### Sub Code: 16SCCMM9

### NUMERICAL METHODS WITH MATLAB PROGRAMMING

**Objectives:**

1. To introduce the exciting world of programming to the students through numerical methods.
2. To introduce the techniques of MATLAB programming.
3. To solve numerical problems using MATLAB programming.

**UNIT I**

MATLAB Environment : Getting Started – Solving Problems in MATLAB – Saving you works – Predefined MATLAB Functions – Using Predefined Functions – Manipulating Matrices – Computational Limitations-Special Values and Functions.

**UNIT II**

Plotting : Introduction Two Dimensional Plots – Three Dimensional Plotting – Editing Plots from the Menu Bar – Creating Plots from the Workshop Window – Programming in MATLAB : introduction – Problems with Two Variables – Input/Functions – Statement level Control Structures.

**UNIT III**

Numerical Techniques : Introduction – Curve Fitting: Linear and Polynomial Regression – Using the Interactive Fitting Tools – Numerical Integration – Numerical Differentiation.

**UNIT IV**

Curve Fitting – Linear and parabolic curves by the method of least squares principle- Solving algebraic and transcendental equations-Bisection method, false position method and Newton Raphson method – Solving simultaneous algebraic equation – Guass – seidal method – Guass elimination method.

**UNIT V**

Interpolation – Newton’s forward and backward difference formulae – Lagrange’s interpolation formulae – Numerical integration using Trapezoidal and Simpson’s one – third rules – solution of ODE’s = Euler method and Runge – Kutta fourth order method.

**Books for Study**

1. Delores M.Etter, David C.Kuncicky, Holly Moore. Introduction to MATLAB, Published by Dorling Kindersley (india) Pvt. Ltd., licenses of Pearson Education in South Asia.
2. M.K.Venkatraman, Numerical methods in Science and Engineering, National Publisher Company, Fifth Edition, 2001 (For Units IV and V).

Unit 1 : Chapter 2 & 3

Unit 2 : Chapter 4 & 5

Unit 3 : Chapter 8.

Unit 4 : Chapter 2 section 1.7-1.8, Chapter 3, section 2, 4 and 5, Chapter 4,

section 2, 6 of (2).

Unit 5 : Chapter 6, sec 3, 4. Chapter 8, sec 4, Chapter 9, sec 8, 10, Chapter 11, sec

10, 16.

### Sub Code: 16SCCMM10

### REAL ANALYSIS

**Objectives:** To enable the students to

1. Understand the real number system and countable concepts in real number system.
2. Provide a Comprehensive idea about the real number system.
3. Understand the concepts of Continuity, Differentiation and Riemann Integrals.
4. Learn Rolle’s Theorem and apply the Rolle’s theorem concepts.

### UNIT I

Real Number system – Field axioms –Order relation in R. Absolute value of a real number & its properties –Supremum & Infimum of a set – Order completeness property – Countable & uncountable sets.

### UNIT II

Continuous functions –Limit of a Function – Algebra of Limits – Continuity of a function –Types of discontinuities – Elementary properties of continuous functions – Uniform continuity of a function.

### UNIT III

Differentiability of a function –Derivability & Continuity –Algebra of derivatives – Inverse Function Theorem – Daurboux‟s Theorem on derivatives.

### UNIT IV

Rolle’s Theorem –Mean Value Theorems on derivatives- Taylor’s Theorem with remainder- Power series expansion .

### UNIT V

Riemann integration –definition – Daurboux’s theorem –conditions for integrability – Integrability of continuous & monotonic functions - Integral functions –Properties of Integrable functions - Continuity & derivability of integral functions – The Fundamental Theorem of Calculus and the First Mean Value Theorem.

### TEXT BOOK(S)

### M.K,Singhal & Asha Rani Singhal , A First Course in Real Analysis, R.Chand & Co., June 1997 Edition

### Shanthi Narayan, A Course of Mathematical Analysis, S. Chand & Co., 1995

UNIT – I - Chapter 1 of [1]

UNIT – II - Chapter 5 of [1]

UNIT – III - Chapter 6 – Sec 1 to 5 of [1]

UNIT – IV - Chapter 8 – Sec 1 to 6 of [1]

UNIT – V - Chapter 6 – Sec 6.2, 6.3, 6.5, 6.7, 6.9 of [2]

### REFERENCE(S)

1. Goldberge, Richard R, Methods of Real Analysis, Oxford & IBHP Publishing Co., New Delhi, 1970.

### Sub Code:16SCCMM11

### STATICS

**OBJECTIVE:**

1. To provide the basic knowledge of equilibrium of a particle.
2. To develop a working knowledge to handle practical problems.

### UNIT I

Introduction – Forces acting at a point: Triangle of forces – Resolution of force – Condition of equilibrium.

### UNIT II

Parallel forces and Moments: Resultant of parallel forces – Theorems on Moments – Moment about an axis – couples.

### UNIT III

Equilibrium of three forces acting on a rigid body: Conditions of equilibrium – Trigonometrical theorems and problems - Coplanar forces: Reduction of Coplanar forces – Equation of Line of action of the resultant **–** Conditions of equilibrium

### UNIT IV

Friction: Introduction – Laws of Friction – Definitions – Equilibrium of a particle on a rough inclined plane.

### UNIT V

Equilibrium of strings: Equation of the Common Catenary -Parabolic Catenary.

### TEXT BOOK:

M.K.Venkataraman, Statics, Agasthiyar Publications, 17th edition, 2014.

UNIT I -Chapter1, Chapter2.

UNIT II -Chapter 3, Chapter 4.

UNIT III -Chapter 5 (Section 1-6), Chapter 6 (Section 1-12).

UNIT IV -Chapter 7 (Section 1-13) Pages: 206 – 238.

UNIT V -Chapter 9 (Section 1- 8)

### REFERENCE(S)

### V.Dharmapadham, Statics, S.Viswanathan Publishers Pvt.Ltd, 2006.

### P. Duraipandian, Laxmi Duraipandian and Muthamizh Jayapragasam, Mechanics S.Chand & Company PVT, LTD, 2014

### S.L.Lony, Elements of Statics and Dynamics, Part-I, A.I.T.B.S.Publishers, 2007.

### Sub Code:16SCCMM1P

**NUMERICAL METHODS WITH MATLAB PROGRAMMING (P)**

**Objectives:**

1. 1. To introduce the exciting world of programming to the students through numerical methods.
2. To introduce the techniques of MATLAB programming.
3. To solve numerical problems using MATLAB programming.

**LIST OF PRACTICALS**

* 1. Linear Interpolation
  2. Linear Regression
  3. Curve Fitting
  4. Trapezoidal rule of integration
  5. Simpson’s 1/3 rule of integration
  6. Newton – Raphson method of solving equations
  7. Gauss – elimination method of solving simultaneous equations
  8. Gauss – Seidal method of solving simultaneous equations
  9. R-K fourth order method of solving differential equations
  10. Lagrange’s method of interpolation.

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### Sub Code: 16SMBEMM1:1

**MAJOR BASED ELECTIVE I (A)**

**OPERATIONS RESEARCH**

### Objectives:

1. To introduce the various techniques of Operations Research.
2. To make the students solve real life problems in Business and Management

### UNIT I

Linear programming problem - Mathematical formulation – Illustrations on Mathematical formulation on Linear Programming Problems – Graphical solution method - some exceptional cases - Canonical and standard forms of Linear Programming Problem - Simplex method.

### UNIT II

Use of Artificial Variables (Big M method - Two phase method) – Duality in Linear Programming - General primal-dual pair - Formulating a Dual problem - Primal-dual pair in matrix form -Dual simplex method.

### UNIT III

Transportation problem - LP formulation of the TP - Solution of a TP - Finding an initial basic feasible solution (NWCM - LCM -VAM) – Degeneracy in TP - Transportation Algorithm (MODI Method) - Assignment problem - Solution methods of assignment problem – special cases in assignment problem.

### UNIT IV

Queuing theory - Queuing system - Classification of Queuing models - Poisson Queuing systems Model I (M/M/1)(∞/FIFO) only - Games and Strategies – Two person zero sum - Some basic terms - the maximin-minimax principle -Games without saddle points-Mixed strategies - graphic solution 2xn and mx2 games.

### UNIT V

PERT and CPM – Basic components – logical sequencing - Rules of network construction- Critical path analysis - Probability considerations in PERT.

### Book for Study:

Kanti Swarup, P.K. Gupta and ManMohan, Operations Research, 13th edition, Sultan Chand and Sons, 2007.

Unit 1: Chapter 2 Sec 2.1 to 2.4, Chapter 3 Sec 3.1 to 3.5, Chapter 4 Sec 4.1 , 4.3

Unit 2: Chapter 4 Sec 4.4, Chapter 5 Sec 5.1 to 5.4, 5.9

Unit 3: Chapter 10 Sec 10.1, 10.2, 10.8, 10.9, 10.12, 10.13, Chapter 11 Sec 11.1 to 11.4

Unit 4: Chapter 21 Sec 21.1, 21.2, 21.7 to 21.9, Chapter 17 Sec 17.1 to 17.6

Unit 5: Chapter 25 Sec 25.1 to 25.4, 25.6, 25.7

### Book for Reference:

1. Sundaresan.V, Ganapathy Subramanian. K.S. and Ganesan.K,Resource Management Techniques, A.R. Publications, 2002.
2. Taha H.A., Operations Research: An introduction, 7th edition, Pearson Prentice Hall, 2002.