

MATHEMATICS ADVISORY NOTES FOR FROSH, 2009 - 2010
UNIVERSITY OF CALIFORNIA, SANTA CRUZ

To be successful in many majors requires you demonstrate some level of ability in mathematics or statistics. This guide will allow you to compare your ability in mathematics, assessed either by the Math Placement Exam or advanced standing credit, to the levels required as prerequisites for work in UCSC's majors.

An important goal for your first year is to assess your math ability and ensure you have demonstrated the level needed to successfully make progress in the major(s) you are considering. This will be the level of precalculus for some majors and completion of a sequence of courses in calculus for others. Many majors require additional work in math and statistics that builds on these foundations.

Information about the Math Placement Exam is at <http://www.math.ucsc.edu/placement/index.html>. Detailed information about major requirements is in the General Catalog (<http://reg.ucsc.edu/catalog/>) and department websites.

<p>The following majors require completion of a sequence of courses in calculus. Some also require statistics:</p> <ul style="list-style-type: none"> • All majors in Biological Sciences: Biology, Ecology and Evolution, Marine Biology, Plant Sciences, Health Sciences, Molecular Cellular & Developmental Biology, Neuroscience and Behavior • All majors in Engineering: Bioengineering, Bioinformatics, Computer Engineering, Computer Science, Computer Game Design, Electrical Engineering, Information Systems Management • Biochemistry & Molecular Biology • Chemistry • Earth Sciences • Mathematics • All majors in Physics: Physics, Applied Physics, Astrophysics, Physics Education • Combined majors including those above: Earth Sci/Anthropology, Economics/ Math, Environmental Studies/Earth Sci 	<ul style="list-style-type: none"> • Unless you have Advanced Placement (AP exam) or transferable college/university credit in Math, you should take the Math Placement Exam as soon as possible if you are interested in one of these majors. • To preserve the possibility of making successful progress in these majors, you should begin taking math classes immediately, and successfully complete at least the first course in calculus during your first year. • If your initial Math Placement Exam score does not qualify you to begin the appropriate sequence in calculus (see reverse), it is especially important that you take the appropriate math class (based on your placement exam score) as soon as possible in your first year, and that you demonstrate progress toward calculus. • If you do not pass your first math course with at least a grade of C, you should consult with an adviser on ways to improve your math preparation or to consider other majors to meet your educational goals. • See the reverse side of this sheet for information about getting started in the appropriate calculus series.
<p>The following majors require completion of a sequence of courses in calculus, with additional work in statistics:</p> <ul style="list-style-type: none"> • Business Management Economics • Economics • Global Economics • Combined majors including those above: Latin American Latino Studies/Global Economics, Environmental Studies/Economics 	<ul style="list-style-type: none"> • Unless you have Advanced Placement (AP exam) or transferable college/university credit in Math, you should take the Math Placement Exam as soon as possible if you are interested in one of these majors. • To preserve the possibility of making successful progress in these majors, you should successfully complete the first course in calculus during your first year. • If your initial Math Placement Exam score does not qualify you to begin Economics (or AMS) 11A, it is especially important that you take the appropriate math class (based on your placement exam score) as soon as possible in your first year, and that you demonstrate progress toward calculus. • If you do not pass your first math course with at least a grade of C, you should consult with an adviser on ways to improve your math preparation or to consider other majors to meet your educational goals. • See the reverse side of this sheet for information about getting started in the appropriate calculus series.
<p>The following majors require precalculus and statistics:</p> <ul style="list-style-type: none"> • Environmental Studies • Psychology • Combined major including those above: Environmental Studies/Biology (Other combined majors involving Environmental Studies have additional requirements as noted above.) 	<ul style="list-style-type: none"> • Unless you have Advanced Placement (AP exam) or transferable college/university credit in Math, you should take the Math Placement Exam as soon as possible if you are interested in one of these majors. • To preserve the possibility of making successful progress in these majors, you should complete precalculus (or pre-statistics for Environmental Studies or Combined Environmental St./ Biology) during your first year. • If you do not pass your first math course with at least a grade of C, you should consult with an adviser on ways to improve your math preparation or to consider other majors to meet your educational goals.

• Majors other than those listed above do not require courses in mathematics. In some cases math or statistics courses are recommended or listed as options for meeting major requirements.

• All students must complete a general education requirement in Quantitative Reasoning (Q).

GETTING STARTED IN CALCULUS AT UC SANTA CRUZ: 2009 - 2010

The course in which to begin your study of calculus depends on two things:

1. Your placement according to your current skills, knowledge, and abilities. This is typically measured by your score on the Math Placement Exam, by AP calculus exam scores, or by prior college course work in mathematics.

- If you scored 5, 6, or 7 on the International Baccalaureate (IB) Higher Level Mathematics Exam, talk with an adviser.
- If you scored below 12 on the Math Placement Exam, contact the Math Undergraduate Adviser to discuss your options.

2. Your intended major. Different majors require different types of mathematical preparation.

This chart will help you determine which calculus (or precalculus) course to begin with.

If you plan to major in:	Take one of these courses, depending on your placement:
<ul style="list-style-type: none"> • Any major in Engineering: Bioengineering, Bioinformatics, Computer Engineering, Computer Science, Computer Game Design, Electrical Engineering, Information Systems Management • Chemistry, B.S. ** • Any major in Physics: Physics, Applied Physics, Astrophysics, Physics Education • Mathematics • Combined major: Economics/ Mathematics 	<ul style="list-style-type: none"> • If your math placement score is 12 - 19, and you did not score 3 or above on an AP Calculus exam, and you have not taken a transferable college or university math class, take: > Math 2, College Algebra for Calculus • If your math placement score is 20 - 39, and you did not score 3 or above on an AP Calculus exam, and you have not taken a transferable college or university math class, take: > Math 3, Precalculus, OR > AMS 3, Precalculus for Science and Engineering • If your math placement score is 40+, or if you scored 3 on the AP Calculus AB exam, and you have not taken a more advanced math class at another college or university, take: > Math 19A, Calculus for Science, Engineering, and Mathematics. • If you scored 4 or 5 on the AP Calculus AB exam, or 3 on the AP Calculus BC exam, take: > Math 19B, Calculus for Science, Engineering, and Mathematics • If you have taken a transferable math course at another college or university, or if you scored 4 or 5 on the AP Calculus BC exam: > Contact your department/ major adviser • Students in these majors should not take the Math 11 A-B calculus series!
<ul style="list-style-type: none"> • Any major in Biological Sciences: Biology, Ecology and Evolution, Marine Biology, Plant Sciences, Health Sciences, MCD Biology, Neuroscience and Behavior • Biochemistry & Molecular Biology • Chemistry, B.A. ** • Earth Sciences • Combined majors: Earth Sciences/Anthropology, Environmental Studies/ Earth Sciences 	<ul style="list-style-type: none"> • If your math placement score is 12 - 19, and you did not score 3 or above on an AP Calculus exam, and you have not taken a transferable college or university math class, take: > Math 2, College Algebra for Calculus • If your math placement score is 20 - 30, and you did not score 3 or above on an AP Calculus exam, and you have not taken a transferable college or university math class, take: > Math 3, Precalculus, OR > AMS 3, Precalculus for Science and Engineering • If your math placement score is 31 - 39, or if you scored 3 on the AP Calculus AB exam, and you have not taken a more advanced math class at another college or university, take: > Math 11A, Calculus with Applications * see below • If you scored 4 or 5 on the AP Calculus AB exam, or if you scored 3 on the AP Calculus BC exam, take: > Math 11B, Calculus with Applications * see below • If you have taken a transferable math course at another college or university, or if you scored 4 or 5 on the AP Calculus BC exam: > Contact your department/ major adviser. * Students who seek a more challenging calculus series may choose to take Math 19A – 19B. See Math 19A and 19B placement requirements in the first box above. The Math 19 A-B series is recommended for Earth Science majors who plan a concentration in planetary sciences.
<ul style="list-style-type: none"> • Economics • Business Management Economics • Global Economics • Combined majors: Latin American Latino Studies/Global Economics and Environmental Studies/Economics 	<ul style="list-style-type: none"> • If your math placement score is 12 - 19, and you did not score 3 or above on an AP Calculus exam, and you have not taken a transferable college or university math class, take: > Math 2, College Algebra for Calculus • If your math placement score is 20 - 30, and you did not score 3 or above on an AP Calculus exam, and you have not taken a transferable college or university math class, take: > Math 3, Precalculus, OR > AMS 3, Precalculus for Science and Engineering • If your math placement score is 31 - 39, or if you scored 3 on the AP Calculus AB exam, and you have not taken a more advanced math class at another college or university, take: > Econ 11A, Mathematical Methods for Economists ,* OR > AMS 11A, Mathematical Methods for Economists * see below • If you scored 4 or 5 on the AP Calculus AB exam, or if you scored 3 on the AP Calculus BC exam, take: > Econ 11B, Mathematical Methods for Economists ,* OR > AMS 11B, Mathematical Methods for Economists * see below • If you scored 4 or 5 on the AP Calculus BC exam, take: > Math 22, Introduction to Calculus of Several Variables, * OR > Math 23A, Multivariable Calculus * see below • If you have taken a transferable math course at another college or university: > Contact your department/ major adviser. * Students who seek a more challenging calculus series, or who plan graduate school in Economics or Business, should see the Economics adviser.
<ul style="list-style-type: none"> • Environmental Studies • Psychology • Combined major: Environ Studies/Biology (Other combined majors involving Environmental Studies have additional requirements as noted above.) 	<ul style="list-style-type: none"> • If your math placement score is 12 - 19, and you did not score 3 or above on an AP Calculus exam, and you have not taken a transferable college or university math class, take: > Math 2, College Algebra for Calculus • If your math placement score is 20 - 30, and you did not score 3 or above on an AP Calculus exam, and you have not taken a transferable college or university math class, take: > Math 3, Precalculus, OR > AMS 3, Precalculus for Science and Engineering OR > For Environmental Studies & Combined Environmental Studies/Biology majors only: AMS 2, Pre-statistics • If you have taken a transferable math course at another college or university: > Contact your department/ major adviser.

** Math requirements for chemistry depend on which degree you pursue (B.A. or B.S.). Contact the Chemistry adviser for assistance.