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

Tiruchengode-637 215

Department of Mathematics –PG

List of New Courses Introduced

- Design Theory
- Neural Networks
- MATLAB

Encls:

1. Copy of Scheme of Examination.
2. Syllabus Copy of New Courses.
3. Mapping of Courses of New Courses.

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)
CONTROLLER OF EXAMINATIONS
TIRUCHENGODE-637 215.

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

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 & Scie
(Autonomous)
TIRUCHENGODE - 637 215
Namakkal-Dt. Tamil Nadu. INDIA

Mr. M. PRASAD, M.Sc., M.B.A., M.Phil.,
Controller
K.S. Rangasamy College
Tiruchengode - 637 215

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 & Sci.
(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.,
Controller of Examinations
K.S. Rangasamy College of Arts & Science (Autonomous)
Tiruchengode - 637 215, Namakkal Dt., Tamil Nadu, 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 COURSE COMPLETION

Students shall

- Complete all Major papers
- Opt any one Elective Subject in each of Second and Third semester.
- Complete one value education in Second semester.
- Career Competency Skills papers as non credit course in I and II semester.
- Complete one IDC in Third semester.

TOTAL CREDIT DISTRIBUTION

Components	Total Marks		Credits
Core	100X17 PAPERS	1700	72
Elective	100X2 PAPERS	200	8
IDC	100X1 PAPER	100	2
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)
TIRUCHENGODE - 637 215
Namakkal Dt, Tamil Nadu, INDIA

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

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

18PMAEL201	ELECTIVE I: DESIGN THEORY	SEMESTER – II

Course Objectives:

The Course aims

- To study about Steiner triple systems
- To Introduce mutually orthogonal Latin squares

Credits: 4 **Total Hours: 50**

UNIT	CONTENTS	Hrs.	CO
I	**Steiner Triple Systems:** The existence problem – The Bose construction – Skolen construction – The 6n+5 construction – The Wilson construction – Cyclic Steiner triple systems. **(Chapter - 1 Section: 1.1 – 1.4, 1.6, 1.7)**	10	CO 1
II	**λ-Fold Triple Systems:** Triple system of index $\lambda > 1$ – The existence of idempotent Latin squares – 2 fold triple systems – Mendelsohn triple systems –λ=3 and 6 – λ-fold triple systems in general. **(Chapter - 2 Sections: 2.1– 2.6)**	10	CO 2
III	**Maximum Packings and Minimum Coverings:** The general problem – Maximum packings – Minimum coverings. **(Chapter - 4 Sections: 4.1 – 4.3)**	10	CO 3
IV	**Kirkman Triple Systems:** A recursive construction – Constructing pairwise balanced designs. **(Chapter - 5 Sections: 5.1 – 5.2)**	10	CO 4
V	**Mutually Orthogonal Latin Squares:** Introduction – The Euler and MacNeish Conjectures – Disproof of the MacNeish Conjecture – Disproof of Euler conjecture – Orthogonal Latin Squares of order $n \equiv 2 \pmod 4$. **(Chapter - 6 Sections: 6.1 –6.5)**	10	CO 5

Text Book

1. *Rodger, C.A. and Charles C. Lindner,* 2009. **Design Theory,** [Second Edition]. CRC Press, New York.

Reference Books

1. *Ian Anderson,* 1998.**Combinatorial Designs and Tournaments,** Clarendon Press, Oxford.
2. *Yury J. Lonin and Mohan S, Shrikande.* 2006. **Combinatorics of Symmetric Designs,** Cambridge University Press.
3. *Wallis, W.D.,* 2007. **Introduction to Combinatorial Designs,** [Second Edition]. Chapman and Hall/CRC, New York.

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

Mr. M. PRA... M.Sc., M.Phil.,
Co... Mathematics
K.S. Rangasamy ... (Autonomous)
Tiruchengo... adu. India.

COURSE OUTCOMES (CO)

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

CO 1	Learn the concepts of construction of triple system
CO 2	Design Latin squares for various triple system
CO 3	Understand the concepts of maximum packing and minimum covering
CO 4	Construct pairwise balanced design for Kirkman triple system
CO 5	Gain knowledge on Euler conjecture

MAPPING

CO \ PSO	PSO 1	PSO 2	PSO 3	PSO 4	PSO 5
CO 1	M	H	M	H	M
CO 2	M	H	M	H	M
CO 3	M	H	M	H	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 & Sci
(Autonomous)
TIRUCHENGODE - 637 215
Namakkal-Dt. Tamil Nadu. INF

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.

18PMAEL302	ELECTIVE II: NEURAL NETWORKS	SEMESTER – III

Course Objective:

The Course aims

- To develop the skills to gain a basic understanding of neural network

Credits: 4 **Total Hours: 50**

UNIT	CONTENTS	Hrs.	CO
I	**Neuron Model and Network Architectures:** Neuron Model – Network Architectures. **An Illustrative Example:** Perceptron – Hamming Network – Hopfield Network. **(Chapter –2 and 3)**	10	CO 1
II	**Perceptron Learning Rule:** Learning Rules – Perceptron Architecture – Perceptron Learning Rule – Proof of Convergence. **Supervised Hebbian Learning:** Linear Associator – The Hebb Rule – Performance Analysis - Pseudoinverse Rule – Application – Variations of Hebbian Learning. **(Chapter –4 and 7).**	10	CO 2
III	**Performances Surfaces and Optimum Points:** Taylor Series – Vector Case - Directional Derivatives – Minima – Necessary Conditions for Optimality – First-Order Conditions – Second-Order Conditions - Quadratic Functions. **(Chapter –8).**	10	CO 3
IV	**Performance Optimization:** Steepest Descent – Stable Learning Rates – Minimizing Along a Line - Newton's Method – Conjugate Gradient. **BackPropagation:** Multilayer Perceptrons – Pattern Classification – Function Approximation – Using BackPropagation – Convergence - Generalization. **(Chapter – 9and 11).**	10	CO 4
V	**Associative Learning:** Simple Associative Network – Unsupervised Hebb rule – Hebb Rule with Decay - Simple Recognition Network – Instar Rule – Kohonen Rule - Simple Recall Network – Outstar Rule. **(Chapter –13)**	10	CO 5

Text Book

1. *Martin T. Hagan, Howard B. Demuth and Mark Beale,* 2010. **Neural Network Design,** Cengage Learning India Private Ltd., New Delhi.

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

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

Reference Books	
1.	James A. *Freeman and David M. Skapura,* 2003. **Neural Networks Algorithms, applications and Programming Techniques**, Pearson Education.
2.	*Robert J. Schalkoff,*1997. **Artificial Neural Network**,Mcgraw-Hill International Edition.

COURSE OUTCOMES (CO)

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

CO 1	Learn basic neural network architecture
CO 2	Gain knowledge on Perceptron learning rule and Hebb rule
CO 3	Know about the optimality conditions for various functions
CO 4	Understand the concepts of performance optimization and Backpropagation
CO 5	Learn the concepts of associative learning

MAPPING

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

H-High; M-Medium; L-Low

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.B.A., M.Phil.,
Controller of Examinations
K.S. Rangasamy College of Arts & Sci. (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.

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

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. PR... M.Sc., M.B.A., M.Phil.,
C...
K.S. Rangasamy Colleg... (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
K. S. Rangasamy College of Arts & Scien
(Autonomous)
TIRUCHENGODE - 637 215
Namakkal-Dt. Tamil Nadu. INDIA

CONTROLLER OF EXAMINATIONS

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