

Semester VI 6 S - Paper XI (Linear Algebra)

Sr No	Topic	Link
Unit 1 Vector Space		
1	Definition and example of vector spaces	https://www.youtube.com/watch?v=1XIT3Y2oyAU
2	Subspaces	https://www.youtube.com/watch?v=y_PHA3szo5s
3	Sum and direct sum of subspaces	https://www.youtube.com/watch?v=kSyYgXvBpQQ
4	Linear span	https://www.youtube.com/watch?v=iF7ya80h1Rs
5	Linear dependence, Independence and their basic properties	https://www.youtube.com/watch?v=9WjuLvPT_2A
6	Basis , Finite dimensional vector spaces	https://www.youtube.com/watch?v=pG-IAFOiOw4
7	Existence theorem for bases	https://www.youtube.com/watch?v=cwIIXBSEFX4
8	Invariance of the number of elements of a basis set Dimension	https://www.youtube.com/watch?v=nfpwu7081E
Unit II Linear Transformations		
1	Linear transformation and their representation as matrices	https://www.youtube.com/watch?v=NCsoLIlz_IU
2	The algebra of linear transformations	https://www.youtube.com/watch?v=ldHB7CRxgOw&list=PLrt1YsMQhC9j1Ex-
3	The rank nullity theorem	https://www.youtube.com/watch?v=HnFFuXDi9p8
4	Change of basis.	https://www.youtube.com/watch?v=P2LTAUO1TdA
Unit III Dual Spaces		
1	Dual space	https://www.youtube.com/watch?v=OGO3HGIOQO4
2	Bidual space and natural isomorphism	https://www.youtube.com/watch?v=8TeXSy2Qwa8
3	Adjoint of a linear transformation	https://www.youtube.com/watch?v=kl_tOMfq-UM
4	Eigen values and eigenvectors of a linear transformation	https://www.youtube.com/watch?v=TH2nvOymftc
Unit IV Inner Product Spaces :		
1	Inner product spaces	https://www.youtube.com/watch?v=02jLbsGQ9CI
2	Cauchy-Schwarz inequality	https://www.youtube.com/watch?v=MFBYI-bVCkY
3	Orthogonal vectors Orthogonal complements	https://www.youtube.com/watch?v=1SCrAH8s1As
4	Orthonormal sets and bases	https://www.youtube.com/watch?v=7BFx8pt2aTQ
5	Bessel's inequality for finite dimensional spaces	https://www.youtube.com/watch?v=RbL8v1m-nOA
6	Gram Schmidt Orthogonalisation process.	https://www.youtube.com/watch?v=q5u1xveFvHI

Unit V Modules :

- 1 Modules, Submodules, Quotient modules
- 2 Homomorphism and Isomorphism theorems.

<https://www.youtube.com/watch?v=HHyBTIUJyF0>

<https://www.youtube.com/watch?v=qTb1-KiGTR0>

Semester VI

6 S Paper XII (Optional)

(Special Theory of Relativity)

Sr No	Topic	Link
Unit 1 Review of Newtonian Mechanics:		
1	Inertial frames.	https://www.youtube.com/watch?v=WWiBEDc6gDU
2	Speed of light and Galilean relativity	https://www.youtube.com/watch?v=P79Ur8LVcy8
3	Relative character of space and time	https://www.youtube.com/watch?v=D2yTYX9gGfk
4	Postulates of Special theory of relativity	https://www.youtube.com/watch?v=ErgEkxL-S2o
5	Lorentz Transformations and its geometrical interpretation	https://www.youtube.com/watch?v=gFU-p94oAuA
Unit II Relativistic Kinematics:		
1	Composition of parallel velocities	https://www.youtube.com/watch?v=ItgsWG60Ygg
2	Length contraction	https://www.youtube.com/watch?v=p6hhFkSXpRY
3	Time Dilation	https://www.youtube.com/watch?v=d1sxag038IU
4	Transformation equation for components of velocities and acceleration c	https://www.youtube.com/watch?v=Hb44MQxjWbo
Unit III Dual Spaces		
1	Geometrical representation of Space-Time	https://www.youtube.com/watch?v=XR0hQTu_tXk
2	Four dimensional Minkowskian space-time of relativity	https://www.youtube.com/watch?v=zRcX08Ay2dI
3	Time like, Light Like and space like intervals	https://www.youtube.com/watch?v=lyso3Z6niPc
4	Four vector and tensors in Minkowskian space-time.	https://www.youtube.com/watch?v=BuavtlfjvMc
Unit IV Relativistic Mechanics		
1	Variation of mass with velocity	https://www.youtube.com/watch?v=5EfHutPEAug
2	Equivalence of mass and energy	https://www.youtube.com/watch?v=Yywwsn3w9BY
3	Transformation equations for mass, momentum and energy.	https://www.youtube.com/watch?v=n_MyPtEb058
4	Relativistic force and transformation equations for its components.	https://www.youtube.com/watch?v=MhbYDy_x_VE