1. Students are advised to consult a counselor when selecting a Mathematics course.
2. New students are required to take an assessment test to determine initial course placement. See Student Success and Support Program for alternatives and exemptions.
3. Individualized Self-Study Mathematics MATH 099 is available for MATH 065, 070, or 102 to be taken for credit, one unit at a time.
4. Some courses below dotted line may not be transferable to certain four-year institutions. Consult Counselors/Transfer Center/4 yr. catalogs.
Definition
Mathematics is an important tool with which problems can be solved. Numbers, letters, or other symbols constitute the language of mathematics and, as in any language, are used to convey ideas and relationships especially in science. The final balance in a checkbook is a simple example of this relationship while landing astronauts on the moon reveals its complexity.

Staff
To access faculty and staff, dial (661) 722-6300, then the 4-digit extension.

Dean:
Dr. Leslie Uhazy ext. 6415

Administrative Assistant:
Wendy Cios ext. 6415

Clerical Assistant III:
Suzanne Olson ext. 6415

Department Chair:
Tooraj Gordi ext. 6019

Lab Technician:
position vacant ext. 6881

Faculty:
Dr. Paul Ahad ext. 6954
Debra Anderson ext. 6745
Snizhana (Jane) Bowers ext. 6947
Dr. Magdalena Caproiu ext. 6576
Roberto Diaz ext. 6421
James Dorn ext. 6811
Katherine Engelen ext. 6776
Luis Enriquez ext. 6244
Dezdemona Ginosian ext. 6971
Tooraj Gordi ext. 6019
Dr. Cindy Hendrix ext. 6744
Dr. Igor Marder ext. 6238
Dr. Ryoichi Osawa ext. 6291
Kenan Shahla ext. 6759
Michael Tran ext. 6595
Eugenie Trow ext. 6425
Pavinee Villapando ext. 6129
Nancy Wendt ext. 6420

Adjunct Faculty:
To access adjunct faculty voice mail, dial (661) 722-6300, then the 4-digit number.

Randy Ades 2080
Jose Alvarado 2160
John Asatryan 2534
Michael Bellavia 2633
Pakawan Berry 2992
Steve Brown 2238
David Butzke 2351
Daniel Byrne 2372
Larry Dale 2230
Timothy Ferguson 2381
Monette Fowler 2207
Larry Gorden 2603
Burton Gray 2293
Robert Haynes 2318
Norman Hines 2356
Dr. William Kitto 2948
Mario Martinez-Quijada 2368
Andrew Mashhour 2306
Michael McMillan 2499
Jose Menjivar 2393
Lyudmila Michael 2159
Hasmik Mkrtchyan 2047
Sam Pearsall 2298
Udani Ranasinghe 2195
Peter Robles 2236
Dr. Nash Saleh 2131
Timothy Schroeder 2690
John Thurston 2249
Mike Wallace 2008
Thomas Weadock 2472
Rong You 2484
Malik Younus 2258
Jietong Zhang 2253

Program Description
A student may improve basic mathematical skills through remedial course work or prepare for transfer to a B.A. or B.S. program in Mathematics, Physics, Chemistry, or Engineering.

Students must receive a minimum grade of “C” or better in all required core courses and the specific courses listed as program electives in order to qualify for the degree or certificate.

Distinctive Features
Courses in arithmetic and algebra provide the basic mathematical skills required in many fields. Statistics, linear algebra, calculus, and differential equations provide problem-solving tools for the physical and social sciences and engineering.

Math Labs: There is a math laboratory located in the Learning Center and additional support for math courses utilizing computer based instruction is found in The Prime Room, ME 100. Help in the Learning Center including tutoring is available on a drop-in basis. The Prime Room houses primarily Math 001, Individualized Self-Study courses. Students who are not enrolled in any of the Math 001 sections will have a limited access to this room. All math students are encouraged to utilize these learning resources.

Career Options
Actuary
Appraiser
Assessor
Auditor
Biometrician
Budget Analyst
Casualty Rater
Controller
Computer Programmer
Demographer
Econometrician
Engineering Analyst
Epidemiologist
Financial Analyst
Investment Analyst
Management Scientist
Mathematician
Operations Researcher
Public Opinion Analyst
Statistician
Surveyor
Systems Analyst
Teacher
Urban Planner

(Most of these careers require education beyond the two-year college level.)

Program Learning Outcomes

AS in Mathematics and AS-T in Mathematics

1. Demonstrate computational mastery.
2. Solve mathematical problems, both computational and proof, independently.
3. Understand and apply algorithms to solve problems.
4. Model and analyze real world problems by reformulating them into mathematical context.
5. Recognize the interdependency of different areas in mathematics, and the connection between mathematics and other disciplines.

Certificate Program

Certificate not applicable.

Associate Degree

Mathematics

An associate degree with a major in Mathematics is available. A minimum of 29 units is required. Students who intend to transfer are strongly encouraged to complete either the Intersegmental General Education Transfer Curriculum (IGETC) or the California State University General Education – Breadth (CSU GE) requirements. (See Graduation/Associate Degree Requirements and Transfer Information.)

Required Courses: (29 units)  units
MATH 150, Calculus and Analytic Geometry  5
MATH 160, Calculus and Analytic Geometry  4
MATH 220, Linear Algebra  4
MATH 230, Differential Equations  4
MATH 250, Calculus and Analytic Geometry  4

Choose a minimum of 8 units from the lists below with at least 4 units from A:

Required Electives A:  units
MATH 220, Linear Algebra  4
MATH 230, Introduction to Ordinary Differential Equations  4

Required Electives B:  units
*PHYS 110, General Physics  4
MATH 116, Introduction to Statistics Using R or MATH 115, Statistics  4

*Courses denoted with an asterisk will fulfill the completion requirements for both the major and general education.

Except in cases of a prerequisite requirement, it is not required to take courses in exactly this sequence; they are recommended in this order to facilitate success.

Recommended Plan of Study

First Semester  units
CSU GE requirement Area A2  3
CSU GE requirement Area C1 3
CSU GE requirement Area C2 3
CSU GE requirement Area D 3
CSU GE requirement Area E 3
Total 15

<table>
<thead>
<tr>
<th>Second Semester</th>
<th>units</th>
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<tbody>
<tr>
<td>MATH 150, Calculus and Analytic Geometry (CSU GE B4)</td>
<td>5</td>
</tr>
<tr>
<td>CSU GE requirement Area B1/B3</td>
<td>3-4</td>
</tr>
<tr>
<td>CSU GE requirement Area A1</td>
<td>3</td>
</tr>
<tr>
<td>CSU GE requirement Area D</td>
<td>3</td>
</tr>
<tr>
<td><strong>Total 14-15</strong></td>
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</table>

<table>
<thead>
<tr>
<th>Third Semester</th>
<th>units</th>
</tr>
</thead>
<tbody>
<tr>
<td>MATH 160, Calculus and Analytic Geometry</td>
<td>4</td>
</tr>
<tr>
<td>Required Elective List A</td>
<td>4</td>
</tr>
<tr>
<td>CSU GE requirement Area A3</td>
<td>3</td>
</tr>
<tr>
<td>CSU GE requirement Area C</td>
<td>3</td>
</tr>
<tr>
<td>CSU GE requirement Area D</td>
<td>3</td>
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<tr>
<td><strong>Total 17</strong></td>
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</table>

<table>
<thead>
<tr>
<th>Fourth Semester</th>
<th>units</th>
</tr>
</thead>
<tbody>
<tr>
<td>MATH 250, Calculus and Analytic Geometry</td>
<td>4</td>
</tr>
<tr>
<td>Required Elective List B</td>
<td>4-5</td>
</tr>
<tr>
<td>CSU GE requirement Area B2/B3</td>
<td>3-4</td>
</tr>
<tr>
<td>*CSU Transferable Electives</td>
<td>0-3</td>
</tr>
<tr>
<td><strong>Total 13-14</strong></td>
<td></td>
</tr>
</tbody>
</table>

| CSU GE or IGETC Pattern | 37-39 |
| CSU Transferable Elective Units to reach Degree | Total 60 |

*Electives should be taken from other courses within the discipline.

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**Transfer**

Students planning to continue studies at a four-year college or university after AVC should visit the Transfer Resource Center and consult with a counselor as soon as possible. Additional information on official transfer articulation agreements from AVC to many CSU/UC campuses can be found at the following Web site: www.assist.org

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**Prerequisite Completion**

If a course is listed as a prerequisite for another course, that prerequisite course must be completed with a satisfactory grade in order to enroll in the next course. According to Title 5, Section 55200(d), a satisfactory grade is a grade of “A,” “B,” “C” or “P”. Classes in which the Pass/No Pass option is available are indicated with an asterisk (*) before the course title. See “Pass/No Pass Option” in the catalog for full explanation.

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**Mathematics Courses**

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
<th>Units</th>
<th>Hours</th>
<th>Advisory</th>
</tr>
</thead>
<tbody>
<tr>
<td>MATH 001</td>
<td>INDIVIDUALIZED SELF-STUDY MATHEMATICS</td>
<td>1–12</td>
<td>3-36</td>
<td>AVC Math Assessment Test. (The Course Requisites for each class taken in MATH 001 are the same as those for the course named in the course description.) Individualized and self-paced study of the basic skills courses from Arithmetic to Intermediate Algebra in a supervised environment for the motivated student. These courses include MATH 065 (C, D, E, and F), MATH 070 (C, D, E, and F), and MATH 102 (C, D, E, and F). Students may choose from single unit courses: MATH 065C, 065D, 065E, 065F, 070C, 070D, 070E, 070F, 102C, 102D, 102E, 102F and enroll in only one unit at a time. Upon satisfactory completion of that unit, students may proceed to the next unit. At least four units must be completed in any academic year which also includes Winter and Summer sessions. The instructor will explain the unit system and assist students with selection of the appropriate unit course at the first class meeting. The instructor will also give initial orientation explaining testing, review tests to help students define what skills have been mastered, and refer students to readily available support services. Instructor does not lecture nor does he/she structure the pace of materials or determine when a student needs to proceed other than by setting deadlines for completion of one unit. Regular attendance is expected. Grading for MATH 065C through 070F is P (for pass ) and NP (for no-pass). Students will earn letter grades A, B, C, D, or F in Math 102C through 102F. Letter grade I (incomplete) will not apply to Math 001 sequence.</td>
</tr>
<tr>
<td>MATH 020</td>
<td>MANAGING MATH ANXIETY</td>
<td>.5</td>
<td>9</td>
<td>Eligibility for ENGL 097 and READ 095. Designed to provide students with the skills to reduce math frustration by diagnosing social causes and educational contexts and overcoming math myths and misconceptions. This course will also cover the following skills: recognizing math anxiety, developing various coping skills which include relaxation and wellness techniques, and becoming aware of personal learning style preferences for math. Math-specific testing skills will be taught using currently adopted texts for MATH 065 and MATH 070. NOTE: No grade will be given for this class; student will receive “pass” or “no pass” only. (Credit course not applicable to the associate degree and certificate programs.)</td>
</tr>
<tr>
<td>MATH 021</td>
<td>MATH STUDY STRATEGY</td>
<td>1</td>
<td>18</td>
<td>Eligibility for ENGL 097 and READ 095. Designed to assist students in improving their math study skills</td>
</tr>
</tbody>
</table>
so they can develop appropriate study strategies for math classes. Various methods and techniques will be explored including: developing a math textbook study system, math textbook annotating, math lecture note taking, listening, math problem solving strategies, test preparation, test taking strategies, relating learning preferences to math, and effective memory techniques. Time management at test time and identifying available campus resources for math will also be presented. **NOTE:** No grade will be given for this class; student will receive “pass” or “no pass” only. (Credit course not applicable to the associate degree and certificate programs.)

**MATH 065  BASIC MATH**

4 units  
4 hours weekly  
**Advisory:** Eligibility for ENGL 099.  
This course is intended to prepare students for beginning algebra and college level courses and programs. It covers basic operations with whole numbers, rational numbers and integers. Students will learn how to solve proportions, percent problems and find perimeter, area, and volume of basic geometric figures and solids. Students will be introduced to the language of algebra and learn how to evaluate algebraic expressions and solve first degree equations. MATH 065 is not a transferable course and does not satisfy GE requirements. **NOTE:** No grade will be given for this class; student will receive “pass” or “no pass” only. (Credit course not applicable to the associate degree and certificate programs.)

**MATH 070  ELEMENTARY ALGEBRA**

4 units  
4 hours weekly  
**Prerequisite:** Eligibility for MATH 070 (AVC assessment) or Completion of MATH 065.  
**Advisory:** Eligibility for READ 099.  
This course is for the student who has had some previous training in algebra. Topics in Math 070 include operations with signed numbers, variables, algebraic expressions, linear equations, word problems, exponents, polynomials, special products, factoring, algebraic fractions, graphing, systems of equations, and graphing linear equations in two variables. **NOTE:** No grade will be given for this class; student will receive “pass” or “no pass” only. (Credit course not applicable to the associate degree and certificate programs.)

**MATH 102  *INTERMEDIATE ALGEBRA**

4 units  
4 hours weekly  
**Prerequisite:** Eligibility for MATH 102 (AVC assessment) or Completion of MATH 070.  
**Advisory:** Eligibility for READ 099.  
This course is for the student who has been very successful completing Elementary Algebra and who is comfortable taking math classes. Topics include: Radical Expressions and Equations, Quadratic Equations and their graphs, Circles, Introduction to Functions, Systems of Linear Equations and Inequalities, Compound and Absolute Value Inequalities, Exponential and Logarithmic Functions, and word problems appropriate to all these topics. (AVC)

**MATH 105  GEOMETRY AND METHODS OF PROOF**

3 units  
3 hours weekly  
**Prerequisite:** Eligibility for MATH 105 (AVC assessment) or Completion for MATH 102.  
**Advisory:** Eligibility for READ 099.  
Using Euclidean geometry as a paradigm of deductive systems, this course is designed to give STEM students an introductory overview, appreciation, and understanding of the role of theorem and proof in mathematics in preparation for the calculus sequence and beyond. The deduction of geometric concepts and theorems important in later courses will emphasize the anatomy of a deductive system and basic direct proof. This experience will then be extended to non-geometric systems, where students will be introduced to some basic analytical methods of proving familiar mathematical statements about numbers, sets, and functions. (CSU, AVC)

**MATH 115  STATISTICS**

4 units  
4 hours weekly  
**Prerequisite:** Completion of MATH 102.  
**Advisory:** Eligibility for College Level Reading.  
The use of probability techniques, hypothesis testing, and predictive techniques to facilitate decision-making. Topics include descriptive statistics; probability and sampling distributions; statistical inference; correlation and linear regression; analysis of variance, chi-square and t-tests; and application of technology for statistical analysis including the interpretation of the relevance of the statistical findings. Applications using data from disciplines including business, social sciences, psychology, life science, health science, and education. (C-ID: MATH 110) (CSU, UC, AVC)

**MATH 116  INTRODUCTION TO STATISTICS USING R**

4 units  
4 hours weekly  
**Prerequisite:** Completion of MATH 102 (AVC Assessment).  
**Advisory:** Eligibility for College Level Reading.  
This course will cover the common traditional statistical methods taught in a beginning course using the statistical software R. Course will include statistical reporting of results using R-markdown authoring in the R-Studio program. The use of probability techniques, hypothesis testing, and predictive techniques to facilitate decision-making. Topics include descriptive statistics; probability and sampling distributions; statistical inference; correlation and linear regression; analysis of variance, chi square and t tests. (CSU, UC, AVC)
<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Name</th>
<th>Units</th>
<th>Hours Weekly</th>
<th>Prerequisite</th>
<th>Advisory</th>
</tr>
</thead>
<tbody>
<tr>
<td>MATH 120</td>
<td>*MATH FOR TEACHERS</td>
<td>3</td>
<td>3</td>
<td><strong>Prerequisite:</strong> Completion of MATH 102.</td>
<td><strong>Advisory:</strong> Eligibility for College Level Reading.</td>
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</tr>
<tr>
<td>MATH 124</td>
<td>FINITE MATH</td>
<td>4</td>
<td>4</td>
<td><strong>Prerequisite:</strong> Completion of ENGL 099 and MATH 102.</td>
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<td><strong>Advisory:</strong> Eligibility for College Level Reading.</td>
<td></td>
</tr>
<tr>
<td>MATH 128</td>
<td>*COLLEGE ALGEBRA FOR LIBERAL ARTS</td>
<td>3</td>
<td>3</td>
<td><strong>Prerequisite:</strong> Eligibility for MATH 128 (AVC assessment) or Completion of MATH 102.</td>
<td><strong>Advisory:</strong> Eligibility for College Level Reading.</td>
</tr>
<tr>
<td>MATH 135</td>
<td>*PLANE TRIGONOMETRY</td>
<td>3</td>
<td>3</td>
<td><strong>Prerequisite:</strong> Completion of MATH 102 or Eligibility for MATH 135 (AVC Assessment).</td>
<td><strong>Advisory:</strong> Eligibility for College Level Reading.</td>
</tr>
<tr>
<td>MATH 140</td>
<td>*PRECALCULUS</td>
<td>5</td>
<td>5</td>
<td><strong>Prerequisite:</strong> Completion of MATH 105 and MATH 135, or Eligibility for MATH 140 (AVC Assessment).</td>
<td><strong>Advisory:</strong> Eligibility for College Level Reading.</td>
</tr>
<tr>
<td>MATH 148</td>
<td>CALCULUS FOR BUSINESS &amp; ECONOMICS</td>
<td>4</td>
<td>4</td>
<td><strong>Prerequisite:</strong> Completion of MATH 128 or MATH 124.</td>
<td></td>
</tr>
<tr>
<td>MATH 150</td>
<td>CALCULUS AND ANALYTIC GEOMETRY</td>
<td>5</td>
<td>5</td>
<td><strong>Prerequisite:</strong> Completion of MATH 140 or Eligibility for MATH 150 (AVC Assessment).</td>
<td><strong>Advisory:</strong> Eligibility for College Level Reading.</td>
</tr>
<tr>
<td>MATH 160</td>
<td>CALCULUS AND ANALYTIC GEOMETRY</td>
<td>4</td>
<td>4</td>
<td><strong>Prerequisite:</strong> Completion of MATH 150.</td>
<td><strong>Advisory:</strong> Eligibility for College Level Reading.</td>
</tr>
</tbody>
</table>
MATH 220 LINEAR ALGEBRA
4 units
4 hours weekly
**Prerequisite:** Completion of MATH 160.
**Advisory:** Eligibility for College Level Reading.
This is an introductory course in linear algebra, designed for transfer students majoring in the mathematical, biological, physical, engineering, sociological or managerial sciences. Topics to be covered include systems of linear equations, matrices, determinants, vector spaces, inner product spaces, linear transformations, eigenvalues and eigenvectors. This course will include references to applications of the above topics in the areas of differential equations, least squares fitting to data, geometry of linear operators on R2, diagonalizing quadratic forms and conic sections. (C-ID: MATH 250) (CSU, UC, AVC)

MATH 230 INTRODUCTION TO ORDINARY DIFFERENTIAL EQUATIONS
4 units
4 hours weekly
**Prerequisite:** Completion of MATH 160.
**Advisory:** Completion of MATH 220 and MATH 250, and Eligibility for College Level Reading.
This is an introduction course in solving numerous types of ordinary differential equations including first order linear and nonlinear equations, higher order linear equations, systems of linear equations, and the associated initial value problems. In addition to the standard methods, the Laplace transform, power series method, and matrix method are covered. Applications of differential equations in physics, chemistry, economics and social sciences will be studied throughout the course. (CSU, UC, AVC)

MATH 250 CALCULUS AND ANALYTIC GEOMETRY
4 units
4 hours weekly
**Prerequisite:** Completion of MATH 160.
**Advisory:** Eligibility for College Level Reading.
This course is a continuation of MATH 160. Includes vector theory and the geometry of 3-dimensional space, vector-valued functions, functions of several variables, partial differentiation, multiple integration and vector analysis. (CSU, UC, AVC)