Title of The Paper:RING THEORY AND VECTOR CALCULUS

LEARNING OBJECTIVES

The aim of this course is to learnthe concept of ring theory which is the pillar to abstract algebra and some parts of number theory. It also introduce the concept of Euclidean Algorithm for integers and polynomial rings over a field.

LEARNING OUTCOMES

- Learning of basic concepts in RINGS and FIELDS
- Critical Assessment of mathematical proofs
- Explanation of curve fitting by simple examples

UNIT– 1(12hrs) RINGS-I

DefinitionofRingandbasicproperties, BooleanRings, divisorsofzeroandcancellationlawsRings, IntegralDomains,DivisionRingandFields,Thecharacteristicofa ring – ThecharacteristicofanIntegralDomain, ThecharacteristicofaField.SubRings,Ideals

UNIT– 2(12hrs) RINGS-II:-

DefinitionofHomomorphism–HomorphicImage–ElementaryPropertiesofHomomorphism– KernelofaHomomorphism–FundamentaltheoremofHomomorhphism–MaximalIdeals– Prime Ideals

UNIT–3(12hrs) VECTORDIFFERENTIATION:-

VectorDifferentiation,Ordinaryderivativesofvectors,Differentiability,Gradient,Divergence, Curoperators,and Formulaeinvolvingtheseoperators.

UNIT– 4(12hrs) VECTORINTEGRATION: -

Line Integral, SurfaceIntegral, Volumeintegralwithexamples.

UNIT– 5(12hrs) VECTORINTEGRATIONAPPLICATIONS:-

TheoremsofGaussandStokes,Green'stheoreminplaneand applicationsofthesetheorems.

ReferenceBooks:-

1.AbstractAlgebrabyJ.Fralieh,PublishedbyNarosaPublishinghouse.
2.VectorCalculusbySanthiNarayana,PublishedbyS. Chand&CompanyPvt.Ltd.,NewDelhi.
3.AtextBookofB.Sc.,MathematicsbyB.V.S.S.Sarmaand others, publishedbyS.Chand&CompanyPvt.Ltd.,NewDelhi.
4.VectorCalculusbyR.Gupta,PublishedbyLaxmiPublications.
5.VectorCalculusbyP.C.Matthews,PublishedbySpringerVerlagpublicattions.
6.RingsandLinearAlgebrabyPundir&Pundir,PublishedbyPragathiPrakashan.

Title of The Paper: LINEAR ALGEBRA

LEARNING OBJECTIVES

The aim of this course is to develop the work of vector spaces and its subspaces and to prove certain standard theorems.

LEARNING OUTCOMES

- To determine the basis of a vector space
- To find out the dimension of a vector space
- To recognize a vector with respect to a given basis

UNIT– I(12hrs): VectorSpaces-I:

VectorSpaces,Generalpropertiesofvectorspaces,n-dimensional Vectors,additionandscalar multiplicationofVectors,internal andexternal composition,Nullspace,Vectorsubspaces,Algebraof subspaces, Linear Sum of two subspaces, linear combination of Vectors, Linear span Linear independenceandLineardependenceofVectors.

UNIT–II(12hrs): VectorSpaces-II:

BasisofVectorspace, Finite dimensional Vector spaces, basis extension, co-ordinates,DimensionofaVector space,Dimensionofasubspace, Quotientspaceand DimensionofQuotientspace.

UNIT–III(12hrs):LinearTransformations:

Lineartransformations,linearoperators,PropertiesofL.T,sum andproductof LTs,AlgebraofLinear Operators,Rangeandnullspaceoflineartransformation,RankandNullityoflineartransformations – Rank –NullityTheorem.

UNIT–IV(12hrs):Matrix:

Matrices, ElementaryProperties ofMatrices, Inverse Matrices, Rank ofMatrix, Linear Equations, Characteristic Roots,CharacteristicValues&Vectorsofsquare Matrix,Cayley–HamiltonTheorem.

UNIT–V(12hrs):Innerproductspace :

Innerproductspaces,Euclideanandunitaryspaces,Norm orlengthofaVector,Schwartzinequality, TriangleinInequality,Parallelogramlaw,Orthogonality,Orthonormal set,completeorthonormalset, Gram–Schmidtorthogonalisationprocess.Bessel'sinequalityand Parseval'sIdentity.

ReferenceBooks:

1.LinearAlgebrabyJ.N.SharmaandA.R.Vasista,publishedbyKrishnaPrakashanMandir,Meerut-250002.

2.MatricesbyShantiNarayana,publishedbyS.ChandPublications.

3.LinearAlgebrabyKennethHoffmanandRayKunze,published byPearsonEducation(lowpricededition),NewDelhi.

4.LinearAlgebrabyStephenH.FriedbergetalpublishedbyPrenticeHallofIndiaPvt.Ltd.4th Edition2007.