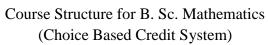
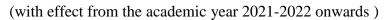


# MANONMANIAM SUNDARANAR UNIVERISTY, TIRUNELVELI-12

# **SYLLABUS**

## UG - COURSES – AFFILIATED COLLEGES







Semester-VI							
Part	Subject Status	Subject Title	Subject Code	Credit			
III	Core	COMPLEX ANALYSIS	CMMA61	4			
III	Core	GRAPH THEORY	CMMA62	4			
III	Core	NUMBER THEORY	CMMA63	4			
III	Core	DYNAMICS	CMMA64	4			
III	Core	NUMERICAL METHODS	CMMA65	4			
III	Elective 1	FUZZY MATHEMATICS	CEMA62	4			
III	Elective 2	CODING THEORY	CEMA65	4			



#### Total Marks: 100 Internal Exam: 25 marks + External Exam: 75 marks

#### A. Scheme for internal Assessment:

Maximum marks for written test: 20 marks

**3 internal tests**, each of **I hour** duration shall be conducted every semester.

To the average of the **best two** written examinations must be added the marks scored in. The **assignment** for 5 marks.

The break up for internal assessment shall be:

Written test- 20 marks; Assignment -5 marks Total - 25 marks

#### **B.** Scheme of External Examination

3 hrs. examination at the end of the semester

A-Part: 1 mark question two - from each unit B-Part: 5 marks question one - from each unit C-Part: 8 marks question one - from each unit

### Conversion of Marks into Grade Points and Letter Grades

S.No	Marks	Letter Grade	Grade point (GP)	Performance
1	90-100	O	10	Outstanding
2	80-89	A+	9	Excellent
3	70-79	A	8	Very Good
4	60-69	B+	7	Good
5	50-59	В	6	Above Average
6	40-49	С	5	Pass
7	0-39	RA	-	Reappear
8	0	AA	-	Absent

# **Cumulative Grade Point Average (CGPA)**

$$CGPA = \frac{\Sigma (GP \times C)}{\Sigma C}$$

- **GP** = Grade point, **C** = Credit
- CGPA is calculated only for Part-III courses
- CGPA for a semester is awarded on cumulative basis

## > Classification

a) First Class with Distinction
b) First Class
c CGPA ≥ 7.5\*
c CGPA ≥ 6.0

c) Second Class :  $CGPA \ge 5.0$  and < 6.0

d) Third Class : CGPA < 5.0



# **COMPLEX ANALYSIS**

## **Objective:**

• To introduce coding and decoding concepts. Also to develop the students in the field of coding theory

#### UNIT-1:

Analytic functions - Functions of a complex variable, Limits, theorems on limit, continuous function, Differentiability, The Cauchy-Riemann equations, Analytic functions, Harmonic functions.

## UNIT-2:

Bilinear Transformations – Elementary Transformations, Cross Ratio, Fixed Points of Bilinear Transformations, Some Special Bilinear Transformations.

## UNIT-3:

Complex Integration – Definite Integral, Cauchy's Theorem, Cauchy's Integral Formula, Higher Derivatives.

#### UNIT-4:

Series Expansions – Taylor's Series, Laurent's Series, Zeros of an Analytic Function, Singularities.

#### UNIT-5:

Calculus of Residues- Residues, Cauchy's Residue Theorem, Evaluation of Definite Integrals.

#### **Text Book:**

1. Arumugam. S and T.Issac—"Complex Analysis"—Scitech Publishing House—Chennai,(2002).

- 1. Churchill. R.V. and J.W.Brown— "Complex variables and Applications"— McGraw Hill International Editions—IX Edition, 2013.
- 2. Ponnuswamy. S "Foundations of Complex Analysis", Narosa Publication House, New Delhi, II Edition 2005.
- 3. Duraipandian. P and Lakshmi Duraipandian—"Complex Analysis"—Emerald Publications, Chennai(2001).



## GRAPH THEORY

## **Objective:**

• To introduce the notion of graph theory and its applications and to learn the techniques in Graph Theory.

#### UNIT-1:

Definition and examples of graphs –degrees- sub graphs–isomorphism–independent sets and coverings–matrices–operations of graphs.

## UNIT-2:

Degree sequences-graphic sequences- walks-trails and paths -connectedness and components-connectivity.

#### UNIT-3:

Eulerian graphs-Hamiltonian graphs, Trees and its characterization-centre of a tree.

## UNIT-4:

Planargraphs-Definition and properties—chromatic number and chromatic index.

#### UNIT-5:

Chromatic polynomials, definition and basic properties of digraphs, paths and connectedness in digraphs.

## **Text Book:**

1. Arumugam.S & S.Ramachandran–Invitation to Graph Theory, Scitech Publications, Chennai, 2002.

- 1. Kumaravelu.S and Susheela Kumaravelu Graphtheory-Nagercoil, 2002.
- 2. Narasingh Deo-Graph theory with application to engineering and computer science, Prentice-Hall of India pvt. Ltd., New Delhi, 1979.



# **NUMBER THEORY**

## **Objective:**

• To highlight the beauties in the world of numbers and to prepare the students for coding through congruence.

#### UNIT-1:

Peano's Axioms-Mathematical induction-The Binomial Theorem-Early Number Theory.

## UNIT-2:

Division Algorithm–GCD–Euclidean Algorithm–The Diaphantine Equation ax+by=c.

#### UNIT-3:

The fundamental Theorem of Arithmetic – The Sieve of Eratosthenes– The Goldbach conjecture.

#### UNIT-4:

Basic properties of congruences-Linear congruence and The Chinese Remainder Theorem.

#### UNIT-5:

Fermat's Theorem-Wilson's Theorem-The Fermat-Kraitchik Factorization Method.

## **Text Book:**

1. David. M. Burton –Elementary Number Theory-Tata McGraw Hill Education Pvt. Ltd- (Sixth Edition)-2007.

- 1. Ivan Niven and H, Zuckerman-An Introduction to Theory of Numbers, Cambridge University Press-2019.
- 2. Kumaravelu.S, and Susheela Kumaravelu- Elements of Number Theory Nagercoil, 2002.



## **DYNAMICS**

## **Objective:**

• To provide a basic knowledge of the behaviour of objects in motion and to develop a working knowledge to handle practical problems.

## UNIT-1:

Projectiles – Equation of path–range–maximum height–time offlight.

## UNIT-2:

Collision of elastic bodies–Laws of impact–direct and oblique impact.

## UINT-3:

Simple Harmonic Motion (SHM) in a straight line-Geometrical representation—composition of SHM of the same period in the same line and along two perpendicular directions.

#### UNIT-4:

Motion under the action of central forces—velocity and acceleration in polar coordinates.

#### UNIT-5:

Differential Equation of central orbit-pedal equation of central orbit-problems to find the law of force towards the pole when the orbit is given.

### **Text Book:**

1. Venkatraman, M.K.-A Text Book on Dynamics, Agasthiar Publication, Trichy,2020.

- 1. Narayanan, S-Dynamics, S. Chand & company (New Delhi),16<sup>th</sup> Edition,1986.
- 2. Duraipandian. P, Laxmi Duraipandian and Muthamizh Jayapragasam-Mechanics S.Chand& Company (2003).
- 3. I. Rajeswari–Dynamics Saras Publication, Nagercoil, I edition (2019).



# **NUMERICAL METHODS**

## **Objective:**

To introduce finite differences and to solve numerical problems by different methods.

#### UNIT-1:

Solution of Numerical algebraic and Transcendental Equations: Bisection method-Newton's method. Criterion of order of convergence of Newton's method. Regula False method – Gausse limination–Gauss Jacobi–Gauss Seidal method.

#### UNIT-2:

Finite Difference: First and higher order differences - Forward and backward differences -Properties of Operator -Differences of a polynomial-Factorial Polynomial.

#### UNIT-3:

Interpolation: Newton's Forward–backward, Gauss forward–backward interpolation formula—Bessel's formula. Divided differences – Newton's divided difference formula - Lagrange's interpolation formula.

#### **UNIT -4:**

Numerical Differentiation and integration: Newton's forward and backward differences for differentiation- Derivatives using Bessel's formula-Trapezoidal rule-Simpson's 1/3 rule & 3/8 rule.

## UNIT-5:

Difference equations: Definitions-order and degree of difference equation-Linear difference equation-finding complementary function-particular integral-simple applications.

## **Text Book:**

1. Venkatraman. M.K-Numerical methods in Science and Engineering National Publishing Company-Edition 1998.

- 1. Kandasamy. P.K. Thilagavathy and K. Gunavathy, Numerical Methods, S.Chand & Company Ltd. Edn. 2006.
- 2. Autar Kawand Egwwn Enc Kalu–Numerical methods with Application Abidet. Autokaw.com 2<sup>nd</sup> Edtion, 2011.
- 3. Dr.A. Singaravelu ,Statistics & Numerical Methods, Meenakshi Agency(2012).



# **FUZZY MATHEMATICS**

## **Objective:**

To introduce fuzzy concepts to students and to facilitate the students to study fuzzy operations and fuzzy numbers

## **Course Content**

## UNIT-1:

Crisp Sets– Fuzzy Sets–Basic Types–Basic Concepts–Characteristics and Significance of Paradigm Shift.

## UNIT-2:

Additional properties of  $\alpha$ -cuts– representations of fuzzy sets– Extension principle for fuzzy sets.

## UNIT-3:

Fuzzy set operations—Fuzzy complements—Fuzzy intersections: t-norms—Fuzzy Unions: t-conforms—Combinations of operations.

#### **UNIT-4:**

Fuzzy numbers – linguistic variables-arithmetic operations on intervals-arithmetic operations on fuzzy numbers-Lattice of fuzzy numbers-Fuzzy Equations.

## **UNIT-5:**

Fuzzy decision making – Individual Decision Making-Multi-person decision making-fuzzy linear programming.

#### **Text Book:**

1. George J.Klir and Bo BoYuan–Fuzzy sets and Fuzzy Logic Theory Applications, Prentice Hall of India, 2002, New Delhi.

#### **Book for Reference:**

1. George J.Klir and Tina.A.Folger–Fuzzy sets, uncertainty and Information – Prentice Hall of India, 2003, NewDelhi.



# CODING THEORY

## **Objective:**

• To introduce coding and decoding concepts. Also to develop the students in the field of coding theory

## **UNIT -1:**

Introduction to coding theory, Basic assumptions, Correcting and detecting error patterns – information rate–effects of error correction and detection –finding the most likely code word transmitted.

### **UNIT-2:**

Linear codes—subspaces independence—basis, dimension—matrices—Bases for C and C+ generating matrices on coding.

#### **UNIT-3:**

Parity check matrices—equivalent codes—distance of a linear code—Linear codes—cosets—MLD for linear codes—Reliability of IMLD for linear codes.

## **UNIT-4:**

Some bounds for codes—perfect codes—hamming codes—extended codes—The extended Golay code—decoding the extended Golay code—Golay code.

## **UNIT-5:**

Polynomial and words—introduction to cyclic codes— Polynomial encoding and decoding—finding cyclic codes—Dualcyclic codes.

## **Text Book:**

1. Coding theory, The essentials–Marcel Dekker, Inc. Madtrison Avenue, NewYork.

- 1. Elwyn Berlekamp– Algebraic Coding Theory–Springer-1970
- 2. San Ling and Chaoping Xing, coding theory A first course, Cambridge University Press, New York (2004)

