Syllabus: *Math 220 Calculus I*

Course Information

Course Prefix/Number: Math 220	Credit Hours: 5
Semester: Spring 2017	Course Title: Calculus I
Class Days/Times: Tuesday - Thursday 10:50 AM – 12:55 PM	Room: A 3

Instructor Information: Name: Jorge Guarin	Phone/Voice Mail: (520) 383-0101 E-mail: jguarin@tocc.edu Office location: Main Campus Office hours: To Be Determined

Course Description:

Introduction to analytical geometry and calculus. Includes limits, continuity, differentiation and integration of algebraic and basic trigonometric functions, and applications of differentiation and integration.

Course Objectives:
During this course students will

1. Determine slope of a line, equation of line, apply parallel and perpendicular properties, be able to test for symmetry with respect to the origin, the x-axis, and the y-axis, and find the distance between two points.
2. Determine equations of a circle, ellipse-major axis, minor axis, foci.
3. Determine if a relation is a function and find its domain, range, and inverse.
4. Determine the average rate of change or the difference quotient.
5. Evaluate right and left hand limits for rational and multipart functions, and functions involving radicals.
6. Determine when a right or left hand limit is infinite in a positive or negative sense.
7. Apply the definitions and the limit theorems to evaluate finite and infinite limits.
8. State the definitions of the derivative and use it to find derivatives of rational functions and functions involving square roots.
9. Interpret the derivative as a slope of a tangent line, and use the derivative to find equations of tangent lines to curves.
10. State the definitions of continuity at a point, and apply the definition and the continuity theorems to determine at which point a function is continuous.
11. Determine from a graph whether a function is continuous and whether it is differentiable.
12. Apply the basic differentiation rules to find derivatives of polynomial functions.
13. State and use the product rule in finding derivatives.
14. State and use the quotient rule in finding derivatives.
15. State and use the chain rule to find derivatives of composite functions and radicals.
16. Find second and higher order derivatives and use them to solve problems involving velocity and acceleration.
17. Find derivates using the technique of implicit differentiation.

18. State Rolle's theorem and the Mean Value theorem and show that it holds on a given interval and find the number in the interval which is guaranteed by the theorem.
19. Find the critical numbers of a function and the intervals on which the function is increasing and decreasing.
20. Find the local extrema for a given function.
21. Use the second derivative test to verify the maximum and minimum points.
22. Solve word problems which involve maxima and minima of a functional relationship.
23. Solve problems involving related rates.
24. Determine the indefinite integral and it's constant, if possible. State the definition of the definite integral and apply the fundamental theorem of calculus to evaluate them.
25. Solve integration by the u-substitution method.
26. Use summation and the definite integral to determine the area under a curve.

Student Learning Outcomes (SLOs) :
After completion of the course students will be able to

- Perform optimization problems with the use of iPads.

- Create mathematical projects using PowerPoint.

- Employ technology to set up and solve real world situations using calculus.

Texts and Materials: An iPad is required for this class.
Required Text: Calculus: Early Transcendentals, 5th Edition, by Larson & Edwards.
ISBN: 13 9781111171698. Publisher: Cengage Learning. Checking out and returning an Ipad is a requirement to obtain a grade in this class. APP: The "Free GraCalc" app is recommended.

Evaluation and Grading & Assignments:
Attendance:
The attendance policy for this class is simple. You are all adults who have in some form paid for this class. If you do not wish to come to any session, you do not have to attend. However, you are still responsible for completing work on time. If you are late for class, enter quietly and sit down. You will not be allowed to make up any quiz you miss because of tardiness. In case of a valid emergency, contact the instructor using the information given on the first page. After filling out an absence form, the instructor will decide whether or not the work missed can be made up.

Academic Integrity: Violations of scholastic ethics are considered serious offenses by Tohono O'odham Community College, the Mathematics Department, and by your instructor. Students may consult the TOCC Student Handbook sections on student code of conduct, on scholastic ethics and on the grade appeal procedure.
[*a*] All homework can be done independently or with other students. The purpose of homework is to develop critical thinking skills and also to develop specific skills related to teaching mathematics by repeated practice of these skills. Without this practice most students find it impossible to perform well in this class. No collaboration is tolerated during exams in-class exams.
[*b*] Students are expected to abide by the Student Code of Conduct and the Scholastic Code of Conduct found in the Tohono O'odham Community College Student Handbook. Copies are available at the main student bookstore.

Course Feedback:
All materials submitted will be graded and returned the next class period after they are submitted.

Homework Policy:
Homework will be assigned each class period (see Homework) and is due at the beginning of the next class period before the quiz. The solutions to all odd-numbered problems in the text are found on book site in the internet. Late homework will not be accepted unless the student has made an arrangement with the instructor

before it is to be turned in.

Withdrawals:
Please be sure to withdraw yourself by **April 3, 2017** if you do not expect to complete the class, otherwise you may receive an "F" grade.

Workload:
Students are expected to spend an average of 18 hours per week attending class sessions, doing assignments and preparing for exams. The standard Carnegie Unit of college credit assigns one credit hour for each 15 hours of class time and assumes that students spend two hours working outside the classroom for each hour of classroom instruction. For a three-credit semester course, this translates to an average of 12 hours spent outside of class weekly for 8 weeks.

Grading System/Policies:

Your final grade will be calculated as follows:

24 homework assignments	200 points
5 quizzes	200 points
5 tests	300 points
1 project	100 points
1 final exam	200 points
Total possible	1000 points

Grading Scale

A =	1000 - 900 points
B =	899 - 800 points
C =	799 - 700 points
D =	699 – 600 points
F =	less than 600 points

Incomplete (I) grade:
To receive an " I " grade, you must have finished at least 1/2 of the course requirements and specifically request the grade. Please call before the last week of class to be sure that there is sufficient time to consider your request. An incomplete grade generally implies that a student has shown sufficient initiative to complete the course on his or her own. You will receive a copy of the standard "I" form filed with the grade. This form details specifically what must be done to complete the course. A student has one year to complete the required work, after which the grade automatically reverts to an "F."

Make-up Assignments:
No make-up assignments will be given and no late assignments will be accepted unless the student has made arrangements with the instructor.

Extra Credit Opportunities: Do not ask for extra credit opportunities until you have completed all of the required assignments to date. The instructor will occasionally give extra credit homework, quiz, and exam questions that test critical thinking skills.

Final Grades: Students will receive a grade transcript from the college mailed to the address given with registration materials at the end of the semester when all grades have been recorded.

SPECIAL NOTE TO STUDENT: For privacy and security reasons, instructors are advised **NOT** to give grades over the telephone.

Course Outline:
I. Differentiation
   A. Limit definition of derivative
   B. Numerical differentiation
   C. Constant rule
   D. Power rule
   E. Constant multiple rule

      F.   Sum and difference rule
      G.   Product rule
      H.   Quotient rule
      I.   Derivative of e^x and $\ln x$
      J.   Chain rule (optional)
      K.   Interpreting derivative as slope
      L.   Finding equation for a tangent line (optional)

II.   Optimization
      A.   Demand
      B.   Cost
      C.   Revenue
      D.   Profit
      E.   Marginal cost
      F.   Marginal revenue
      G.   Marginal profit
      H.   Maximizing profit and revenue
      I.   Find break-even points given revenue and cost (optional)
      J.   Find intervals of profit and loss (optional)

III. Integration
      A.   Numerical integration (midpoint sums)
      B.   Area under curve
      C.   Definite and indefinite integration
      D.   Fundamental Theorem of Calculus
      E.   Integration formulas for polynomials, e^x, and $\ln x$
      F.   Cumulative distribution function as an integral
      G.   Consumer surplus

IV. Finite Random Variables
      A.   Probability mass function
      B.   Cumulative distribution function
      C.   Expected value (mean)
      D.   Variance and standard deviation
      E.   Binomial random variable

V.   Continuous Random Variables
      A.   Probability density function
      B.   Cumulative distribution function
      C.   Integral definition of expected value
      D.   Integral definition of variance and standard deviation
      E.   Uniform random variable
      F.   Exponential random variable
      G.   Normal random variable
          1.   Standard normal
          2.   Standardizing normal random variables
          3.   Using inverse normal to simulate normal random samples

VI. Computer skills
      A.   Graphing functions, including piecewise
      B.   Simulating normal random samples
      C.   Creating trend lines
      D.   Numerically solving equations (e.g., *Excel's* solver function)
      E.   Constructing *pdf* histogram from a random sample

VII. Class Presentations
      A.   Students will be required to present mathematics to the instructor and classmates
      B.   Students will use software to create slide presentations of their mathematical results

VIII. Written Reports
      A.   Students will be required to write a mathematical report for their project
      B.   Mathematical ideas will be presented in written, graphic, and numeric format

DISCLAIMER: This syllabus is designed to evolve and change throughout the semester based on class progress and interests. You will be notified of any changes as they occur.

#	Day	Date	Sections	Hw Due	Test
1	Tuesday	1/17/2017	1.1		
2	Thursday	1/19/2017	1.2	1.1	
3	Tuesday	1/24/2017	1.3	1.2	
4	Thursday	1/26/2017	1.4	1.3	
5	Tuesday	1/31/2017	1.5	1.4	
6	Thursday	2/2/2017	1.6	1.5	
7	Tuesday	2/7/2017	Review Chap 1	1.6	
T1			1.1 - 1.6	Quiz 1	Chap 1
8	Thursday	2/9/2017	2.1		
9	Tuesday	2/14/2017	2.2	2.1	
10	Thursday	2/16/2017	2.3	2.2	
11	Tuesday	2/21/2017	2.4	2.3	
12	Thursday	2/23/2017	2.5	2.4	
13	Tuesday	2/28/2017	Review Chap 2	2.5	
T2			2.1 - 2.5	Quiz 2	Chap 2
14	Thursday	3/2/2017	3.1		
15	Tuesday	3/7/2017	3.2	3.1	
16	Thursday	3/9/2017	3.3	3.2	
NC	Tuesday	3/14/2017	Spring Break		
NC	Thursday	3/16/2017	Spring Break		
17	Tuesday	3/21/2017	3.4	3.3	
18	Thursday	3/23/2017	3.5	3.4	
19	Tuesday	3/28/2017	3.7	3.5	
20	Thursday	3/30/2017	Review Chap 3	3.7	
T3			3.1 - 3.7	Quiz 3	Chap 3
21	Tuesday	4/4/2017	4.1		
21	Thursday	4/6/2017	4.3	4.1	
22	Tuesday	4/11/2017	4.4	4.3	
23	Thursday	4/13/2017	4.7	4.4	
24	Tuesday	4/18/2017	Review Chap 4	4.7	
T4			4.1 - 4.7	Quiz 4	Chap 4
25	Thursday	4/20/2017	5.1		
26	Tuesday	4/25/2017	5.2	5.1	
27	Thursday	4/27/2017	5.4	5.2	
28	Tuesday	5/2/2017	Review Chap 5	5.4	
T5			5.1 - 5.4	Quiz 5	Chap 5
29	Thursday	5/4/2017	Review Final		
30	Tuesday	5/9/2017	Review Final		
FE	Thursday	5/11/2017	1.1 - 5.4		Final Exam

Homework

Hw #	Quiz	Chapter	Section	Page	Numbers	Score
Hw 1		1	1.1 - 1.6	58	1-63 Odd #	
	Q 1	1	Chapter 1 Form A		ALL	
Test 1		1	Chapter 1 Form B			
Hw 2		2	2.1 - 2.5	111	1-85 Odd #	
	Q 2	2	Chapter 2 Form A		ALL	
Test 2		2	Chapter 2 Form B			
Hw 3		3	3.1 - 3.8	197	1- 160 EOO #	
	Q 3	3	Chapter 3 Form A	253	ALL	
Test 3		3	Chapter 3 Form B			
Hw 4		4	4.1 - 4.8	278	1-114 EOO #	
	Q 4	4	Chapter 4 Form A		ALL	
Test 4		4	Chapter 4 Form B			
Final Exam		1 to 5				

Acknowledgment of Receipt of Syllabus

Date: _____

Please read, sign and return the following acknowledgment to me in class, *or* return to me at the following address:

Jorge Guarin
Tohono O'odham Community College
P.O. Box 3129
Sells, AZ 85634

☐ I have received my MAT 220 syllabus (including course objectives, policies, requirements and schedule) and have read and understood all the enclosed materials

☐ I have no objection to receiving an occasional call from the instructor at the number given with my registration materials.

☐ I prefer that the instructor not call or contact me by phone anytime during the semester.

My reason(s) for taking this course:
_____
_____
_____

My background in this area includes:
_____
_____
_____

☐ I would like to be contacted by the instructor regarding the following concerns:
_____
_____
_____
_____

_____   _____
Print Name Clearly Here   Sign Name Here

_____   _____
Student ID Number   Telephone Number

_____   _____
Current Mailing Address/City/State/Zip   E-mail Address