**B.Sc. Mathematics**

**I YEAR - I SEMESTER**

**COURSE CODE: 7BMAA1**

**ALLIED COURSE - I – ANCILLARY MATHEMATICS I**

**Unit – I**

Matrices – Characteristic Equation and Cayley Hamilton Theorem (Proof not included) – Finding the inverse of a matrix using Cayley – Hamilton Theorem ‒ Eigen values and Eigen vectors.

**Unit – II**

Equations of the first order but of Higher Degree – Equations solvable for dy / dx – Equations solvable y, x – Clairaut’s form – Linear equations with constant coefficients – Finding the complementary function and particular integral of the type eax,cos ax, sinax.

**Unit – III**

Differential Calculus – Successive Differentiation – nth derivative of standard functions (Derivation not needed) problems – Leibnitz formula for the nth derivative of a product (proof not needed) simple problems only – curvature and radius of curvature in Cartesian coordinates only – problems.

**Unit – IV**

Integral Calculus – Integration by Parts – Bernoulli’s formula – Definite integrals – properties – problems.

**Unit – V**

Trigonometry : Expression for sinnθ, cosnθ and tannθ, sinnθ, cosnθ (n being a +ve integer) Expansion of sinθ, cosθ, tanθ in powers of θ (only problems in all the above)

**Text Books:**

1. Modern Algebra by Dr. S.Arumugam and A.ThangapandiIssac, Scitech Publications, Chennai, 2003.
2. Differential Equations and its Applications by S.Narayanan and T.K.ManickavachagomPillay, S.Viswanathan (Publishers & Printers) Pvt. Ltd., 2015.
3. Calculus VolumeI by S.Narayanan&T.K.ManicavachagomPillay, S.Viswanathan (Printers & Publishers) Pvt. Ltd, 2006.
4. CalculusVolumeII by S.Narayanan&T.K.ManicavachagomPillay, S.Viswanathan (Printers & Publishers) Pvt. Ltd, 2014.
5. Ancillary Mathematics Paper I (Revised) by. S.Arumugam and

A.ThangaPandi Isaac, New Gamma Publishing House,Palayamkottai,2002

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| **Unit I** | Chapter 7sections 7.7 & 7.8 of (1) |
| **Unit II** | Chapter 4 sections 1, 2.1, 2.2, 3.1 of (2)Chapter 5 sections upto 4.2 (b) of (2)  |
| **Unit III** | Chapter 3sections 1.2, 1.3, 2.1, 2.2 (problems only) of (3)Chapter 10 sections 2.1 & 2.3 of (3) |
| **Unit IV** | Chapter 1 sections 11, 12, 15.1 of (4) |
| **Unit V** | Chapter 4 sections 4.1, 4.2, 4.3 of (5) |

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 **I YEAR - II SEMESTER**

**COURSE CODE: 7BMAA2**

**ALLIED COURSE - II – ANCILLARY MATHEMATICS II**

**Unit – I**

Vector Calculus – Vector Differentiation ‒ Gradient – Divergence – Curl – Properties – Results.

**Unit – II**

Linear equations with constant coefficients with Right hand side of the from eax v where vis any function of x – xm (a power of x) m being a positive integer – Linear equations with variable coefficients (Homogeneous Differential Equations only)

**Unit – III**

Fourier Series – Definition – Fourier Series Expansion of Periodic Functions with Period 2π – Even and Odd functions – Half range Fourier Series ‒ Problems.

**Unit – IV**

Interpolation – Newton’s Interpolation formula – Central Difference Interpolation formulae – Lagrange’s interpolation formulae.

**Unit – V**

Correlation – Rank Correlation – Regression lines and Regression coefficients.

**Text Books:**

1. Analytical Geometry of Three Dimensions and Vector Calculus by

 Dr. S.Arumugam and A.Thangapandi Issac, New Gamma Publishing House, Palayamkottai, Reprint 2006.

1. Differential Equations and its Applications by S.Narayanan and T.K.Manicavachagom Pillay, S.Viswanathan (Printers and Publishers) Pvt. Ltd., 2015.
2. Calculus Volume III by S.Narayanan &T.K.Manicavachagom Pillay, S.Viswanathan Printers & Publishers, 2014.
3. Numerical Analysis with Programming in C by Dr. S.Arumugam, A.Thangapandi Issac and Dr. A.Somasundaram, New Gamma Publishing House, Palayamkottai, June, 2013.
4. Statistics by Dr. S.Arumugam and Mr. A.Thangapandi Issac, New Gamma Publishing House, Palayamkottai.

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| **Unit I** | Chapter 5 sections 5.1 to 5.4 of (1) |
| **Unit II** | Chapter 5 section 4.2(c),(d);sections 5.1 to 5.5 of (2) |
| **Unit III** | Chapter 6 sections 1 to 4, 5.1, 5.2 of (3) |
| **Unit IV** | Chapter 4 sections 4.1 to 4.3 of (4) |
| **Unit V** | Chapter 6 sections 6.1 to 6.3 of (5) |

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**II YEAR - III SEMESTER**

**COURSE CODE: 7BMAA3**

**ALLIED COURSE - III – ANCILLARY MATHEMATICS III**

**Unit – I**

Partial Differential Equations – Formation of Partial Differential Equations by eliminating arbitrary constants and arbitrary functions – Complete, Particular, Singular and General integral.

**Unit – II**

Solving Lagrange’s linear equation Pp + Qq = R ,Solution of equations of Standard types f (p, q) = 0, z = px + qy + f (p, q), f (z, p, q) = 0, f1 (x, p) = f2 (y, q).

**Unit – III**

Laplace Transform – Definition – Laplace transform of some Standard Functions –problems – Inverse Laplace Transform – Standard formulae – problems.

**Unit – IV**

Numerical Differentiation – Derivatives using Newton’s Forward Difference formula – Derivatives using Newton’s Backward Difference formula – Derivatives using Newton’s Central difference formula – Maxima and Minima of the interpolating polynomial.

**Unit – V**

Beta and Gamma functions – Relations between them – Evaluation of multiple integrals using Beta and Gamma functions.

**Text Books:**

1. Differential Equations and Applications by Dr. S.Arumugam and A.ThangapandiIssac, New Gamma Publishing House, Palayamkottai, Edition 2014.
2. Numerical Analysis with Programming in C by Dr. S.Arumugam, Prof. A.ThangapandiIssac& Dr. A.Somasundara, New Gamma Publishing House, Palayamkottai, Edition, 2013.
3. Calculus Volume II by S.Narayanan and T.K.ManicavachagomPillay, S.Viswanathan (Printers & Publishers) Pvt. Ltd, 2014.

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| **Unit I** | Chapter 4 sections 4.1 & 4.2 of (1) |
| **Unit II** | Chapter 4 sections 4.3, 4.4 of (1) |
| **Unit III** | Chapter 3 sections 3.1 & 3.2 of (1) |
| **Unit IV** | Chapter 5 of (2) |
| **Unit V** | Chapter 7 sections 2,3,4 &5 of (3) |

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**II YEAR - IV SEMESTER**

**COURSE CODE: 7BMAA4**

**ALLIED COURSE - IV – OPTIMIZATION TECHNIQUES**

**Unit – I**

Origin and Development of O.R. – Definition of O.R. – Linear Programming – Mathematical formulation ‒ Graphical method – Problems.

**Unit – II**

Simplex method using Slack and surplus variables.

**Unit – III**

Transportation Problem – Definition – Finding initial basic feasible solution by

 North – West Corner rule – Least Cost method – Vogel’s Approximation method.

**Unit – IV**

Assignment problem – Definition – Finding optimal solution by using Hungarian method.

**Unit – V**

Sequencing Problem – Processing n jobs through two machines ‒ processing n jobs through K machines – problems.

**Text Book:**

1. Operations Research (14th edition) by Kanti Swarup, P.K.Gupta & Man Mohan, Sultan Chand & Sons, Publishers, New Delhi, 2008.

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| **Unit I** | Chapter 1sections 1.1 to 1.3Chapter 2 sections 2.1 to 2.4Chapter 3 sections 3.1 to 3.3 |
| **Unit II** | Chapter 3 sections 3.4 & 3.5Chapter 4 sections 4.1 to 4.3 (Theorems not included)  |
| **Unit III** | Chapter 10 sections 10.1 – 10.3, 10.5, 10.8, 10.9 |
| **Unit IV** | Chapter 11 sections 11.1, 11.2 & 11.3  |
| **Unit V** | Chapter 12 sections 12.1 – 12.5 |

**Books for Reference:**

1. Operations Research (2nd edition) by P.K.Gupta and D.S.Hira, S.Chand& Co.,

New Delhi, 2004.

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