

SUFFOLK UNIVERSITY
Mathematics and Computer Science Department

MATHEMATICS SURVIVAL MANUAL



SUFFOLK
UNIVERSITY

COLLEGE OF ARTS & SCIENCES

2011 - 2012

Dear Student:

On behalf of the Math and Computer Science Department and the Math /CS Support Center we welcome you to Suffolk University. We hope that you will take advantage of the many opportunities that Suffolk offers to help you encounter new ideas, acquire new skills, and grow intellectually.

The purpose of this guide is to answer two questions that are of interest to most students who are taking first year math courses:

- (1) What is the math requirement?
- (2) What resources are available to help me with my math courses?

Going to college is one of the most important things that you will ever do. The decisions that you make about courses and majors will determine what kinds of choices and opportunities you will have later in life.

Some careful thought about these matters now, and early in your school career, can save you a lot of trouble later and help to make your college years more pleasant and productive.

Please take the time to read through the attached material. If you have any questions please don't hesitate to call or visit the Math/CS Support Center, (located in Fenton, room 636, phone 617-573-8763) or the Mathematics Department office (located in Fenton, room 621, phone 617-573-8251) and speak to any one of us in the department.

Good luck and best wishes from all of us.

Prof. Jeanne Dodge, Director
Math /CS Support Programs

Dr. Edith Cook, Chair
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WHAT IS THE MATHEMATICS REQUIREMENT?

Your mathematics requirement depends upon whether you are in the College of Arts and Sciences (CAS) or the Sawyer Business School (SBS).

For CAS students the requirement is:

Choose any MATH course at level 130 or higher.

Some majors have specific mathematics requirements. For example, Chemistry, Computer Science, Math, Physics and Engineering require MATH 165 & MATH 166 (plus other courses). Biology requires MATH 134 or higher. Please make sure that you carefully check the requirements of your intended major. If your math placement exam indicates that you are at the level of M121,130,134 and you are majoring one of these sciences should take Math 121.

For SBS students the requirement is:

MATH 130, MATH 134 or MATH 165.

Some majors have specific mathematics requirements. Accounting and Finance require MATH 134 or higher. Please make sure that you carefully check the requirements of your intended major. If you are strong in math and are considering graduate school you should consider taking M165. Many graduate schools actually prefer Math 165.

Many students will need to take a suitable preparatory course (MATH 104 or 121) prior to taking the course that satisfies the requirement. The required Math course is best taken during your freshman year so that you can have the advantage of applying the mathematics skills to future courses such as science and economics.

If you have not yet decided on a major, the best strategy is to take the most advanced math sequence that you can handle. This will guarantee you the maximum number of options later on as you become more certain of which field you wish to specialize in. Even if you have decided on a major you should allow for the possibility that you might change your mind.

CAN'T I PUT IT OFF TILL LATER?

It is not wise to wait. Many courses depend on math as a prerequisite. Also, the longer the time since your last math course, the harder it is to remember what you knew. Once we humans start procrastinating it is hard to stop! No special favors are available for students who wait until the senior year to take math and then fail. Math is a requirement at Suffolk because we believe that a college educated person must know some mathematics in order to have any chance at all of understanding the world and its problems.

AT WHAT LEVEL SHOULD I BEGIN?

Math placement exams, given to virtually all incoming students, are offered several times during the summer, and during the first two weeks of each semester. Also, the Math/CS Support Center (MSC) has self-tests to help you assess your knowledge of math and choose the appropriate course. During the first meeting of all math classes, instructors spend time discussing the content and prerequisites for the courses. If you find that you chose the wrong math course it is possible to move from one class to another during the "Drop-Add Period" (the first two weeks of class).

WHAT RESOURCES ARE AVAILABLE TO HELP ME WITH MY MATH COURSES?

MATH/CS SUPPORT CENTER

The Math/CS Support Center, run by the Department of Mathematics, offers a variety of types of assistance to students during day and evening hours in Fall, Spring, and Summer semesters. The following is a brief outline of the programs that are available. Detailed schedules are published at the start of each semester and are available from the Math/CS Support Center Office in Fenton 636.

COURSE WORK HELP

STAFFING

Assistance is provided by caring adjunct faculty and upper-level undergraduate and graduate students, selected for their mathematical and /or computer programming skills and teaching ability.

- ***DROP-IN MATH HELP SESSIONS***

Math Help offers individual and small group tutoring, on a drop in basis, for course content in all freshmen level mathematics courses. This is a good place to ask questions about daily homework and lectures-- before questions become problems. Students may drop in as often as needed. The center, located in Fenton 636, is open more than 45 hours each week, divided between day and evening hours. The center is open and manned from the first week of classes through final exams. Students may visit the center whenever it is open, whether they are having severe difficulty, need just a little bit of help, or just want a friendly place in which to do their math homework.

- ***ONE-ON-ONE HELP BY APPOINTMENT***

In addition to our drop-in help, The Math/ C.S. Support Center offers a limited amount of one-on-one tutorial help in course content for all freshmen level mathematics courses. Tutors will answer questions about material presented in your class, go over problems similar to assigned homework, review for exams, and work on strategies for studying math. Tutoring sessions will be tailored to the needs of the student. Unlike the drop-in math help program, students participating in this service are guaranteed a 1-1 appointment for a specified amount of time. Our services are always free of charge, and those who register for one-on-one help can also take advantage of the drop-in services offered by the Center.

- ***COMPUTER SCIENCE HELP***

Computer Science help is offered for freshmen level (and select upper level) computer science courses. Schedules are distributed each semester detailing the types of tutoring that are available for each course, but depending on the semester and the course, there two types of tutoring available:

1. **Drop-in Computer Science Tutoring** is offered in the Fenton building (in either Fenton 234 or Fenton 431) and is manned by undergraduate students, graduate students and adjunct faculty members. Students can stop by and ask specific questions or start working on their programs and, if they get stuck, a tutor is there to help them.
2. **By Appointment Computer Science Tutoring** is offered in the Fenton computer lab (Fenton 234.) Students should sign up in advance in the Math/CS Support Center (Fenton 636) during registration hours (listed outside the MSC each semester), by calling (617)973-5350 or by emailing waldman@mcs.suffolk.edu . (Calls or emails left outside the hours of 10am-4pm will be answered the next business day.) Appointments are in half-hour intervals and students can sign up for multiple appointments per week.

BASIC MATH SKILLS HELP:

- ***MATHSHOP***

MATHSHOP is a non-credit, full-semester workshop, designed for students who need substantial review before starting MATH 104 or 121. Similar to a course, MATHSHOP meets three hours per week, throughout the semester. Each MATHSHOP section systematically covers the fundamentals of mathematics such as: arithmetic with signed numbers, fractions, decimals, percentages, basic algebra, and solving equations. Study skills and strategies for dealing with math anxieties are also discussed. There are usually five sections of MATHSHOP each Fall semester, three sections each Spring semester, and one section during each summer session.

BALLOTTI LEARNING CENTER

The Ballotti Learning Center, located in room Donahue 208, offers assistance in general study skills, time management, note taking, text comprehension, etc. Ballotti tutors are not authorized to give tutoring help in math or computer science course content.

COURSE DESCRIPTIONS

Mathematics Courses

MATHEMATICS 000 - MATHSHOP: A Bridge to College Mathematics

A NON-CREDIT, full semester workshop designed for students who need substantial review before starting MATH 104 or MATH 121. Similar to a course, MATHSHOP meets three hours per week throughout the semester. Topics covered are tailored to the needs of the students and include basic math material, basic algebra, graphing, ways of dealing with math fears, and study methods. *1 term - 0 credits. Several sections normally offered each semester*

Mathematics 104 - *Precalculus for Management and Social Sciences

A selection of topics in algebra and elementary analytic geometry including, but not restricted to: properties of real numbers, linear equations and inequalities, absolute value equations and inequalities, polynomials, rational expressions, exponents and radicals, quadratic equations, functions, linear, quadratic, and polynomial models, rational, exponential and logarithmic functions. Applications and graphs are stressed throughout the course. This course is intended to prepare students who have only had one year of high school algebra to take MATH 134. Students may not use this course alone to satisfy the C.A.S. math requirement. ***Prerequisite:*** *Qualifying placement exam score. Students who are not prepared for this course should take MATHSHOP. 1 term - 4 credits. (4 hours per week) Several sections offered each semester. This course cannot be taken for credit by a student who already has credit for a more advanced course.*

Mathematics 121 - *Precalculus Mathematics

A review of topics in algebra, trigonometry and analytic geometry intended for students needing one additional semester of preparation before taking MATH 165. Students may not use this course alone to satisfy the C.A.S. math requirement. ***Prerequisite:*** *MATH 104 with C or higher qualifying placement exam score indicating solid grounding in intermediate algebra. 1 term - 4 credits, (4 lecture hours plus 1 recitation hour per week). Normally offered each semester. This course cannot be taken for credit by a student who already has credit for a more advanced course.*

Mathematics 130 - *Topics in Finite Mathematics

Linear Modeling (for example, using linear functions to model supply/demand situations), graphing, linear programming, financial functions (compound interest, annuities, and amortization of loans), sets, Venn diagrams, counting and combinatorics, discrete probability, conditional probability, Bernoulli experiments, Bayes theorem. **Prerequisite:** *Qualifying placement exam score or MATH 104 or. 1 term - 4 credits. (4 hours per week) Several sections offered each semester.*

Mathematics 134 - *Calculus for Management and Social Sciences

A one-semester introduction to differential and integral calculus. Theory is presented informally and topics and techniques are limited to polynomials, rational functions, logarithmic and exponential functions. This course cannot be used to satisfy core or complementary requirements by students majoring in chemistry, computer science, engineering, mathematics, or physics **Prerequisite:** *qualifying placement exam score or MATH 104. 1 term - 4 credits. (4 hours per week) Several sections offered each semester.*

Mathematics 165 - Calculus I

Functions, limits and continuity; instantaneous rate of change, tangent slopes, and the definition of the derivative of a function; power, product, and quotient rules, trig derivatives, chain rule, implicit differentiation; higher order derivatives; applications (curve sketching, limits at infinity, optimization, differentials); other transcendental functions (inverse trig functions, exponential and log functions, hyperbolic trig functions); anti-derivatives; indefinite integrals; applications (net change). **Prerequisite:** *MATH 121 with a grade of C or higher or placement score indicating solid preparation in high school algebra and trigonometry. 1 term - 4 credits (4 lecture hours plus 1 recitation session each week) Normally offered each semester.*

Mathematics 166 - Calculus II

Riemann sums and definite integrals; Fundamental Theorem; applications (areas); integration of exponential functions, trig functions, and inverse trig functions; techniques of integration (by parts, trig substitution, partial fractions); area, volume, and average value applications; differential equations (separable, exponential growth, linear); infinite sequences and series; convergence tests; power series; Taylor and Maclaurin series (computation, convergence, error estimates, differentiation and integration of Taylor series). **Prerequisite:** *MATH 165 with a grade of C or higher. 1 term - 4 credits (4 lecture hours plus 1 recitation session each week) Normally offered each semester.*

CAS students pursuing a Bachelor of Science degree must also satisfy the Quantitative Reasoning requirement

This requirement can be satisfied by taking one of the several approved courses.

The current list of approved courses contains all Computer Science course as well as STATS240, all offered by the Mathematics and Computer Science department. The following courses from the aforementioned list: CMPSC120, CMPSC124, CMPSC125, CMPSC131, CMPSC132 and STAT240 are supported by the Math/CS Support Center.

In addition, the list of approved courses for the Quantitative Reasoning contains offerings from the Biology, Government, Psychology and Economics departments.

Computer Science Courses

Computer Science 120 - Programming for the World Wide Web

This hands-on course is aimed at students who want to learn how to build interesting and interactive web pages. We do not use any drag-and-drop software for this purpose. Instead we cover the basics of HTML and PHP and, if time permits, we look at some ways of building web pages that interact with databases. Each student will have, for the duration of the course, an account on a server that permits individuals to have web pages that are visible on the World Wide Web. *[4 semester hours]- 4 credits.*

Computer Science 124 - Game Programming

This course introduces students to computer game development, including, but not limited to, game programming. We use Game Maker framework for personal computers that runs equally well on XP, Vista, and Linux. We learn about the foundational concepts of two-dimensional games: graphics, sound, objects, actions, rooms, scores, levels, multiplayer support, artificial intelligence, and more. Game Maker has an intuitive interface that makes game development approachable for everyone including those who have never written a single game or a single computer program. All games created by Game Maker can be saved as standalone applications and can be shared freely with classmates, friends, and family. This is not a course in graphics design, audio editing, or scriptwriting. Students are encouraged to use their creativity and imagination to design games and the correctness of game implementation is stressed throughout the course. *[4 credits, 4 hours per week. No prerequisite.]*

Computer Science 130 - Game Programming II

This course will be a continuation of CMPSC 124 and go more in-depth into coding and the designing of different types of games or applications. Using the Game Maker framework, students will challenge their creativity by developing strategy, isometric, and platform scrolling games, among others. In this class, students will go beyond the drag and drop options of Game Maker and explore the possibilities within the Game Maker Language (GML), creating more complex games. We will make GUIs, program audio engines, and experience the rich learning process of taking a game from inspiration through implementation.

Computer Science 131 - Computer Science I

This course offers a rigorous introduction to computer science in Java with an emphasis on problem solving, object-oriented programming and graphical user interfaces. Topics include expressions, input/output, control structures, intrinsic data types, classes and methods, iteration, top-down programming, arrays, graphical user interfaces and elements of UML. *1 term - 4 credits. Normally offered each semester.*

Computer Science 132 -Computer Science II

The second course in Java programming emphasizes object oriented programming, data structures and algorithms, and programming. Topics include inheritance, polymorphism, exception handling, recursion, simple data structures (linked lists, stacks, queues, trees), sorting, searching and files. Students learn how to use debugging and documentation tools. *Prerequisite: CMPSC 131. 1 term - 4 credits. Normally offered each semester.*

STATS 240 - Introduction to Statistics

Topics include: data presentation, measures of central locations and dispersion, probability and probability distributions, estimation, hypothesis testing, simple and multiple regression models. The use of Excel and SPSS will be emphasized throughout the course. **Prerequisite:** *Math 130 or higher. 1 term - 4 credits (4 hours per week). This course will be taught by Math Department faculty. Normally offered each semester.*