Syllabus

Calculus I - Fall Semester, 2013
Calculus II - Spring Semester, 2014

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Course Website: https://icat.okcareertech.org
Important course information such as a tentative schedule, homework information, and examination dates will be posted on the website. It is recommended that you check the site regularly. Some additional information is located at the following web site as well https://www.sotc.edu/pages/oklahoma-school-of-science-and-mathematics

Course Objectives: To achieve college level calculus knowledge and be prepared to start Calculus II or higher in college. Additionally, after successful completion of these courses, the student should show significant improvement in the ACT examination, dominate the AP examination and develop expertise with the graphing calculator.

Textbook: Calculus, 9th edition by Dale Varberg, Edwin J. Purcell, and Steven E. Rigdon. (Textbooks are provided by OSSM, you will have to sign a release stating you are responsible for replacing the book if lost or destroyed).

Course Prerequisites: The minimum prerequisites for the course are Algebra I, Geometry and Algebra II. A Trigonometry course is very helpful, but not absolutely necessary.

Course Materials: All students will need a graphing calculator not only for this course, but also for the AP examination. I recommend the Texas Instruments line. The TI-83, 83-Plus, 84-Plus, TI Nspire, and 89 models are acceptable. You need to be aware the TI-89 model is not allowed for use on the ACT exam. A large three-ring binder and 3x5 note-cards are required. Good organization of notes, homework assignments and examinations will be not only a valuable tool when reviewing for the AP examination, but also an excellent resource in future mathematics courses. You are required to put a cover on your textbook. Use only a paper textbook cover.
The nylon covers do not fit the Calculus textbooks correctly. Students will be charged for damaged textbooks. **College ruled paper and sharpened pencils should obviously be with the student during each class session.**

**Help From Classmates:** You are encouraged to consult with other students about the homework problems. Talking about mathematics is often an effective way to learn the concepts. A word of caution is called for here. The purpose of working together is to learn, not simply to copy. **It is a complete waste of time to copy from someone else’s work. If you do this, you will not learn the material adequately and you will pay a heavy price on the quizzes and examinations.**

**Homework:** Students receive homework credit for attempting the homework problems. Students should realize that if their process is correct, their answer will also be correct barring any algebra errors. For maximum credit on homework, show all the steps that lead to your final answer. Be sure to make your line of reasoning clear. In other words, justify your answer. Expressing the *how* and *why* of your solution will not only clarify the idea in your own mind, but it will also prepare you for the free response section of the AP examination. **The primary way you will learn calculus is by working problems.** Working the assigned homework problems is probably the bare minimum amount necessary to master the material. Working extra problems is strongly encouraged and will be necessary to attain full mastery of the material.

**Make-Up Policy:**
(Homework)
Students should anticipate school/activity absences and report them to the instructor **beforehand** so that the appropriate arrangements can be made. The only absences, which the student may make arrangements for extra time on, are those for personal emergencies and illnesses. Any homework or assignment that was due on the day of an absence should be given to a classmate. Otherwise, students need to get the assignments prior to the absence by calling the instructor, contacting classmates or by accessing the website. In general, students have the number of days they miss to make up the homework. Be advised that you are **FULLY** responsible for the material covered in each class regardless of the due date of the homework assignments, **whether or not you are present.** Handouts of the lesson presentations will be available to students upon request, or the student may copy notes from a classmate. Due to the rigorous pace at which these courses are taught, students are discouraged from having excessive absences.

(Examinations & Quizzes)
Fall and Spring tentative examination dates are posted on the Calculus site in the course description. Please check your calendar **regularly** to see if there are any conflicts. The sooner we know about a conflict the more likely we can resolve it. Make up examinations and quizzes will **only** be given after all other rescheduling possibilities have been explored. To preserve the integrity of the examination/quiz scores, all make-up examinations and quizzes will necessarily be different from the examination/quiz taken by the class. I reserve the right to administer oral make-up quizzes and examinations and to administer make-up quizzes/examinations outside of class time.
Students who miss quizzes/examinations for school/activity absences **WITHOUT** making prior arrangements for a make-up, may receive a grade of zero. Students who miss quizzes/examinations due to personal emergencies/illnesses **must** bring a note from a parent/guardian or physician in order to be able to reschedule the missed quiz/examination. It is imperative that students learn excellent time management skills and instructor communication skills for success at the college level. These rules and requirements ensure the students will know how to communicate with their college professors and meet stringent college project deadlines.

**Grades:** Grades will come from homework, calculator labs, quizzes, topic examinations and the final semester examinations. Each of these will be worth a certain percentage of your grade, please note below:

- Homework: 20%
- Quizzes: 25%
- Examinations: 35%
- Final Examination: 20%

Your percentage grade will be converted to a letter grade as follows:

- A+ 95 or above
- A 90-94
- A- 87-89
- B+ 83-86
- B 80-82
- B- 75-79
- C+ 70-74
- C 65-69
- C- 60-64
- D+ 55-59
- D 51-54
- F 50 or below

**Keep in mind, the focus of the class is** learning, **not grade earning.**
Calculus I - Fall 2012

Foundation and Review:
• Fundamental Algebraic Operations/Completing the Square/Word Problems
• Systems of Equations/Graphing Equations/Inequalities
• Function Operations/Compositions/Graphing/Translating/Domain/Range
• Trigonometric Definitions/Graphing/Proofs/Identities/Inverses
• Exponentials/Roots/Absolute Value/Polynomials/Asymptotes
• Exponential/Logarithmic Functions
• Vectors/Conic Sections/Polar/Parametric
• Partial Fraction Decomposition/Matrices/Sequences/Series

Functions and Limits:
• Introduction to Limits
• Limit Theorems
• Continuity of Functions
• Limits at Infinity, Infinite Limits

The Derivative:
• Two Problems with One Theme
• The Derivative
• Rules for Finding Derivatives/Derivatives of Sines and Cosines
• The Chain Rule
• Leibniz Notation/Higher-Order Derivatives
• Implicit Differentiation
• Maxima and Minima
• Monotonicity and Concavity
• Local Maxima and Minima
• Maxima and Minima/Relationships of f, f ’, f ”
• The Mean Value Theorem

Applications of the Derivative:
• Related Rates/Indeterminate Forms of Type / Other Indeterminate Forms
• More Maxima and Minima Problems
• Economic Applications
• Length of a Plane Curve

The Integral:
• Antiderivatives (Indefinite Integrals)
• Differentials & Approximations/Differential Equations/Slope Fields/Euler’s Method/
  Newton’s Method
• Sums and Sigma Notation/ Introduction to Area
• The Definite Integral/ Numerical Integration
• The Fundamental Theorem of Calculus/ More Properties of the Definite Integral
• Aids in Evaluating Definite Integrals
Transcendental Functions:
- The Natural Logarithm Function
- Inverse Function and Their Derivatives
- The Natural Exponential Function
- General Exponential and Logarithmic Functions
- Exponential Growth and Decay
- The Inverse Trigonometric Functions
- Derivatives of Trigonometric Functions

Calculus II - Spring 2013

Applications of the Integral:
- The Area of the Plane Region
- Volumes of Solids: Slabs, Disks, Washers
- Volumes of Solids of Revolutions: Shells
- Calculus in Polar Coordinates
- Vector-Valued Functions and Curvilinear Motion
- Curvature and Acceleration

Techniques of Integration:
- Integration by Substitution
- Some Trigonometric Integrals
- Rationalizing Substitutions
- Integration by Parts
- Integration of Rational Functions
- Improper Integrals: Infinite Limits
- Improper Integrals: Infinite Integrands

Infinite Series:
- Taylor’s Approximation to Functions
- Bounding the Errors
- Infinite Sequence
- Infinite Series
- Positive Series: The Integral Test
- Positive Series: Other Tests
- Alternating Series, Absolute Convergence
- Power Series
- Operations on Power Series
- Taylor and Maclaurin Series

Review for AP Calculus BC Exam

Instructors Note: I reserve the right to modify or amend this syllabus at any time. Should modification become necessary, the students will be notified as soon as possible.