



الجامعة الافتراضية السورية  
SYRIAN VIRTUAL UNIVERSITY

# Linear Algebra Course

Course description

**I**nformation

**T**echnology

**E**ngineering



Syrian Arab Republic	 الجامعة الافتراضية السورية SYRIAN VIRTUAL UNIVERSITY	الجمهورية العربية السورية
Ministry of Higher Education		وزارة التعليم العالي
Syrian Virtual University		الجامعة الافتراضية السورية

### 1. Basic Information:

<b>Course Name</b>	Linear Algebra
<b>Course ID</b>	BLA401
<b>No. of Recorded Sessions*</b>	10 – 12
<b>No. of Synchronized Sessions*</b>	10 – 12
<b>No. of Quizzes (hrs.)</b>	–
<b>Exam (hrs.)</b>	2
<b>Registered Sessions Work Load (hrs.)</b>	36
<b>Synchronized Sessions Work Load (hrs.)</b>	36
<b>Credit Hours</b>	5

\* The duration of each session 1.5 hr

### 2. Pre-Requisites:

Course	ID
Mathematical Analysis I	BMA401

### 3. Course Objectives:

This course exposes main concepts of linear algebra. Topics include: vector spaces, matrix algebra, determinants and its applications, dot product and orthogonality, eigen vectors and eigen values.

This course prepares students to apply the basics of linear algebra in their domains of specialties: find the base of a vector space and calculate its dimension, apply matrix operations, find the matrix of a linear application, calculate determinant, study matrices and orthogonal sets, find eigen vectors and its corresponding values, diagonalize matrix and decompose matrix as a product of two matrices.

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#### 4. Learning Outcomes (LO):

After successfully completing the course, students should be able to:

- Understand the vector spaces and its bases and dimension.
- Understand the matrices and master its operations.
- Find determinant value.
- Study dot product and orthogonality (matrices and sets).
- Understand and find eigen vectors and values.
- Apply matrix diagonalization.

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## 5. Assessment Results:

Chapter No.	Chapter Title	Intended Objectives	Assessment Type				
			Developed content/ Recorded Sessions	Practical Activities (Synchronized Sessions)	Quizzes and Exams	Presentations And Interviews	Reports
CH1	Vector spaces	Understand the vector spaces and its bases and dimension.	X	X	X		X
CH2	Matrix algebra	Understand the matrices and master its operations.	X	X	X		X
CH3	Determinants and its applications	Find determinant value	X	X	X		X
CH4	Dot product and orthogonality	Study dot product and orthogonality	X	X	X		X
CH5	Eigen	Understand and	X	X	X		X

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	vectors and eigen values	find eigen vectors and values					
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## 6. Course Syllabus

Chapter No.	Chapter Title	Chapter Content (Syllabus)	No. of Theoretical Learning Units	No. of Practical Learning Units)
CH1	Vector spaces	<ol style="list-style-type: none"> <li>1. Vector space</li> <li>2. Sub vector space</li> <li>3. Base and dimension</li> <li>4. Direct sum and complement spaces</li> <li>5. Linear application</li> <li>6. Linear application rank</li> </ol>	3	3
CH2	Matrix algebra	<ol style="list-style-type: none"> <li>1. Matrix operations</li> <li>2. Square matrices</li> <li>3. Special matrices</li> <li>4. Linear application matrix</li> <li>5. Matrix rank</li> <li>6. Change bases</li> <li>7. Similar matrices</li> </ol>	2	2
CH3	Determinants and its applications	<ol style="list-style-type: none"> <li>8. Permutation signature</li> <li>9. Determinant properties</li> <li>10. Determinant value</li> <li>11. Determinant application</li> </ol>	2	2
CH4	Dot product and	<ol style="list-style-type: none"> <li>1. Dot product and its properties</li> <li>2. Norm</li> </ol>	2	2

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	orthogonality	<ol style="list-style-type: none"> <li>3. Normalized vector space</li> <li>4. Orthogonal sets and matrices</li> </ol>		
<b>CH5</b>	Eigen vectors and eigen values	<ol style="list-style-type: none"> <li>1. Constant space</li> <li>2. Eigen vectors and values</li> <li>3. Special polynomial</li> <li>4. Matrix eigen values and its properties</li> <li>5. Eigen spaces</li> </ol>	3	3



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## 7. Practical Activity:

- Tools and Labs:

Tool Name	Description

- Practical Activities per Chapters:

Chapter	Practical Activity	Remarks
CH1	<input checked="" type="checkbox"/> Exercises <input checked="" type="checkbox"/> Homework <input type="checkbox"/> Webinars <input type="checkbox"/> Project <input type="checkbox"/> Experiment <input type="checkbox"/> Other	
CH2	<input checked="" type="checkbox"/> Exercises <input checked="" type="checkbox"/> Homework <input type="checkbox"/> Webinars <input type="checkbox"/> Project <input type="checkbox"/> Experiment <input type="checkbox"/> Other	

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<b>CH3</b>	<input checked="" type="checkbox"/> Exercises <input checked="" type="checkbox"/> Homework <input type="checkbox"/> Webinars <input type="checkbox"/> Project <input type="checkbox"/> Experiment <input type="checkbox"/> Other	
<b>CH4</b>	<input checked="" type="checkbox"/> Exercises <input checked="" type="checkbox"/> Homework <input type="checkbox"/> Webinars <input type="checkbox"/> Project <input type="checkbox"/> Experiment <input type="checkbox"/> Other	
<b>CH5</b>	<input checked="" type="checkbox"/> Exercises <input checked="" type="checkbox"/> Homework <input type="checkbox"/> Webinars <input type="checkbox"/> Project <input type="checkbox"/> Experiment <input type="checkbox"/> Other	

## 8. References: