2019:

GETTING STARTED IN MATH, ENGINEERING, AND THE SCIENCES

Some beginning advice....
This Session

This session is designed to give you introductory information about beginning the college-level study of the Sciences at Dartmouth College

Goals:
• To introduce you to the Science Curricula at Dartmouth
• For you to assess High-School preparation in the Sciences and what that means for starting Science sequencing at Dartmouth
• For you to understand the best way to begin course work in individual disciplines (=departments/majors)
• For you to understand the relationship between courses in different Disciplines (Departments/majors)
Overall info/advice

• Know where you’re starting (i.e., placements in math, sciences, etc.,) and your strengths

• Not the same as high school (in terms of pace, difficulty, and grade scale)

• Successful students use Resources !!

• Your current comfort and mastery of Math has implications for how you begin study in the sciences
Know where you’re starting

• Because, this has implications for:

  • How easy or difficult your transition to college-level science coursework will be

  • What classes you take your first term

  • What classes you take your first year

  • Whether you take certain classes in combination

  • Later flexibility for other opportunities (Foreign Study, Off term, etc.)
Is this you?

• Placement into MATH 1 (no calculus experience in High School)
• No AP courses in Math or Science
• Concern about Math/Science preparation
• Less than 700 on the SATI Math Test
Or, is this you?

• Placement into MATH 3 (some calculus experience in High School)
• You took AP Science course in High School but did not get a 5 on the AP (or didn’t take it)
• No “credit-on-entrance” in science courses on placement record
Or, is this you?

• Placement into MATH 8 or higher
• You got a 5 on one or more AP exams: Biology, Physics, Chemistry
• One or more “credit-on-entrance” in science on placement record
• Score of 22-30 on the Biology Placement/Advisory test
• Confidence/a strong background in science
Take a minute and decide

**Little or no math and science background**
- Placement into MATH 1 (no calculus experience in High School)
- No AP courses in Math or Science
- Concern about Math/Science preparation
- Less than 700 on the SATI Math Test

**Some math and science background**
- Placement into MATH 3 (some calculus experience in High School)
- You took AP Science course in High School but did not get a 5 on the AP (or didn’t take it)
- No advanced placement in science courses on placement record

**A great deal of math and science background**
- Placement into MATH 8 or higher
- You got a 5 on one or more AP exams: Biology, Physics, Chemistry
- One or more “credit-on-entrance” in science on placement record
- Score of 22-30 on the Biology Placement/Advisory Test
- Confidence/a strong background in science
Implications for little or no math and science background

• Be cautious about doubling up in Science, Math, or Engineering classes in any particular term during your first year (There are exceptions, e.g. Engineering; consult with departments and your advisors)

• Two courses with labs in one term is always a large work load. Be very cautious about taking two lab courses in the same term during your first year

• You will likely adjust to college level work at a pace that will allow for success in your first year

• You will have less flexibility in your D-Plan (i.e., schedule) particularly later years

• Off-campus programs (LSAs and FSPs) are possible but require careful early planning of your schedule

• You will have room for fewer electives

• If you are Pre-health, you can still complete the Pre-health curriculum before you leave Dartmouth. The norm at Dartmouth and nationwide is to take a year off between college and medical school. This enables you to plan a more flexible schedule for completing the pre-health curriculum before you leave Dartmouth.

• You should limit your extracurricular activities during the first year (this includes even internships and academic opportunities outside the classroom)
Implications for some math and science background

• Be cautious in doubling up Science, Math, or Engineering in the first term
• You might want to avoid having your first lab course be during a term where you are taking two such courses
• Pay careful attention to your schedule as you go forward. You can do Foreign Study, etc., but it requires advance planning.
• You should limit your extracurricular activities for the first year
• This allows you to apply to medical school in your final year at Dartmouth.
A great deal of math and science background

• You will have more flexibility down the road. (But don’t squander this)
• It will be easier to fulfill a second major in addition to your science major (if you choose to)
• You should be able to fulfill the prerequisites for your science major in your first year
• It is OK to double up on Math and Science courses in the first term
• You may consider taking two courses with labs in the first term
• You may be taking intermediate level math/sciences courses in your first year
Some general advice
(This is not the same as high school)

• Course work will go faster than you anticipate (keep up with notes and problems; this will start in the first week)

• Schedule 3 hours of study and prep time out of class for every hour you spend in class. (i.e., you will need a minimum of 30 hours a week outside of class to keep up)

• As you adjust to college work, you will need to learn how to study. This takes time.

• Don’t be surprised if your first exam grade is less than 70%. This could very well be a respectable grade (depending on the curve/course etc.)

• Limit extracurricular activities. Especially until you have college academics under your belt.
Successful students use resources

• Professors’ Office Hours
• Math Department – drop-in tutorials
• Biology and Chemistry – use the Teaching Science Fellows
• Computer science - take advantage of section leaders and TAs in COSC 1 and COSC 10
• Academic Skills: Learning strategies
• Tutor Clearinghouse: peer tutors and study groups
  • Sign up early in the term
• Form your own study group
• Engineering: Dartmouth Emerging Engineers (DEE). FREE study sessions five nights a week at Thayer to help with pre-requisites. Empathetic TA’s, engineering faculty advising, a community of engineering students. https://engineering.dartmouth.edu/dee/
Teaching Science Fellows

Alice Hsu ’19
(Chemistry)
and
Miranda Greig ‘19
(Biology)

Office: 123 Life Sciences Center

Fall term covering BIO 12/19 and CHEM 5, but available to any science student

E-mail or drop by!

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Teaching Fellows’ Website

http://sites.dartmouth.edu/teachingsciencefellows

OR Google: Dartmouth Teaching Sciences Fellows

It’s the first thing that pops up!
Basic Guidelines...
Mathematics

Math is not only a major, but math classes are pre-requisites for STEM majors, so starting at the correct place is critical.

**Little or no math and science background**

- If you’ve never taken calculus, take MATH 1 this Fall and MATH 3 in the Winter

**Some math and science background**

- If you’ve taken some calculus but do not place out of MATH 3, take MATH 3 this Fall

**A great deal of math and science background**

- You are placed into MATH 8 or higher
- Depending on what you think you might want to major in, take more Math in the Fall or Winter
- If you are considering majoring in Math, take a Math class Fall term
Biology

Little or no math and science background

• If placed into MATH 1, take MATH 1 this Fall and MATH 3 in the Winter
• Consider taking BIO 11 in the Winter or Spring
• Consider taking BIO 2 this Fall

Some math and science background

• If placed into MATH 3, take MATH 3 this Fall
• Take BIO 11 sometime this year; consider a foundation course (BIO 12-16)
• Consider taking CHEM 5 in the Winter

A great deal of math and science background

• Take Biology 19 in the Fall or a foundation course (12-16) in the Fall or Winter (BIO 12-16); consider taking a second foundation course this year
• Consider taking CHEM 5 (Fall or Winter) and CHEM 6 (Spring) this year
Chemistry

Little or no math and science background

• If placed into MATH 1, take MATH 1 this Fall and MATH 3 in the Winter
• Take CHEM 5 in the Winter, CHEM 6 in the Spring

Some math and science background

• If placed into MATH 3, take MATH 3 this Fall
• Take CHEM 5 in the Winter, CHEM 6 in the Spring (this allows you to take organic chemistry sophomore year)
• Consider taking CHEM 5 in the Fall, if you have credit for MATH 3

A great deal of math and science background

• Take CHEM 10 in the Fall (it is your only chance)
• If you have credit on entrance for CHEM 5 and CHEM 6, consider taking organic chemistry (in consultation with the Department)
Computer Science

Students wishing to devote one course to the study of Computer Science should take COSC 1 offered in Fall, Winter, and Spring. No previous programming experience is required to take COSC 1 (over half of students taking COSC 1 have no computer programming experience). Students wishing to devote two or more courses to the study of Computer Science should begin with COSC 1 and COSC. Students wishing to take courses in Digital Arts should start by taking COSC 1 or COSC 2. ENGS 20 may substitute for COSC 1 in any program of study.

Little or no math and science background

• If placed into MATH 1, take MATH 1 this Fall and MATH 3 in the Winter

Some math and science background

• If placed into MATH 3, take MATH 3 this Fall

Please note:

• COSC 1 is a prerequisite for COSC 10
Earth Science

Prerequisites: Any one introductory Earth Science course (EARS 1-9 exclusive of EARS 7); EARS 40; CHEM 5 (or CHEM 10); and any one of the following courses taken at Dartmouth: MATH 3, MATH 8, MATH 9, MATH 11, MATH 12, MATH 13, MATH 14, MATH 23, or MATH 46.

**Little or no math and science background**

- If placed into MATH 1, take MATH 1 this Fall and MATH 3 in the Winter
- EARS 1 the Fall or Spring

**Some math and science background**

- If placed into MATH 3, take MATH 3 this Fall
- EARS 1 in Fall or Spring or EARS 18 in the Fall

**A great deal of math and science background**

- EARS 1 in Fall or Spring or EARS 18 in the Fall
- CHEM 5 in the Winter
Engineering

Little or no math and science background

• If placed into MATH 1, take MATH 1 this fall, MATH 3 in the winter, MATH 8 in the spring. Use the first year to develop confidence in mathematics. Be sure to speak to a faculty advisor in Engineering about planning your program.

• Take MATH 13, PHYS 13, PHYS 14, and ENGS 20 in the second year, preparing to begin engineering core courses during sophomore summer.

Some math and science background

• If placed into MATH 3, take MATH 3 this fall, MATH 8 in the winter.

• Take PHYS 13 in the winter, PHYS 14 in the spring. Talk to your engineering advisor about taking MATH 13 or ENGS 20 or ENGS 21 in the spring.

• Plan to complete math and physics, plus ENGS 20 and 21, by the end of sophomore year, to begin taking engineering core courses during sophomore summer.

• CHEM 5 can wait until later.

A great deal of math and science background

• Take MATH 8 +13 or 11 in fall/winter, with PHYS 13 +14 in winter/spring.

• Take ENGS 20 or 21 in the Spring, the other during sophomore Fall. Talk to your engineering advisor about planning the second year.

• CHEM 5 can be taken sophomore year or wait until later
Physics and Astronomy

Little or no math and science background

• If placed into MATH 1, take MATH 1 this Fall and MATH 3 in the Winter
• Note: PHYS 3 & 4 are for non-majors (don’t start here if you want to major)
• Note for Premeds: additional winter Physics 3/ Spring Physics 4 track this year

Some math and science background

• If placed into MATH 3, take MATH 3 this Fall
• Take PHYS 13 in the Winter, PHYS 14 in the Spring

A great deal of math and science background

• Take Physics 13, 14, 19 in the first year (or postpone 19 until Sophomore fall)
  OR,
• Take 15/16/40 in the first year (the accelerated track)
• Note: Additional Winter PHYS 15/ Spring PHYS 16 this year; PHYS 40 offered both Fall and Spring Term

Note: PHYS 15 requires that your high school physics used calculus and requires taking an on-line placement exam during orientation
Neuroscience

Prerequisites: PSYC 6, PSYC 10; two courses from among MATH 3, 4, 8, ENGS 20, COSC 1, 10; and two courses from among CHEM 5, 6, PHYS 3, 4

Little or no math and science background

• If placed into MATH 1, take MATH 1 this Fall and MATH 3 in the Winter
• Take Psyc 6 in Winter or next (sophomore) Fall

Some math and science background

• If placed into MATH 3, take MATH 3 this Fall
• Take PSYC 6 Fall or Winter term

A great deal of math and science background

• Take PSYC 6 Fall or Winter term