**Course Syllabus**
**SEMESTER**
**School of Science, Technology, Engineering and Mathematics**

**Course Name:** **Business Calculus**

**Course Number:** MTH 178-XXX

**Credits:** 5 Hours/Web

**Professor's Name:**

**Office Location:**

**Campus Phone:**

**Campus E-mail:**

**Catalog Description:** This course is an introduction to the study of differential and integral calculus of algebraic, logarithmic, and exponential functions of one variable. Topics covered include graphical, numerical and algebraic determination of derivatives and integrals, applications of the derivative including minima and maxima, and integration and its applications. Specific applications related to the field of business and other disciplines are included throughout the course.

**Testing**: **When you review the syllabus, please note the test windows. Please make sure that you are able to take the tests during those test windows throughout the semester.**

**Prerequisites/Co-Requisites**: "C" or better in MTH 170 College Algebra or MTH 170P College Algebra Plus or placement

**Current Textbooks, Materials, Equipment (software/hardware requirements):**
**1)** ***Calculus with Applications*****, Brief** ***Version***, 12/e. Margaret Lial, Raymond Greenwell, and Nathan Richey, Pearson Education, Inc., 2022. The Texas Instrument TI-83 or TI-84 series graphing calculator is required.

**2) Calculator:** Many chapters of the text contain exercises that explore numerical patterns and/or graphing calculator exercises that ask students to generate and interpret graphs as a tool to understanding mathematical and real world relationships. Each student

is expected to have a scientific calculator. The Texas Instruments (TI-83 series or) TI-84 series graphing calculator is the official calculator for the course.

**3) A reliable Computer (This course is offered on http://www.pearsonmylabandmastering.com )** that meets the following system requirements for operating systems, connection speed, and browser versions:

https://www.pearsonmylabandmastering.com/northamerica/?cc

**Pearson Support:** Students will need to go to

**https://support.pearson.com/getsupport/s/contactsupport**

and fill out the requested information. After submission the user will be given a case number and directed to the customer support phone number that can best address the reported issue.

**General Information**
For information on FERPA, Cheating and Plagiarism, Assessment of Student Learning Outcomes and Student Code of Conduct, please refer to the appropriate section of the current Owens Community College Catalog online.

**Course Outcomes:**
The purpose of Business Calculus is to provide the student with the essential concepts of differential and integral calculus so that the student can apply these concepts to the solution of various applied problems inherent in the field of business.
Students will be exposed to appropriate technology in order to promote understanding to support problem solving.

**Student Learning Outcomes:**
The successful Business Calculus student should be able to apply the following competencies to a wide range of functions, including piecewise, polynomial, rational, algebraic, exponential and logarithmic.

Upon the completion of this course the successful Business Calculus student should be able to:

**1. Demonstrate an understanding of limits and continuity.**
* Determine limits analytically, numerically and graphically including one-sided limits and limits at infinity.
* Analyze the limit behavior of a function at a point in its domain to determine if the function is continuous at that point. Determine intervals in which a function is continuous.
* Analyze and classify the discontinuities of a function.

**2. Demonstrate an understanding of derivatives and the ability to compute derivatives.**
* Use the limit definition of the derivative to determine the existence and to find the

derivative of a given function.
* Find the derivative of a function by identifying and applying the appropriate derivative formula.
* Find higher order derivatives.

**3. Understand the interpretation of derivatives and their applications in a business environment.**
* Interpret the derivative as a rate of change.
* Find the slope of the tangent line to the graph of a function at a given point.
* Use the first derivative to determine intervals on which the graph of a function is increasing or decreasing and to determine critical points of the function.
* Use the second derivative to determine intervals on which the graph of a function is concave upwards or concave downwards and to determine points of inflection.
* Find and classify relative extrema and, on a closed interval, absolute extrema of a function.
* Solve applied problems including marginal analysis applications.
* Explain the relationship between marginal cost and average cost.
* Determine and discuss the elasticity of demand for a product.

**4. Understand the concept of integration and demonstrate ability to find indefinite and definite integrals apply those results to the business setting.**
* Construct antiderivatives analytically.
* Find indefinite integrals using integration formulas and the method of substitution.
* Find indefinite integrals using integration by parts.
* Identify definite integrals of functions as the areas of regions between the graph of the function and the x-axis.
* Understand and use the Fundamental Theorem of Calculus to evaluate definite integrals.
* Use definite integrals to calculate the area of the region under a curve and the area of the region between two curves.
* Determine present value and future value for an investment with interest compounded continuously.
* Determine the average value of a function on an interval.
* For given supply and demand functions find and interpret the consumer's surplus and the producer's surplus.

**5. Demonstrate an understanding of functions of two variables (Time permitting)**
*Find the domain and compute the partial derivatives for functions of two variables.
*Determine critical points for functions of two variables.
*Use the Second Derivative Test to determine the nature of critical points of a function of two variables.

**Grading Procedure:** (i.e., include the way in which the grade is calculated)
Each student's grade will be based on 7 (seven) tests collectively having a grand total of 1000 points. The seventh test is a comprehensive final. NO PARTIAL CREDIT WILL BE GIVEN. Each test must be taken during the "window of time" specified in the tentative schedule shown below. Three consecutive hours will be allowed for each test. Once a student starts taking a test the computer clock starts ticking and cannot be stopped.

It is very important for each student to carefully plan when to start a test and thus be aware of the time to finish (three hours later). The questions of each test will be presented one at a time and an answer for each question must be submitted before the next question can be viewed. Once a question is answered there is no way to go back and change the answer --- thus it is very important to spend sufficient time on each question to decide on an answer. But of course each student needs to plan the time per question so as to finish the test in the allotted four hours.
Each student's grade will be determined according to the following scheme:

**Out of the 1000 possible points to earn the grade of A, a student must achieve a total of 900 points or more; to earn the grade of B a student must achieve a total of 800 points or more but less than 900 points; to earn the grade of C a student must achieve a total of 700 points or more but less than 800 points; to earn the grade of D a student must achieve a total of 600 points or more but less than 700 points; to earn the grade of F a student must achieve a total of less than 600 points. The final exam (test 7) is worth 400 points. The first six tests are each worth 100 points**.

**Homework does not count any points toward your course total. Sample tests and quizzes do not count any points toward your course total.**

The tests are closed book & closed notes (no outside help or assistance on the tests)!

**Each test MAY BE TAKEN ONLY ONCE and must be taken during the "window of time" specified in the tentative schedule shown below. Three consecutive hours will be allowed for each test. Once a student starts taking a test the computer clock starts ticking and cannot be stopped. It is very important for each student to carefully plan when to start a test and thus be aware of the time to finish (three hours later). The questions of each test will be presented one at a time. If you do not know how to answer a question, move to the next question but DO NOT forget to return and do the one(s) you skipped. Each student needs to plan the time per question so as to finish the test in the allotted three hours. Every test has both a date and time that it is due. Any test turned in after the listed due date will not be accepted. Exceeding the allowed time limit is considered late. Late tests will not be graded. The tests are closed book & closed notes (no outside help or assistance on the tests)!**

**Make-up Test Policy : There will be NO make-up tests allowed for any reasons. Exceeding the allowed time limit is considered late**. Late tests will not be graded. There will be no make-up exams. A grade of zero will be given for a missed exam. The tests are closed book & closed notes (no outside help or assistance on the tests)! **Please note that the window to take a test will be open for 41 hours (please see the calendar at the end of this syllabus). Please try to take the test during the first 36 hours and DO NOT wait to the last hour to take the test. There will be no make-up tests allowed and extensions to finish the tests will not be allowed.**

**Specific Course Rules:**

1. **Make-up exam/test policy:** There will be no make-tests allowed for any reasons. **The final exam is mandatory. Failure to take the final exam will result in an "F" for the entire course.**
2. **Class Participation:** It is welcomed and encouraged.

**CONTACTING THE PROFESSOR:**
E-mail me at EMAIL.

**Any e-mail correspondence with me MUST be done using your OZONE e-mail of Owens Community College --- I will not read any other e-mail (and in fact will delete it). This is a policy of OCC which is strictly enforced.**

**Make sure that in the subject header/line of the email you ALWAYS state MTH 178 student.**

**All of our correspondence and contact throughout the course will be done virtually through email (using your OZONE e-mail of Owens Community College). This is a web course hence our meetings will be virtual (i.e. online --- we will not be meeting face to face).**

## Tentative Schedule for MTH-178 (SEMESTER)

| Dates | Directions and Information |
|---|---|
| DATE | **Get registered into Pearson/MyMathLab and perform the tasks indicated therein --- as indicated in the e-mails you received.** |
| | **Study chapter 3 (sections 3.1 to 3.5) of the text. Complete the homework assignment relative to chapter 3 (found in the HOMEWORK ) by TIME.**<br>**Complete Test 1 by DATE at TIME --- the time window for this test is from DATE at TIME and you have TIME hours to do this test.**<br>The test must be completed and submitted by DATE at TIME. |
| DATE | **Study chapter 4 (sections 4.1 to 4.5) of the text. Complete the homework assignment relative to chapter 4 (found in the HOMEWORK ) by DATE at TIME.**<br>**Complete Test 2 by DATE at TIME --- the time window for this test is from DATE at TIME and you have TIME hours to do this test.**<br>The test must be completed and submitted by DATE at TIME. |

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|---|---|
| | **Study chapter 5 (sections 5.1 to 5.4) of the text. Complete the homework assignment relative to chapters 5 (found in the HOMEWORK ) by DATE at TIME. Complete Test 3 by DATE at TIME --- the time window for this test is from DATE at TIME and you have TIME hours to do this test.**<br>The test must be completed and submitted by DATE at TIME. |
| | **Study chapter 6 (sections 6.1 to 6.6) of the text. Complete the homework assignment relative to chapter 6 (found in the HOMEWORK ) by DATE at TIME. Complete Test 4 by DATE at TIME --- the time window for this test is from DATE at TIME and you have TIME hours to do this test.**<br>The test must be completed and submitted by DATE at TIME. |
| | **Study chapter 7 (sections 7.1 to 7.6) of the text. Complete the homework assignment relative to chapter 7 (found in the HOMEWORK ) by DATE at TIME. Complete Test 5 by DATE at TIME --- the time window for this test is from DATE at TIME and you have TIME hours to do this test.**<br>The test must be completed and submitted by DATE at TIME. |
| | **Study chapter 8 (sections 8.1 to 8.4) of the text . Complete the homework assignment relative to chapter 8 found in the HOMEWORK ) by DATE at TIME. Complete Test 6 by DATE at TIME --- the time window for this test is from DATE at TIME and you have TIME hours to do this test.**<br>The test must be completed and submitted by DATE at TIME. |
| | **Study chapter 9 (sections 9.1 to 9.3) of the text. Complete the homework assignment relative to Chapter 9 (found in the HOMEWORK ) by DATE at TIME. Complete Test 4 by DATE at TIME --- the time window for this test is from DATE at TIME and you have TIME hours to do this test.**<br>The test must be completed and submitted by DATE at TIME. |

**Disclaimer**: "The instructor reserves the right to amend this syllabus as deemed necessary and will communicate such amendment to the students in the course."

Reminder...
Each test must be taken during the "window of time" specified in the tentative schedule shown below. NO PARTIAL CREDIT WILL BE GIVEN. Once a student starts taking a test the computer clock starts ticking and cannot be stopped. Tests will not be handed back. Each Test must be taken in one sitting (Forced Completion). You are allowed 3 hours to take each Test, only once, no retakes. Plan your schedule carefully and make sure that your computer is reliable. The tests are closed book & closed notes (no outside help or assistance on the tests)!

If you get locked out, you should be sure to e-mail me (using your Ozone e-mail) stating the trouble you experienced. I will then reply with my decision concerning the matter --- most likely you will not be allowed to repeat the test and I will determine your score for the test based on whatever you managed to do.

You are allowed a total of TIME (TIME) hours to take each test. Beyond this time, the test window will either close (causing a lockout) or your test will not be automatically

graded. In either case you should be sure to e-mail me (using your Ozone e-mail) stating what you experienced. I will then reply with my decision. Late tests will not be graded. Exceeding the allowed time limit is considered late. A grade of zero will be given for any late test.

Do not wait until the last minute to take a test. Give allowances for power outage, computer lockouts, and other computer or unforeseen problems.

A final note about systems being down: in order to take an online course, you need a good, working computer system and a stable internet connection. If your computer routinely crashes or if your connection has serious problems, you will want to find alternate ways to access the course and complete your work. Routine and persistent problems with technology (that are not the fault of OCC's server) will not be considered valid excuses for late work.

## GENERAL COLLEGE INFORMATION

**Classroom Admittance**
Owens Community College (OCC) classes (e.g. traditional, land-based, laboratory, hybrid, asynchronous online, synchronous online, etc.) shall only be attended by officially registered OCC students, instructor of record, guest lecturer or substitute instructor. Visitors are not permitted in the classroom and should not attend or participate in an online class session. See FERPA information at http://www2.ed.gov/policy/gen/guid/fpco/ferpa/index.html

**Counseling Services**
Counseling services are available at no charge to Owens CC students providing assistance with personal, educational, interpersonal, family, social, or psychological difficulties. If you feel you may benefit from this service, contact Counseling Services at 567.661.7168 or https://www.owens.edu/counseling/students/

**Tutoring and Academic Assistance**
Information on tutoring services, writing center and academic success centers is available at https://www.owens.edu/successcenters/

**Safety**
If you have concerns about your safety or the safety of others, contact the Department of Public Safety at 567-661-7575 or https://www.owens.edu/dps/

**STUDENT MENTAL HEALTH SERVICES**
Student Mental Health Services are available at no charge for Owens' students to provide assistance with personal, educational, interpersonal, family, social, or psychological difficulties. If you feel you may benefit from this service, please contact Student Services. If you have concerns about your safety or the safety of others, contact the Department of Public Safety immediately at 567.661.7575.

**Disability Services:** If you have a disability or acquire one, you may be entitled to receive individualized services and/or accommodations intended to assure you an equal opportunity to participate in and benefit from the program. To receive more information or to apply for services, please contact the Office of Disability Services in College Hall 116 at 567-661-7007 or email disability@owens.edu.

**Assessment:** Please refer to page the College Catalog for the college statement on the Assessment of Student Learning.

**Student Code of Conduct:** All students are expected to follow Owens Community College's Student Code of Conduct. If you are unfamiliar with the code, it can be found at https://www.owens.edu/student_services/code_conduct.html

**Anti-Discrimination and Harassment & Title IX/Sexual Misconduct:**
All students, faculty, and staff are expected to follow Owens Community College's Anti-Discrimination and Harassment Policy and the College's Title IX/Sexual Misconduct Procedures and Guidelines. The College strictly prohibits and will not tolerate harassment, discrimination, intimidation, or hostile/offensive working or learning environments.
If you are unfamiliar with the Anti-Discrimination and Harassment Policy, it can be found at: https://www.owens.edu/trustees/procedures/proc3358-11-4-17.pdf
If you are unfamiliar with the Title IX/Sexual Misconduct Procedures and Guidelines, it can be found at: https://www.owens.edu/trustees/procedures/proc3358-11-4-17-titleIX.pdf

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All students are expected to follow Owens Community College's Student Code of Conduct. If you are unfamiliar with the code, review at https://www.owens.edu/student_services/code_conduct.html

- Any student suspected of cheating or plagiarism will be dealt with in accordance with the standards set forth in the College Catalog.
- For information on FERPA and Assessment of Student Learning Outcomes, please refer to the appropriate section of the current Owens Community College Catalog online.
- All student athletes will be treated the same as all other students as per policies in the course syllabus and college's student handbook.

**Miscellaneous Information:**

Owens Community College does not automatically withdraw students when they stop attending class, nor does the College permit instructors to withdraw students who stop attending class. To avoid earning an F, the student who needs to stop attending a class should complete the necessary paperwork at the Records Office to officially drop the class from his/her schedule by the "Last Day to Drop" deadline, which is published in the schedule book. Students who stop attending a class but do not officially drop the class will earn an F.

**SUPPORT SERVICES**

**Math Tutoring Center—Remote and Face-to-Face Tutoring Available.** The Math Tutoring Center is available to help students deal with any issues involving math, computers, and general study skills. Visit https://www.owens.edu/successcenters/index.html for hours and additional information.

**Inclement Weather Policy:**
In the event that the College closes due to inclement weather, all on-campus, hybrid, and synchronous mathematics classes will be cancelled. Asynchronous classes will not be affected. If the decision is made to close the College, a public announcement will be communicated via local television, social media, and Owens Alert. Students will not receive individual class cancellation notices.
If the College is open, all on-campus, hybrid, and synchronous classes will meet as regularly scheduled.
For addition information about the communication of closings or to learn about Owens Alert, visit https://www.owens.edu/news/weather.html

**Religious Accommodations:** A student seeking an accommodation for an absence permitted under Ohio's Testing Your Faith Act must provide the instructor with a **written email** notice with the specific dates for an absence, and must do so not later than fourteen (14) days after the first day of instruction. **Alternative accommodations are not retroactive, and no academic penalty will be imposed for an absence under the policy*.** The request for an alternative accommodation will be kept confidential. Students with questions about a religious accommodation under Ohio's Testing your Faith Act may contact the College's Office of Academic Affairs: provost@owens.edu

*The policy may be found on the Owens website: 3358:11-2-63 Accommodation for a Student Absence for the Observance of Religious Beliefs and Practices Policy

*The instructor reserves the right to amend this syllabus as necessary and will communicate amendments to students in the course.*