**1. COURSE TITLE\*:** **Calculus for Business, Social and Life Sciences**

**2. CATALOG – PREFIX/COURSE NUMBER/COURSE SECTION\*: MATH 2241**

**3. PREREQUISITE\*:** One of the following:

* 4 years of College Preparatory Math
* Math 1141 or Math 141

**COREQUISITE(S)\*: None**

**4. COURSE TIME/LOCATION/MODALITY: (*Course Syllabus – Individual Instructor Specific*)**

**5. CREDIT HOURS\*:** 5 **LECTURE HOURS\*:** 5

**LABORATORY HOURS\*:** 0 **OBSERVATION HOURS\*:** 0

**6. FACULTY CONTACT INFORMATION: *(Course Syllabus – Individual Instructor Specific)***

**7. COURSE DESCRIPTION\*:**

This course is designed for business majors or other majors who will need a calculus-based applications course. Topics will include limits, rates of change, optimization and other applications involving derivatives, exponential and logarithmic functions, and applications of integrals. Credit will not be awarded for both Math 2221 and Math 2241.

**8. LEARNING OUTCOMES\*:**

At the completion of this course the student will be able to:

1. Demonstrate an understanding of limits and continuity. (TMM013 – Outcome 1)
2. Demonstrate an understanding of derivatives and the ability to compute derivatives. (TMM013 – Outcome 2)
3. Understand the interpretation of derivatives and their applications in a business environment. (TMM013 – Outcome 3)
4. Understand the concept of integration and demonstrate ability to find indefinite and definite integrals and apply those results to the business setting.
5. (TMM013 – Outcome 4)
6. Demonstrate an understanding of functions of two variables. (TMM013 – Outcome 5

**9.       ADOPTED TEXT(S)\*:**

*Calculus for Business, Economics, Life Sciences and Social* *Sciences*

14th Edition, 2019

Barnett, Ziegler and Byleen, Stocker

Pearson.

ISBN: 9780134851990

**9a: SUPPLEMENTAL TEXTS APPROVED BY FULL TIME DEPARTMENTAL FACULTY (INSTRUCTOR MUST NOTIFY THE BOOKSTORE BEFORE THE TEXTBOOK ORDERING DEADLINE DATE PRIOR TO ADOPTION) \*\*\*.**

**10. OTHER REQUIRED MATERIALS: (SEE APPENDIX C FOR TECHNOLOGY REQUEST FORM.)\*\***

A scientific calculator is required; a graphing calculator is strongly recommended. Symbolic manipulator calculators (e.g., TI–89 or TI-Nspire) are prohibited on tests.

**11. GRADING SCALE\*\*\*:**

Grading will follow the policy in the catalog. The scale is as follows:

A: 90 – 100

B: 80 – 89

C: 70 – 79

D: 60 – 69

F: 0 – 59

**12. GRADING PROCEDURES OR ASSESSMENTS: (*Course Syllabus – Individual Instructor Specific)***

|  |
| --- |
| *Example 1 - By Percent* |
| Homework 10%  Quizzes/Tests 90%  Total 100% |

|  |  |  |
| --- | --- | --- |
| *Example 2* | | |
| *Category* | *By Total Points* | *% of Grade* |
| Homework (20x10) | 200 | 10% |
| Quizzes/Tests  (5x360) | 1800 | 90% |
| Total | 2000 | 100% |

|  |  |  |
| --- | --- | --- |
| *Example 3* | | |
| *Category* | *By Total Points* | *% of Grade* |
| Online Quizzes | 400 | 100% |
| Online Tests  (6x100) | 600 | 15% |
| Notebook  (2x500) | 1000 | 25% |
| Midterm | 1000 | 25% |
| Final | 1000 | 25% |
| Total | 4000 | 100% |

**13. COURSE METHODOLOGY: *(Course Syllabus – Individual Instructor Specific)***

The course design provides instruction and materials to support the course objectives.  Classes may consist of a variety of means to accomplish this including but not limiting to: lectures, class discussions, small group projects, supplemental materials, and outside assignments.  Practice is an important part of the learning process.  For every one hour of class time, two additional hours of study time should be expected.

**14. COURSE OUTLINE: *(Course Syllabus – Individual Instructor Specific)***

**Chapter 1 - Functions and Graphs**

1.1 Functions (Review as needed.)

1.2 Elementary Functions: Graphs and Transformations (Review as needed.)

1.3 Linear and Quadratic Functions (Review as needed.)

1.4 Polynomial and Rational Functions (Review as needed.)

1.5 Exponential Functions (Review as needed.)

1.6 Logarithmic Functions (Review as needed.)

**Chapter 2 - Limits and the Derivative**

2.1 Introduction to Limits (TMM013 Standard 1.01)

2.2 Infinite Limits and Limits at Infinity (TMM013 Standard 1.01)

2.3 Continuity (TMM013 Standard 1.02)

2.4 The Derivative (TMM013 Standard 2.01)

2.5 Basic Differentiation Properties (TMM013 Standard 2.02)

2.6 Differentials (Optional)

2.7 Marginal Analysis in Business and Economics

(TMM013 Standards 3.06 and 3.07)

**Chapter 3 - Additional Derivative Topics**

3.1 The Constant *e* and Continuous Compound Interest (TMM013 Standard 4.08)

3.2 Derivatives of Exponential and Logarithmic Functions (TMM013 Standard 2.02)

3.3 Derivatives of Products and Quotients

(TMM013 Standards 2.02 and 2.03)

3.4 The Chain Rule

(TMM013 Standards 2.02 and 2.03)

3.5 Implicit Differentiation (TMM013 Standard 2.02)

* 1. Related Rates (TMM013 Standard 3.06)
  2. Elasticity of Demand (TMM013 Standard 3.08)

**Chapter 4 - Graphing and Optimization**

4.1 First Derivative and Graphs

(TMM013 Standards 3.01, 3.02 and 3.03)

4.2 Second Derivative and Graphs (TMM013 Standard 3.04)

4.3 L'Hopital's Rule (Optional)

4.4 Curve Sketching Techniques

(TMM013 Standards 3.03 and 3.04)

* 1. Absolute Maxima and Minima (TMM013 Standard 3.05)
  2. Optimization

(TMM013 Standards 3.06 and 3.07)

**Chapter 5 - Integration**

5.1 Antiderivatives and Indefinite Integrals (TMM013 Standard 4.01)

5.2 Integration by Substitution (TMM013 Standard 4.02)

5.3 Differential Equations; Growth and Decay (TMM013 Standard 4.08)

* 1. The Definite Integral (TMM013 Standard 4.04)
  2. The Fundamental Theorem of Calculus (TMM013 Standard 4.06)

**Chapter 6 - Additional Integration Topics**

6.1 Area Between Curves (TMM013 Standard 4.07)

6.2 Applications in Business and Economics

(TMM013 Standards 4.08, 4.09 and 4.10)

6.3 Integration by Parts (Optional) (TMM013 Standard 4.03) 6.4 Integration Using Tables (Optional)

**Chapter 7 - Multivariable Calculus**

7.1 Functions of Several Variables (Optional) (TMM013 Standard 5.01)

7.2 Partial Derivatives (Optional) (TMM013 Standard 5.03)

7.3 Maxima and Minima (Optional)

(TMM013 Standard 5.04, 5.05)

7.4 Maxima and Minima Using Lagrange Multipliers (Optional)

(TMM013 Standard 5.06)

7.5 Method of Least Squares (Optional)

7.6 Double Integrals Over Rectangular Regions (Optional)

7.7 Double Integrals Over More General Regions (Optional)

**15. SPECIFIC MANAGEMENT REQUIREMENTS\*\*\*:**

Suggested pace for the course, by section numbers:

Week 1: 3.1

Week 2: 3.2, 3.3

Week 3: 3.4, 3.5

Week 4: 3.6, 3.7

Week 5: 4.1, 4.2

Week 6: 4.3

Week 7: 4.4

Week 8: 4.5, 4.6

Week 9: 5.1, 5.2

Week 10: 5.3, 5.4

Week 11: 5.5, 5.6

Week 12: 6.1

Week 13: 6.2

Week 14: 6.3, 6.4, 6.5

Week 15: 7.1, 7.2

Week 16: Finals

**16. FERPA:\***

Students need to understand that your work may be seen by others. Others may see your work when being distributed, during group project work, or if it is chosen for demonstration purposes. Students also need to know that there is a strong possibility that your work may be submitted to other entities for the purpose of plagiarism checks.

**17. DISABILITIES:\***

Students with disabilities may contact the Disability Services Office, Central Campus, at 800-628-7722 or 937-393-3431.

**18. OTHER INFORMATION\*\*\*:**

**SYLLABUS TEMPLATE KEY**

**\*** Item cannot be altered from that which is included in the master syllabus approved by the Curriculum Committee.

**\*\*** Any alteration or addition must be approved by the Curriculum Committee

\*\*\*Item should begin with language as approved in the master syllabus but may be added to at the discretion of the faculty member.