KINGDOM OF SAUDI ARABIA

Technical and Vocational Training Corporation

General Directorate of Curricula

المؤسسة العامة للتدريب التقني والمهني
Technical and Vocational Training Corporation

General Studies Department

General Courses

Department	General Study	**Major**				
Course Name	Engineering Mathematics	**Course Code**	MATH 381			
Prerequisites		**Credit Hours**	5		CTH	6
		CRH	L	5	P	0	T	1

Course Description :

This course is designed to give trainees a basic knowledge on the trigonometry, basic operations and resolution of equations of complex numbers. Also, this course is designed to learning trainees on how to resolve ordinary differential equations of order 1 and order 2, in a first step. Then, in a second step, they discover how to resolve these equations, alternatively, by using the Laplace Transform. Finally, the last chapter of this course is useful for trainees on how to apply Fourier and Z- Transforms.

General Objective:

The objectives of the "Engineering Mathematics" course are to ensure that trainees, whatever their mathematical background at entry, acquire the mathematical knowledge and skills required for the more advanced mathematical techniques introduced and applied in their specialized courses in the field of Telecommunications. These needs provide motivation for the Mathematics course.

Detailed Objectives:
  Trainee will be able to:

1-	Study trigonometric relations, trigonometric functions, polar coordinates, graphs and derivatives.
2-	Resolve operation on complex numbers including addition, subtraction, multiplication, division, powers and roots, apply Demoiver theorem and find solution of a quadratic equation.
3-	Resolve linear ordinary differential equation of order 1 and of order 2.
4-	Apply Laplace transform and solve initial value problems by Laplace transform.
5-	Apply Fourier transform and Z Transform.

Detailed of Theoretical Contents			
Hours	**Contents**		**Assessment Tools**
16	**Trigonometry** • Trigonometric relations, trigonometric functions, • Graphs of mathematical functions, polar coordinates, • Derivatives of trigonometric functions.		
	Textbook	1	Essential Trigonometry: A Self-Teaching Guide- Tim Hill - 2013	
		2	Algebra and Trigonometry (10th Edition) - Michael Sullivan -2015	
16	**Complex numbers** • Operation on complex numbers: addition, multiplication, division, • Geometric representation and Polar form, • Demoivre Theorem , Root of a complex number, • Solution of a quadratic equation.		
	Textbook	1	Complex Numbers from A to ... Z, Titu Andreescu, Dorin Andrica	

Detailed of Theoretical Contents			
Hours	**Contents**		**Assessment Tools**
		2	Complex Numbers and Geometry (Mathematical Association of America Textbooks) 2nd Edition - Liang-shin Hahn	
16	**Ordinary differential equations** • Some first- order of the differential equation, • Second-order linear differential equation.		
	Textbook	1	A Short Course in Ordinary Differential Equations, Qingkai Kong, Springer International publishing, 2014	
		2	Lectures, Problems And Solutions For Ordinary Differential Equations Second Edition Edition - Yuefan Deng -2017	
16	**Laplace Transform** • Definition of Laplace and Inverse Laplace transform • Solving initial value problem by Laplace transforms		
	Textbook	1	An Introduction to Laplace Transforms and Fourier Series, Phil Dyke, Springer –Verlag London, 2014	
		2	Complex Variables and the Laplace Transform for Engineers - Wilbur R. Le Page -2010	
14	**Fourier and Z- Transforms** • Fourier series, • Fourier transform, • Z-Transform : Bilateral end Unilateral, • Inverse Z-transform.		
	Textbook	1	An Introduction to Laplace Transforms and Fourier Series, Phil Dyke, Springer –Verlag London, 2014	
		2	Theory and Application of the Z-Transform Method- Eliahu Ibrahim Jury- ISBN-13: 978-0882751221	

Textbooks	• Essential Trigonometry: A Self-Teaching Guide- Tim Hill - 2013	
	• Algebra and Trigonometry (10th Edition) - Michael Sullivan -2015	
	• Complex Numbers from A to ... Z, Titu Andreescu, Dorin Andrica	
	• Complex Numbers and Geometry (Mathematical Association of America Textbooks) 2nd Edition - Liang-shin Hahn	
	• A Short Course in Ordinary Differential Equations, Qingkai Kong, Springer International publishing, 2014	
	• Lectures, Problems And Solutions For Ordinary Differential Equations Second Edition Edition - Yuefan Deng -2017	
	• An Introduction to Laplace Transforms and Fourier Series, Phil Dyke, Springer –Verlag London, 2014	
	• Complex Variables and the Laplace Transform for Engineers - Wilbur R. Le Page -2010	
	• Theory and Application of the Z-Transform Method- Eliahu Ibrahim Jury- ISBN-13: 978-0882751221	