1. Catalog Description

a. Course level: Math 150A
b. Title: Calculus I
c. Credit: 5 units
d. Term to be offered: F, S
e. Course Description: Limits, continuity, and derivatives for functions of one variable, applications of the derivative, the definite integral, applications of the integral.
f. Prerequisites: Passing score on or exemption from the Entry Level Mathematics Examination or credit in Math 093, and either a passing scores on the Mathematics Placement Test or completion of Math 105, or both Math 102 and 104, with a C or better. Students who transfer the equivalent of Math 105, or both Math 102 and 104, with a C or better are required to achieve a passing scores on the Math Placement Test.

2. CSUN Math Student Learning Objectives
The Student Learning Outcomes for the undergraduate mathematics program state: At the end of their program of study, students should be able to:

1. demonstrate a command of the content usually associated with an undergraduate degree in mathematics;

2. communicate mathematical ideas clearly and cogently, both orally and in written form;

3. present clear and rigorous proofs;

4. build mathematical models and demonstrate problem solving skills, including proper use of mathematical software;

5. understand principles underlying various branches of mathematics and recognize their interrelationship;

6. experience mathematical discovery and independently read and understand mathematical articles or texts written at an undergraduate level

In completing this course, students will be able to:
i. read, interpret and solve word problems.
ii. write solutions using correct technical notation and grammar.
iii. apply the theory of limits and derivatives.
iv. apply scientific concepts related to derivatives, functions, and relations.
v. apply scientific concepts related to integration.
b. Upon successful completion of this course, students will:
i. be prepared for more advanced courses requiring calculus.
ii. appreciate the importance of mathematics and its applications to the sciences.
iii. to use the concepts of calculus to solve basic applications, including word problems.

3. Course Outline

Weeks 1-3
Limits and Rates of Change
Limits of functions: introduction to limits and a rigorous definition of limit.
Rules for operations on limits.
Limits at infinity and infinite limits.
Limits involving trigonometric functions.
Continuity.

Weeks 4-6
Derivatives and Related Rates
Definition of derivative; use of the definition to find the derivative of simple functions.
Product and quotient rules.
Chain rule and Leibniz notation, differentials, linear approximation.
Derivatives of trigonometric functions.
Higher order derivatives.
Implicit differentiation.
Applications of the derivative. Rates of change. Related rates.

Weeks 7-9
The Mean Value Theorem, Interpreting Graphs
Rolle's Theorem and Mean Value Theorem.
First derivative test and Second derivative test.
Graphing.
Optimization problems.
Newton’s method.

Weeks 10-12
Methods of Integration
Definition of sigma notation.
Riemann sum, areas.
Indefinite integral and Antiderivative.
Definite integral.
Fundamental Theorem of Calculus.
Substitution Rule.

Weeks 13-15
Applications of Integration
Areas.
Area between curves.
Volumes of solids.
Work.
Average value of a function.

4. Evaluation of Student Learning
Evaluation may includes homework, weekly quizzes, a minimum of 3 in-class examinations, and a final exam.

This course satisfies the criteria for a writing active course through the emphasis on correct mathematical writing required when the student supplies complete reasoning as part of the solutions to problems.

5. Implementation
The text to be used is Calculus, sixth edition, by James Stewart; Brooks/Cole, 2008.
Higher Education
6610 California State University

The California State University (CSU) system is comprised of 23 campuses, including 22 university campuses and the California Maritime Academy. The system is administered by an independent governing Board of Trustees that includes 25 members: 5 ex officio, 16 appointed by the Governor to four-year terms and 4 members appointed to two-year terms (two student representatives—one voting and one non-voting; and one representative each from faculty and alumni). The Trustees appoint the Chancellor, who is the chief executive officer of the system, and the Presidents, who are the chief executive officers of the respective campuses. More....

MAJOR PROGRAM CHANGES Back to Top

• California State University (CSU) will receive a General Fund augmentation of $125.1 million, equal to a five percent increase in the University of California's 2012-13 General Fund support budget. Consistent with the Administration's policy to make higher education more affordable, the budget assumes that the university will not increase tuition and fees in 2013-14.

PROGRAMS Back to Top
The following table presents total proposed budget year positions and expenditures for each budgeted program area. These expenditures include all funding sources that support the state agency's programs.

<table>
<thead>
<tr>
<th>Code</th>
<th>Program</th>
<th>Proposed 2013-14*</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Positions</td>
</tr>
<tr>
<td>01</td>
<td>Instruction</td>
<td>20,798.5</td>
</tr>
<tr>
<td>02</td>
<td>Research</td>
<td>49.3</td>
</tr>
<tr>
<td>03</td>
<td>Public Services</td>
<td>77.5</td>
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<td>04</td>
<td>Academic Support</td>
<td>5,305.5</td>
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<tr>
<td>05</td>
<td>Student Services</td>
<td>5,451.6</td>
</tr>
<tr>
<td>06</td>
<td>Institutional Support</td>
<td>4,615.4</td>
</tr>
<tr>
<td>07</td>
<td>Operations and Maintenance of Plant</td>
<td>3,362.8</td>
</tr>
<tr>
<td>08</td>
<td>Student Financial Aid</td>
<td>-</td>
</tr>
<tr>
<td>09</td>
<td>Auxiliary Enterprises</td>
<td>1,812.5</td>
</tr>
<tr>
<td></td>
<td>Total, Positions and Expenditures (excluding Infrastructure)</td>
<td>41,473.1</td>
</tr>
<tr>
<td></td>
<td>Infrastructure Expenditures</td>
<td>-</td>
</tr>
<tr>
<td></td>
<td>Total, Positions and All Expenditures</td>
<td>41,473.1</td>
</tr>
</tbody>
</table>

More....
Each spring on campuses throughout the California State University system, we learn of faculty leaving our ranks. Some faculty leave because they have completed their participation in the Faculty Early Retirement Program, some of chosen to retire, and others have taken positions elsewhere. We thank such colleagues for what they have contributed to our institutions and wish them well. Each fall we welcome new colleagues to our campuses. Unfortunately, in recent years we have been losing more tenured and probationary faculty than we have been hiring. Dr. Margaret Merrifield, Senior Director of Academic Human Resources at the CSU Chancellor’s Office, shared with the Academic Senate CSU at its May 2013 meeting that last year approximately 500 such faculty members departed the CSU and only about 400 were hired. The decline in the number of tenured/tenure-track faculty continues a long trend in the CSU and is contrary to the commitments made by the CSU.ii

In 2001, the state legislature passed Assembly Concurrent Resolution 73. This resolution called for the CSU, the ASCSU and the California Faculty Association jointly to develop a plan that, in part, would raise the level of tenured and tenure-track faculty to 75% of the instructional faculty. Nine months later, leaders of these three bodies all signed a memo committing to achieve the goals of ACR 73. Attached to this memo was a report noting that while headcount of tenured and tenure-track faculty had remained fairly constant from 1984 until 2001, there had been a significant increase in the number of lecturers. In 1984, 27.7 percent of the faculty were lecturers. By 2001, that number had increased to 36.2 percent. The report acknowledged the many valuable contributions to the CSU mission made by lecturers, but argued that the “trend is important because tenured and tenure-track faculty bear the primary responsibility for student advising, program development and revision, and participation in shared governance. When their proportions decline, the quality of these efforts also wanes.”

In developing its strategic plan, Access to Excellence, in 2008, the CSU again recognized the need to expand the number of tenured and tenure-track faculty and committed to “develop a comprehensive plan for reinvestment in its faculty to meet its goals of reducing compensation gaps and increasing the number of tenure-track faculty.” The plan explains this commitment this way:

The pattern across American higher education and within the CSU in the last decade has been to shift reliance for instruction onto non-tenure-track faculty. In the CSU, such faculty have represented more than half of the teaching force since 1999. The current proportion is approximately two-thirds of the total faculty.13 This is a worrisome situation because of the potential for erosion of quality and diminishing of intellectual independence that is associated with tenure.”

13Cited figures are “head count,” and not “full time-equivalent” faculty. In terms of full-time equivalent, non-tenure/tenure track faculty represent about one-third of CSU faculty.

This past fall, 60.6 percent of the FTEF in the CSU were tenured or on a tenure-track appointment. It was 63.8 percent in 2001. The number of FTE tenured/tenure-track faculty has declined by 4 percent since 2001 (from 10,029 to 9,656). There has been a simultaneous increase in the number of students taught in the CSU from 271,774 Full Time Equivalent Students in 2001.iv to 354,286 in 2012.v That is an increase of 30 percent. How has the CSU been able to teach so many more students with a declining number of permanent faculty? Not surprisingly, the answer is through larger classes and a 10 percent increase in the number of lecturers (from 5,693 in 2001 to 6,274 in 2012).

These changes mean that the average faculty member now has many more students to advise, counsel, nurture, and support. The ratio of FTES to FTE tenured and tenure-track faculty was 27.10 to one in 2001, but there are now 36.69 students for every permanent faculty member. That is a 35 percent
increase. The increase in the number of lecturers also requires greater time spent hiring, supervising and observing lecturers by department chairs and tenured/tenure-track faculty. It is little wonder that many permanent faculty feel overwhelmed.

Next fall, when 2014-2015 budget requests for the CSU are being developed, the Faculty Affairs Committee intends to offer a resolution addressing this situation and calling for a greater system-wide commitment to the hiring of tenured and tenure-track faculty.

**CSU-Based Permanent Faculty Numbers**

Kevin Baaske - May 28, 2013

<table>
<thead>
<tr>
<th>Variable</th>
<th>2001</th>
<th>2012</th>
<th>Percent change</th>
</tr>
</thead>
<tbody>
<tr>
<td>Full-time Equivalent tenured/tenure-track faculty</td>
<td>9,656</td>
<td>9,656</td>
<td>4%</td>
</tr>
<tr>
<td>Full-Time Equivalent Students</td>
<td>271,774</td>
<td>354,287</td>
<td>30%</td>
</tr>
<tr>
<td>Full-time Equivalent lecturer faculty</td>
<td>5,693</td>
<td>6,274</td>
<td>10%</td>
</tr>
<tr>
<td>Student to Faculty Ratio with “F” = tenured/tenure-track</td>
<td>271,774 divided by 10,029 = 27.10 per permanent faculty member</td>
<td>354,287 divided by 9,656 = 36.69 per permanent faculty member</td>
<td>35% increase</td>
</tr>
</tbody>
</table>

i For system-wide data from 1990 to 2011, see Faculty Historical Employment Data http://www.calstate.edu/HR/Fac_HistEmpl_11.pdf. Data for 2012 was provided to the Faculty Affairs Committee by Dr. Margaret Merrifield on May 15, 2013.


iv Analytic Studies CSU Fall Term Enrollment Summary, Fall 2001 Profile, Table 3. http://www.calstate.edu/as/stat_reports/2001-2002/F0103.htm

v Analytic Studies CSU Fall Term Enrollment Summary, Fall 2012, Table 15. http://www.calstate.edu/as/stat_reports/2012-2013/rf12_15.htm