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
(Autonomous),
Tiruchengode - 637 215.

COE

Mr. M. PRASAD, M.Sc., M.B.A., M.Phil.
Controller of Examinations
K.S. Rangasamy College of Arts & Science (Autonomous)
Tiruchengode - 637 215. Tamilnadu. India.

K.S. RANGASAMY COLLEGE OF ARTS & SCIENCE (AUTONOMOUS) * TIRUCHENGODE-637 215 * CONTROLLER OF EXAMINATIONS

PRINCIPAL
K. S. Rangasamy College of Arts & Science
(Autonomous)
TIRUCHENGODE - 637 215
Namakkal-Dt. Tamil Nadu.

SCHEME OF EXAMINATION

Subject Code	Subject	Hrs of Instruction	Exam. Duration (Hours)	Max.marks			Credit Points
				CA	CE	Total	
FirstSemester							
	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**

PRINCIPAL
K.S. Rangasamy College of Arts & Sci...
(Autonomous)
TIRUCHENGODE - 637 215
Namakkal-Dt. Tamil Nadu. INDIA

CONTROLLER OF EXAMINATIONS

Mr. M. PRASAD, M.Sc., M.Phil.,
K.S. Rangasamy College of Arts & Science (Autonomous)
Tiruchengode - 637 215, Namakkal, India.

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**

PRINCIPAL
K.S. Rangasamy College of Arts & Scien...
(Autonomous)
TIRUCHENGODE - 637 215
Namakkal-Dt. Tamil Nadu, INDIA

Mr. M. PRASAD, M.Sc., M.B.A., ...Ph.D.,
Co...ller of Examinations
K.S. Rangasamy College of Arts & Science (Autonomous)
Tiruchengode - 637 215. Tamilnadu. India.

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**

PRINCIPAL
K.S. Rangasamy College of Arts & Science
(Autonomous)
TRICHENGODE - 637 215
Namakkal Dt. Tamil Nadu. INDIA

Mr. M. PRABHU, M.Sc., M.B.A., M.Phil.,
Controller of Examinations
K.S. Rangasamy College of Arts & Science (Autonomous)
Tiruchengode - 637 215. Tamilnadu. India.

18PMAM405	CORE XV: MATLAB	SEMESTER – IV

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.

PRINCIPAL
S. Rangasamy College of Arts & Sc
(Autonomous)
TIRUCHENGODE - 637 215
Namakkal-Dt, Tamil Nadu, INDIA

Mr. M. PRASAD M.Sc., M.B.A., M.Phil.,
Controller of Examinations
K.S. Rangasamy College of Arts & Science (Autonomous)
Tiruchengode - 637 215. Tamilnadu

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

PSO / CO	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

PRINCIPAL
K. S. Rangasamy College of Arts & Science
(Autonomous)
TIRUCHENGODE - 637 215
Namakkal-Dt. Tamil Nadu, INDIA

K.S. RANGASAMY COLLEGE OF ARTS & SCIENCE (AUTONOMOUS) CONTROLLER OF EXAMINATIONS TIRUCHENGODE 637 215.

Mr. M. PRASAD M.Sc., M.B.A., M.Phil.,
Controller of Examinations
K.S. Rangasamy College of Arts & Science (Autonomous)
Tiruchengode - 637 215. Tamilnadu. India.

18PMAMP401	CORE PRACTICAL II:MATLAB	SEMESTER – IV

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

PRINCIPAL
S. Rangasamy College of Arts & Sci
(Autonomous)
TIRUCHENGODE - 637 215
Namakkal-Dt. Tamil Nadu. INDIA

S.RANGASAMY COLLEGE OF ARTS & SCIENCE (AUTONOMOUS) CONTROLLER OF EXAMINATIONS TIRUCHENGODE 637 215

Mr. M. PRASAD, M.Sc., M.B.A., M.Phil.,
Controller of Examinations (Autonomous)
K.S. Rangasamy College of Arts & Science (Autonomous)
Tiruchengode - 637 215. Tamilnadu. India.

18PMAMP101	CORE PRACTICAL I: MATHEMATICAL TEXT EDITOR – LATEX	SEMESTER – I

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 2
5	Creation of Differential equations	03	CO 2
6	Creation of Integral equations	03	CO 3
7	Preparing a question paper	03	CO 4
8	Inserting pictures	03	CO 5
9	Creation of Powerpoint presentation	03	CO 5
10	Article preparation		

Reference Book

1. *Nambudiripad, K.B.M.*, 2014. **LaTeX for begineers.**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

PRINCIPAL
K.S. Rangasamy College of Arts & Science (Autonomous)
TIRUCHENGODE - 637 215
Namakkal-Dt. Tamil Nadu. INDIA

Mr. M. PRASA... M.B.A., M.Phil.
Controller
K.S. Rangasamy College of Arts & Science (Autonomous)
Tiruchengode - 637 215. Tamilnadu. India.

18PMAM303	CORE XII: OPTIMIZATION TECHNIQUES	SEMESTER – III

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.

PRINCIPAL
K. S. Rangasamy College of Arts & Sc.
(Autonomous)
TIRUCHENGODE - 637 215
Namakkal-Dt. Tamil Nadu. INDIA

Mr. M. PRASAD, M.Sc., M.B.A., M.Phil.
K.S. Rangasamy College of Arts & Science (Autonomous)
Tiruchengode - 637 215, Tamilnadu.

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

PRINCIPAL
K. S. Rangasamy College of Arts & Science
(Autonomous)
TIRUCHENGODE - 637 215
Namakkal-Dt. Tamil Nadu. INDIA

K.S.RANGASAMY COLLEGE OF ARTS & SCIENCE (AUTONOMOUS) CONTROLLER OF EXAMINATIONS TIRUCHENGODE-637 215

Mr. M. PRASAD, M.Sc., M.B.A., M.Phil.,
Controller of Examinations
K.S. Rangasamy College of Arts & Science (Autonomous)
Tiruchengode - 637 215. Tamilnadu. India.

18PCSMAI301	INTER DISCIPLINARY COURSE : PROGRAMMING IN C++	SEMESTER – III

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.	*BjarneStroustrup.* 2000. **The C++ Programming Language.** [Third Edition]. Addison Wesley, Boston.
4.	*John R. Hubbard.* 2003. **Programming with C++.** Schaums outline series,TMH, New Delhi.

PRINCIPAL
K. S. Rangasamy College of Arts & Scien
(Autonomous)
TIRUCHENGODE - 637 215
Namakkal-Dt. Tamil Nadu

Mr. M. PRASAD
K.S. Rangasamy College
Tiruchengode - 637 215. Tamilnadu. India.

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

PSO / CO	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

PRINCIPAL
K. S. Rangasamy College of Arts & Scien...
(Autonomous)
TIRUCHENGODE - 637 215
Namakkal-Dt. Tamil Nadu. INDIA

K.S.RANGASAMY COLLEGE OF ARTS & SCIENCE (AUTONOMOUS)
CONTROLLER OF EXAMINATIONS
TIRUCHENGODE-637 215.

Mr. M. PRASAD ... M.B.A.,M.Phil.
... Officer
K.S. Rangasamy College ...
Tiruchengode - 637 215. Tamilnadu, India.

18PCSMAIP301	INTER DISCIPLINARY COURSE PRACTICAL: PROGRAMMING IN C++	SEMESTER – III

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

PRINCIPAL
K. S. Rangasamy College of Arts & Scien...
(Autonomous)
TIRUCHENGODE - 637 215
...makkal-Dt. Tamil Nadu. INDIA

CONTROLLER OF EXAMINATIONS

Mr. M. PRASAD, M.Sc., M.B.A., M. ....,
Controller of ...s
K.S. Rangasamy College of ... (Autonomous)
Tiruchengode - 637 215. Tamilnadu. India.