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 2020-2021 onwards)

Semester-V				
Part	**Subject Status**	**Subject Title**	**Subject Code**	**Credit**
3	Core	Linear Algebra		4
3	Core	Real Analysis		4
3	Core	Statics		4
3	Core	Transforms and their Applications		4
3	Major Elective Paper	1. Programming in c 2. Discrete Mathematics 3. Combinational Mathematics		4
3	Major Elective Paper	1. Operations Research I 2. Stochastic Process 3. MS Office		4
4	Skill Based Common	Personality Development	ACSB51	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

Objectives:

- To acquire knowledge about vectors spaces, Inner product spaces and linear transformations.
- To solve problems in matrices.

Course Learning Outcomes: It enables the students to

1. understand the relation between matrix and linear transformation.
2. learn the method of finding Eigen values and Eigen vectors of a matrix.
3. study the concept of linear dependence and independence sets, basis.

UNIT – 1:

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

UNIT – 2:

Span of a set – linear dependence and independence – basis and dimension – theorems.

UNIT – 3:

Rank and 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 – rank – Cayley Hamilton theorem – Application of Cayley Hamilton theorem.

UNIT – 5:

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

Text Book:

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

Books for Reference:

- Sharma J.N and Vashistha A. R. Linear Algebra - Krishna Prakash Nandir 1981.
- John B. Fraleish – A first Course in Abstract Algebra 7th edition, Pearson,

2002.

- N. Ramabhadran & R. Balakrishnan , Text book of algebra –Vikas Publishing Co. Revised Edition 1985.

REAL ANALYSIS

Objectives:

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

Course Learning Outcomes:

- grasp the basic concept interior and closure of a set.
- accommodate the notions of various metric spaces.

UNIT – 1:

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

UNIT – 2:

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

UNIT – 3:

Continuity – Homomorphism – Uniform Continuity – Discontinuous functions of R.

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 characterisations for compactness – Compactness and Continuity.

Text Book:

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

Book for Reference:

- Richard R.Goldberg -Methods of Real Analysis - Oxford and IBH Publishing Co. New Delhi.
- R Visvanathan nayak, Real Analysis -Emerald Publishers, Reprint 1992.
- Real Analysis – Viswanath Naik. K, Emerald Publishers , Chennai.

STATICS

Objectives:

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

Course Learning Outcomes: It enables the students to

- rcognize the concept of friction.
- know the method to solve the problems related to that.

UNIT – 1:
Forces acting at a point – Parallelogram law of forces – Triangle of forces – Lami's theorem – Problems.

UNIT – 2:
Parallel forces and moments – resultant of two parallel forces – resultant of two unlike unequal parallel forces – Varigon's theorem – Problems.

UNIT – 3:
Equilibrium of three forces acting on a rigid body – three coplanar forces theorem – Problems.

UNIT – 4:
Friction – Laws of friction – angle of friction – equilibrium of a particle (i) on a rough inclined plane (ii) under a force parallel to the plane (iii) under any force – Problems.

UNIT – 5:
Equilibrium of strings – equation of the common catenary – tension at any point – geometrical properties of common catenary – Problems.

Text Book:
M. K. Venkatraman – Statics, Agasthiar Publications, Trichy (2020).

Books for reference:

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

TRANSFORMS AND THEIR APPLICATIONS

Objectives:

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

Course Learning Outcomes: It enables the students to

1. develop the Knowledge on Fourier & Z Transforms.
2. get notions to solve the problems related to that.

UNIT – 1:
Fourier Transforms – Properties of Fourier Transforms.

UNIT – 2:
Infinite Fourier Cosine and Sinne Transforms – Properties.

UNIT – 3:
Finite Fourier Transforms.

UNIT – 4:
Z -transforms – Properties.

UNIT – 5:
Inverse Z -transforms.

Text Book:
Singaravelu .A– Eingineering mathematics (volume III) – Meenakshi Agency, Chennai(2019).

Books for Reference:

1. Muthucumaraswamy.R - Transforms and Partial Differential Equation Equations –Yes Dee Publications – Second Edition(2019).
2. Gangatharan, Engineering Mathematics (volume I) – Prentice Hall of Iindia Pvt.Ltd. (2007).

3. Dr.C.Muthulakshmi @ Saisikala and R.Ponraj - Transforms and their applications, Charulatha Publication (2020).

PROGRAMMING IN C

Objectives:

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

Course Learning Outcomes: It enables the students to

1. gain Knowledge to write programs in C.
2. train the students to acquire knowledge in C language.

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 – get char(), 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 go to statement. Decision making and looping: Introduction – while, Do while and for statement – jumps in loops.

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 handing 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:

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. Ramasamy et.al.-Programming in C- Scetech Publication (INDIA) Pvt.Ltd. II Edition(2015).
3. Ashok N.Kamathane - Programming with Ansi and Turbo C – Dorling Kindersley (India) Pvt.Ltd,(2009).

DISCRETE MATHEMATICS

Objectives:

- To study concepts of mathematics logic.
- To understand the basics of Lattices and Boolean Algebra.

Course Learning Outcomes: It enables the students to

1. know the number system and codes.
2. get basic ideas of Decimals, Binary, Octal and Hexadecimal and Gray code.

UNIT – 1: (Mathematical logic)

Statement and notation – Connectives – Negation – Conjunction – Disjunction – Statement formula and truth table – Conditional and biconditional – Well defined formulae – tautologies.

UNIT – 2:

Normal forms – The theory of interference for the statement calculus – The Predicate – The 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 and posets – 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:

Tremblay and Manohar – Discrete mathematical structures with application to Computer Science (Tata McGraw Hill) New Delhi 1997.

Books for Reference:

1. M. K. Venkataraman and others – Discrete mathematic - The National Publishing Pvt.Ltd.(2000).
2. G. Balaji – Discrete mathematics – Balaji Publishers Chennai (2013).
3. T. Veerarajan – Discrete mathematics Tata McGraw Hill – 2009.

COMBINATIONAL MATHEMATICS

Objectives:

- To know the basic concepts of Pairings.
- To understand relations.

Course Learning Outcomes: It enables the students to

1. develop Block design & Square block designs.
2. study the basic concept of Permutations.

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:

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

Objectives:

- To introduce the various techniques of operations research.
- To make the students to solve real life problems.

Course Learning Outcomes: It enables the students to

2. learn the relationship between Primal and Dual Problems.
3. study about transportation Problem.

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:

KantiSwarup, P. K. Gupta and Manmohan – Operations Research – Sultan Chand and sons – 2006, 12th edition.

Books for Reference:

1. Gupta P. K and D. S. Hira – Operations Research – S. Chand & Sons-VII Edition.

2. J. Ranganath and A. S. Srikantappa – Operations Research – Yes Dee Publishing House, Chennai (2017).
3. Hamdy A. Taha – Operations research, An introduction - 8th Edition Prentice – Hall India (2006).

STOCHASTIC PROCESS

Objectives:

- To understand the concepts of Stochastic process.
- To know Markov chains.

Course Learning Outcomes: It enables the students to

1. enrich the Knowledge in determination of Higher Transition Probabilities.
2. understand the generalisation of Poisson process.

UNIT – 1:
Generating functions – Laplace transform of probability distribution – Classification of distribution – Stochastic process – introduction – 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 – Graph Theoretic approach.

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

Book 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).

M.S OFFICE

Objectives:

- To develop the knowledge of computer.
- To know the importance of Word, Excel and PowerPoint.

Course Learning Outcomes: It enables the students to

1. enrich the knowledge in formatting document of various types.
2. prepare excel worksheets & PowerPoint Design.

UNIT – 1:

MS Word: Creating a document – saving, printing, editing and closing the document – copying, pasting, finding and replacing a text – adding headers and footers.

UNIT – 2:

Formatting a document – Turning Bold on/off – Underline on/off – highlight on/off – changing font size – page setup – changing margins – bullets and numbering – working with tables – changing the column width and row height – inserting or deleting a row/column – mail merge.

UNIT – 3: MS Excel:

Creating a worksheet – entering, editing, deleting data in cells – saving and previewing the worksheet – entering formulas – Working with basic functions – SUM, AVERAGE, MAX and MIN – sorting.

UNIT – 4:

Formatting a worksheet – inserting, deleting a row/column, changing font size – Graphs and charts – Simple calculations using mathematical, Statistical logical functions.

UNIT – 5: MS Power point:

Creating a simple presentation – adding transition effects to a presentation – adding sound effects to a presentation – creating hyperlinks between slides – changing the backward – inserting images on slides.

Text Book:

Dr. P. Rizwan Ahmed,‟ Office Automation 2010 ”, Margham Publications 2016.

Books for reference:

1. Stephen. L. Nelson & Julia Kelly - The Compete Reference”,TataMc Graw Hill Publishing company Ltd(2001).
2. Sumner Mary-‟Enterprise Resource Planning” Pearson Education,. I-Edition 2004.

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.