

Annexure No.	18 C
SCAA Dated	29.02.2008

BHARATHIAR UNIVERSITY :: COIMBATORE – 641 046

Allied Mathematics - I

(For B. Sc - Physics and Chemistry major - 2007 – 2008 Batch and onwards)

Credit Hours: 7

Subject Title: Allied Mathematics I

Subject Description

This course presents a study on theory of equations, matrices, trigonometry, Laplace transform and Fourier series.

Goals: To enable the students the basic concepts of theory of equations, matrices, solving differential equations using Laplace transform and Fourier series

Objectives: On completion of this course the students should gain knowledge about solving equations, solving first and second order differential equations using Laplace transforms, Fourier series which will be useful in their field of study.

Unit I: Theory of Equations:

Polynomial Equations with real coefficients irrational roots, complex roots - symmetric function of roots – Transformation of equations by increasing or decreasing roots by a constant – Reciprocal Equations - Newton’s method to find a root approximately.

Unit II: Matrices:

Eigen Values and eigen vectors, Cayley-Hamilton theorem (without proof) – Verification and computation of inverse.

Unit III: Trigonometry:

Expansion in Series – Expansion of $\cos^n \theta$, $\sin^n \theta$, in a series of cosines and sines of multiples of θ – Expansions of $\cos n\theta$ and $\sin n\theta$ in powers of sines and cosines - hyperbolic functions and inverse hyperbolic functions.

Unit IV: Laplace Transforms:

Definition – Laplace Transform of Standard functions – Linearity property – First shifting theorem – Transform of $tf(t)$, $f(t) / t$ and derivatives – Inverse Laplace transforms of standard functions.

Unit V: Applications of Laplace transforms and Fourier Series:

Applications of Laplace transforms of differential equations of first and second order – Fourier series of functions in $(0, 2\pi)$.

Treatment as in

Kandasamy. P, Thilagavathi. K “Allied Mathematics”, Volume I and II, S.Chand and Company Ltd, New Delhi, 2004.

References:

1. T.K. Manichavasagam Pillai and S.Narayanan, Trigonometry - Viswanathan Publishers and Printers Pvt. Ltd.
2. S. Narayan and T.K. Manicavachagam Pillay “Ancillary Mathematics”, Viswanathan Publishers and Printers Pvt. Ltd.

Allied Mathematics - II
(For B. Sc - Physics and Chemistry major)
(2007 – 2008 Batch and onwards)

Credit Hours: 7

Subject Title: Allied Mathematics II

Subject Description:

This course presents the idea of curvature, multiple integrals, partial differential equations and vectors.

Goals: To enable the students to learn and gain the knowledge, ideas about curvature, multiple integrals and vectors.

Objective: On successful completion of course the students should have series of knowledge about the curvature, Beta, Gamma functions and its application. Learn the partial differential equation types and integration of vectors.

Unit I:

Curvature – Radius of curvature – center of curvature – circle of curvature – Evaluation of double integrals - change of order of integration in double integrals- Application of double integral to find the area between curves.

Unit II:

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

Unit III:

Solving second order linear differential equations with constant coefficients whose R.H.S is of the form ve^{mx} , where v is any function of x - Linear equations with variable coefficients.

Unit IV:

Formation of partial differential equations by elimination of arbitrary constants and functions - Definitions of general, particular and complete solutions - solving standard forms $f(p, q) = 0$, $f(x,p,q) = 0$, $f(y,p,q) = 0$, $f(z, p, q) = 0$, $f(x,p) = f(y,q)$, $z = px + qy + f(p,q)$ - Lagrange's Differential equations $Pp + Qq = R$.

Unit V:

Scalar and vector fields –Differentiation of vectors – Gradient, Divergence and Curl -Integration of vectors – line integral – surface integral – Green's theorem in the plane – Gauss divergence theorem – Stokes theorem – (Statements only).

Treatment as in

1. Kandasamy. P, Thilagavathi. K “ Mathematics for B.Sc. Branch I”, Volume II, III and IV, S.Chand and Company Ltd, New Delhi, 2004.

Reference:

S. Narayan and T.K. Manicavachagam Pillay “Ancillary Mathematics”, Viswanathan Publishers and Printers Pvt. Ltd.