

Semester – IV
Core – IV
Paper-VI (6hrs/week)
ABSTRACT ALGEBRA (90 hours) (ASMA41)

Objectives:

- ❖ To acquire the knowledge about the concept of groups, rings and fields.
- ❖ To study the concept of homomorphism.

Course Learning Outcomes: It enables the students to

1. grasp the concept of cyclic groups, normal subgroups.
2. know the fundamental theorems of homomorphism and how to apply it.

UNIT – 1:

Groups – definition and examples – subgroup – order of an element – centre of a group – Normaliser and Centralizer – Product of two Subgroups – order of HK – Intersection and union of subgroups.

UNIT – 2:

Cyclic groups – generators of a cyclic group – cosets – Lagrange’s theorem – Euler’s theorem – Fermat’s theorem.

UNIT – 3:

Normal Subgroups: Quotient groups – Group Homomorphism – Canonical homomorphism – Kernel of a homomorphism – Isomorphism – Automorphism – Inner automorphism – Permutation groups – Cayley’s theorem.

UNIT -4:

Rings: Definition and examples – Types of rings – Elementary properties of a ring – Integral domain – Field – Subrings – Subfields – Ideals – Principal ideal – Quotient ring – Maximal and prime ideals – Principal ideal domain – UFD.

UNIT -5:

Homomorphism of rings – Isomorphism – Kernel of a homomorphism – Fundamental theorem – Polynomial rings – Division algorithm.

Text Book:

S.Arumugam and A.Thangapandi Issac “ Modern Algebra ” - Scitech Publications, Private limited. (2008)

Books for Reference:

1. M. L. Santiago, Modern Algebra - McGraw Hill Education India Pvt. Limited,(2002).
2. T. K. ManickaVachagam pillai and others - Modern Algebra – S.Visvanathan Publishers (2011).
3. Visvanathan nayak, Modern Algebra -Emerald Publishers, Reprint 1992.

Semester – IV

Skill Based Core – Paper – II (4hrs/week)

TRIGONOMETRY, LAPLACE TRANSFORMS AND FOURIER SERIES (60 hours) (ASMA4A)

Objectives:

- ❖ To understand the concept of Trigonometry.
- ❖ To acquire knowledge about Laplace transform and its inverse.
- ❖ To study the concept of Fourier series and solve problems in Fourier series.

Course Learning Outcomes: It enables the students to

1. know the relation between hyperbolic function and circular function.
2. understand the concept of even and odd function.

UNIT – 1:

Trigonometry: Expansion of $\sin nx$, $\cos nx$, $\tan nx$ and expansions of $\sin^n x$ and $\cos^n x$.

UNIT – 2:

Hyperbolic functions – Relation between hyperbolic functions and circular functions – Inverse hyperbolic functions – Logarithm of a complex number – Summation of series using $C + iS$ method.

UNIT – 3:

Laplace transforms – Inverse Laplace transforms.

UNIT – 4:

Solving linear differential equations with constant coefficients and simultaneous equations using Laplace Transforms.

UNIT -5:

Fourier Series – Definition – Finding Fourier coefficients for a given periodic function with period 2π and $2l$ – odd and even functions – Half range series.

Text Book:

1. Arumugam. S and Thangapandi Issac. A – Trigonometry and Fourier Series.
2. T. K. Manickavachagam Pillai and S. Narayanan – Differential equations and its applications.

Books for reference:

- T. Veerarajan – Algebra and Trigonometry – YES DEE Publishing pvt. Ltd., Chennai.(2020).
- Ray Hanna J – Fourier Series, Transforms and Boundary value Problems, Dover Publications New York, 2008.