



**University/Academy:** Arab Academy for Science, Technology & Maritime Transport  
**Faculty/Institute:** College of Computing & Information Technology  
**Program:** B. Sc. of Computer Science

<b>Course title</b>	<b>Math 0</b>
<b>Course code</b>	<b>BA003</b>

## Form No. (11A) Knowledge and skills matrix for a course

Week	Course content	Knowledge	Intellectual skills	Professional skills	General skills
1	Functions and Limits	<ul style="list-style-type: none"> <li>Understanding Limits</li> <li>Explaining differentiation from first principles</li> <li>Understanding conjugate</li> </ul>	<ul style="list-style-type: none"> <li>Demonstrate Limits</li> <li>Apply on differentiation as first principles</li> <li>Demonstrate conjugate</li> </ul>	<ul style="list-style-type: none"> <li>Use calculus to compute, graph, model, and solve problems.</li> <li>Solve applications from different fields involving various meanings of the derivative.</li> </ul>	<ul style="list-style-type: none"> <li>Develop Creativity, imagination skills, and analytic ability.</li> </ul>
2	Left and right limits and continuity of the functions	<ul style="list-style-type: none"> <li>Explain continuity of a function at a point</li> </ul>	<ul style="list-style-type: none"> <li>Demonstrate continuity of a function at a point</li> </ul>	<ul style="list-style-type: none"> <li>Solve applications from different fields involving various meanings of the derivative.</li> </ul>	<ul style="list-style-type: none"> <li>Develop Creativity, imagination skills, and analytic ability.</li> </ul>
3	Basic rules of differentiation	<ul style="list-style-type: none"> <li>Explain the basic rules of differentiation</li> </ul>	<ul style="list-style-type: none"> <li>Apply on the basic rules of differentiation</li> </ul>	<ul style="list-style-type: none"> <li>Use calculus to compute, graph, model, and solve problems.</li> <li>Solve applications from different fields involving various meanings of the derivative.</li> </ul>	<ul style="list-style-type: none"> <li>Develop Creativity, imagination skills, and analytic ability.</li> </ul>

<b>Week</b>	<b>Course content</b>	<b>Knowledge</b>	<b>Intellectual skills</b>	<b>Professional skills</b>	<b>General skills</b>
4	Chain rule and some applications	<ul style="list-style-type: none"> <li>Define the chain rule</li> <li>Describe implicit differentiation and higher derivatives</li> <li>Explain the derivative of trigonometric functions</li> <li>Discuss geometric applications</li> </ul>	<ul style="list-style-type: none"> <li>Apply on the chain rule</li> <li>Demonstrate implicit differentiation and higher derivatives</li> <li>Demonstrate the derivative of trigonometric functions</li> <li>Demonstrate geometric applications</li> </ul>	<ul style="list-style-type: none"> <li>Use calculus to compute, graph, model, and solve problems.</li> <li>Apply tools and techniques for the design and development of applications.</li> <li>Solve applications from different fields involving various meanings of the derivative.</li> </ul>	<ul style="list-style-type: none"> <li>Develop Creativity, imagination skills, and analytic ability.</li> </ul>
5	Curve sketching	<ul style="list-style-type: none"> <li>Discuss the increasing and decreasing functions</li> <li>Explain local maximum and minimum</li> <li>Describe the absolute maximum and minimum</li> </ul>	<ul style="list-style-type: none"> <li>Demonstrate the increasing and decreasing functions</li> <li>Demonstrate local maximum and minimum</li> <li>Demonstrate the absolute maximum and minimum</li> </ul>	<ul style="list-style-type: none"> <li>Apply tools and techniques for the design and development of applications.</li> </ul>	<ul style="list-style-type: none"> <li>Develop Creativity, imagination skills, and analytic ability.</li> <li>Enhance the use numeracy, calculation and statistical methods.</li> </ul>
6	Integration as an inverse operation of integration	<ul style="list-style-type: none"> <li>Explain the basic rules of integration</li> <li>Define the integrals of simple trigonometric functions</li> <li>Discuss some applications of integration</li> </ul>	<ul style="list-style-type: none"> <li>Apply on the basic rules of integration</li> <li>Demonstrate the integrals of simple trigonometric functions</li> <li>Analyze some applications of integration</li> </ul>	<ul style="list-style-type: none"> <li>Use calculus to compute, graph, model, and solve problems.</li> <li>Use integration and partial fractions in</li> </ul>	<ul style="list-style-type: none"> <li>Develop Creativity, imagination skills, and analytic ability.</li> </ul>

<b>Week</b>	<b>Course content</b>	<b>Knowledge</b>	<b>Intellectual skills</b>	<b>Professional skills</b>	<b>General skills</b>
7	Permutations and combinations, and 7 <sup>th</sup> week exam	<ul style="list-style-type: none"> <li>• Explain the factorial</li> <li>• Define combinations</li> <li>• Define Permutations</li> </ul>	<ul style="list-style-type: none"> <li>• Demonstrate the factorial</li> <li>• Evaluate combinations</li> <li>• Evaluate on Permutations</li> </ul>	<ul style="list-style-type: none"> <li>• many applications in applied sciences.</li> </ul>	<ul style="list-style-type: none"> <li>• Enhance the use numeracy, calculation and statistical methods.</li> </ul>
8	The binomial theorem	<ul style="list-style-type: none"> <li>• Explain the binomial theorem</li> </ul>	<ul style="list-style-type: none"> <li>• Demonstrate the binomial theorem</li> </ul>		<ul style="list-style-type: none"> <li>• Develop Creativity, imagination skills, and analytic ability.</li> </ul>
9	Determinations and Applications	<ul style="list-style-type: none"> <li>• Define Determinants</li> <li>• Explain the properties of determinants</li> <li>• Explain the solution of systems of linear equations by Cramer's Rule</li> </ul>	<ul style="list-style-type: none"> <li>• Demonstrate Determinants</li> <li>• Demonstrate the properties of determinants</li> <li>• Demonstrate the solution of systems of linear equations by Cramer's Rule</li> </ul>	<ul style="list-style-type: none"> <li>• Apply tools and techniques for the design and development of applications.</li> </ul>	<ul style="list-style-type: none"> <li>• Enhance the use numeracy, calculation and statistical methods.</li> </ul>
10	Complex numbers	<ul style="list-style-type: none"> <li>• Define complex numbers</li> <li>• Explain the modulus, amplitude, and the trigonometric form of complex numbers</li> <li>• Explain De Moivre's theorem</li> <li>• Explain the exponential form of complex numbers</li> <li>• Define the cubic roots of unity</li> </ul>	<ul style="list-style-type: none"> <li>• Demonstrate complex numbers</li> <li>• Demonstrate the modulus, amplitude, and the trigonometric form of complex numbers</li> <li>• Demonstrate De Moivre's theorem</li> <li>• Demonstrate the exponential form of complex numbers</li> <li>• Demonstrate the cubic roots of unity</li> </ul>		<ul style="list-style-type: none"> <li>• Enhance the use numeracy, calculation and statistical methods.</li> </ul>
11	Vectors	<ul style="list-style-type: none"> <li>• Defining scalars</li> <li>• Defining Vectors</li> <li>• Describing the representation of vectors in the plane</li> </ul>	<ul style="list-style-type: none"> <li>• Demonstrate scalars</li> <li>• Demonstrate Vectors</li> <li>• Demonstrate the representation of vectors in the plane</li> </ul>		<ul style="list-style-type: none"> <li>• Enhance the use numeracy, calculation and statistical</li> </ul>

Week	Course content	Knowledge	Intellectual skills	Professional skills	General skills
		<ul style="list-style-type: none"> <li>Defining the components of a vector</li> <li>Defining unit vectors</li> </ul>	<ul style="list-style-type: none"> <li>Identify the components of a vector</li> <li>Demonstrate unit vectors</li> </ul>		<ul style="list-style-type: none"> <li>methods.</li> </ul>
12	Forces, the resultant and 12 <sup>th</sup> week exam	<ul style="list-style-type: none"> <li>Define Direction</li> <li>Define magnitude</li> <li>Define point of action</li> <li>Explain unit force (Absolute units and partial units)</li> <li>Explain the resolution of a force in two perpendicular directions</li> <li>Explain the resultant of a set of forces</li> <li>Describing equilibrium of coplanar forces meeting at a point</li> </ul>	<ul style="list-style-type: none"> <li>Demonstrate Direction</li> <li>Demonstrate magnitude</li> <li>Demonstrate point of action</li> <li>Demonstrate unit force (Absolute units and partial units)</li> <li>Identify the resolution of a force in two perpendicular directions</li> <li>Identify the resultant of a set of forces</li> <li>Demonstrate equilibrium of coplanar forces meeting at a point</li> </ul>		<ul style="list-style-type: none"> <li>Develop Creativity, imagination skills, and analytic ability.</li> </ul>
13	Motion of particles in straight lines	<ul style="list-style-type: none"> <li>Explain motion in a straight line</li> <li>Explain the straight motion with uniform acceleration</li> <li>Explain vertical motion under gravity</li> <li>Define Newton's laws of motion</li> <li>Explain motion on inclines planes</li> </ul>	<ul style="list-style-type: none"> <li>Demonstrate motion in a straight line</li> <li>Demonstrate the straight motion with uniform acceleration</li> <li>Demonstrate vertical motion under gravity</li> <li>Demonstrate Newton's laws of motion</li> <li>Demonstrate motion on inclines planes</li> </ul>	<ul style="list-style-type: none"> <li>Apply tools and techniques for the design and development of applications.</li> </ul>	<ul style="list-style-type: none"> <li>Develop Creativity, imagination skills, and analytic ability.</li> </ul>
14	Kinetic and potential energy	<ul style="list-style-type: none"> <li>Define Work, power and energy</li> <li>Define Kinetic energy</li> <li>Define Potential Energy</li> </ul>	<ul style="list-style-type: none"> <li>Demonstrate Work, power and energy</li> <li>Demonstrate Kinetic energy</li> <li>Demonstrate Potential Energy</li> </ul>		<ul style="list-style-type: none"> <li>Enhance the use numeracy, calculation and statistical methods.</li> <li>Develop</li> </ul>

<b>Week</b>	<b>Course content</b>	<b>Knowledge</b>	<b>Intellectual skills</b>	<b>Professional skills</b>	<b>General skills</b>
					Creativity, imagination skills, and analytic ability. •
15	Final revision.	•	•		•

**Course Instructor**

Name:

Signature:

**Head of Department**

Name: **Dr Samah Senbel**

Signature: