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| **Contra Costa College** |

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| **Course Outline** |

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| **Department & Number** | MATH-190 | **Number of Weeks** | 18 |
| **Course Title** | Analytic Geometry and Calculus I  | **Lecture Hours By Term** | 90 |
| **Prerequisite** | MATH-171 or both MATH-121 and MATH-135 | **Lab Hours By Term** |  0 |
| **Challenge Policy**  | Satisfactory completion of an equivalent course. | **\*Hours By Arrangement** |  0 |
| **Co-requisite** |  | **Units**  |  5 |
| **Challenge Policy**  |  |  |  |
| **Advisory** |  |

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| **\*HOURS BY ARRANGEMENT:** | 0 | Hours per term.  |
|  **ACTIVITIES:** (Please provide a list of the activities students will perform in order to satisfy the HBA requirement): |
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| **COURSE/CATALOG DESCRIPTION** |

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| A first course in differential and integral calculus of a single variable: functions; limits and continuity; techniques and applications of differentiation and integration; Fundamental Theorem of Calculus. Primarily for Science, Technology, Engineering & Math Majors. |

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| **COURSE OBJECTIVES:** |
| At the completion of the course the student will be able to: |

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| 1. Compute the limit of a function at a real number;
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| 1. Determine if a function is continuous at a real number;
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| 1. Find the derivative of a function as a limit;
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| 1. Find the equation of a tangent line to a function;
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| 1. Compute derivatives using differentiation formulas;
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| 1. Use differentiation to solve applications such as related rate problems and optimization problems;
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| 1. Use implicit differentiation;
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| **.**1. Graph functions using methods of calculus;
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| 1. Evaluate a definite integral as a limit;
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**INTENDED STUDENT LEARNING OUTCOMES:**

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| 1. Students will be able to evaluate limits of elementary functions using numerical, graphical, and algebraic methods.
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| 1. Students will be able to compute derivatives of elementary functions using the basic differentiation rules.
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| 1. Students will be able to apply derivatives to problems involving related rates, curve sketching, and optimization.
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| 1. Students will be able to compute antiderivatives of basic elementary functions using formulas and the substitution method.
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 **COURSE CONTENT (Lecture):**

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| 1. Definition and computation of limits using numerical, graphical, and algebraic approaches;
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| 1. Continuity and differentiability of functions;
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| 1. Derivative as a limit;
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| 1. Interpretation of the derivative as: slope of tangent line, a rate of change;
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| 1. Differentiation formulas: constants, power rule, product rule, quotient rule and chain rule;
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| 1. Derivatives of transcendental functions such as trigonometric, exponential or logarithmic;
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| 1. Implicit differentiation with applications, and differentiation of inverse functions;
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| 1. Higher-order derivatives;
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| 1. Graphing functions using first and second derivatives, concavity and asymptotes;
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| 1. Maximum and minimum values, and optimization;
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| 1. Mean Value Theorem;
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| 1. Antiderivatives and indefinite integrals;
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| 1. Area under a curve;
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| 1. Definite integral; Riemann sum;
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| 1. Properties of the integral;
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| 1. Fundamental Theorem of Calculus;
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| 1. Integration by substitution;
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| 1. Indeterminate forms and L'Hopital's Rule;
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 **COURSE CONTENT (Lab):**

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| **METHODS OF INSTRUCTION:** |
| Lecture and Discussion |
| Demonstration and collaboration |
| Daily reading assignment |
| Homework exercises |

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| **INSTRUCTIONAL MATERIALS:** |

**NOTE:** To be UC/CSU transferable, the text must be dated within the last 7 years OR a statement of justification for a text beyond the last 7 years must be included.

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| Textbook Title: | Calculus : Early Transcendentals |
| Author: | Anton, Bivens, and Davis |
| Publisher: | J. Wiley & Sons, Inc. |
| Edition/Date: | 10th Edition / 2012 |
| Textbook Reading Level: |  |
| Justification Statement: | *(For textbook beyond 7 years)* |
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| Lab Manual Title  | (*if applicable*): N/A |

**OUTSIDE OF CLASS WEEKLY ASSIGNMENTS:**

Title 5, section 55002.5 establishes that a range of 48 -54hours of lecture, study, or lab work is required for one unit of credit. For each hour of lecture, students should be required to spend an additional two hours of study outside of class to earn one unit of credit.

* State mandates that sample assignments must be included on the Course Outline of Record.

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|  **Outside of Class Weekly Assignments** | **Hours per week** |

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| Weekly Reading Assignments *(Include detailed assignment below, if applicable)* | 4 |

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| Students are responsible for reading the sections of the text corresponding to the week’s lectures. Typically, 2 – 5 sections of the text will be covered per week. This translates to approximately 30 pages of reading per week. |

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| Weekly Writing Assignments *(Include detailed assignment below, if applicable)* |  |

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| Weekly Math Problems *(Include detailed assignment below, if applicable)* | 6 - 12 |

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| Students are assigned approximately 8 – 20 exercises in each section of the text covered. This means that there are approximately 20 – 100 homework exercises per week; 6 – 12 hours is a minimum amount of time that students will spend solving homework problems per week. |

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| Lab or Software Application Assignments *(Include detailed assignment below, if applicable)* |  |

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| Other Performance Assignments *(Include detailed assignment below, if applicable)* |  |

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**STUDENT EVALUATION**: **(Show percentage breakdown for evaluation instruments)**

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| * Course must require use of critical thinking, college-level concepts & college-level learning skills.
* For degree credit, course requires essay writing unless that requirement would be inappropriate to the course objectives. If writing is inappropriate, there must be a requirement of problem-solving or skills demonstration.
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|  | **%** | Essay (If essay is not included in assessment, explain below.) |
| N/A |
| 25 | **%** | Computation or Non-computational Problem Solving Skills |
|  | **%** | Skills Demonstration |
| 75 | **%** | Objective Examinations |
|  |  | Other (describe) |
|  | **%** |  |

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|  **GRADING POLICY: (Choose LG, P/NP, or SC)** |
|  **X** | **Letter Grade** |  | **Pass / No Pass** |  | **Student Choice** |
| 90% - 100% = A  | 70% and above = Pass | 90% - 100% = A |
| 80% - 89% = B  | Below 70% = No Pass  | 80% - 89% = B |
| 70% - 79% = C  |  | 70% - 79% = C |
| 60% - 69% = D  |  | 60% - 69% = D |
| Below 60% = F  |  | Below 60% = F |
| *or* |
| 70% and above = Pass |
| Below 70% = No Pass |
| **Prepared by:** | Carol Stanton |

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| **Date:**  | Spring 2014 |

*Revised form 01/14*