PELLISSIPPI STATE COMMUNITY COLLEGE
MASTER SYLLABUS

# APPLIED CALCULUS
# MATH 1830

**Class Hours: 4.0** **Credit Hours: 4.0**

**Laboratory Hours: 0.0** **Date Revised: Fall 2017**

## Catalog Course Description

Topics include differentiation and integration of polynomial, rational, exponential, and logarithmic functions and methods of numerical integration. Topics from business modeling, such as economic applications and case studies, are explored with computer simulations, computer labs, or calculators. A graphing calculator is required.

## Prerequisites

High school algebra I and algebra II and precalculus and ACT math score of at least 22 and an ACT reading score of at least 19 or equivalent math and reading scores or MATH 1130 or MATH 1710 or MATH 1730

## Textbook(s) and Other Reference Materials Basic to the Course

**Textbook:**

Barnett, Raymond A., Michael R. Ziegler, and Karl E. Byleen. *College Mathematics for Business, **Economics, Life Sciences, and Social Sciences,*** **Prentice Hall, custom 13th edition, 2015.**

**References**

Lial, Margaret L., Raymond N. Greenwell, and Nathan P. Ritchey. *Finite Mathematics and Calculus with Applications,* 9th edition, Pearson Education, Inc., 2011.
Bittinger, Marvin L., David J. Ellenbogen, and Scott Surgent. *Calculus and Its Applications,* 10th edition, Pearson Education, Inc., 2012.

**Personal Equipment**

A non-symbolic graphing calculator is required. The TI-83, TI-83+, TI-84, or TI-84+ is recommended.

## Week/Unit/Topic Basis

| Week | Topic |
|---|---|
| 1. | Introduction to Limits. Infinite Limits and Limits at Infinity. |
| 2. | Continuity. Review of Finding Linear Equations. |
| 3. | The Derivative. Basic Differentiation Properties. |
| 4. | Differentials. Marginal Analysis in Business and Economics. Review. Test 1. |
| 5. | The Constant *e* and Continuous Compound Interest. Derivatives of Exponential and Logarithmic Functions. |
| 6. | Derivatives of Products and Quotients. The Chain Rule. |
| 7. | Review. Test 2. First Derivative and Graphs. |
| 8. | First Derivative and Graphs continued. Second Derivative and Graphs. |

9. Curve-Sketching Techniques. Absolute Maxima and Minima.
10. Optimization. Review. Test 3.
11. Antiderivatives and Indefinite Integrals. Integration by Substitution.
12. Differential Equations; Growth and Decay. The Definite Integral.
13. The Fundamental Theorem of Calculus. Area between Curves.
14. Review. Test 4. Review for Comprehensive.
15. Comprehensive Final Exam.

**Course Goals**

NOTE: Roman numerals after course goals reference the General Education Goals of the Mathematics program.

The course will

A. Build the skills to compute derivatives of algebraic, logarithmic, and exponential functions. VI.1,3,5
B. Guide students toward the effective use of derivatives to analyze behavior of functions. VI.1,3,5,6
C. Build the skills to calculate integrals of algebraic, logarithmic, and exponential functions. VI.1,3,5
D. Enhance the student's knowledge of the use of differentiation and/or integration to solve applications from business, economics, social and life science. VI.1,2,3,4,5,6
E. Enhance effective use of calculus concepts to interpret, communicate, and report business application problems and their solutions in a clear and concise manner. VI.1,2,3,4,5,

**Expected Student Learning Outcomes**

NOTE: Letters after performance expectations reference the course goals listed above.

The student will

1. Calculate the limit of an algebraic function. A
2. Recognize a continuous function. B
3. Calculate the derivative of an algebraic function by the delta process. A
4. Calculate the derivative of polynomials, products, quotients, powers, and implicit functions using delta-derived rules. A
5. Apply derivatives to solve application problems such as problems involving distance, velocity, and acceleration; and maximum-minimum problems. A, D, E
6. Sketch curves using information obtained from the derivatives of a function. A
7. Calculate the derivatives of exponential and logarithmic functions. A
8. Integrate polynomial, power, logarithmic, and exponential functions and use this knowledge to evaluate definite and indefinite integrals. C, D
9. Apply derivatives to solve business/economic and life/physical sciences application problems. A, D,E
10. Apply the integration process to solve application problems that occur in business/economic and life/physical sciences. C,D, E

11. Utilize appropriate technology and applicable case studies/projects that involve real-world data to enhance the conceptual understanding and usefulness of calculus and to provide training in an area that both business and industry are now demanding. D, E

## Evaluation

### Testing Procedures

100% of grade or instructor discretion if lab work and/or section projects are utilized. Students are evaluated primarily on the basis of tests, quizzes, homework, and the comprehensive final exam. A minimum of 5 major tests and the comprehensive is recommended.

### Laboratory Expectations

0% of grade or instructor discretion. Instructor discretion on case studies, lab and/or section projects.
Field Work: None.

**Other Evaluation Methods: None.**
**Grading Scale**

| Grading Scale | Grade |
|---|---|
| 93 – 100 | A |
| 88 – 92 | B+ |
| 83 – 87 | B |
| 78 – 82 | C+ |
| 70 – 77 | C |
| 60 – 69 | D |
| Below 60 | F |

## Policies

### Attendance Policy

Pellissippi State expects students to attend all scheduled instructional activities. As a minimum, students in all courses (excluding distance learning courses) must be present for at least 75 percent of their scheduled class and laboratory meetings in order to receive credit for the course. Individual departments/programs/disciplines, with the approval of the vice president of Academic Affairs, may have requirements that are more stringent. In very specific circumstances, an appeal of the policy may be addressed to the head of the department in which the course was taken. If further action is warranted, the appeal may be addressed to the vice president of Academic Affairs.

### Academic Dishonesty

Academic misconduct committed either directly or indirectly by an individual or group is subject to disciplinary action. Prohibited activities include but are not limited to the following practices:

- Cheating, including but not limited to unauthorized assistance from material, people, or devices when taking a test, quiz, or examination; writing papers or reports; solving problems; or completing academic assignments.
- Plagiarism, including but not limited to paraphrasing, summarizing, or directly quoting published or unpublished work of another person, including online or computerized services, without proper documentation of the original source.
- Purchasing or otherwise obtaining prewritten essays, research papers, or materials prepared by another person or agency that sells term papers or other academic materials to be presented as one's own work.
- Taking an exam for another student.
- Providing others with information and/or answers regarding exams, quizzes, homework or other classroom assignments unless explicitly authorized by the instructor.
- Any of the above occurring within the Web or distance learning environment.

Please see the Pellissippi State Policies and Procedures Manual, Policy 04:02:00 Academic/Classroom Conduct and Disciplinary Sanctions for the complete policy.

**Accommodations for Disabilities**

Students that need accommodations because of a disability, have emergency medical information to share, or need special arrangements in case the building must be evacuated should inform the instructor immediately, privately after class or in her or his office. Students must present a current accommodation plan from a staff member in Disability Services (DS) in order to receive accommodations in this course. Disability Services (http://www.pstcc.edu/sswd/) may be contacted via Disability Services email or by visiting Alexander 130.

**Other Policies**

Make-up work: Instructor discretion about make-up tests and/or assignments.
Cell phones: Cell phones are to be either turned off or put in vibration mode while in class. Instructor discretion as to penalty.