

**Mathematics 3**

Basic Course Information		
Course Number	12026911	Subject Category
Class Format	Lecture	Credit Type and Number of Credits
Department	CompuStar	Year
Period of Study	Semester 1	Classes per Week
Required Materials		
Instructor	Dr. Nathaniel Burbaui	Dr. Dawan Chumrouriam

**Course Objective**  
 When successfully complete this course, students will be able to:  
 1. Understand the concept of limits, can calculate the limit of functions, and can explore the behavior of functions by using the idea of limits.  
 2. Understand the meaning of derivative, can compute the derivative of functions and can apply the differentiation to its applications such as graphing or finding extreme or inflection points, etc.  
 3. Understand the integral of elementary functions, can compute and apply the integration to its applications such as finding area of regions, volume of 3D objects, surface area of 3D objects, length of curves embedded in a 3D space, etc.

Evaluation (Rubric)	High Level of Achievement (Very Good)	Standard Level of Achievement (Good)	Unacceptable Level of Achievement (Fail)
Evaluation 1	Understand and can compute the limit of functions. Can explore the behavior of functions by using the idea of limits.	Understand and can compute the limit of functions. Can explore the behavior of simple functions by using the idea of limits.	Can't compute the limit of functions. Can't explore the behavior of functions by using the idea of limits.
Evaluation 2	Understand and can compute the derivative of function. Can apply the differentiation to its applications.	Understand and can compute the derivative of functions. Can apply the differentiation to simple applications.	Can't compute the derivative of functions. Can't apply the differentiation to its applications.
Evaluation 3	Understand and can use the integration techniques to compute the integral of functions.	Understand and can use the integration techniques to compute the integral of simple functions.	Can't compute the integral of functions.
Evaluation 4	Can apply the integration to its applications.	Can apply the integration to simple applications.	Can't apply the integration to its applications.

**Relationship with Learning Outcomes**  
**GI1) Wide knowledge on Science and Engineering and practical ability to apply them to solve problems in the society.**  
**GI4) Creativity to make a new value with fusing the knowledge from various fields.**

**Teaching Method**  
 Outline:  
 Class Format: Lecture, Drill, Group Work, and Presentation  
 Please Note: Class format is subject to change depending on students' prior knowledge and preparation.

Course Plan	Contents and Method of Course	Goals	Related MOC
1st week	Chapter 1: Limits & Continuity	The reasons that why we have to learn calculus. The concept of limits. Calculating the limit of functions.	1-1-51
2nd week	Chapter 1: Limits & Continuity	Indefinite limits, Limits at infinity, Limits and Continuity	1-1-51
3rd week	Chapter 2: Differentiation - Tangent lines, Slope and Rates of change. - Define the derivative function formally using limit notation.	The concept of the derivative as a slope-producing function. Determine with some function can or can not differentiable.	1-1-52
During the 4th week	First Quarter Examination (15%)	Week 1-3: 90 minutes	
4th week	Chapter 2: Differentiation - Differentiation Techniques	The fundamental formulae. The product and quotient rules. Higher order derivative. The chain rule.	1-1-53
5th week	Chapter 2: Differentiation - Differentiation Techniques - Topics in Differentiation	Derivatives of trigonometric functions. The derivative formulae for exponential, logarithmic and inverse trigonometric functions.	1-1-54
6th week	Chapter 2: Differentiation - Topics in Differentiation	Implicit differentiation. Indeterminate forms and L'Hospital's rule.	1-1-55
7th week	Chapter 2: Differentiation - Applications of Differentiation	Relative and Absolute maximum/minimum. Graphing: polynomial and rational functions.	1-1-56
8th week	Chapter 2: Differentiation - Applications of Differentiation	Min-max problems. Derivatives of Parametric equation.	1-1-57
9th week	Midterm Examination (20%)	Week 4-8: 90 minutes	
10th week	Chapter 3: Integration - Indefinite Integrals	Introduce basic antidifferentiation and formulae. Define the definite integral in terms of a limit of Riemann sums. Fundamental Theorem of Calculus.	1-1-58
11th week	Chapter 3: Integration - Definite Integrals	Properties of definite integral	1-1-59
12th week	Chapter 3: Integration - Integration Techniques	U-Substitution. Improper Integrals	1-1-60
13th week	Chapter 3: Integration - Integration Techniques	Integration by Parts	1-1-61
14th week	Chapter 3: Integration - Integration Techniques	Partial Fractions. Integrating trigonometric functions	1-1-62
15th week	Chapter 3: Integration - Integration Techniques	Trigonometric Substitution	1-1-63
During the 15th week	Third Quarter Examination (20%)	Week 10-15: 90 minutes	
16th week	Chapter 4: Applications of Integration	Area Between Two Curves. Area of region represented with polar coordinate	1-1-64
17th week	Chapter 4: Applications of Integration	Volume by Slcing - Disks and Washers. Volume of revolution	1-1-65
18th week	Chapter 4: Applications of Integration	Length of Plane Curves. Area of Surface of Revolution	1-1-66
19th week	Chapter 4: Review	Review before final examination.	1-1-67
20th week	Final Examination (20%)	Week 16-19: 90 minutes	
21st week	Return answer sheets, review semester and give feedback	Summary	

Basic Ability	Communication	Health & Environment	Career Development/Leadership
0	0	0	0
1	1	1	1
2	2	2	2
3	3	3	3
4	4	4	4
5	5	5	5
6	6	6	6
7	7	7	7
8	8	8	8
9	9	9	9