MATHEMATICS
SCHOOL OF MATHEMATICS, SCIENCE, AND ENGINEERING
DEAN Janet Mazzarella, M.A., Office 215A, 619-482-6344
DEPARTMENT CHAIR Richard Fielding, M.S.; Silvia Nadalet, M.A.

GENERAL DESCRIPTION
In today’s highly technological society, the study of mathematics has become increasingly important, particularly to computer science. Mathematics is a study that provides a foundation for problem solving and logical reasoning skills. It includes arithmetic, algebra, geometry, trigonometry, calculus, statistics, and computer programming, etc. Mathematics is the science of numbers and their operations, interrelations, combinations, generalizations, and abstractions. In addition to college-level mathematics courses (numbered 100 or above) that will meet the lower-division needs of college transfer students, Southwestern College offers developmental courses consisting of arithmetic through intermediate algebra.

Students may opt to take their developmental courses in one of several formats. All formats require students to study and complete assignments outside of class. Variable sections are self-paced and computer-aided, have no fixed class meetings, and may permit a student to complete more than one course per semester. Interactive sections have regular class meeting with an instructor who uses computer-aided instruction. Hybrid classes meet with an instructor, but with less-frequent campus meetings, and require additional computer-aided instruction outside of class. Traditional lecture sections may include computer-aided instruction or online assignments.

Many of the mathematics courses are designated “Requires graphing Calculator” in the class schedule. These classes incorporate new technology into the curriculum. Both traditional and calculator methods of problem solving are taught. Instructors may choose to require or prohibit calculator use on certain assignments. Students do not need to be proficient with their calculators before enrolling to do well.

However, students are encouraged to acquire and learn to use the graphing calculator prior to enrolling in college-level courses which require a graphing calculator. Graphing calculators which perform algebraic manipulation are not permitted in any Southwestern College math course.

CAREER OPTIONS
Below is a sample of the career options available for the mathematics major. A few of these require an associate degree, most require a bachelor’s degree, and some require a graduate-level degree: numerical analyst, teacher, engineering analyst, systems analyst, operations analyst, casualty rater, technical writer, research assistant, statistician, and computer specialist. In addition, there is presently a great need for high school and college mathematics instructors with this area of employment continuing to grow as society becomes more technological in business, industry, government, and education.

DEGREE/CERTIFICATE OPTIONS MAJOR CODE
Associate in Arts Degree: Transfer Preparation
Mathematics 01580

Associate in Science Degree: Transfer Preparation
Mathematics (SB 1440) 01585

Consult with a counselor to develop a Student Education Plan (SEP), which lists the courses necessary to achieve your academic goal.

Web sites for mathematics majors:
SDSU: http://www.math.sdsu.edu
UCSD: http://www.math.ucsd.edu
CSU, San Marcos: http://www2.csusm.edu/math/
Articulation: http://www.assist.org

The program below is undergoing modification and the modification will be placed into an addendum upon Chancellor’s Office approval - see your counselor for further information and visit the college website under http://www.swccd.edu/catalog link for the latest addenda updates.

ASSOCIATE IN ARTS DEGREE

MATHS

TRANSFER PREPARATION * (MAJOR CODE: 01580)
Mathematics has become essential and pervasive in the workplace. Projections indicate that its use will expand as will the need for more workers with knowledge of college-level mathematics.

PROGRAM STUDENT LEARNING OUTCOME STATEMENT:

• Use the basic definitions, properties, theorems, and techniques of Calculus.
FIRST SEMESTER
MATH 250 Analytic Geometry and Calculus I 5

SECOND SEMESTER
MATH 130 Introduction to Computer Programming ** 4
MATH 251 Analytic Geometry and Calculus II 4

THIRD SEMESTER
MATH 252 Analytic Geometry and Calculus III 4
Complete 3–4 units from electives *** 3–4

FOURTH SEMESTER
Complete 3–4 units from electives *** 3–4

Total units 23–25

** MATH 130 may be taken in any semester; however, it should be noted that MATH 130 is a prerequisite for the elective MATH 140.

***Electives: MATH 119, 140, 253, 254, 260.

To earn an associate degree, additional general education and graduation requirements must be completed. See page 62.

* Students planning to transfer to a four-year college or university should complete courses specific to the transfer institution of choice. University requirements vary from institution to institution and are subject to change. Therefore, it is important to verify transfer major preparation and general education requirements through consultation with a counselor in either the Counseling Center or Transfer Center. See catalog TRANSFER COURSES INFORMATION section on page 45 for further information.

ASSOCIATE IN SCIENCE DEGREE

MATH 250 Analytic Geometry and Calculus I 5
MATH 251 Analytic Geometry and Calculus II 4
MATH 252 Analytic Geometry and Calculus III 4

Choose a minimum of 6 units with at least 3 units from Group A
(3 units are required from Group A, no units are required from Group B, however all 6 units can come from Group A)

Group A:

MATH 253 Introduction to Differential Equations 3
OR
MATH 254 Introduction to Linear Algebra 3

Group B:

MATH 119 Elementary Statistics 4
OR
MATH 260 Discrete Mathematics 3
OR
PHYS 270 Principles of Physics I 3
AND
PHYS 271 Principles of Physics Laboratory I 1

Total units 19–20

Some courses within this program may require additional coursework that must be completed prior to enrollment in these courses. Please consult the individual course listings for prerequisites and any other limitations on enrollment.
Students planning to transfer to a four-year college or university should complete courses specific to the transfer institution of choice. University requirements vary from institution to institution and are subject to change. Therefore, it is important to verify transfer major preparation and general education requirements through consultation with a counselor in either the Counseling Center or Transfer Center. See catalog TRANSFER COURSES INFORMATION section on page 45 for further information.

The Mathematics Department recommends the MATH 119 be taken as an elective if it is not chosen from Group

**MEDICAL ASSISTANT—ADMINISTRATIVE AND CLINICAL**

HIGHER EDUCATION CENTER AT NATIONAL CITY

DEAN Christine Perri, Office, M.A., Office 7103B, 619-216-6668

DIRECTOR Deanna Reinacher, MT (ASCP), Ed.M.

FACULTY Luis Osuna, M.D.

**GENERAL DESCRIPTION**

Designed to respond to the ever-increasing need for well-trained, skilled personnel to fill positions in the allied healthcare industry as medical assistants. Today’s healthcare industry demands a higher level of thinking and performance skills than ever before. The medical assistant programs prepare students for careers as administrative medical or clinical assistants or as medical office managers. The administrative medical assistant provides service to patients within the front office environment. The clinical medical assistant provides some administrative services to patients with primary duties in a clinical (back office) environment.

**CAREER OPTIONS**

The U.S. Bureau of Labor and Statistics has placed medical offices and healthcare facilities among the top ten industries expected to generate the largest number of new jobs. Employment in health services is expected to grow quickly during the coming decades because of the expanding healthcare needs of an aging population. Few fields are as immune to recession as healthcare. Potential employers include, but are not limited to hospitals and doctors’ offices, urgent care, outpatient surgery, industrial and sports medicine clinics; insurance companies, skilled nursing facilities, state and federal health agencies, and medical research institutions.

Career options available for the medical assistant and medical office management major. Some require a certificate of achievement and must require an associate in science degree or higher degree: medical assistant—administrative or clinical, medical, office clerk, medical secretary, medical transcriptionist, medical records clerk, medical records coder, medical records technician, registered records administrator, health insurance specialist, health information administrator, medical office manager, quality assurance specialist, and medical interpreter.

**DEGREE/CERTIFICATE OPTIONS**

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<th>MAJOR CODE</th>
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<td>02314</td>
<td>Associate in Science Degree: Career/Technical</td>
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<tr>
<td>02315</td>
<td>Medical Assisting Administrative</td>
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<td>Medical Assisting—Clinical</td>
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<td>Medical Assisting—Medical Insurance Billing and Coding</td>
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<td>02329</td>
<td>Medical Interpreter—Intermediate (English/Spanish)</td>
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<td>02312</td>
<td>Medical Office Management—Basic</td>
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<tr>
<td>02313</td>
<td>Medical Office Management—Advanced</td>
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Consult with a counselor to develop a Student Education Plan (SEP), which lists the courses necessary to achieve your academic goal.

**ASSOCIATE IN SCIENCE DEGREE**

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<th>MEDICAL ASSISTING</th>
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<td>CAREER TECHNICAL (MAJOR CODE: 02314)</td>
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Prepares students to provide medical assisting services in ambulatory health care facilities, including medical offices, clinics and hospitals. Medical Assistants participate in clinical, administrative and medical insurance billing and coding functions. Clinical functions include obtaining vital signs, preparing patients for and assisting with examinations and procedures, administering medications and performing treatments. Clinical functions may also include drawing blood, performing basic laboratory tests, and taking EKGs. Administrative and billing/coding functions include managing records, completing insurance coding, and providing for billing and collecting as well as serving as receptionist, and scheduling appointments.

Some courses within this program may require additional coursework that must be completed prior to enrollment in these courses. Please consult the individual course listings for prerequisites and any other limitations on enrollment.