National Taiwan University of Science and Technology

2019 Summer Program

MATH 122 Calculus 2

Course Outline

Term: July 01-August 02,2019

Class Hours: 16:00-17:50 (Monday through Friday)

Course Code: MATH 122

Instructor: Dr. Calistus Ngonghala

Home Institution: University of Florida

Office Hours: TBA and By Appointment

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Credit: 4

Class Hours: According to the regulations of Minister of Education, R.O.C, 18 class hours could be counted as 1 academic credit in all universities in Taiwan. This course will have 72 class hours, including 40 lecture hours, professor 10 office hours, 10-hour TA discussion sessions, 2-hour review sessions, 10-hour extra classes.

Course Description:
Calculus 2 is the second of a sequence of three courses in calculus covering basic concepts of calculus. The course covers integration techniques, applications of integrals, basic differential equations, sequences, and power series.

Course Objectives:
The objective of the course is to build an understanding of the fundamental principles and applications of integral calculus through lectures, homework, discussions, quizzes and exams.

Required Textbooks:
Calculus: Early Transcendentals, 8th edition, by James Stewart or the online open source textbook found at http://bit.ly/2vK7UTB.

Grading & Evaluation

		Grade	Range
Attendance and participation:	10%	A	90-100
Homework and quizzes:	20%	B	80-89
Midterm:	30%	C	70-79
Final:	40%	D	60-69
Total:	100%	F	0-59

Course Schedule

Week1 *Integration*: Anti-derivative, indefinite integrals, approximating areas, definite integrals, Fundamental Theorem of Calculus, integration formulas, substitutions, integration of logarithmic and exponential functions.

Week2 *Integration*: Integration by parts, trigonometric integrals and substitutions, rational fractions, other strategies, improper integrals.

Week3 *Applications of integration*: Arclength and surface area, area and volume of revolution, work, moment, center of mass, ordinary differential equations (basic concepts, direction fields, separable equations)

Week4 *Applications of integration*: exponential growth and decay, the logistic equation. *Sequences and series*: Sequences, infinite series, comparison and limit comparison test, divergence and integral tests

Week5 *Sequences and series*: Alternating series and ratio tests, power series, radius and interval of convergence, Taylor and Maclaurin series

Detailed Course Outline:

Week	Date	Chapter	Topic
1	07/01/2019	1 Integration	1.1 Anti-derivatives
			1.2 Indefinite integrals
	07/02/2019		1.3 Approximating areas
			1.4 The definite integral
	07/03/2019		1.5 Fundamental Theorem of Calculus
			1.6 Integration formulas
	07/04/2019		1.7 Substitutions
			1.8 Integration of logarithmic and exponential functions
			1.9 Integrals resulting in inverse trigonometric functions
2	07/08/2019	2 Integration techniques	2.1 Integration by parts
			2.2 Trigonometric integrals
	07/09/2019		2.3 Trigonometric substitutions
			2.4 Integrating rational fractions (partial fractions)

	07/10/2019		2.5 Other strategies
			2.6 Improper integrals
	07/11/2019		Exam 1
	07/15/2019	3 Applications of integration	3.1 Arc length of a curve and surface area
			3.2 Area and volume of revolution
3	07/16/2019		3.3 work, moments and centers of mass
	07/17/2019	4 First order Equations	4.1 Basics of differential equations
			4.2 Direction fields
	07/18/2019		4.3 Separable equations
	07/22/2019		4.4 Exponential growth and decay, logistic equation
4	07/23/2019	5 Sequences and series	5.1 Sequences
			5.2 Infinite series
	07/24/2019		5.3 Comparison and limit comparison test
			5.4 Divergence and integral test
	07/25/2019		Exam 2
	07/29/2019		5.6 Alternating series test
			5.7 Ratio and root tests
5	07/30/2019		5.8 Power series
			5.9 Radius and interval of convergence
			5.10 Taylor and Maclaurin series
	07/31/2019		Final Exam
	08/01/2019		Discussion of final exam

Student responsibilities/expectations: The main course material will be presented through lectures. A discussion session, to be held every Friday will offer an opportunity for students to discuss course material and assigned problems with a teaching assistant (TA). Students are advised to keep pace with the course material as it is being presented. Consequently, students should endeavor to attend all class meetings and discussion sessions, be early for class, and spend sufficient time working on assigned homework problems. If for any reason a student misses a class, he/she should endeavor to obtain the notes and learn the missed material before the next class meeting.   Students should not hesitate to ask questions or seek additional assistance to ensure that they are staying on pace with the class. Students will be expected to come to class prepared and ready to participate actively. Please, turn off your cell phones and put aside any unrelated material before class begins. Students should exhibit a sense of responsibility and respect towards fellow students. Late-coming to class or early departure from class meetings will not be allowed.

Examinations: There will be two exams plus one cumulative final exam. Each exam will consist of a multiple choice and a problem (free-response) section. The free-response problem section will contain problems to

solve and definitions, brief explanations of concepts, and simple proofs.

Quizzes: Quizzes will be administered periodically throughout course period. Quizzes are meant to test the understanding of covered topics, and to give a benchmark prior to the exams.

Homework: The purpose of homework is to develop more skills in the material covered. It will be the student's responsibility to solve the assigned homework problems in a timely manner. Students who intend to do well in the course are advised to solve the homework problems. Students should feel free to approach the instructor with difficulties from homework problems. Problems in which students encounter difficulties may also be discussed in class.