



# BROWARD COLLEGE COURSE OUTLINE

**LAST REVIEW:** 2010 – 2011

*(i.e. 2006-2007)*

**NEXT REVIEW:** 2015 – 2016

*(i.e. 2011-2012)*

**STATUS:** A

*(A, I, D)*

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

**COMMON COURSE NUMBER:** MAC 2233

**CREDIT HOURS:** 3

**CONTACT HOUR BREAKDOWN**

*(Per 16 week term)*

**CLOCK HOURS:**

*(Voc. Course ONLY)*

Lecture: **48**

Lab:

Clinic:

Other:

**PREREQUISITE(S):** MAC 1105

**COREQUISITE(S):** None

**PRE/COREQUISITE(S):** None

**COURSE DESCRIPTION** *(750 characters, maximum):*

This is a general education course which includes the college-level skills of calculus including functions, graphs, limits, differentiation, integration, average and instantaneous rates of change, and other applications. Meets Area 5A of the general education requirements for the A.A. degree. Meets Areas 4 or 5 of the general education requirements for the A.S. degree. Recommendation of the Mathematic Department or at least a grade of “C” in the prerequisite course is required.

General Education Requirements – Associate of Arts Degree (AA), meets Area(s): Area 5

General Education Requirements – Associate in Science Degree (AS), meets Area(s): Area 4

General Education Requirements – Associate in Applied Science Degree (AAS), meets Area(s): Area 4

## UNIT TITLES

**1. Functions, Graphs, Limits**

**2. Derivatives**

**3. Integration**

**4. Exponential and Logarithmic Functions**

\*\*\* Complete the following only if course is seeking general education status \*\*\*

**GENERAL EDUCATION Competencies and Skills \*:**

In the box to the right of the Competency/Skill, enter all specific **student learning outcome** unit numbers, as indicated in the course outline (i.e. 1.1, 2.7, 4.2, 4.0 and 5.12) that apply.

<b>Course must include <u>all</u> of the following:</b>	
<b>1. Read with critical comprehension**</b>	1.5, 2.9, 3.4, 4.8
<b>2. Write clearly and coherently**</b>	1.5, 2.2, 2.4, 2.5, 2.6, 2.9, 3.2, 3.3, 3.4, 4.4, 4.5, 4.6, 4.7, 4.8
<b>3. Demonstrate literacy as appropriate within a given discipline**</b>	1.0, 2.0, 3.0, 4.0 Quantitative 3.4.4, 4.8.1, 4.8.2, 4.8.3, Technology
<b>4. Apply problem solving skills or methods to make informed decisions in a variety of contexts**</b>	1.0, 2.0, 3.0, 4.0
<b>Course must include at least <u>one</u> of the following:</b>	
<b>5. Differentiate between ethical and unethical behavior</b>	
<b>6. Demonstrate an understanding of the physical, biological, and social environments and how individual behaviors impact this complex system.</b>	3.4.4, 4.8
<b>7. Demonstrate an understanding of and appreciation for human diversities and commonalities.</b>	
<b>8. Speak and listen effectively.</b>	

*\*General Education Competencies and Skills endorsed by 2010-2011 General Education Task Force*

**\*\*Required Competencies**

**1) Read with critical comprehension.**

The student will be introduced to the basic texts, concepts, vocabulary, and methods necessary for developing an understanding of the discipline and meeting the required benchmarks as stated in the course outline.

**2) Write clearly and coherently.**

The student will demonstrate an understanding and mastery of subject matter in a variety of ways, including writing. Writing activities may include both graded and ungraded essays, short answer quizzes, summaries, reactions, journals, and various other reports.

**3) Demonstrate and apply literacy across all the disciplines (indicate which ones apply).**

- a) **Information literacy** means understanding how to locate needed information, using the appropriate technology for the task, managing and evaluating the extracted information and using it effectively and ethically.
- b) **Technology literacy** is the ability to responsibly and effectively use appropriate technology to access, manage, integrate, or create information, and/or use technology to accomplish a given task.
- c) **Workplace literacy** is having the appropriate knowledge and skills to communicate and work with others effectively and perform job duties, whether it is through the use of computers and/or other technology.
- d) **Cultural literacy** is recognizing, understanding, and appreciating the similarities and differences between one’s own culture and the cultures of others through a study of the arts, customs, beliefs, values, and history that define a culture.
- e) **Quantitative literacy** is having the ability to formulate, solve and interpret mathematical/statistical operations and graphical/tabular representations to make informed decisions.
- f) **Scientific literacy** means understanding the methodology and application of the scientific process, the physical and biological worlds, and recognizing that scientific knowledge is continuously updated or revised as new information is discovered.

**4. Apply problem-solving skills or methods to make informed decisions in a variety of contexts.**

The student will use acquired skills or methods to recognize, analyze, adapt, and apply critical thinking to solve problems and make informed decisions.

## EVALUATION:

In the box to the right of the Methods of Assessment, enter all specific learning outcome numbers (i.e. 1.1, 2.7, 4.0, 4.2 and 5.12) that apply.

1. Portfolio	
2. Short essays	
3. Research Papers	
4. Group projects	
5. Discussions (In class and online)	
6. Multiple Choice tests	1.0, 2.0, 3.0, 4.0
7. Presentations	
8. Service Learning Projects	
9. Quizzes (pop, announced, etc.)	1.0, 2.0, 3.0, 4.0
10. Take-home tests	1.0, 2.0, 3.0, 4.0
11. Summaries, critiques, and analyses	
12. Reaction papers	
13. Surveys	
14. Performance	
15. Short answer tests	1.0, 2.0, 3.0, 4.0
16. Classroom debates and colloquia	
17. Blogs, wikis, web pages	
18. Other (Please explain)	

## **UNITS**

### **Unit 1 Functions, Graphs, Limits**

General Outcome:

- 1.0 The student shall be able to demonstrate knowledge of the concepts of function, graphing and limits.

Specific Measurable Learning Outcomes:

Upon successful completion of this unit, the student shall be able to:

- 1.1+ Define, graph, and write the equation for a linear function in the form  $f(x) = mx + b$ .
  - 1.2+ Calculate the slope and intercepts of a linear function.
  - 1.3 Evaluate the limit of a function, including limits at infinity and one-sided limits.
  - 1.4 Determine the continuity of a function at a point or on an interval.
  - 1.5 Read and analyze functions to solve applied problems including, but not restricted to:
    - 1.5.1 Fixed and variable costs
    - 1.5.2 Revenue and profit
    - 1.5.3 Supply and demand
    - 1.5.4 Break-even and equilibrium points
- + Review as needed

**Common Course Number: MAC2233**

## **Unit 2 Derivatives**

General Outcome:

- 2.0 The student shall be able to demonstrate knowledge of the meaning of derivatives, their applications, and, and rules of differentiation.

Specific Measurable Learning Outcomes:

Upon successful completion of this unit, the student shall be able to:

- 2.1 Demonstrate knowledge of the meaning of a derivative.
- 2.2 State and apply the definition of derivative.
- 2.3 Recognize the different derivative notations.
- 2.4 State and apply the rules of differentiation.
- 2.5 Calculate higher order derivatives with or without technology as appropriate.
- 2.6 Determine increasing and decreasing intervals, concavity, critical values, relative extrema, points of inflection, and absolute extrema using first and second derivatives.
- 2.7 Identify and cursorily sketch vertical and horizontal asymptotes of a rational function.
- 2.8 Analyze and sketch polynomial functions with optional technology support for arithmetic as needed.
- 2.9 Read and use derivatives to solve applied problems including, but not restricted to:
- 2.9.1 Equation of tangent line
- 2.9.2 Marginal analysis, optionally including differentials
- 2.9.3\* Price elasticity of demand
- 2.9.4 Optimization in the context of business applications, i.e., maximizing profit, etc.
- 2.9.5 Average cost and profit

\* Optional learning outcome, up to the discretion of the instructor

**Common Course Number: MAC2233**

**Unit 3 Integration**

General Outcome:

- 3.0 The student shall be able to demonstrate knowledge of integrals and their applications.

Specific Measurable Learning Outcomes:

Upon successful completion of this unit, the student shall be able to:

- 3.1 State and apply the rules of integration.
- 3.2 Perform indefinite integration.
- 3.3 Evaluate definite integrals.
- 3.4 Read and use integrals to solve problems including, but not restricted to:
  - 3.4.1 Area
  - 3.4.2 Evaluating the constant of integration to derive cost and revenue functions from marginal functions.
  - 3.4.3\* Calculate and interpret consumer and producer surplus.
  - 3.4.4 Calculate quantity from growth/decay function.

\* Optional

Common Course Number: MAC2233

**Unit 4 Exponential and Logarithmic Functions**

General Outcome:

- 4.0 The student shall be able to demonstrate knowledge of exponential and logarithmic functions, their derivatives, integrals and applications.

Specific Measurable Learning Outcomes:

Upon successful completion of this unit, the student shall be able to:

- 4.1+ Sketch the graph of  $f(x) = e^x$  and related functions using technology as appropriate.
- 4.2+ Sketch the graph of  $f(x) = \ln x$  and related functions using technology as appropriate.
- 4.3+ State and apply the properties of logarithms.
- 4.4+ Solve logarithmic and exponential equations.
- 4.5 Find derivatives of exponential and logarithmic functions.
- 4.6 Find integrals of exponential functions.
- 4.7 Find integrals resulting in logarithmic functions.
- 4.8 Read and apply exponential and logarithmic functions to discrete and continuous problems including, but not limited to:
- 4.8.1 Present value and future value including compounding.
- 4.8.2 Effective rate
- 4.8.3 Finding C (initial value) and k (proportionality constant) in exponential growth and decay.
- + Review as needed