Interactive Computation: Matrices and Vectors - Matrix and Array Operations - Command-Line Functions - Using Built-in Functions and On-line Help - Saving and Loading Data - Plotting Simple Graphs. (Chapter - 3 Sections: 3.1, 3.2, 3.5 - 3.8)	08	CO 2
III	Programming in MATLAB (Scripts and Functions): Script Files - Functions Files - Language- Specific Features - Advanced Data Objects. (Chapter - 4 Sections: 4.1 - 4.4)	08	CO 3
IV	Applications: Linear Algebra: Solving a Linear System - Finding Eigen Values and Eigen Vectors - Matrix Factorizations. (Chapter - 5 Sections: 5.1.1, 5.1.3, 5.1.4)	08	CO 4
V	Applications: Data Analysis and Statistics - Numerical Integration - Ordinary Differential Equations - Nonlinear Algebraic Equations. (Chapter - 5 Sections: 5.3 - 5.6)	08	CO 5

Text Book

1. RudraPratap, 2010. **Getting Started with MATLAB**, Oxford University Press, New York.

Reference Books

1. William John Palm, [2005], **Introduction to Matlab 7 for Engineers**, Mcgraw-Hill Professional.
2. Dolores M. Etter, David C. Kuncicky, and Holly Moore, [2004], **Introduction to MATLAB 7**, Pearson India, New Delhi.

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COURSE OUTCOMES (CO)

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

CO 1	Gain knowledge on MATLAB
CO 2	Learn various types of functions in MATLAB
CO 3	Know the properties of script and function files
CO 4	Find solutions of the mathematical equations and Eigen values and Eigen vectors of given matrices.
CO 5	Solve ordinary differential equations and non-linear algebraic equations.

MAPPING

CO \ PSO	PSO 1	PSO 2	PSO 3	PSO 4	PSO 5
CO 1	L	M	M	L	M
CO 2	L	M	M	L	M
CO 3	L	L	M	L	M
CO 4	M	H	M	H	M
CO 5	M	H	M	H	M

H-High; M-Medium; L-Low

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18PMAMP401	CORE PRACTICAL II:MATLAB	SEMESTER - IV
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Course Objectives:

The Course aims

- Gain knowledge to solve the differential equations and solve the system of linear equations.
- Learning about to plot for a function.

Credits: 2

Total Hours: 21

PROGRAM	CONTENTS	Hrs.	CO
1	Addition of two matrices, finding the determinant of a matrix and finding Eigen values and Eigen vectors of a matrix.	03	CO 1
2	Straight line fit and exponential curve fitting.	03	CO 2
3	Solving linear ODE using Euler and Runge-Kutta method.	03	CO 2
4	Solving non-linear ODE using Newton and RegulaFalsi method.	03	CO 2
	Solving integral equations using Trapezoidal and Simpson's rule.	03	CO 2
5	Solving system of equation using matrix method and Gauss Elimination method.	03	CO 3
6	Calculate mean, median, standard deviation, variance, maximum value, minimum value, range, skewness and kurtosis from the given data.	03	CO 4
7	Plotting a function (2D & 3D)	03	CO 5

Reference Book

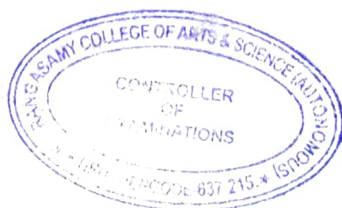
1. RudraPratap, 2010. **Getting Started with MATLAB**, Oxford University Press, New York.

COURSE OUTCOMES (CO)

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

CO 1	Find Eigen Value and Eigen Vector for a given matrix
CO 2	Gain knowledge on solving differential equations and integral equations
CO 3	Know about the concept of solving the system of equations
CO 4	Find the value of averages and standard deviation of the given data
CO 5	Plot a diagram for the given function

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18PMAMP101	CORE PRACTICAL I: MATHEMATICAL TEXT EDITOR - LATEX	SEMESTER - I
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Course Objective:

The Course aims

- To enable the students to prepare research articles in LaTeX format

Credits: 2		Total Hours: 30	
PROGRAM	CONTENTS	Hrs.	CO
1	Creation of documents using itemization, enumeration and description	03	CO 1
2	Creation of Mathematical Statements	03	CO 1
3	Creation of Tables	03	CO 1
4	Creation of Matrices	03	CO 1
5	Creation of Differential equations	03	CO 2
6	Creation of Integral equations	03	CO 2
7	Preparing a question paper	03	CO 3
8	Inserting pictures	03	CO 4
9	Creation of Powerpoint presentation	03	CO 5
10	Article preparation	03	CO 5
Reference Book			
1.	Nambudiripad, K.B.M., 2014. LaTeX for beginners. Narosa Publishing House private limited, New Delhi.		

COURSE OUTCOMES (CO)

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

CO 1	Create mathematical statements, tables and matrices
CO 2	Demonstrate Differential equations and Integral equations
CO 3	Prepare question papers in LaTeX format
CO 4	Gain knowledge of inserting pictures
CO 5	Prepare PowerPoint presentation and Article in LaTeX



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18PMAM303	CORE XII: OPTIMIZATION TECHNIQUES	SEMESTER - III
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Course Objectives:

The Course aims

- To provide the Mathematical techniques to model and analyze decision problems.
- To provide the effective application of optimization techniques in real life.

Credits: 4

Total Hours: 60

UNIT	CONTENTS	Hrs.	CO
I	Advanced Linear Programming Revised Simplex Method: Development of the Optimality and Feasibility Conditions - Revised Simplex Algorithm - Bounded-Variables Algorithm. (Chapter - 7 Sections: 7.2.1, 7.2.2 and 7.3)	12	CO 1
II	Integer Linear Programming Integer Programming Algorithms: Branch-and-Bound Algorithm - Cutting Plane Algorithm. (Chapter - 9 Sections: 9.2.1, 9.2.2)	12	CO 2
III	Deterministic Dynamic Programming: Recursive Nature of Computation in DP - Forward and Backward Recursion. Selected DP Applications: Work-Force Size Model - Equipment Replacement Model (Chapter - 10 Sections: 10.1, 10.2, 10.3.2, 10.3.3)	12	CO 3
IV	Classical Optimization Theory Unconstrained Problems: Necessary and Sufficient Conditions - The Newton-Raphson Method. Constrained Problems: Equality Constraints - Inequality Constraints - Karush-Kuhn-Tucker Conditions. (Chapter - 18 Sections: 18.1.1, 18.1.2, 18.2.1, 18.2.2)	12	CO 4
V	Non Linear Programming Algorithms Unconstrained Algorithms: Direct Search Method - Gradient method. Constrained Algorithms: Separable Programming - Quadratic Programming. (Chapter - 19 Sections: 19.1.1, 19.1.2, 19.2.1, 19.2.2)	12	CO 5

Text Book

1. Hamdy A Taha. 2007. **Operations Research: An Introduction.** [Eighth Edition]. Prentice Hall of India Private Limited, New Delhi.

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Reference Books	
1.	Frederick, S. Hillier and Gerald J Lieberman.2007. Introduction to Operations Research. [Eighth Edition]. Tata McGraw Hill Publishing Company Limited, New Delhi.
2.	Sharma, J.K. 2007. Introduction to Operations Research Theory and Applications. [Third Edition]. MacMillan India Ltd., New Delhi.

COURSE OUTCOMES (CO)

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

CO 1	Solve advanced linear programming problem
CO 2	Find the integer solution of linear programming problem
CO 3	Determine the optimum work force size and optimum replacement period
CO 4	Solve non linear programming problem by using Newton-Raphson, Jacobi and Lagrangian methods
CO 5	Gain knowledge on separable and quadratic programming problem

MAPPING

CO \ PSO	PSO 1	PSO 2	PSO 3	PSO 4	PSO 5
CO 1	M	H	H	H	M
CO 2	M	H	H	H	M
CO 3	M	H	H	H	M
CO 4	M	H	H	H	M
CO 5	M	H	H	H	M

H-High; M-Medium; L-Low

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18PCSMIAI301	INTER DISCIPLINARY COURSE : PROGRAMMING IN C++	SEMESTER - III
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Course Objectives:

The Course aims

- To write robust, maintainable, elegant and efficient C++ code.
- To deploy good C++ programming practices.
- To implement advanced Object-Oriented techniques in C++ to realize efficient and flexible applications

Credits: 2

Total Hours: 45

UNIT	CONTENTS	Hrs.	CO
I	Principles of Object Oriented Programming: Object Oriented Paradigm - Basic concepts of OOP - Benefits of OOP - Applications of OOP - Beginning with C++: Structure of C++ program - Simple C++ program - Compiling and Linking.	08	CO 1
II	Tokens, Expressions and Control Structures: Keywords - Identifiers and Constants - Variables - Data Types - Operators - Control Structures - Functions in C++.	09	CO 2
III	Classes and Objects: Introduction - Defining Member Function - Arrays within a class - Arrays of Objects - Friendly Functions - Constructors and Destructors: Introduction - Parameterized Constructors - Copy Constructors - Destructors.	09	CO 3
IV	Operator Overloading: Introduction - Rules - Overloading Unary and Binary Operators - Inheritance: Single - Multilevel - Multiple - Hybrid - Virtual Base Class - s - Virtual Functions.	10	CO 4
V	Working with Files: Introduction - Opening and Closing a File - File Modes - Sequential Input and Output Operations - Random Access File.	09	CO 5

Text Book


1. *Balagurusamy, E. 2007. Object Oriented Programming with C++. [Third Edition]. Tata McGraw Hill Publishing Company Limited, New Delhi.*

Reference Books

1. *Ravichandran, D. 2002. Programming with C++. [Second Edition]. Tata McGraw Hill publishing company limited, New Delhi.*
2. *Ira Pohl. 2003. Object oriented Programming using C++. [Second Edition]. Pearson Education Asia, New Delhi.*
3. *Bjarne Stroustrup. 2000. The C++ Programming Language. [Third Edition]. Addison Wesley, Boston.*
4. *John R. Hubbard. 2003. Programming with C++. Schaums outline series, TMH, New Delhi.*


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COURSE OUTCOMES (CO)


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

CO 1	Define the concepts of object oriented programming and its benefits.
CO 2	Apply the class and objects concepts in real time environments.
CO 3	Analyze the complexity of the real world problems and suitable methods to solve it.
CO 4	Apply the effective oops methodology in reducing runtime and coding lines.
CO 5	Manage file operations in different modes according to the requirement.


MAPPING

CO \ PSO	PSO				
	PSO 1	PSO 1	PSO 1	PSO 1	PSO 1
CO 1	M	M	M	L	L
CO 2	M	M	M	L	L
CO 3	M	M	M	L	L
CO 4	M	M	M	L	L
CO 5	M	M	M	L	L

H-High; M-Medium; L-Low


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18PCSMaip301	INTER DISCIPLINARY COURSE PRACTICAL: PROGRAMMING IN C++	SEMESTER - III
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Course Objectives:

The Course aims

- To understand all the object oriented concepts practically.
- To develop the programmatical skill in C++ in real time Applications.

Credits: 2

Total Hours: 30

PROGRAM	CONTENTS	Hrs.	CO
1	Program for Classes and Objects.	03	CO 1
2	Program for Classes and Objects using Scope Resolution Operator.	03	CO 1
3	Program for Inline functions.	03	CO 2
4	Program for Friend functions.	03	CO 2
5	Program for Function Overloading.	03	CO 3
6	Program using Constructor and Destructor.	03	CO4
7	Program using Operator Overloading.	03	CO4
8	Program using Pure Virtual Function.	03	CO4
9	Program for Single and Multiple Inheritances.	03	CO5
10	Program for Hierarchical and Hybrid Inheritances.	03	CO5

Web Reference

<https://www.programiz.com/cpp-programming/examples>


<https://www.javatpoint.com/cpp-program>

<https://www.geeksforgeeks.org/cc-programs>


COURSE OUTCOMES (CO)

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

CO 1	Expertise in the Concepts of Class and Object.
CO 2	Work with Inline and Friend functions.
CO 3	Apply the Overloading concepts in real time applications.
CO 4	Handle Memory management using Constructor and Destructor.
CO 5	Pertain different Types of Inheritance in Applications


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