SYLLABUS

MANONMANIAM SUNDARANAR UNIVERISTY, TIRUNELVELI-12

UG - COURSES – AFFILIATED COLLEGES

Course Structure for **B.Sc Maths**

(Choice Based Credit System)

(with effect from the academic year 2017- 2018 onwards)

Semester-V				
Part	Subject Status	Subject Title	Subject Code	Credit
III	Core	ABSTRACT ALGEBRA II	SMMA51	5
	Core	REAL ANALYSIS II	SMMA52	5
	Core	STATICS	SMMA53	5
	Core	TRANSFORMS AND THEIR APPLICATIONS	SMMA54	5
	Elective	ASTRONOMY -I	SMMA5A	4
IV	Elective	OPERATIONS RESEARCH - I	SMMA5D	4
	Common	PERSONALITY DEVELOPMENT	SCSB5A	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

ABSTRACT ALGEBRA II

Objectives:

- To facilitate a better understanding of vector space
- To solve problems in matrices

Unit I

Vector Spaces : Definition and examples – elementary properties – subspaces – linear transformation – fundamental theorem of homomorphism

Unit II

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

Unit III

Rank and nullity Theorem – matrix of a linear transformation **Inner product space :** Definition and examples – orthogonality – orthogonal complement – Gram Schmidt orthognalisation process**.**

Unit IV

Matrices : Elementary transformation – inverse – rank -Cayley Hamilton Theorem-Applications of Cayley Hamilton Theorem

Unit V

Eigen values and Eigen vectors – Properties and problems-Bilinear Forms-Quadratic Forms-Reduction of quadratic form to diagonal form

Text Book:

1. Arumugam & Issac – Modern Algebra

Books for Reference :

2. Shama .J.N and Vashistha .A.R, "Linear Algebra", Krishna Prakash Nandir, 1981.
3. John B. Fraleigh, "A First Course in Abstract Algebra", 7th edition, Pearson, 2002.
4. Strang G., "Introduction to Linear Algebra", 4th edition, Wellesly Cambridge Press, Wellesly, 2009.
5. Artin M., "Abstract Algebra", 2nd edition, Pearson, 2011

REAL ANALYSIS – II

Objectives:

- To understand the real number of system and metric spaces
- To know the concepts of continuity and Riemann integrals
- To study the concept of connectedness and compactness

Unit I

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

Unit II

Closed sets – closure – Limit points – Dense sets – complete metric space – Cantor‟s intersection theorem – Baire‟s Category Theorem.

Unit III

Continuous functions on metric spaces : Functions - continuous at a point on the real line – Functions - Continuous – uniform continuous in a metric space – Discontinuous function of R.

Unit IV

Connectedness and compactness : Connectedness – connected subset of R – connectedness and continuity – compact metric spaces – compact subset of R – Heine Borel theorem.

Unit V

Riemann Integral : Sets of measure zero – Existence of the Riemann integral – Derivatives – Rolle‟s theorem – Fundamental theorem of Calculus – Mean value theorem – Cauchy‟s mean value theorem – Taylor‟s theorem**.**

Text Books:

1. Arumugam & Issac – Modern Analysis
2. Malic .S.C - Mathematical Analysis, Wiley Eastern Limited, New Delhi.

Books for Reference :

1. Tom .M. Apostal – Mathematical Analysis, II Edition, Narosa Publishing House, New Delhi (Unit I) (1997)
2. Goldberg .R – Methods of Real Analysis Oxford and IBH Publishing Co. New Delhi (200)
3. Viswanath Naik .K – Real Analysis, Emerald Publishers, Chennai.
4. Berberian .S.K – First course in Real Analysis, Springer Verlag, New York.

STATICS

Objectives:

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

Unit I :

Forces acting at a point – parallelogram Law f forces – Triangle of forces – Lami‟s Theorem – Problems.

Unit II:

Parallel forces and moments – resultant of two parallel forces – resultant of two unlike unequal parallel forces – Varignon‟s Theorem – Problems.

Unit III :

Equlibrium of three forces acting on a regid body – three coplanar forces theorem – problems.

Unit IV :

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 V :

Equilibrium of strings – equation of the common catenary – tension at any point – Geometrical properties of common catenary – problems.

Text Book:

1. Venkatraman, M.K. - Statics, Agasthiar Publications, Trichy.

Books for Reference: .

1) S – Statics, Emerald Publishers.
2) Duraipandian, P, Laxmi Duraipandian and Muthamizh Jayapragasam- Mechanics,S.Chand & Company.
3) Narayanan, S-Statics, S.Chand & Company, New Delhi.
4) Viswanatha Naik, K and Kasi, M

TRANSFORMS AND THEIR APPLIATIONS

Objectives:

- To develop the knowledge of Transformations
- To solve the problems connected

Unit I

Fourier transforms-Properties of Fourier transforms

Unit II

Infinite Fourier Cosines and Sine transforms-Properties

Unit III

Finite Fourier transforms

Unit IV

Z tranforms-Properties

Unit V

Inverse Z transforms

Text Book:

1) A.Singaravelu-Engineering Mathematics (Volume III)-Meenakshi Agency,Chennai

Reference Book:

2. A.Gangatharan-Engineering Mathematics (Volume II)-PHI (2007)

ASTRONOMY - I

Objectives:

- To introduce the exciting world of Astronomy to students
- To understand the movements of the celestial sphere
- To study the Kepler‟s laws of motion

Unit I

Spherical Trigonometry Spherical triangle – The fundamental formula of Spherical trigonometry, the sine, cosine, four parts and Napier formula (without proof) and simple problems.

Unit II

The celestial sphere Celestial co-ordinates – Diurnal motion – Rising and setting of a star – sidereal time – circumpolar stars – Morning and evening stars - Twilight.

Unit III

Earth – length of a day – Refraction – Tangent formula – Cassini‟s formula – Effects of refraction

Unit IV

Geocentric parallax – Effects – Heliocentric parallax – Effects

Unit V

Kepler‟s laws – verification of Kepler‟s laws – True anomaly, mean anomaly, Eccentic anomaly – Relation between them.

Text Book:

1. Kumaravelu .S and Susheela Kumaravelu – Astronomy for degree classes, Rainbow Printers, Nagercoil (2005)

Book for Reference :

1. Ramachandran .G.V – Astonomy

Operations Research-I

Objectives:

- To introduce the various techniques of operations research
- To make the students solve real life problems in Business Management
- To understand different types of LPP

Unit I

Linear Programming Problem

Mathematical formulation of LPP Graphical Method- Simplex Method – Artificial variable technique

Unit II

Concept of Duality – Primal and Dual Problems – Duality – Dual Simplex Method.

Unit III

Transportation Problem :

North-West Corner Rule – Matrix Minima method – Vogel‟s Approximation Method – MODI Method – Degeneracy and Unbalanced Transportationproblem.

Unit IV

Assignment Problem :

Hungarian Method – Unbalance Assignment Problem

Unit V

Sequencing Problem:

jobs and 2 machines- n jobs and 3 machines- 2 jobs and m machines

Text Book :

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

Books for Reference :

1) Gupta .P.K and D.S. Hira – Operations Research – S. Chand and Company.
2) B.J. Ranganath and A.S.Srikantappa -Operations Research, Yesdee Publishing House,Chennai(2017)
3) Hillier, F.S. and G.J. Lieberman - Introduction to Operations Research, 9th Ed., Tata McGrawHill, Singapore, 2009.
4) Hamdy A. Taha, - Operations Research, An Introduction, 8th Ed., Prentice – Hall India, 2006.
5) Hadley .G. - Linear Programming, Narosa Publishing House, New Delhi, 2002.