Mathematics (MATH)

Contact the Mathematics Department for further information.
(760) 744-1150, ext. 2535
Office: E-11

Associate in Science Degrees -

AS Degree requirements are listed in Section 6 (green pages).
• Mathematics

Associate in Science for Transfer -

AS-T, IGETC, and CSUGE requirements are listed in Section 6 (green pages).
• Mathematics

Any student wishing to earn an A.S. Degree must meet competence requirements at the MATH 60 level. Methods by which a student can demonstrate competence are listed under "Competence Requirements" in front of this catalog. Students wishing to enroll in MATH 50, 50A, 56, 60, 110, 115, 120, 135 and 140 must participate in the mathematics placement process or meet the prerequisite listed in the catalog. The mathematics placement test may be taken two times within a two year period, through the Palomar College Counseling Center. The assessment and placement process determines eligibility for enrollment in these courses. Students interested in determining their readiness to enroll in MATH 140 may additionally request to take the College Algebra Asset Test. Arrangements for this test can be made in the Counseling Center.

PROGRAMS OF STUDY

Mathematics

The Associate in Science in Mathematics for Transfer provides students the opportunity to meet lower division transfer requirements for a major in Mathematics. It provides the foundation for studying Physics, Engineering, the Physical, Biological and Health Sciences, Economics, Business, Computer Science, Statistics, and many others.

ASSOCIATE IN SCIENCE FOR TRANSFER MAJOR

Pursuant to SB1440, the following completion requirements must be met:

"(1) Completion of 60 semester units or 90 quarter units that are eligible for transfer to the California State University, including both of the following:

(A) The Intersegmental General Education Transfer Curriculum (IGETC) or the California State University General Education - Breadth Requirements.
(B) A minimum of 18 semester units or 27 quarter units in a major or area of emphasis, as determined by the community college district.

(2) Obtainment of a minimum grade point average of 2.0."

ADTs also require that students must earn a C or better in all courses required for the major or area of emphasis. A "P" (Pass) grade is not an acceptable grade for courses in the major.

Program Requirements

MATH 140	Calculus with Analytic Geometry, First Course	5
MATH 141	Calculus with Analytic Geometry, Second Course	4
MATH 205	Calculus with Analytic Geometry, Third Course	4

List A (Choose 1 course)

MATH 200	Introduction to Linear Algebra	3
MATH 206	Calculus with Differential Equations	4

List B (Choose 1 course not previously taken)

MATH 120	Elementary Statistics	4
MATH 200	Introduction to Linear Algebra	3
MATH 206	Calculus with Differential Equations	4
MATH 245	Discrete Mathematics	3
PHYS 230	Principles of Physics	5
TOTAL UNITS		**19 - 22**

Mathematics

Provides the background to satisfy upper division course work in mathematics and for entry-level positions that require a knowledge of mathematics such as Technical Assistant and Mathematical Technician. The student is advised to check with the school to which he or she wishes to transfer for additional courses which may be required.

A.S. DEGREE MAJOR

Program Requirements		**Units**
MATH 140	Calculus with Analytic Geometry, First Course	5
MATH 141	Calculus with Analytic Geometry, Second Course	4
MATH 205	Calculus with Analytic Geometry, Third Course	4
MATH 120 or	Elementary Statistics	
MATH 200 or	Introduction to Linear Algebra	
MATH 206	Calculus with Differential Equations	3,4
MATH/		
CSCI 146 or	FORTRAN 90 for Mathematics and Science	3
CSCI 220	C Programming	4
TOTAL UNITS		**19 - 21**

Recommended Electives: PHYS 230, 231, 232; CHEM 110, 115; MATH 245

COURSE OFFERINGS

Courses numbered under 50 are non-degree courses.
Courses numbered under 100 are not intended for transfer credit.

MATH 10 Basic Arithmetic (3)
3 hours lecture
Non-degree Applicable
Basic arithmetic computational skills, with an emphasis on the whole numbers, fractions, decimals, and an introduction to the concepts of area and perimeter. Designed for students who are lacking fundamental arithmetic skills.

MATH 12 Supplemental Instruction for Basic Arithmetic (1)
1 hour lecture
Note: *Pass/No Pass grading only*
Non-degree Applicable
Supplemental instruction for students enrolled in MATH 10 – Basic Arithmetic. Designed for students who need additional review of basic arithmetic topics.

MATH 15 Prealgebra (3)
3 hours lecture
Note: *May be taught in Spanish*
Non-degree Applicable
The basic arithmetic operations, integers, fractions, decimals, percents, ratio and proportion, basic geometric con¬cepts, problem-solving techniques, and an introduction to algebraic thinking.

MATH 17 Supplemental Instruction for Prealgebra (1)
1 hour lecture
Note: *Pass/No Pass grading only*
Non-degree Applicable
Supplemental instruction for students enrolled in MATH 15 - Prealgebra. Designed for students who need additional review of prealgebra topics.

MATH 42A Supplemental Instruction for Beginning Algebra Part I (1)
1 hour lecture
Note: *Pass/No Pass grading only*
Non-degree Applicable
Supplemental instruction for students enrolled in MATH 50A - Beginning Algebra. Designed for students who need additional review of beginning algebra topics.

MATH 42B Supplemental Instruction for Beginning Algebra Part II (1)
1 hour lecture
Note: *Pass/No Pass grading only*
Non-degree Applicable
Supplemental instruction for students enrolled in MATH 50B - Beginning Algebra. Designed for students who need additional review of beginning algebra topics.

MATH 47A Mathematics Topics (.5 - 4)
(Formerly MATH 47)
Units awarded in topics courses are dependent upon the number of hours required of the student. Any combination of lecture and/or laboratory may be scheduled by the department. Refer to Class Schedule.
Non-degree Applicable
Topics in Mathematics. See class schedule for specific topic covered. Course title will designate subject covered.

MATH 47B Mathematics Topics (.5 - 4)
Units awarded in topics courses are dependent upon the number of hours required of the student. Any combination of lecture and/or laboratory may be scheduled by the department. Refer to Class Schedule.
Prerequisite: *A minimum grade of 'C' in MATH 15, or eligibility determined through the math placement process.*
Topics in Mathematics. See class schedule for specific topic covered. Course title will designate subject covered.

MATH 50 Beginning Algebra (4)
4 hours lecture
Prerequisite: *A minimum grade of 'C' in MATH 15 or eligibility determined through the math placement process*
Note: *Selected classes may occasionally be taught in Spanish*
Elementary algebra which emphasizes mathematical reasoning, problem solving, and real-world applications using numerical, algebraic, and graphic models. Topics include problem-solving techniques, algebraic expressions, polynomials, linear equations, linear inequalities, linear and nonlinear graphs, systems of linear equations in two variables, integer exponents, proportions, and radicals.

MATH 50A Beginning Algebra Part I (2)
2 hours lecture
Prerequisite: *A minimum grade of 'C' in MATH 15 or eligibility determined through the math placement process*
Note: *Not open to students with credit in MATH 50*
First part of Math 50 with emphasis on mathematical reasoning, problem solving, and real-world applications using numerical, algebraic, and graphical models. Topics include problem-solving techniques, algebraic expressions, polynomials, linear equations, linear inequalities, linear and nonlinear graphs, and natural number exponents.

MATH 50B Beginning Algebra Part II (2)
2 hours lecture
Prerequisite: *A minimum grade of 'C' in MATH 50A*
Note: *Not open to students with credit in MATH 50*
Second part of Math 50 with continued emphasis on mathematical reasoning, problem solving, and real-world applications, using numerical, algebraic, and graphical models. Topics include problem-solving techniques, algebraic expressions, polynomials, linear equations, linear inequalities, linear and nonlinear graphs, systems of linear equations in two variables, integer exponents, proportions, and radicals.

MATH 52A Explorations in Algebra (1)
3 hours laboratory
Prerequisite: *MATH 15, or eligibility determined through the math placement process*
Supplemental active learning instruction for students enrolled in an intensive version of beginning and intermediate algebra. Collecting, analyzing and mathematically modeling experimental data using polynomial, exponential, and logarithmic functions. Designed to support and strengthen student understanding of beginning and intermediate algebra concepts.

MATH 53 Prealgebra/Beginning Algebra (6)
6 hours lecture
Prerequisite: *MATH 15, or eligibility determined through the math placement process.*
Elementary algebra with a review of selected topics from prealgebra. Emphasizes mathematical reasoning, problem-solving, and real-world applications using numeric, algebraic, and graphic models. Topics include number sense, percents, ratio and proportion, basic geometric concepts, problem-solving techniques, algebraic expressions, polynomials, linear equations, linear inequalities, linear and nonlinear graphs, systems of linear equations in two variables, integer exponents, and radicals.

MATH 54 Algebra for Statistics (6)
6 hours lecture
Prerequisite: *A minimum grade of 'C' in MATH 15, or eligibility determined through the math placement process.*
The core algebra skills needed to understand the concepts, formulas, and graphs used in transfer-level statistics are investigated. Integrates numeracy, proportional reasoning, algebraic reasoning, and functions. Develops conceptual and procedural tools that support the use of key mathematical concepts in a variety of contexts. Throughout the course, college success content will be integrated with mathematical topics. This course is NOT intended for math, science, computer science, business, or engineering majors.

MATH 55 Geometry (4)
4 hours lecture
Prerequisite: *A minimum grade of 'C' in either MATH 50, MATH 50B, or MATH 53 or eligibility determined through the math placement process*
Fundamentals of plane geometry and selected topics from solid geometry developed by both inductive and deductive processes. Especially recommended for prospective teachers and/or students who will be taking Trigonometry.

MATH 56 Beginning/Intermediate Algebra (6)
6 hours lecture
Prerequisite: *A minimum grade of 'C' in MATH 50 or MATH 50B, or MATH 53 or eligibility determined through the math placement process*
Note: *Not open to students with credit in MATH 60*
A review of elementary algebra and in-depth coverage of intermediate algebra intended for the student who has previous experience with algebra. Meets requirement for the A.A. degree. Meets prerequisite requirement for mathematics course numbers 100-120.

MATH 60 Intermediate Algebra (4)
4 hours lecture
Prerequisite: *A minimum grade of 'C' in either MATH 50, MATH 50B, or MATH 53 or eligibility determined through the math placement process*
Graphic, numeric, analytic and applied perspectives on topics including linear, quadratic, exponential and logarithmic functions, exponents and radicals, linear and nonlinear systems of equations and inequalities.

MATH 63 Intermediate Algebra with Geometry (8)
8 hours lecture
Prerequisite: *MATH 50, MATH 50B, or MATH 53, or eligibility determined through the math placement process.*
Note: *Not open to students with prior credit in MATH 56 or 60*
Covers intermediate algebra. Also covers geometric topics including similarity, right triangle trigonometry, and coordinate geometry. Emphasis is placed on understanding concepts rather than rote memorization of formulas.

MATH 97 Mathematics Topics (.5 - 4)
Units awarded in topics courses are dependent upon the number of hours required of the student. Any combination of lecture and/or laboratory may be scheduled by the department. Refer to Class Schedule.
Prerequisite: *A minimum grade of 'C' in either MATH 50, MATH 50B, or MATH 53 or eligibility determined through the Math Placement process*
Topics in Mathematics. See Class Schedule for specific topic offered. Course title will designate subject covered.

MATH 100 Exploring Mathematics (3)
3 hours lecture
Prerequisite: *A minimum grade of 'C' in MATH 56 or MATH 60 or eligibility determined through the math placement process*
Note: *May not be used to clear high school deficiency for students transferring to UC systems Fall 1994 or later*
Transfer acceptability: *CSU; UC – MATH 100, 105 and 106 combined: maximum credit, one course*
Selected topics from logic, modern algebra, number theory, and geometry. Designed to give the student an introduction to the structure of mathematics and its applications. Recommended for liberal arts students.

MATH 105 Concepts of Elementary Mathematics I (3)
3 hours lecture
Prerequisite: *A minimum grade of 'C' in MATH 56 or MATH 60 or eligibility determined through the math placement process*
Transfer acceptability: *CSU; UC – MATH 100, 105 and 106 combined: maximum credit, one course*
Selected topics from the real number system including properties and operations with integers and rational numbers as fractions and decimals. Additional topics include problem solving, numeration systems, number theory, and topics in logic and set theory. Recommended for prospective teachers.

MATH 106 Concepts of Elementary Mathematics II (3)
3 hours lecture
Prerequisite: *A minimum grade of 'C' in MATH 105*
Transfer acceptability: *CSU; UC – MATH 100, 105 and 106 combined: maximum credit, one course*
An extension of Mathematics 105, including selected topics from two-and-three-dimensional geometry, motion geometry, and measurement. Recommended for prospective elementary and junior high school teachers, parents, and liberal arts students.

MATH 110 College Algebra (4)
4 hours lecture
Prerequisite: *A minimum grade of 'C' in MATH 56 or MATH 60 or eligibility determined through the math placement process*
Transfer acceptability: *CSU; UC – MATH 110 and 135 combined: maximum credit, one course.*
C-ID MATH 151
Study of the behavior and characteristics of functions from graphic, numeric, analytic and applied perspectives, including general polynomial functions, rational functions, exponential and logarithmic functions, and sequences. Systems of equations in several variables with an emphasis in matrix solutions.

MATH 115 Trigonometry (3)
3 hours lecture
Prerequisite: *A minimum grade of 'C' in MATH 56 or MATH 60 or eligibility determined through the math placement process*
Transfer acceptability: *CSU*
The trigonometric functions and their applications including emphasis on the analytical aspects, identities, and trigonometric equations.

MATH 120 Elementary Statistics (4)
4 hours lecture
Prerequisite: *A minimum grade of 'C' in MATH 56 or MATH 60 or eligibility determined through the math placement process*
Transfer acceptability: *CSU; UC – MATH 120, and PSYC/SOC 205, combined: maximum credit, one course*
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 interpretation of the relevance of the statistical findings. Applications using data from disciplines including business, social sciences, psychology, life science, health science and education.

MATH 130 Calculus for Business and the Social Sciences (4)
4 hours lecture
Prerequisite: *A minimum grade of 'C' in MATH 110 or eligibility determined through the math placement process*
Note: *Not open to students with credit in MATH 140*
Transfer acceptability: *CSU; UC – MATH 130 and 140 combined: maximum credit, one course*
C-ID MATH 140
Functions and their graphs including exponential and logarithmic functions, single variable calculus, limits, differentiation, integration and their applications, multivariable calculus, with application to business, social sciences and behavioral science.

MATH 135 Precalculus Mathematics (5)
5 hours lecture
Prerequisite: *A minimum grade of 'C' in MATH 115 or eligibility determined through the math placement process*
Transfer acceptability: *CSU; UC – MATH 110 and 135 combined: maximum credit, one course.*
Designed for students who intend to take calculus. Emphasizes study of the behavior and characteristics of functions from graphic, numerical, analytic, and applied perspectives. Includes trigonometric functions, general polynomial functions, rational functions, exponential functions, logarithmic functions, absolute value functions, functions with rational exponents, and sequences. Selected topics from analytic geometry and linear systems are also presented.

MATH 140 Calculus With Analytic Geometry, First Course (5)
5 hours lecture
Prerequisite: *A minimum grade of 'C' in MATH 135, or MATH 110 and MATH 115, or eligibility determined through the math placement process*
Transfer acceptability: *CSU; UC – MATH 130 and 140 combined: maximum credit, one course*
C-ID MATH 211
An introduction to analytic geometry, differentiation and integration of algebraic and transcendental functions of a single variable, and applications of differentiation.

MATH 141 Calculus With Analytic Geometry, Second Course (4)
4 hours lecture
Prerequisite: *A minimum grade of 'C' in MATH 140*
Transfer acceptability: *CSU; UC*
C-ID MATH 221
Continuation of MATH 140. Topics include definite integrals and their applications; methods of integration (including the use of modern computational technology as appropriate); indeterminate forms; improper integrals; sequences; infinite series; Taylor series; conic sections; polar coordinate; and parametric equations from analytic, graphic, and numeric perspectives.

MATH 146 Fortran-90 for Mathematics and Science (3)
2 hours lecture - 3 hours laboratory
Prerequisite: *A minimum grade of 'C' in MATH 135, or MATH 110 and MATH 115, or a passing grade on the appropriate placement test*
Note: *Cross listed as CSCI 146*
Transfer acceptability: *CSU; UC*
Programming in FORTRAN 90 to solve typical problems in mathematics, computer science, physical sciences, and engineering. Programming is done on a PC.

MATH 197 Mathematics Topics (.5 - 4)
Units awarded in topics courses are dependent upon the number of hours required of the student. Any combination of lecture and/or laboratory may be scheduled by the department. Refer to Class Schedule.
Prerequisite: *A minimum grade of 'C' in either MATH 56 or MATH 60, or eligibility determined through the math placement process*
Transfer acceptability: *CSU; UC – Credit determined by UC upon review of course syllabus*
Topics in Mathematics. See Class Schedule for specific topic offered. Course title will designate subject covered.

MATH 200 Introduction to Linear Algebra (3)
3 hours lecture
Prerequisite: *A minimum grade of 'C' in MATH 141*
Transfer acceptability: *CSU; UC*
C-ID MATH 250
Matrices, determinants, vectors, linear dependence and independence, basis and change of basis, linear transformations, and eigen values.

MATH 205 Calculus With Analytic Geometry, Third Course (4)
4 hours lecture
Prerequisite: *A minimum grade of 'C' in MATH 141*
Transfer acceptability: *CSU; UC*
C-ID MATH 230
Vectors in the plane and space, three-dimensional coordinate system and graphing, vector-valued functions and differential geometry, partial differentiation, multiple integration, and vector calculus.

MATH 206 Calculus With Differential Equations (4)
4 hours lecture
Prerequisite: *A minimum grade of 'C' in MATH 205*
Transfer acceptability: *CSU; UC*
C-ID MATH 240
A first course in ordinary differential equations from analytic, geometric, numeric and applied perspectives (including the use of modern computational technology as appropriate). Topics include exact, separable, and linear equations; initial value and boundary-value problems; systems of first-order equations; reduction of order; undetermined coefficients; variation of parameters; series solutions; and Laplace transforms.

MATH 245 Discrete Mathematics (3)
3 hours lecture
Prerequisite: *A minimum grade of 'C' in MATH 130 or MATH 140*
Transfer acceptability: *CSU; UC*
The study of prepositional and predicate logic, number theory and methods of proof, elements of set theory, relations and functions, the Pigeonhole Principle, sequences, infinite sets, basic counting techniques, permutations, combinations, graphs and trees, and applications directed to the field of computer science.

Medical Assisting

See Business (BUS)
Medical Assisting Clinical not offered at Palomar College

Microbiology (MICR)

Contact the Life Sciences Department for further information.
(760) 744-1150, ext. 2275
Office: NS-207A

COURSE OFFERINGS

MICR 110 Microbiology and Foods (3)
2 hours lecture - 3 hours laboratory
Note: *Cross listed as FCS 110*
Transfer acceptability: *CSU*
Introduction to the principles of microbiology with an emphasis on foodborne pathogens. Students will explore biological factors and controls relating to reproduction of microorganisms and the effects on public health. This course does not meet microbiology requirement for pre-health students.

MICR 197 Microbiology Topics (.5 - 4)
Units awarded in topics courses are dependent upon the number of hours required of the student. Any combination of lecture and/or laboratory may be scheduled by the department. Refer to Class Schedule.
Transfer acceptability: *CSU*
Topics in Microbiology. See Class Schedule for specific topic offered. Course title will designate subject covered.

MICR 200 Fundamentals of Microbiology (4)
2 hours lecture - 7 hours laboratory
Prerequisite: *A minimum grade of 'C' in BIOL 102; or BIOL 200 and CHEM 104 or CHEM 100; or BIOL 100 and CHEM 104 or CHEM 100; or BIOL 105 and CHEM 104 or CHEM 100; or BIOL 101, BIOL 101L and CHEM 104 or CHEM 100; or ZOO 203*
Transfer acceptability: *CSU; UC*
Fundamentals of microbiology including medical aspects of microbiology.

Multicultural Studies (MCS)

See also Africana Studies, American Indian Studies, American Studies, Chicano Studies, Judaic Studies

Contact the Multicultural Studies Department for further information.
(760) 744-1150, ext. 2206
Office: MD-354

COURSE OFFERINGS

MCS 100 Introduction to Multicultural Studies (3)
3 hours lecture
Transfer acceptability: *CSU; UC*
Social, cultural and political awareness of diverse national and international systems of thought and multicultural groups as revealed through their social institutions and cultural traditions emanating from family, community and nation - state.

MCS 110 Diverse Cultures in America Today (3)
3 hours lecture
Note: *Cross listed as AMS 110*
Transfer acceptability: *CSU; UC*
An investigation of prevalent cultural trends in four groups of diverse ethnic and cultural backgrounds in America -- African Americans, Latinos, Chinese, and people of Jewish heritage -- since World War II. Emphasis will be placed on the literary, musical, and artistic expressions of their heritage, social conditions, struggle to become part of the main culture, and response to prejudice, racial, and religious discrimination. Selections dealing with social conditions will include such diverse issues as family life, intergenerational conflicts, and religious traditions.

MCS 115 Graphics and Media: A Multicultural Perspective (3)
3 hours lecture
Note: *Cross listed as GC 115*
Transfer acceptability: *CSU; UC*
An introduction to the impact of media technology on the visual arts from a multicultural perspective. Includes print, Internet, multimedia, and game design. Embraces the diversity and multicultural perspectives that reflect American demographics by presenting individual and collaborative contributions as well as strategies for designing niche marketing and advertising graphics for a multicultural society. Addresses the impact of globalization. Examines gender, ethnicity (African American, American Indian, Asian-Americans and/or Pacific Islanders, and Mexican American in particular), age, sexual orientation, and universal access for people with impairments.

MCS 124 Islamic Cultures and Traditions (3)
3 hours lecture
Note: *Cross listed as RS 124*
Transfer acceptability: *CSU; UC*
An introductory course designed for students with a general interest in the Islamic world, including its history and cultural traditions. Examines the main social, traditional and legal institutions of Islam.