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

Course title	**Numerical Methods**
Course code	**CS301**

Form no. (11A): **Knowledge and skills matrix for a course**

Course content	Week	Knowledge	Intellectual skills	Professional skills	General skills
Introduction to Numerical Analysis and course description	1	• Understand what's Numerical Analysis and solution of equations		• Show an introduction to Numerical Analysis and solution of equations	• Exhibit appropriate numeracy skills in understanding and presenting cases involving a quantitative dimension. • Demonstrate the ability to make use of a range of learning resources and to manage one's own learning. • Show the use of information-retrieval.
Numerical Interpolation(1)	2	• Demonstrate how to do numerical interpolation of unequal spaced data points, error, and derived difference table.	Know the different interpolation techniques and when to use them	• Solve problems of numerical interpolation •	
Numerical Interpolation (2)	3	• Explain how to do numerical interpolation of equally spaced data points, error, and difference tables.			
Numerical Integration(1)	4	• Describe numerical integration of unequally spaced data points and errors.	Know the different integration techniques and when to use them	• Solve problems of integration using different techniques	
Numerical Integration (2)	5	• Demonstrate numerical integration of equally spaced data points and error.			
Rules for Numerical Integration and composite methods	6	• Explain the Rules for Numerical Integration and composite methods	Comprehend rules and apply them	• Solve problems using composite methods	

7th Week Exam	7	•	•		
Rules for Differentiation (1)	8	• Explain differentialtion rules for unequally spaced data points and error	• Know the different differentiation rules and when to use them	• Solve differentiation problems using the different techniques. •	
Rules for Differentiation (2)	9	• Demonstrate differentiation rules for equally spaced data points and error.			
Least Square Error	10	• Explain what is meant by least square error and error propagation •		• Learn how to measure error & error propagation • Solve problems on least square error and regression	
Solution of system of linear equations: Jaccobi and Gauss-Zeidel method	11	• Solving linear equations	Demonstrate how to solve equations	• Solve problems using the Jaccobi and Gauss-Zeidel methods for Integral Matrices	
12th week exam	12	•		•	
Finding roots of any equation using the bisection method	13	• Demonstrate how to find roots of any equation using the bisection method	• Know the different methods to find roots and when to use them •	• Solve numerical problems •	
Finding roots of any equation using the Newton's Raphson method	14	• Demonstrate how to find roots of any equation using the Newton's Raphson method			
Review	15	•		•	

Course Instructor **Head of Department**