



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

Course title	Calculus 3
Course code	BA 201

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

Week	Course content	Knowledge	Intellectual skills	Professional skills	General skills
1	First order ordinary differential equations: Separable equations Initial value problems Homogeneous equations	<ul style="list-style-type: none"> Define what is meant by differential equations. Describe separable and homogeneous first order ordinary differential equations 	<ul style="list-style-type: none"> Solve separable and homogeneous first order ordinary differential equations problems 	<ul style="list-style-type: none"> Use calculus to compute, graph, model, and solve problems. 	<ul style="list-style-type: none"> Enhance the use numeracy, calculation and statistical methods.
2	<ul style="list-style-type: none"> Total differential and exact equations - Linear equations 	<ul style="list-style-type: none"> Identify exact and linear first order ordinary differential equations 	<ul style="list-style-type: none"> Solve exact and linear first order ordinary differential equations problems 		
3	<ul style="list-style-type: none"> Bernoulli's equation - Revision on first order ordinary differential equations 	<ul style="list-style-type: none"> Discuss Bernoulli's first order ordinary differential equations 	<ul style="list-style-type: none"> Solve Bernoulli's first order ordinary differential equation problems 		
4	<ul style="list-style-type: none"> Second order ordinary differential equations with constant coefficients: Fundamental set of solutions Linear independence of solutions: Wronskian- General solution of homogeneous equations 	<ul style="list-style-type: none"> Explain the fundamental set of solutions of the second order ordinary differential equations with constant coefficients and the linear independence of the solutions. Define the Wronskian Discuss the general solution of the homogeneous equations 	<ul style="list-style-type: none"> Examine the linear independence of solutions Compute the Wronskian Solve the homogeneous second order ordinary differential equations with constant coefficients 		

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• 5	<ul style="list-style-type: none"> Second order ordinary differential equations with constant coefficients: Non-homogeneous equations (Method of undetermined coefficients) 	<ul style="list-style-type: none"> Discuss the method of undetermined coefficients to solve non-homogeneous second order differential equations with constant coefficients 	<ul style="list-style-type: none"> Apply the method of undetermined coefficients to the non-homogeneous equations 	<ul style="list-style-type: none"> Use calculus to compute, graph, model, and solve problems. 	
• 6	<ul style="list-style-type: none"> Second order ordinary differential equations with constant coefficients: The method of variation of parameters. Second order ordinary differential equations with variable coefficients: [Cauchy - Euler Equation] 	<ul style="list-style-type: none"> Explain the method of variation of parameters Explain Cauchy -Euler Equation 	<ul style="list-style-type: none"> Apply the method of variation of parameters to the second order ordinary differential equations with constant coefficients Solve Second order ordinary differential equations with variable coefficients: [Cauchy -Euler Equation] 	<ul style="list-style-type: none"> Use calculus to compute, graph, model, and solve problems. 	<ul style="list-style-type: none"> Enhance the use numeracy, calculation and statistical methods.
• 7	<ul style="list-style-type: none"> Laplace transforms: Basic definition- First shifting Theorem (s-shifting) 	<ul style="list-style-type: none"> Define Laplace transforms Know first shifting theorem (s-shifting) 	<ul style="list-style-type: none"> Apply the first shifting theorem (s-shifting) 		
• 8	<ul style="list-style-type: none"> Laplace transforms: Derivatives of Transforms - Transform Integration 	<ul style="list-style-type: none"> Recognize derivatives of transforms and transform integration 	<ul style="list-style-type: none"> Solve problems on derivatives of transforms and transform integration 	<ul style="list-style-type: none"> Use calculus to compute, graph, model, and solve problems. 	<ul style="list-style-type: none"> Enhance the use numeracy, calculation and statistical methods.
• 9	<ul style="list-style-type: none"> Laplace transforms: Unit step function - Second shifting theorem (t-shifting) 	<ul style="list-style-type: none"> Define Unit step function Know second shifting theorem (t-shifting) 	<ul style="list-style-type: none"> Apply the second shifting theorem (t-shifting) 		
• 10	<ul style="list-style-type: none"> Inverse Laplace transforms 	<ul style="list-style-type: none"> Explain the inverse Laplace transforms 	<ul style="list-style-type: none"> Solve Inverse Laplace transforms problems 	<ul style="list-style-type: none"> Use calculus to compute, graph, model, and solve problems. 	<ul style="list-style-type: none"> Enhance the use numeracy, calculation and statistical

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					<ul style="list-style-type: none"> • methods.
• 11	<ul style="list-style-type: none"> • Applications: Solution of ODEs using Laplace transforms • – Solution of R-L circuit using the Laplace transforms 	<ul style="list-style-type: none"> • Know the solution of ODEs using Laplace transforms. • Know the solution of R-L circuit using the Laplace transforms 	<ul style="list-style-type: none"> • Solve ODEs and R-L circuit using the Laplace transforms 	<ul style="list-style-type: none"> • Use calculus to compute, graph, model, and solve problems. • Evaluate the electric current passing through R-L circuit using the Laplace Transforms • Apply tools and techniques for the design and development of applications. 	<ul style="list-style-type: none"> • Enhance the use numeracy, calculation and statistical methods.
• 12	<ul style="list-style-type: none"> • Fourier series: Fourier series for functions of period 2P 	<ul style="list-style-type: none"> • Discuss Fourier series • Know Fourier series for functions of period 2P 	<ul style="list-style-type: none"> • Analyze the Fourier series for functions of period 2P 		<ul style="list-style-type: none"> • Develop Creativity, imagination skills, and analytic ability.
• 13	<ul style="list-style-type: none"> • Fourier series: Fourier series for even and odd functions. • 	<ul style="list-style-type: none"> • Know Fourier series for even, odd functions 	<ul style="list-style-type: none"> • Analyze the Fourier series for even and odd functions 		<ul style="list-style-type: none"> • Develop Creativity, imagination skills, and analytic ability.
• 14	<ul style="list-style-type: none"> • • Fourier integrals. 	<ul style="list-style-type: none"> • Know Fourier integrals 	<ul style="list-style-type: none"> • Analyze the Fourier integrals 		<ul style="list-style-type: none"> • Develop Creativity, imagination skills, and analytic ability.
• 15	<ul style="list-style-type: none"> • Linear programming and simplex method 	<ul style="list-style-type: none"> • Discuss Linear Programming • Know the Simplex method 	<ul style="list-style-type: none"> • Solve Linear programming problems • Analyze the simplex method • 	<ul style="list-style-type: none"> • Use calculus to compute, graph, model, and solve problems. 	<ul style="list-style-type: none"> • Enhance the use numeracy, calculation and statistical methods. • Develop Creativity, imagination skills, and

Week	Course content	Knowledge	Intellectual skills	Professional skills	General skills
					analytic ability.

Course Instructor

Name:

Signature:

Head of Department

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**Dean - College of Computing and Information
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