Beijing Jiaotong University

2020 Summer Session

MATH 122 Calculus 2

Course Outline

Term: July 13-August 7, 2020

Class Hours: 14:00-15:50 (Monday through Friday)

Course Code: MATH 122

Instructor: Dr. Calistus Ngonghala

Home Institution: University of Florida, USA

Office Hours: TBA and by appointment

Email: calistusnn@gmail.com

Credit: 4

Class Hours: This course will have 52 class hours, including 32 lecture hours, 8 professor office hours, 8 TA discussion session hours, and 4 review session hours.

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. Integration by parts, trigonometric integrals and substitutions.

Week2 *Integration*: Rational fractions, other strategies, improper integrals. *Applications of integration*: Arclength and surface area, area and volume of revolution, work, moment, center of mass.

Week3 *First order ordinary differential equations*: Basic concepts, direction fields, separable equations, exponential growth and decay, logistic equation. *Sequences and infinite series*: comparison and limit comparison test, divergence and integral tests.

Week4 *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
	Monday	1	Integration	1.1 Anti-derivatives
				1.2 Indefinite integrals
				1.3 Approximating areas
1	Tuesday	2	Integration techniques	1.4 The definite integral
				1.5 Fundamental Theorem of Calculus
				2.1 Integration formulas
				2.2 Substitutions
	Wednesday			2.3 Integration of logarithmic and exponential functions
				2.4 Integrals resulting in inverse trigonometric functions
	Thursday			2.5 Integration by parts
				2.6 Trigonometric integrals and substitutions
	Monday	2	Integration techniques	2.7 Integrating rational fractions (partial fractions)
				2.8 Other strategies
				2.9 Improper integrals
2	Tuesday			**Mid-term Exam**
	Wednesday	3	Applications of integration	3.1 Arc length of a curve and surface area
				3.2 Area and volume of revolution

	Thursday			3.3 work, moments and centers of mass
	Monday	4	First order Equations	4.1 Basics of differential equations 4.2 Direction fields
3	Tuesday			4.3 Separable equations 4.4 Exponential growth and decay, logistic equation
	Wednesday	5	Sequences and Series	5.1 Sequences 5.2 Infinite series
	Thursday			5.3 Comparison and limit comparison test 5.4 Divergence and integral test
	Monday			5.6 Alternating series test 5.7 Ratio and root tests
4	Tuesday	5	Sequences and Series	5.8 Power series 5.9 Radius and interval of convergence 5.10 Taylor and Maclaurin series
	Wednesday			**Final Exam**
	Thursday			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 one mid-term exam 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.