VEL TECH HIGH TECH

Dr. RANGARAJAN Dr. SAKUNTHALA ENGINEERING COLLEGE

An Autonomous Institution

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DEPARTMENT OF ARTIFICIAL INTELLIGENCE AND DATA SCIENCE

INNOVATIVE ASSIGNMENT-2

DEGREE	**B.TECH (AIDS)**	**FACULTY NAME Dr. P SENTHIL KUMAR**
COURSE CODE	**21MA33T**	**COURSE NAME: LINEAR ALGEBRA FOR DATA SCIENCE**
YEAR/SEM	**II/III (2023-2024)**	**STUDENTS STRENGTH / BATCHES: 125 / 42**

VHNO	STUDENT NAME	ASSIGNMENT TOPICS	CO	K LEVEL
BATCH 1				
VH 11927	GEETHAPRIYA S L	Evaluate by the Gram Schmidt Process to the given subset S = {(1, −2, −1,3), (3,6,3, −1), (1,4,2,8)}$and\ x$ = (−1,2,1,1) of the inner product space $V = R^4$ to obtain an orthogonal basis for span(S). Then normalize the vectors in this basis to obtain an orthonormal basis β for span(S) **Ref: Kolman, B. Hill, D.R.,—Introductory Linear Algebra Linear Algebra –A Geometric Approach**	CO3 & CO4	K3
VH 11954	M MEGAVARSHINI	Let V and W be vector spaces and let T: $V \rightarrow W$ be a linear transformation. If β = $\{v_1, v_2, \ldots v_n\}$is a basis for V,then show that $SpanT(\beta) = R(T)$. Also prove that T is one –to-one if and only if $N(T) = \{0\}$ 3. Let T: $P_2\ (R) \rightarrow P_3\ (R)$ be defined by $[(x)] = 2f'(x) + \int_0^x 3(t)$. Prove that T is linear, find the bases for $N(T)$ and $R(T)$. Compute the nullity and rank of T. Determine whether T is one-to-one or onto. **Ref: Kolman, B. Hill, D.R.,—Introductory Linear Algebra Linear Algebra –A Geometric Approach**	CO3 & CO4	K3
VH 11950	MALAR VIZHI K	Let T: $P_2\ (R) \rightarrow P_3\ (R)$ be defined by $[(x)] = (x) + f'(x)$is linear. Find the bases for both $N(T)$, $R(T)$, nullity of T, rank of T and determine whether T is one –to-one or onto **Ref: Kolman, B. Hill, D.R.,—Introductory Linear Algebra Linear Algebra –A Geometric Approach**	CO3 & CO4	K3
BATCH 2				
VH 12012	AANDAL PRAGADEESHWARI S	Let U be a finite dimensional vector space over the field F and let be $B = \{\alpha_1, \alpha_2, \alpha_3 \ldots\ldots \alpha_n\}$	CO3 & CO4	K3

		an ordered basis for U. Let V be a vector space over the space field F and let $\{\beta_1, \beta_2, \beta_3 \ldots\ldots \beta_n\}$ be any vectors in V. Then there exists a unique linear transformation T from U into V such that $(\alpha_i) = \beta_i, i = 1,2,3,\ldots n$. **Ref: Kolman, B. Hill, D.R.,—Introductory Linear Algebra Linear Algebra –A Geometric Approach**		
VH 11915	DEVADHARSHINI K	Let V and W be vector spaces, let T: $V \rightarrow W$ be linear and let $\{w_1, w_2, \ldots \ldots \ldots \ldots .\}$ be a linearly independent subset of $R(T)$. Prove that S= $\{v_1, v_2, \ldots \ldots\}$ is chosen so that $T(v_i) = w_i$ for i = 1,2,3, … . k this is linearly independent**.** **Ref: Kolman, B. Hill, D.R.,—Introductory Linear Algebra Linear Algebra –A Geometric Approach**	CO3 & CO4	K3
VH 11942	KAVIYA DHARSHINI M	Let T: $R^3 \rightarrow R^3$ be a linear transformation defined by $(x, y, z) = (x + 2y - z, y + z, x + y - 2z)$. Evaluate a basis and dimension of null space $N(T)$ and range space $R(T)$ and range space $R(T)$. Also verify dimension theorem **Ref: Kolman, B. Hill, D.R.,—Introductory Linear Algebra Linear Algebra –A Geometric Approach**	CO3 & CO4	K3
BATCH 3				
VH 11903	ANUSHIYA J	Find an orthogonal basis of the inner product space R_3 (R) with standard inner product, given the basis B= $\{(1,1,0), (1,-1,1), (-1,1,2)\}$ using Gram-Schmidt orthogonalization process. **Ref: Kolman, B. Hill, D.R.,—Introductory Linear Algebra Linear Algebra –A Geometric Approach**	CO3 & CO4	K3
VH 11934	HARSHINEE R	Suppose that T is one –to-one and that s is a subset of V .Prove that S is linearly independent if and only if T(S) is linearly independent Suppose $\beta = \{v_1, v_2, \ldots \ldots v_n\}$ is a basis for V and T is one –to-one and onto. Prove that $(\beta) = \{T(v_1), T(v_2), \ldots \ldots \ldots , T(v_n)\}$ is a basis for W **Ref: Kolman, B. Hill, D.R.,—Introductory Linear Algebra Linear Algebra –A Geometric Approach**	CO3 & CO4	K3
VH 11943	KEERTHIGA M	Point out that T is a linear transformation and find bases for both $N(T)$ and $R(T)$. Compute nullity rank T. Verify dimension theorem also verify whether T is one –toone or onto where T: $P_2(R) \rightarrow P_3(R)$ defined by $T[f(x)] = xf(x) + f'(x)$ **Ref: Kolman, B. Hill, D.R.,—Introductory Linear Algebra Linear Algebra –A Geometric Approach**	CO3 & CO4	K3
BATCH 4				
VH 11910	BHUVANESHWARI B	Evaluate using the Gram Schmidt Process to the given subset S = {(1, 1,1), (0,1,1), (0,0,1)}	CO3 &	K3

		and x = (1,0,1) of the inner product space V = R 3 to obtain an orthogonal basis for span(S). Then normalize the vectors in this basis to obtain an orthonormal basis β for span(S), and compute the Fourier coefficients of the given vector relative to β. **Ref: Kolman, B. Hill, D.R.,—Introductory Linear Algebra Linear Algebra –A Geometric Approach**	CO4	
VH 11914	DEEPTHI T	Let V and W be vector spaces with subspacesV_1 *and* W_1respectively. If T: $V \rightarrow W$ is linear .Prove that $T(V_1)$ is a subspace of W and that x∈ V: $T(x) \in W_1$}is a subspace of V **Ref: Kolman, B. Hill, D.R.,—Introductory Linear Algebra Linear Algebra –A Geometric Approach**	CO3 & CO4	K3
VH 11904	ARJUN HARI G	For a linear operator T: $R^3 \rightarrow R^3$ defined as $T(a, b, c) = (-7a - 4b + 10c, 4a - 3b + 8c, -2a + b - 2c)$,Point out the Eigen values of T and an ordered basis β for R^3 such that the matrix of the given transformation with the respect to the new resultant basis β is a diagonal matrix **Ref: Kolman, B. Hill, D.R.,—Introductory Linear Algebra Linear Algebra –A Geometric Approach**	CO3 & CO4	K3
BATCH 5				
VH 11911	CHARAN B	Using least square approximation to find the best fit in a linear function for {(−3,9)(− 2,6)(0,2)(1,1)} and compute error E **Ref: Kolman, B. Hill, D.R.,—Introductory Linear Algebra Linear Algebra –A Geometric Approach**	CO3 & CO4	K3
VH 11917	DHANUSH M	Let V and W be vector spaces with subspacesV_1 *and* W_1respectively. If T: $V \rightarrow W$ is linear .Prove that $T(V_1)$ is a subspace of W and that x∈ V: $T(x) \in W_1$}is a subspace of V **Ref: Kolman, B. Hill, D.R.,—Introductory Linear Algebra Linear Algebra –A Geometric Approach**	CO3 & CO4	K3
VH 11902	ANBAZHAGAN R	Let V and W be vector spaces and let T: $V \rightarrow W$ be a linear transformation. If β = $\{v_1, v_2, \ldots v_n\}$is a basis for V,then show that $SpanT(\beta) = R(T)$. Also prove that T is one –to-one if and only if $N(T) = \{0\}$ **Ref: Kolman, B. Hill, D.R.,—Introductory Linear Algebra Linear Algebra –A Geometric Approach**	CO3 & CO4	K3
BATCH 6				
VH 11906	ARUNKUMAR S	Let $x = (2, 1+i, i)$ and $y = (2-i, 2, 1+2i)$ be vectors in C3 . Compute $< x, y >$. $\|x\|$, $\|y\|$and $\|x + y\|$. Then verify both the Cauchy Schwarz inequality and the triangle inequality. **Ref: Kolman, B. Hill, D.R.,—Introductory Linear Algebra Linear Algebra –A Geometric Approach**	CO3 & CO4	K3

VH 11936	JAYA KRISHNA B	Let T: P_2 $(R) \rightarrow P_3$ (R) be defined by $[(x)] = 2f'(x) + \int_0^x 3(t)$. Prove that T is linear, find the bases for $N(T)$ and $R(T)$. Compute the nullity and rank of T. Determine whether T is one-to-one or onto. **Ref: Kolman, B. Hill, D.R.,—Introductory Linear Algebra Linear Algebra –A Geometric Approach**	CO3 & CO4	K3
VH 11895	AADITHYA KUMAR B I	Let V be a vector space over a field of characteristic not equal to twoi. Let u and v be distinct vectors in V. Prove that $\{u, v\}$ is linearly independent if and only if $\{u + v, u - v\}$is linearly independent. Let u, v and w be distinct vectors in V. Prove that $\{u, v, w\}$ is linearly independent if and only if $\{u + v, v + w, v + w\}$ is linearly independent **Ref: Kolman, B. Hill, D.R.,—Introductory Linear Algebra Linear Algebra –A Geometric Approach**	CO3 & CO4	K3
BATCH 7				
VH 11909	AYLLA PRUDHVI RAJ	Evaluate by applying the Gram Schmidt Process to the given subset with the inner product $< f(x), g(x) > = \int_0^1 f(t)g(t)dt$, $S = \{1, x, x\,2\}, and\ h(x) = 1 + x$ .of the inner product space $V = P_2(R)$ to obtain an orthogonal basis for span(S). Then normalize the vectors in this basis to obtain an orthonormal basis β for span(S), and compute the Fourier coefficients of the given vector relative to β. **Ref: Kolman, B. Hill, D.R.,—Introductory Linear Algebra Linear Algebra –A Geometric Approach**	CO3 & CO4	K3
VH 11946	KISHORE KUMAR R	a) If a vector space V is generated by a finite set S then prove that some subset of S is a basis for V. Hence Vhas a finite basis b) Decide whether or not the set $\{x^2 + 2x + 1, x^2 + 3, x^2 + x\}$ is a basis for $P_2(R)$ **Ref: Kolman, B. Hill, D.R.,—Introductory Linear Algebra Linear Algebra –A Geometric Approach**	CO3 & CO4	K3
VH 11896	ABUL FASIL J	Let V and W be vector spaces, let T: $V \rightarrow W$ be linear and let $\{w_1, w_2, \ldots \ldots \ldots \ldots .\ \}$be a linearly independent subset of $R(T)$. Prove that S= $\{v_1, v_2, \ldots \ldots\}$ is chosen so that $T(v_i) = w_i$ for $i = 1,2,3, \ldots . k$ this is linearly independent. **Ref: Kolman, B. Hill, D.R.,—Introductory Linear Algebra Linear Algebra –A Geometric Approach**	CO3 & CO4	K3
BATCH 8				
VH 11905	ARUN D	Evaluate by the Gram Schmidt Process to the given subset S = {(1, −2, −1,3), (3,6,3, −1), (1,4,2,8)}$and\ x$ = (−1,2,1,1) of the inner product space $V = R$ 4 to obtain an orthogonal basis for span(S). Then normalize the vectors in this basis to obtain an orthonormal basis β for span(S), and compute the Fourier	CO3 & CO4	K3

		coefficients of the given vector relative to β **Ref: Kolman, B. Hill, D.R.,—Introductory Linear Algebra Linear Algebra –A Geometric Approach**		
VH 11947	LOKESH M	Let T: $R^3 \rightarrow R^3$ be a linear transformation defined by $(x, y, z) = (x + 2y - z, y + z, x + y - 2z)$. Evaluate a basis and dimension of null space $N(T)$ and range space $R(T)$ and range space $R(T)$. Also verify dimension theorem **Ref: Kolman, B. Hill, D.R.,—Introductory Linear Algebra Linear Algebra –A Geometric Approach**	CO3 & CO4	K3
VH 11897	ABISLIN BABI M	Suppose that T is one –to-one and that s is a subset of V.Prove that S is linearly independent if and only if T(S) is linearly independent Suppose $\beta = \{v_1, v_2, \ldots \ldots v_n\}$ is a basis for V and T is one –to-one and onto.Prove that $(\beta) = \{T(v_1), T(v_2), \ldots \ldots \ldots , T(v_n)\}$ is a basis for W **Ref: Kolman, B. Hill, D.R.,—Introductory Linear Algebra Linear Algebra –A Geometric Approach**	CO3 & CO4	K3
BATCH 9				
VH 11948	MADESHWARAN V	Evaluate using the Gram Schmidt Process to the given subset $S = \{(1, 1,1), (0,1,1), (0,0,1)\}$ $and\ x = (1,0,1)$ of the inner product space $V = R$ 3 to obtain an orthogonal basis for span(S). Then normalize the vectors in this basis to obtain an orthonormal basis β for span(S), and compute the Fourier coefficients of the given vector relative to β. **Ref: Kolman, B. Hill, D.R.,—Introductory Linear Algebra Linear Algebra –A Geometric Approach**	CO3 & CO4	K3
VH 11949	MADHANKUMAR G	Point out that T is a linear transformation and find bases for both $N(T)$ and $R(T)$. Compute nullity rank T. Verify dimension theorem also verify whether T is one –toone or onto where T: $P_2(R) \rightarrow P_3(R)$ defined by $T[f(x)] = xf(x) + f'(x)$ **Ref: Kolman, B. Hill, D.R.,—Introductory Linear Algebra Linear Algebra –A Geometric Approach**	CO3 & CO4	K3
VH 11918	DHANUSH S	Let T be a linear operator $T(a, b, c) = (-4a + 3b - 6c, 6a - 7b + 12c, 6a - 6b + 11c)$,$\beta$ be the ordered basis then find $[T]\beta$ which is a diagonal matrix **Ref: Kolman, B. Hill, D.R.,—Introductory Linear Algebra Linear Algebra –A Geometric Approach**	CO3 & CO4	K3
BATCH 10				
VH 11944	KISHOR B	Let V be a finite-dimensional inner product space over F, and let g: V→ F be a linear transformation. Then prove that there exists a unique vector $y \in V$ such that $g(x) = < x, y >$ for all $x \in V$ **Ref: Kolman, B. Hill, D.R.,—Introductory Linear Algebra Linear Algebra –A**	CO3 & CO4	K3

		Geometric Approach		
VH11980	K . SANTHOSH KUMAR	Let V and W be vector spaces, let T: $V \rightarrow W$ be linear and let $\{w_1, w_2, \ldots \ldots \ldots \ldots .\}$be a linearly independent subset of $R(T)$. Prove that S= $\{v_1, v_2, \ldots \ldots\}$ is chosen so that $T(v_i) = w_i$ for i = 1,2,3, … . k this is linearly independent**.** **Ref: Kolman, B. Hill, D.R.,—Introductory Linear Algebra Linear Algebra –A Geometric Approach**	CO3 & CO4	K3
VH 11989	C K SRIRAAM	Suppose that T is one –to-one and that s is a subset of V .Prove that S is linearly independent if and only if T(S) is linearly independent Suppose $\beta = v_1, v_2, \ldots \ldots v_n\}$ is a basis for V and T is one –to-one and onto.Prove that $(\beta) = \{T(v_1), T(v_2), \ldots \ldots \ldots . , T(v_n)\}$ is a basis for W **Ref: Kolman, B. Hill, D.R.,—Introductory Linear Algebra Linear Algebra –A Geometric Approach**	CO3 & CO4	K3
		BATCH 11		
VH 11912	CHARUKESHWARAN S	(i) Let T be a linear operator on v and let W be a T invariant subspace of V. Show that w is invariant under $T*$ (ii) Using least square approximation to find the best fit in a linear function for {(-3,9)(-2,6)(0,2)(1,1)} and compute error E. **Ref: Kolman, B. Hill, D.R.,—Introductory Linear Algebra Linear Algebra –A Geometric Approach**	CO3 & CO4	K3
VH 11941	KARTHI NATARAJAN S	Let T: $R^3 \rightarrow R^3$ be a linear transformation defined by $(x, y, z) = (x + 2y - z, y + z, x + y - 2z)$. Evaluate a basis and dimension of null space $N(T)$ and range space $R(T)$ and range space $R(T)$. Also verify dimension theorem **Ref: Kolman, B. Hill, D.R.,—Introductory Linear Algebra Linear Algebra –A Geometric Approach**	CO3 & CO4	K3
VH 11924	ELAMARAN.V	Point out that T is a linear transformation and find bases for both $N(T)$ and $R(T)$. Compute nullity rank T. Verify dimension theorem also verify whether T is one –toone or onto where T: $P_2(R) \rightarrow P_3(R)$ defined by $T[f(x)] = xf(x) + f'(x)$**)** **Ref: Kolman, B. Hill, D.R.,—Introductory Linear Algebra Linear Algebra –A Geometric Approach**	CO3 & CO4	K3
		BATCH 12		
VH 11929	GOBINATHAN K	(i) Prove that the norm in a inner product space satisfies $\|v\| \geq 0$ and $\|v\| = 0$ if and only if $v = 0$. (ii) Find the norm of v = (1,2) $\in R$ 2with respect to the inner product$< u, v > = x_1 y_1 - 2x_1 y_2 - 2x_2 y_1$. **Ref: Kolman, B. Hill, D.R.,—Introductory Linear Algebra Linear Algebra –A Geometric Approach**	CO3 & CO4	K3
VH 11940	KAMALESH.B	Let T: $P_2(R) \rightarrow P_3(R)$ be defined by $[(x)] = (x)$ +	CO3	K3

		$f'(x)$is linear. Find the bases for both $N(T)$, $R(T)$, nullity of T, rank of T and determine whether T is one –to-one or onto **Ref: Kolman, B. Hill, D.R.,—Introductory Linear Algebra Linear Algebra –A Geometric Approach**	& CO4	
VH 11935	JANAKIRAMAN A	Let V and W be vector spaces and let T: $V \rightarrow W$ be a linear transformation. If $\beta = \{v_1, v_2, \ldots v_n\}$is a basis for V,then show that $SpanT(\beta) = R(T)$. Also prove that T is one –to-one if and only if $N(T) = \{0\}$ **Ref: Kolman, B. Hill, D.R.,—Introductory Linear Algebra Linear Algebra –A Geometric Approach**	CO3 & CO4	K3
BATCH 13				
VH 11938	JEEVANANTHAM S	(i) If x, y and z are vector of inner product space such that $< x, y > =< x, z >$then prove that $y = z$. (ii) Verify $< u, v > = x_1y_1 - x_1y_2 - x_2y_1 + 3x_2y_2$. when $u = (x_1\ x_2)$ $v = (y_1y_2)$ in an inner product. **Ref: Kolman, B. Hill, D.R.,—Introductory Linear Algebra Linear Algebra –A Geometric Approach**	CO3 & CO4	K3
VH 11945	KISHORE KUMAR K	Let $T: R^2 \rightarrow R^2$, be defined by $T(x, y, z) = (2x - y, 3z)$, verify whether T is linear or not. Find N(T) and R(T) and hence verify the dimension theorem. **Ref: Kolman, B. Hill, D.R.,—Introductory Linear Algebra Linear Algebra –A Geometric Approach**	CO3 & CO4	K3
VH 11899	ADHAM AMEER A	Let R^2 have Euclidean inner product. Use Gram Schmidt process to transform the basis (y_1, y_2, y_3) into orthonormal basis , where $y_1 = (1,1,1), y_2 = (0,1,1) and\ y_3 = (0,0,1)$ **Ref: Kolman, B. Hill, D.R.,—Introductory Linear Algebra Linear Algebra –A Geometric Approach**	CO3 & CO4	K3
BATCH 14				
VH 11900	AJITH V	Let V=P(R) and $< f(x), g(x) > = \int_{-1}^{1} f(t)g(t)dt$ βbe the standard ordered basis, using Gram-Schmidt process obtain orthonormal basis for $P_2(R)$ **Ref: Kolman, B. Hill, D.R.,—Introductory Linear Algebra Linear Algebra –A Geometric Approach**	CO3 & CO4	K3
VH 11901	AKASH K	Let $y_1 = (1,1,1), y_2 = (-1,0,-1), y_3 = (-1,2,3)$ check (y_1, y_2, y_3) is linearly independent using Gram Schmidt process compute orthogonal vectors from (y_1, y_2, y_3) **Ref: Kolman, B. Hill, D.R.,—Introductory Linear Algebra Linear Algebra –A Geometric Approach**	CO3 & CO4	K3
VH 11928	GNANA PRAKASH N	Let U be a finite dimensional vector space over the field F and let be $B = \{\alpha_1, \alpha_2, \alpha_3 \ldots\ldots \alpha_n\}$	CO3 & CO4	K3

		an ordered basis for U. Let V be a vector space over the space field F and let $\{\beta_1, \beta_2, \beta_3 \ldots\ldots \beta_n\}$ be any vectors in V. Then there exists a unique linear transformation T from U into V such that $(\alpha_i) = \beta_i, i = 1,2,3,\ldots.n$. **Ref: Kolman, B. Hill, D.R.,—Introductory Linear Algebra Linear Algebra –A Geometric Approach**		
BATCH 15				
VH 11933	HARISH S	Let V=C({-1,1}) with the inner product $< f(x), g(x) > = \int_{-1}^{1} f(t)g(t)dt$, and let W be the subspace $P_2(R)$, viewed as a space of functions. Use the orthonormal basis obtained to compute the "best"(closet) second degree polynomial approximation of the function h(t)=$e\ t$ on the interval [-1,1] **Ref: Kolman, B. Hill, D.R.,—Introductory Linear Algebra Linear Algebra –A Geometric Approach**	CO3 & CO4	K3
VH 11931	HARISHKUMAR M	Let V and W be vector space and T: $V \rightarrow W$ be linear transformation. Prove that (i) The null space of T is a subspace of V. (ii) The range of T is a subspace of V. **Ref: Kolman, B. Hill, D.R.,—Introductory Linear Algebra Linear Algebra –A Geometric Approach**	CO3 & CO4	K3
VH 11921	DHEERAJROHITH J	Evaluate by applying the Gram Schmidt Process to the given subset with the inner product $< f(x), g(x) > = \int_{0}^{1} f(t)g(t)dt$, $S = \{1, x, x\,2\}, and\ h(x) = 1 + x$ .of the inner product space $V = P_2(R)$ to obtain an orthogonal basis for span(S). Then normalize the vectors in this basis to obtain an orthonormal basis β for span(S), and compute the Fourier coefficients of the given vector relative to β. **Ref: Kolman, B. Hill, D.R.,—Introductory Linear Algebra Linear Algebra –A Geometric Approach**	CO3 & CO4	K3
BATCH 16				
VH 11930	GOUTHAM N	Find an orthogonal basis of the inner product space R_3 (R) with standard inner product, given the basis B= {(1,1,0), (1, −1,1), (−1,1,2)} using Gram-Schmidt orthogonalization process. **Ref: Kolman, B. Hill, D.R.,—Introductory Linear Algebra Linear Algebra –A Geometric Approach**	CO3 & CO4	K3
VH 11937	JEEVAN PRASAD S	Let V be a finite-dimensional inner product space over F, and let g: V→ F be a linear transformation. Then prove that there exists a unique vector $y \in V$ such that $g(x) = < x, y >$ for all $x \in V$ **Ref: Kolman, B. Hill, D.R.,—Introductory**	CO3 & CO4	K3

		Linear Algebra Linear Algebra –A Geometric Approach		
VH 11913	DANIELO TONY S	For each of the following inner product spaces V and linear operators Ton V, evaluate T* at the given vector in V. $V = R^3$, $T(a,b) + (2a + b, a - 3b), x = (3,5)$ **Ref: Kolman, B. Hill, D.R.,—Introductory Linear Algebra Linear Algebra –A Geometric Approach**	CO3 & CO4	K3
BATCH 17				
VH 11925	GAUTHAM KRISHNA K	Evaluate by the Gram Schmidt Process to the given subset $S =$ $\{(1,-2,-1,3),(3,6,3,-1),(1,4,2,8)\} and\ x =$ $(-1,2,1,1)$ of the inner product space $V = R_4$ to obtain an orthogonal basis for span(S). Then normalize the vectors in this basis to obtain an orthonormal basis β for span(S), and compute the Fourier coefficients of the given vector relative to β. **Ref: Kolman, B. Hill, D.R.,—Introductory Linear Algebra Linear Algebra –A Geometric Approach**	CO3 & CO4	K3
VH 11939	KALAI ARASAN K	(i)Then normalize the vectors in this basis to obtain an orthonormal basis β for span(S), and (ii).compute the Fourier coefficients of the given vector relative to β. 3. Consider the system $x + 2y + z = 4$; $x - y + 2z = -11$; $x + 5y = 19$; find the minimal solution **Ref: Kolman, B. Hill, D.R.,—Introductory Linear Algebra Linear Algebra –A Geometric Approach**	CO3 & CO4	K3
VH 11920	DHARSHAN J	State and prove Schwarz and Triangle inequality. **Ref: Kolman, B. Hill, D.R.,—Introductory Linear Algebra Linear Algebra –A Geometric Approach**	CO3 & CO4	K3
BATCH 18				
VH 11922	DILLI PRASATH B	Let W be a finite dimensional subspace of an inner product space v and let $y \in V$ then show that there exists unique vectors $u \in w$ and $z \in w^T$ such that $y = u + z$. Furthermore if $\{v_1, v_2, \dots v_k\}$is an orthonormal basis for w then show that $u = \sum_{i=1}^{k} < y, v_i > v$ **Ref: Kolman, B. Hill, D.R.,—Introductory Linear Algebra Linear Algebra –A Geometric Approach**	CO3 & CO4	K3
VH 12009	MADHUBALAN K	Let V be an inner product space, for $x, y, z \in V$ and C∈ F, checkwhether the following are true. $(i) < x, y + z > = < x, y > + < x, z >$ $(ii) < x, cy > = \bar{c} < x, y >$ $(iii) < x, 0 > = < 0, x > = 0$ $(iv) < x, x > = 0 if\ and\ only\ if\ x = 0.$ $(v) < x, y > = < x, z > for\ all\ x \in V\ then\ y = z$ **Ref: Kolman, B. Hill, D.R.,—Introductory Linear Algebra Linear Algebra –A**	CO3 & CO4	K3

		Geometric Approach		
VH 11907	ATHYALA PREM KUMAR	Let V be a finite-dimensional inner product space , and let S be an orthonormal basis for V. if T is a linear operator on V, then prove that $[T^*]_\beta = [T]^*_\beta$ **Ref: Kolman, B. Hill, D.R.,—Introductory Linear Algebra Linear Algebra –A Geometric Approach**	CO3 & CO4	K3
		BATCH 19		
VH 11919	DHARANI B	Let V be an inner product space, and suppose that x and y are orthogonal vectors in V. Prove that $\|x + y\|^2 = \|x\|^2 + \|y\|^2$. Deduce the Pythagorean theorem in R^2 . (a) $V = R^3, S = \{(1,0,1),(0,1,1),(1,3,3)\}$ and $x = (1,1,2)$ (b) $V = R^3, S = \{(1,1,1),(0,1,1),(0,0,1)\}$ and $x = (1,0,1)$ (c) $V = span(s)$, $where\ S = \{(1,i,0),(1-i,2,4i)\} and\ x = (3+i,4i,-1)$ (d) $V = R^t$, $S = \{(2,-1,-2,4),(-2,1,-5,5),(-1,3,7,11)\} and\ x = (-11,8,-4,18)$ (e) $V = R^t$ $S = \{(1,-2,-1,3),(3,6,3,-1),(1,4,2,8)\} and\ x = (-1,2,1,1)$ **Ref: Kolman, B. Hill, D.R.,—Introductory Linear Algebra Linear Algebra –A Geometric Approach**	CO3 & CO4	K3
VH 11923	DINESH M	Evaluate by the Gram Schmidt Process to the given subset $S = \{(1,-2,-1,3),(3,6,3,-1),(1,4,2,8)\} and\ x = (-1,2,1,1)$ of the inner product space $V = R^4$ to obtain an orthogonal basis for span(S). Then normalize the vectors in this basis to obtain an orthonormal basis β for span(S), **Ref: Kolman, B. Hill, D.R.,—Introductory Linear Algebra Linear Algebra –A Geometric Approach**	CO3 & CO4	K3
VH 11898	ADDEPALLI VIJAY SAI	Let V be a finite dimensional inner product space and let T be a linear operator on V. Then prove that there exists a unique function $T^* : v \to v$ such that $< T(x), y > = < x, T^*(y) >$ for all $x, y \in V$ Furthermore T^* is linear. **Ref: Kolman, B. Hill, D.R.,—Introductory Linear Algebra Linear Algebra –A Geometric Approach**	CO3 & CO4	K3
		BATCH 20		
VH 11916	DEVESH PANDI P	Let V be an inner product space, for x, y, z ∈ V and C∈ F, checkwhether the following are true. (i) $< x, y + z > = < x, y > + < x, z >$ (ii) $< x, cy > = \bar{c} < x, y >$ (iii) $< x, 0 > = < 0, x > = 0$ (iv) $< x, x > = 0 if\ and\ only\ if\ x = 0.$	CO3 & CO4	K3

		(v) $< x, y > = < x, z >$ $for\ all\ x \in V\ then\ y = z$ **Ref: Kolman, B. Hill, D.R.,—Introductory Linear Algebra Linear Algebra –A Geometric Approach**		
VH 12013	HASHON S	In $C([0, 1])$, let $f(t) = t$ and $g(t) = e^t$ Compute $< f, g >, \|f\|, \|g\|,$ and $\|f + g\|$. Then verify both the Cauchy-Schwarz inequality and the triangle inequality	CO3 & CO4	K3
VH12654	RAHUL RAGHAVENDRA P	State and prove Cauchy-Schwarz inequality and Triangle inequality in an inner product space. **Ref: Kolman, B. Hill, D.R.,—Introductory Linear Algebra Linear Algebra –A Geometric Approach**	CO3 & CO4	K3
BATCH 21				
VH12655	SANTHOSH P	Evaluate using the Gram Schmidt Process to the given subset S = {(1, 1,1), (0,1,1), (0,0,1)} $and\ x$ = (1,0,1) of the inner product space V = R 3 to obtain an orthogonal basis for span(S). Then normalize the vectors in this basis to obtain an orthonormal basis β for span(S), and compute the Fourier coefficients of the given vector relative to β. **Ref: Kolman, B. Hill, D.R.,—Introductory Linear Algebra Linear Algebra –A Geometric Approach**	CO3 & CO4	K3
VH12651	HARI P	Let $x = (2, 1 + i, i)$ and $y = (2 - i, 2, 1 + 2i)$ be vectors in C3 . Compute $< x, y >. \|x\|, \|y\|,$ and $\|x + y\|$. Then verify both the Cauchy Schwarz inequality and the triangle inequality. **Ref: Kolman, B. Hill, D.R.,—Introductory Linear Algebra Linear Algebra –A Geometric Approach**	CO3 & CO4	K3
VH12650	GOPI S	Let V be an inner product space. Prove that: (a) $\|x \mp y\|^2 = \|x\|^2 \pm 2R < x, y > + \|y\|^2$ for all x, y ∈ V, where $R < x, y >$ denotes the real part of the complex number $< x, y >$. (b) $\|\|x\| - \|y\|\|^2 \leq \|x - y\|$ for all x, y ∈ V **Ref: Kolman, B. Hill, D.R.,—Introductory Linear Algebra Linear Algebra –A Geometric Approach**	CO3 & CO4	K3