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## Syllabus: *Math 220 Calculus I*

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### Course Information

Course Prefix/Number: Math 220	Credit Hours: 5
Semester: Spring 2019	Course Title: Calculus I
Class Days/Times: Tuesday - Thursday 11:30 AM – 1:45 PM	Room: GSK 3

<b>Instructor Information:</b> Name: Jorge Guarin	Phone/Voice Mail: (520) 383-0101 E-mail: <a href="mailto:jguarin@tocc.edu">jguarin@tocc.edu</a> Office location: Education Building, Room 104. Office hours: Tuesday & Thursday 9 AM to 11:30 AM
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### 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 derivatives 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 its 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.

#### **Himdag Cultural Component:**

Mathematics faculty's interpretation of what Nahban said in the "Desert Smells Like Rain" is this: While the Himdag discourages direct, exact answers, in the mathematical world, my students are expected to be able to come up with a precise answer for the situation. As a community college closely associated with the Tohono O'odham Nation, TOCC encourages growth of students' cultural knowledge and my class takes steps to transmit learning mathematics in a way that respects the Tohono O'odham Himdag.

**Texts and Materials:** An iPad is required for this class. **Checking out and returning an iPad from the Library is a requirement to obtain a grade in this class.**

**Required Text:** Calculus. Publisher: EDUCO and it is available on the EDUCO site. To enter to this site, students need to get the **ACCESS CODE** from the library.

**APPS:** The "Free GraCalc 2" and "My script calc" apps can be downloaded from the Apple store..

#### **Evaluation and Grading & Assignments:**

##### **Attendance:**

The attendance policy for this class is simple and it gives you 10% of your grade. "You are expected to arrive to class on time and be prepared to participate in each class period. Four unexcused absences may result in withdrawal and a "W" or "Y" will be recorded. You may Request to be excused from class for religious Observances and practices, for illness, for school or work-related Travel or for personal or family emergency. If you will be absent or have been absent, please notify the instructor as soon as possible (approved by Faculty Senate April 2014).

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, email your instructor using the information given on the first page. After receiving the email, the instructor will decide whether or not can give you an excused absence.

**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:**

Homework by Sections, Chapter Tests. Practice Chapter Tests, Practice Final Exam and Final Exam have been posted on the EDUCO site: [www.educosoft.com](http://www.educosoft.com). All materials submitted will be graded and they scores returned immediately after they are submitted. Students can take up to 3 times any homework, Test or Final Exam. Higher score will be recorded. Datelines for every assignment is on the site. Once the assignment expires, it is removed and you can not continue taking it.

**Homework Policy:**

Homework has been assigned and it is posted on the EDUCO site: Each one comes with its own dateline. You must submit the homework before its dateline.

**Withdrawals:**

Please be sure to withdraw yourself by **March 29, 2019** 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 6 hours spent outside of class weekly for 16 weeks.

**Grading System/Policies:**

Your final grade will be calculated as follows:			Grading Scale	
Attendance	100 points	10%	A =	1000 - 900 points
Homework assignments	300 points	30%	B =	899 - 800 points
Chapter Tests	300 points	30%	C =	799 - 700 points
Tutorial Time	200 points	20%	D =	699 – 600 points
<u>Final Exam</u>	<u>100 points</u>	<u>10%</u>	F =	less than 600 points
Total possible	1,000 points	100%		

**Incomplete (I) grade:**

To receive an “ I “ grade, you must have finished at least 3/4 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. Incomplete Grades that are not corrected by the end of the ninth week of the following semester will automatically change 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. At any time, at the EDUCO site, [educosoft.com](http://educosoft.com) you are able to see your grade.

**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

**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	1/15/2019	Class Overview		
2	Thursday	1/17/2019	1.1 - 1.2		
3	Tuesday	1/22/2019	1.2 - 1.3		
4	Thursday	1/24/2019	1.3 - 1.4	1.1 - 1.2	
5	Tuesday	1/29/2019	1.4 - 1.5		
6	Thursday	1/31/2019	1.5 - 1.6	1.3 - 1.4	
7	Tuesday	2/5/2019	1.6 - Review Test 1	1.5 - 1.6	
<b>T1</b>			<b>Ch 1: 1.1 - 1.6</b>		<b>Ch 1</b>
8	Thursday	2/7/2019	2.1 - 2.2		
9	Tuesday	2/12/2019	2.2 - 2.3		
10	Thursday	2/14/2019	2.3 - 2.4	2.1 - 2.2	
11	Tuesday	2/19/2019	2.4 - 2.5		
12	Thursday	2/21/2019	2.5 - 2.6	2.3 - 2.4	
13	Tuesday	2/26/2019	Review Test 2	2.5 - 2.6	
<b>T2</b>			<b>Ch 2: 2.1 - 2.6</b>		<b>Ch 2</b>
14	Thursday	2/28/2019	3.1 - 3.2		
15	Tuesday	3/5/2019	3.2 - 3.3		
16	Thursday	3/7/2019	3.3 - 3.4	3.1 - 3.2	
<b>NC</b>	<b>Tuesday</b>	<b>3/12/2019</b>	<b>Spring Break - No Class</b>		
<b>NC</b>	<b>Thursday</b>	<b>3/14/2019</b>	<b>Spring Break - No Class</b>		
17	Tuesday	3/19/2019	3.4 - 3.5		
18	Thursday	3/21/2019	3.5 - 3.6	3.3 - 3.4	
19	Tuesday	3/26/2019	3.7 - Review Test 3	3.5 - 3.7	
<b>T3</b>			<b>Ch 3: 3.1 - 3.7</b>		<b>Chap 3</b>
20	Thursday	3/28/2019	4.1 - 4.2		
21	Tuesday	4/2/2019	4.2 - 4.3		
22	Thursday	4/4/2019	4.3 - 4.4	4.1 - 4.2	
23	Tuesday	4/9/2019	4.4 - 4.5		
24	Thursday	4/11/2019	4.5 - 4.6	4.3 - 4.4	
25	Tuesday	4/16/2019	4.6 - 4.7		
26	Thursday	4/18/2019	4.7 - 4.8	4.5 - 4.6	
27	Tuesday	4/23/2019	4.8 - 4.9		
28	Thursday	4/25/2019	4.9 - Review Test 4	4.7 - 4.9	
<b>T4</b>			<b>Ch 4: 4.1 - 4.9</b>		<b>Chap 4</b>
28	Thursday	4/30/2019	5.1 - 5.7		
29	Tuesday	5/2/2019	Review Final Exam		
30	Thursday	5/7/2019	Review Final Exam		
<b>FE</b>	<b>Wednesday</b>	<b>5/9/2019</b>	<b>1.1 - 4.9</b>		<b>Final Exam</b>

## Acknowledgment of Receipt of Syllabus

Date: January 15, 2019

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:

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My background in this area includes:

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

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Print Name Clearly Here

Sign Name Here

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Student ID Number

Telephone Number

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Current Mailing Address/City/State/Zip

E-mail Address