COURSE SYLLABUS

Course Title: Mathematics

(11th Grade, TOEFL-Beginner)

The Asian International School

INSTRUCTIONAL RESOURCES

- Supplementary Material
- Worksheets

LEARNING OUTCOMES

Upon successful completion of this course, the student will:

- Understand sequences and basic combinatorics
- Understand and work with limits
- Understand and work with derivatives of simple and complex functions
- Understand and work with complex numbers, Euler's Number, and Logarithms

COURSE REQUIREMENTS

In order to take this course:

- A scientific calculator will be useful for performing calculations.
- Access to a computer with one of the following programs will be useful:
  - GeoGebra (Free)
  - Mathematica (Paid)
  - GNU Octave (Free)
  - MATLAB (Paid)

I. COURSE SCHEDULE

MONTH/ CHAPTER	UNIT TITLE	LEARNING OUTCOMES	TIME FRAME	NOTES
	SEMESTER 1	18 WEEKS		
AUG./ CHAPTER 1: Sequences	Unit 1: Introduction Unit 2: Combinatorics	Identify and work with composed functions Decompose complex composed functions into their simplest components Identify and use proper notation for finite sums and products.	4 weeks	

SEP./ Chapter 1: Sequences	Unit 3: Introduction to Sequences	At the end of this unit, students should be able to discuss finite and infinite sequences as well as construct both types of sequences. Students should be able to discuss and understand recursion and have a solid understanding of the Fibonacci sequence.	4 weeks	
OCT./ Chapter 1: Sequences	Chapter 1: Comprehensive Project Review for Midterm Exam	The teacher should design a comprehensive project that students will do at home and present their results in class. The comprehensive project should demonstrate the student's understanding and master of the topics and core concepts presented in Chapter 1. Ideally, the comprehensive project will be done in small groups and require outside research from the students.	4 weeks	**Mid-Term Exam**
NOV -DEC./ Chapter 2: Limits	Unit 1: Limits of a Sequences Unit 2: Limits of a Function Unit 3: Continuous Functions Comprehensive Project Review for Final Exam	Discuss convergent and divergent sequences Calculate the limit of a convergent sequence Extend the concept of limits of sequences to limits of functions Provide methods for finding limits of both finite and infinite functions Discuss, understand, and use the limit laws	6 weeks	**Final Exam and Vietnamese Exam**
SEMESTER 2		16 WEEKS		
JAN./ Chapter 3: Derivatives	Unit 1: Introduction to Derivatives Unit 2: Rules for Calculating Derivatives	Understand how to construct the definition of the derivative from the problem of finding the line tangent to a curve. Understand proper notation for the derivative and why we usually prefer Leibniz notation. Calculate simple derivatives using the limit definition of the derivative.	4 weeks	

FEB./ Chapter 3: Derivatives	Unit 3: Derivatives of a Trig Function	This unit will focus on presenting the primary rules for taking derivatives for trigonometric functions. Teachers should pay special attention to the chain rule. A sample worksheet is provided in the supplementary material.	2 weeks	
MAR./ Chapter 4: Complex Numbers, Euler's Number, and Logarithms	Unit 1: Complex Numbers Unit 2: Natural Logarithms	Define i State basic properties of i Define complex numbers Perform basic operations on complex numbers Define e^x and use the definition to estimate e Understand the rules of Natural Logarithms	4 weeks	**Midterm Exam**
APR./ Chapter 4: Complex Numbers, Euler's Number, and Logarithms	Unit 3: Functions with e and ln Comprehensive Project Review for Final Exam	Understand the derivative involving e and ln Understand Euler's Formula Understand Euler's Identity Understand the importance of the above topics to our modern world	6 weeks	**Final Exam and Vietnamese Exam**
TOTAL: 4 Chapters – 12 Units			**32 WEEKS**	