MANONMANIAM SUNDARANAR UNIVERISTY,
TIRUNELVELI-12

SYLLABUS

UG - COURSES – AFFILIATED COLLEGES

Course Structure for B. Sc. Mathematics
(Choice Based Credit System)
(with effect from the academic year 2021-2022 onwards)

Semester-V				
Part	**Subject Status**	**Subject Title**	**Subject Code**	**Credit**
III	**Core**	LINEAR ALGEBRA	CMMA51	4
III	**Core**	REAL ANALYSIS	CMMA52	4
III	**Core**	STATICS	CMMA53	4
III	**Core**	INTEGRAL TRANSFORMS AND Z TRANSFORMS	CMMA54	4
III	**Elective**	1. PROGRAMMING IN C 2. DISCRETE MATHEMATICS 3. COMBINATORIAL MATHEMATICS	CEMA52/ CEMA52/ CEMA53	4
III	**Elective**	1. OPERATIONS RESEARCH - I 2. STOCHASTIC PROCESS 3. MATH TYPING USING LATEX	CEMA54/ CEMA55/ CEMA56	4
IV	**Common**	PERSONALITY DEVELOPMENT	CCSB51	2

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	B	6	Above Average
6	40-49	C	5	Pass
7	0-39	RA	-	Reappear
8	0	AA	-	Absent

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

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

- **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 : CGPA $\geq$ 7.5*****
  b) First Class : CGPA $\geq$ 6.0
  c) Second Class : CGPA $\geq$ 5.0 and $<$ 6.0
  d) Third Class : CGPA$<$ 5.0

LINEAR ALGEBRA

Objective:

- To acquire knowledge about vectors spaces, Inner product space and linear transformations. Also to solve problems in Matrices

UNIT–1:

Vector spaces: Definition and examples–Elementary properties–subspaces–linear transformations–Fundamental theorem of homomorphism.

UNIT–2:

Spanofaset–linear dependence and independence–basis and dimension.

UNIT–3:

Rank - Nullity theorem – Matrix of a linear transformation – Inner product space – Definition and examples–orthogonality –orthogonal complement–Gram Schmidt orthogonalization process.

UNIT–4:

Matrices –Elementary transformation–Inverse and power of a matrix using Cayley Hamilton's theorem–Inverse and rank of a matrix using elementary transformations.

UNIT–5:

Eigen values and Eigen vectors – Properties and problems – Bilinear forms – Quadratic forms –Reduction of quadratic form to diagonal form.

Text Book:

1. S. Arumugan & Thangapandi Issac ,Modern Algebra-Scitech Publication, Reprint(2008).

Books for Reference:

1. Sharma J.N and Vashistha A. R.LinearAlgebra-KrishnaPrakashNandir1981.
2. John B. Fraleish– A first Course in Abstract Algebra 7thedition, Pearson, 2002.
3. N. Ramabhadran & R. Balakrishnan, Text book of algebra –Vikas Publishing Co. Revised Edition1985.
4. Ward Cheney and David Kincaid, Linear Algebra-Theory and Applications. Jones and Barlett India PVT Ltd, New Delhi -First Edition(2010)

REAL ANALYSIS

Objective:

- To acquire knowledge about the real number system and metric spaces.Also to study the concepts of connectedness and compactness.

UNIT–1:

Metric spaces –Examples –bounded sets –open ball–open sets –subspaces–interior of a set.

UNIT–2:

Closed sets–closure–limit points–dense set–complete metric space–Cantor's intersection theorem–Baire's category theorem.

UNIT–3:

Continuity– Homeomorphism– Uniform Continuity

UNIT–4:

Connectedness–Connected subsets of R–Connectedness and continuity–Contraction mapping theorem.

UNIT–5:

Compactness–Compact metric spaces–Compact subsets of R–Heine Borel theorem–Equivalent characterizations for compactness–Compactness and Continuity.

Text Book:

1. Dr. S. Arumugan, Modern Analysis–Yes Dee Publishing Pvt. Ltd. Reprint (2019).

Books for Reference:

1. Richard R. Goldberg–Methods of Real Analysis-Oxford and IBH Publishing Co. New Delhi, Indian edition 1985.
2. R Visvanathan Nayak, Real Analysis- Emerald Publishers, Reprint 1992.
3. Dr. B.S. Vatsa, Introduction to Real Analysis, CBS Publishers and Distributors, New Delhi.

STATICS

Objective:

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

UNIT–1:

Forces acting at a point–Parallelogram law of forces–Triangle law of forces–Lami's theorem

UNIT–2:

Parallel forces and moments–resultant of two parallel forces resultant oftwoun like unequal parallel forces–Varigon's theorem

UNIT–3:

Equilibrium of three forces acting on a rigid body–three coplanar forces theorem.

UNIT–4:

Friction–Laws of friction–angle of friction–equilibrium of a particle (i)onaroughinc lined plane(ii)under a force parallel to the plane (iii)under any force

UNIT–5:

Equilibrium of strings–equation of the common catenary–tension at any point–geometrical properties of common catenary

Text Book:

1. M.K. Venkatraman–Statics, Agasthiar Publications, Trichy(2020).

Books for reference:

1. S.Narayanan, Statics S.Chand and Company, NewDelhi (1985).
2. K.Viswanatha Naik and M.Kari, Statics ,Emerald Publishers, Chennai.
3. Rajeswari–Mechanics-Saras Publication, Nagercoil (2016).

INTEGRAL TRANSFORMS AND Z TRANSFORMS

Objective:

- To develop the knowledge of transforms and to solve problems in Fourier transforms and Z transforms.

UNIT–1:

Fourier Transforms–Properties of Fourier Transforms.

UNIT–2:

Infinite Fourier Cosine and Sine Transforms–Properties.

UNIT–3:

Finite Fourier Transforms.

UNIT–4:

Z-transforms–Properties.

UNIT–5:

Inverse Transforms- Introduction to difference equations and find solution using inverse Z transforms

Text Book:

1. Singaravelu. A–Eingineering mathematics (volumeIII) –Meenakshi Agency, Chennai (2019).

Books for Reference:

1. Muthu Kumaraswamy. R- Transforms and Partial Differential Equation Equations–Yes Dee Publications –Second Edition (2019).
2. Gangatharan, Engineering Mathematics (volume I) –Prentice Hall of India Pvt. Ltd. (2007).
3. Dr.C.Muthulakshmi @ Saisikala and R.Ponraj- Transforms and their applications, Charulatha Publication(2020).

PROGRAMMING IN C

Objective:

- To study the basic concepts and structure of C program and to train the students to write simple C programs.

UNIT–1:

Introduction – Character set, C tokens, keywords and identifiers, Constants ,Variables and Data types.

UNIT–2:

Operators – Arithmetic, relational, logical assignment, increment and decrement, Conditional, Bitwise special operators, Precedence of operators, Managing input and output operators – getchar(), putchar(),scanf() and printf().

UNIT–3:

Decision making and branching-Simple if, if else, nested if and the else if ladder statements, The switch statement,The ?: operator, The goto statement. Decision making and looping-while, Dowhile and for statement, jumpsinloops.

UNIT–4:

One dimensional and two dimensional arrays–declaration, initialization of arrays, Multidimensional arrays, Character arrays and strings: Declaring and initializing string variables, Reading and writing of strings, string handling functions.

UNIT–5:

User defined functions–Definition of function, return values and their types, function calls, function declaration, Category of functions, Nesting of functions, recursion.

Text Book:

1. E. Balaguruswamy - Programming in ANSI C –Tata McGraw Hill Publishing company limited –III Edition (2017).

Books for references:

1. Reema Thareja, Programming in C- Oxford University Press(2018).
2. Ramasamyet.al.-Programming in C-Scetech Publication (INDIA)Pvt. Ltd. IIEdition (2015).
3. Ashok N. Kamathane- Programming with Ansi and TurboC–Dorling Kindersley (India) Pvt. Ltd, (2009).

DISCRETE MATHEMATICS

Objective:

- To study concepts of mathematical logics and to understand the basics of Lattices and Boolean Algebra.

UNIT–1:

Mathematical logic – Statements and notation, Connectives, Negation, Conjunction, Disjunction, Statement formula and truth table, Conditional and biconditional statements. Well defined formulae, tautologies.

UNIT–2:

Normal forms - The theory of interference for the statement calculus, The Predicate, Theory of inference for the Predicate Calculus.

UNIT–3:

Algebraic structures - Groups and monoids, Simple properties, Group codes.

UNIT–4:

Lattices and Boolean algebra -Lattices asposets, Properties of lattices, special lattices, Boolean algebra, Gating networks, Minimal sums of products.

UNIT–5:

Number system and codes - Decimal, Binary, Octal, Hexadecimal–Conversion from one to another–Binary addition, subtraction, multiplication and division, BCD, Weighted excess time, Gray code.

Text Book:

1. J.P. Tremblay and Manohar- Discrete mathematical structures with application to Computer Science(Tata McGraw Hill)New Delhi, 43rd edition 2013.

Books for Reference:

1. M. K. Venkataraman and others –Discrete mathematics- The National Publishing Pvt. Ltd.(2000).
2. G. Balaji– Discrete mathematics– Balaji Publishers Chennai(2013).
3. T. Veerarajan–Discrete mathematics Tata McGraw Hill –2009.
4. Garett Birkh off-Lattice Theory, American Mathematical Soceity(1948).
5. M.K. Sen, B.C.Chakraborty, Introduction to Discrete Mathematics, Books and Allied (P) Ltd (2009).

COMBINATIONAL MATHEMATICS

Objective:

- To know the basic concepts of pairings and to understand relations

Course Content

UNIT–1:

Selections and Binomial coefficients–Permutations–Ordered selections–unordered selections–Miscellaneous Problems.

UNIT–2:

Parings Problems–Pairings within a set–Pairing between sets.

UNIT–3:

Recurrence–Fibonacci–type relations using generating functions–Miscellaneous methods.

UNIT–4:

The Inclusion–Exclusion Principles.

UNIT–5:

Block designs–square block designs.

Text Book:

1. Ian C. Andersen–A first course in combinatorial mathematics –Clarendon Press, Oxford (1989).

Books for Reference

1. Ralph P. Grimaldi, B.V. Ramona –Discrete and combinatorial mathematics–an applied introduction (IV edition).

OPERATIONS RESEARCH -I

Objective:

- To introduce the various techniques of operations research

UNIT–1:

Linear Programming Problem: Mathematical formulation of LPP–Graphical method, Simplex method–Artificial variable technique.

UNIT–2:

Concept of Duality–Primal and Dual problems–Duality–Dual Simplex method.

UNIT–3:

Transportation Problem: North-west Corner rule–Matrix-Minima method–Vogel's approximation method–MODI method–Degeneracy and unbalanced Transportation problem.

UNIT–4:

Assignment Problem: Hungarian method –Unbalanced assignment problems.

UNIT–5:

Sequencing Problem: n jobs and two machines – n jobs and three machines – 2 jobs and m machines.

Text Book:

1. Kanti Swarup, P. K. Gupta and Manmohan – Operations Research – Sultan Chand and sons, (New Delhi)12^{th} edition (2006)

Books for Reference:

1. GuptaP.K and D.S.Hira–Operations Research– S.Chand & Sons Reprint (2012).
2. J.Ranganath and A. S.Srikantappa–Operations Research–YesDee Publishing House, Chennai (2017).
3. Hamdy A.Taha –Operations research, An introduction- 8thEdition Prentice–Hall India (2006).
4. A.C.S. Kumar, Operation Research, Yes Dee Publications, Chennai, 3rd Reprint 2019.

STOCHASTIC PROCESS

Objective:

- To understand the concepts of stochastic process and understand the generalization of Poisson process

UNIT–1:

Generating functions–Laplace transform of probability distribution, Classification of distribution, Stochastic process, specification of stochastic process.

UNIT–2:

Markov chains – Definition and examples , Higher transition probabilities, Generalisation of independent Bernoulli Trails, classification of states and chains, Determination of Higher Transition Probabilities–stability of Markov systems.

UNIT–3:

Markov chain with Denumerable number states – Reducible chains, Statistical inference for Markov chains, Markov chain with continuous state space, Non homogeneous chains.

UNIT–4:

Markov process with discrete state space–Poisson process, Poisson process and related distributions, Generalisation of Poisson process, Birth and Death process.

UNIT–5:

Markov process with Discrete state space–Derived Markov chains, Erlang Process.

Text Book:

1. J.Medhi–Stochastic Process–New Age International Publishers Pvt. Ltd. Third Edition. 2009.

Books for Reference:

1. Suddhendu Biswas – Applied Stochastic Process – New Central Agency Pvt. Ltd., Kolkatta (2012).
2. Paul G. Hoel, Sidney Port & Charles J. Stone–Introduction to Stochastic process–Waveland Press– Boston (1987).
3. V.Thangaraj, Stochastic Process and their applications, New Age International Publishers, New Delhi, First Edition (1995).

PERSONALITY DEVELOPMENT

UNIT: I - PERSONALITY

Definition –Determinants –Personality Traits –Theories of Personality –Importance of Personality Development. SELF AWARENESS–Meaning –Benefits of Self –Awareness –Developing Self –Awareness. SWOT–Meaning –Importance-Application –Components. GOAL SETTING-Meaning-Importance –Effective goal setting –Principles of goal setting –Goal setting at the Right level.

UNIT :II- SELF MONITORING

Meaning –High self –monitor versus low self monitor –Advantages and Disadvantages self monitor-Self –monitoring and job performance. PERCEPTION-Definition-Factor influencing perception-Perception process –Errors in perception –Avoiding perceptual errors. ATTITUDE–Meaning-Formation of attitude –Types of attitude -Measurementof Attitudes –Barriers to attitude change –Methods to attitude change.

ASSERTIVENESS-Meaning –Assertiveness in Communication –Assertiveness Techniques –Benefits of being Assertive –Improving Assertiveness.

UNIT : III - TEAM BUILDING

Meaning –Types of teams –Importance of Team building-Creating Effective Team. LEADERSHIP–Definition –Leadership style-Theories of leadership –Qualities of an Effect leader. NEGOTIATION SKILLS–Meaning –Principles of Negotiation –Types of Negotiation –The NegotiationProcess –Common mistakes in Negotiation process. CONFLICT MANAGEMENT–Definition-Types of Conflict-Levels of Conflict –Conflict Resolution –Conflict management .

UNIT :IV - COMMUNICATION

Definition –Importance of communication –Process of communication -Communication Symbols –Communication network –Barriers in communication –Overcoming Communication Barriers. TRANSACTIONAL ANALYSIS–Meaning –EGO States –Types of Transactions –Johari Window-Life Positions. EMOTIONAL INTELLIGENCE-Meaning –Components of Emotional Intelligence-Significance of managing Emotional intelligence –How to develop Emotional Quotient. STRESS MANAGEMENT–Meaning –Sources of Stress –Symptoms of Stress –Consequences of Stress –Managing Stress.

UNIT :V - SOCIAL GRACES

Meaning–Social Grace at Work –Acquiring Social Graces. TABLE MANNERS–Meaning –Table Etiquettes in Multicultural Environment-Do’s and Don’ts of

Table Etiquettes. DRESS CODE–Meaning-Dress Code for selected Occasions –Dress Code for an Interview. GROUP DISCUSSION–Meaning –Personality traits required for Group Discussion-Process of Group Discussion-Group Discusson Topics. INTERVIEW–Definition-Types of skills –Employer Expectations –Planning for the Interview –Interview Questions-Critical Interview Questions.

REFERENCES:

1. Dr.S. Narayana Rajan, Dr. B. Rajasekaran, G. Venkadasalapthi, V. Vijuresh Nayaham and Herald M.Dhas, Personality Development, Publication Division, Manonmaniam Sundaranar University, Tirunelveli
2. Stephan P.Robbins, Organisational Behaviour, Tenth Edition, Prentice Hall of India Private Limited, New Delhi,2008.
3. Jit S. Chandan, Oragnisational Behaviour, Third Edition, Vikas Publishing House Private Limited, 2008.
4. Dr.K.K. Ramachandran and Dr.K.K. Karthick, From Campus to Corporate, Macmillan Publishers India Limited, New Delhi,2015.