

**School of
Computer
Science**



**Facts Of Life
&&**

Frequently Asked Questions

**Class of 2010
Fall 2006**

This document contains Facts Of Life (FOL) for incoming SCS freshmen, and Frequently Asked Questions (FAQs) that I hear –and feel like I answer over and over again– each summer. So, please read these entries carefully. The information presented here will allow you to plan your fall schedule with a better understanding of the educational environment you are about to enter.

Facts of Life: Being an SCS Freshmen at Carnegie Mellon

1. As an incoming freshman, your general priorities, needs, and wants for courses come after those of every sophomore, junior, and senior at CMU. The reason for this is simple: sophomores are six semesters from graduation, juniors are four semesters from graduation, and seniors are only two semesters from graduation. You, as a freshman, have eight semesters to achieve your goals. Plans to do double majors/degrees or graduate in three years do not change this fact.

2. As an incoming freshman, your general priorities, needs, and wants for courses are no greater or less than any other CMU freshman. All freshman get preferential treatment for courses **within their own major/department**: thus, we guarantee that you will be registered in any Computer Science course that you need to take. Beyond that, all freshmen are equivalent in every way. Plans to do double majors/degrees or graduate in three years do not change this fact.

3. As an incoming freshman, you are here to pursue a Bachelor of Science in Computer Science. That is what you and CMU have agreed to, when you accepted CMU's invitation to attend the School of Computer Science. One requirement for your degree is that you must complete a minor in another field. There was no implicit or explicit offer of a second major/degree. This does not mean that you cannot earn a second major/degree (43 students graduating in Fall 06 did –and many others earned multiple minors), but it does mean that you have no a formal agreement with CMU about such matters. If you can register for and pass the appropriate courses, you will be awarded the second major/degree (or multiple minors). However, you receive no special priority for registration in courses that lead to a second major/degree (or multiple minors).

4. During your first semester at CMU, you probably cannot register for 18-100, Introduction to Electrical Engineering (or other courses required for freshmen in another school/major). There is no policy against you taking such courses: if there is a seat open when you register, take it. But (and this is a big but) do not count on such an opportunity; do not plan for it in your schedule.

Most seats in specialized courses are reserved for freshmen only in that major. If other seats become available, they will go first to seniors, then juniors, then sophomores on the waiting lists, who registered for courses last spring. When these seats are all gone, no one else can register for that course. So, if you want to register for a course like 18-100, you will probably have to wait a semester or two. Plans to do double majors/degrees or graduate in three years do not change this fact. This discussion doesn't apply to service courses in Math, Science, English, etc.; SCS has seats in these courses reserved for our incoming freshmen. Most of you will get whatever Math and Science courses that you want; but only about half of you will be able to register for English (76-101) in the fall; the others will wait until the spring. You'll need to be a bit flexible.

5. You will not be awarded sophomore status just because you have a large number of credits from AP/IB (or transfer) courses. All first year students are freshmen; all second year students are sophomores, and all third year students are juniors –regardless of how many units a student has acquired. There is one exception: if you plan on graduating at the end of your third year, the Assistant Dean will examine your case and can award you early senior status at the start of your third year, if appropriate. So, you are a freshman for your entire first year, and will register for second year courses with all the other freshmen; you will draw for dorm rooms with all the other freshmen. Plans to do double majors/degrees or graduate in three years do not change this fact.

6. It is hard to place out of 21-127 (Discrete Mathematics). Few high schools offer such a course, and there is no AP exam in this area, yet. This course not only covers material in discrete mathematics, it also introduces and drills students in a college-level approach to problem-solving and rigorous proof. It is a prerequisite for both 15-211 and 15-251: most students take 21-127 in the fall semester of their freshman year; then, they take 15-211 in the spring semester of their freshman year, and finally they take 15-251 in the fall semester of their sophomore year. You will take an On-Line Discrete Mathematics Exam to determine if you can place out of 21-127. This is important mostly if you want to take 15-211 or 15-251 during the fall semester. Using previous years as a guide, only about 10%-20% of the incoming students will place out (and, even some who place out will elect to take this course at CMU). There is no penalty for doing poorly on this exam: we don't expect many incoming students to have mastered this material.

7. By taking some CMU courses, you waive certain AP/IB (or transfer) credit that you would otherwise be awarded. For example, if you have Calculus AP/IB credit, and elect to take 21-131, Analysis (a more rigorous approach to the foundations of Calculus –this course is by invitation only from the Mathematics department, and serves as the gateway to their Math Studies sequence, in which some CS students double major), you waive your AP credit for the first semester of Calculus (assuming that you pass 21-131). **Important Note:** Your goal at CMU is to challenge yourself and learn new things; it is not to collect units. Very few CS majors graduate with exactly the 360 units that are required: most have many more. You must not let the loss of previously awarded credit keep you from taking challenging courses and learning new things. Such an approach is antithetical to our understanding of why you are here.

8. If you do poorly on the On-Line Calculus Placement Exam, you will have to take a Calculus course at CMU, even if you have earned AP/IB (or transfer) credit. Several years ago, the previous freshman advisor received a phone call from an incoming freshman concerning the Calculus Placement Exam (it wasn't on-line then) that went something like this:

Freshman: I took the AP BC exam for Calculus in the 8th grade and scored a 5. Do you really expect me to remember all that stuff for this placement exam?

Advisor : Yes; if you do not remember this material at an appropriate level, you must repeat the course here at CMU, because subsequent classes will assume you know it.

Remember, you come to CMU to learn, not just to collect units. When you finish a course here, we expect that you know the material and can use it in a later course. If that course is a prerequisite for another course, and you don't remember the material in the first course, then you will not be able to learn properly in the second course. The On-Line Calculus Placement Exam serves as an indicator of how much you remember about Calculus. In decisions about Calculus, or other courses, we will always ask, "Will awarding credit for this course compromise a student's learning in a future course?" Unless the answer is, "no", we will not award the credit. So, please take the On-Line Calculus Placement Exam very seriously!

9. We are leery of awarding credit for any Computer Science course (beyond 15-200) that is not taught by a highly reputable Computer Science Department in a reputable School. The reasoning is the same as for FOL 8: when we award credit, we are concerned about compromising a student in later courses. If the Assistant Dean were to award transfer credit for say 15-211, and we later find out that the student is not adequately prepared for subsequent courses (typically by him/her taking a course requiring 15-211 as a prerequisite, and doing poorly in it), it could be a very expensive mistake. The student would have to go back and take 15-211, as well as the other course again. In fact, because of us incorrectly awarding credit, the student might have to pay tuition for attending CMU for an extra semester. Thus, we tend to be conservative in awarding credit in an attempt to avoid this kind of costly mistake.

10. Successfully registering for a course does not mean that you should be in the course. Many courses have special locks that are designed keep out (certain) freshmen. However, you may find a course, by some fluke, that allows you to register for it, even if though you should not be able to do so. For one example (and I have seen many), a freshman found that he could register for a Biology Lab course that was designed for Biology majors only; against the advice of his advisor, the Biology Advisor, and the Associate Dean of the Mellon College of Science, he registered for the course. When the professor teaching the course learned that this student was not a Biology major, she immediately dropped him from the course. So, just being able to register for a course does not mean that you belong there, nor that you will be able to take it.

As another example, once a student with an AP English grade of 5 registered for a 300-level English writing course, also against all advice. This student was not dropped from the course, as in the previous case. When he showed up at his advisor's office, he complained that the 1500 pages of weekly reading, coupled with the written analysis due each week, was unfair because none of the other students in the course had a Programming assignment and Discrete Math problem set due each week. Very little sympathy was offered. What was offered instead was the question, "What did you expect from a junior level writing course that is full of junior English majors, who are not taking a Programming or Discrete Math course? This was why you were advised not to take the course in the first place." There is a reason why CMU uses an advising system: we offer advice based on years of observing students working towards exactly the same goals as you are. Our advice is not meant to hold you back or to create unnecessary hurdles for you to jump. But, when our advice differs from your desires (or just what you want to hear), you should listen carefully to what we are saying and try to understand our point of view.

11. All this said, you are the person in charge of scheduling courses during your four years at CMU. We want to encourage students to register for courses that will challenge them, not retake courses consisting of material that they already learned in high school or elsewhere (balanced by FOL 8 and FOL 9). You are going to build your schedule using CMU's On Line Registration (OLR) during the summer (although most students continue making small changes after they arrive at CMU). We will show you how to do so, and we will be available to answer any of questions that arise while you register. But, you will do your own registration, so you must have a fundamental understanding of what is required to graduate in four years. That is the main purpose of our summer communications. If you think that you are too busy to read this material, or the material is too boring –or just too badly written– then you will build your first semester schedule lacking much of the understanding that is necessary to do so correctly. We will spend more time during your first semester at CMU explaining what you need to graduate. But if you have not read all of this material, several times, attempting to understand and master it, you will glean little from these discussions.

12. Rich Pattis will be your freshman advisor; you will be assigned another advisor at the end of your Freshman year, who will advise you for your last three years at CMU. We will talk with you, offer advice to you, and comment on your scheduling plans. However, you must first articulate to us what you are planning, and you must come to us well-informed. This means that you must be fluent with the registration material that we ask you to read during the summer, and must at least begin to understand what it takes administratively to earn a Bachelor's Degree in Computer Science at CMU. To balance out all that has been said above, we will act as your advocate in all manner of issues while you are attending CMU. But you must keep us well informed and act in a partnership with us. Of course, we encourage you to solicit information not only from us, but from other faculty, other students, and even your parents. Of course, getting all this information is a simple step: analyzing it and making a decision is harder (but at least, if you follow these steps, you will make an informed decision).

Frequently Asked Questions by Incoming SCS Freshmen

1. What is the overall goal in building my schedule?

You want to satisfy the following requirements in the first four semesters, or sooner:

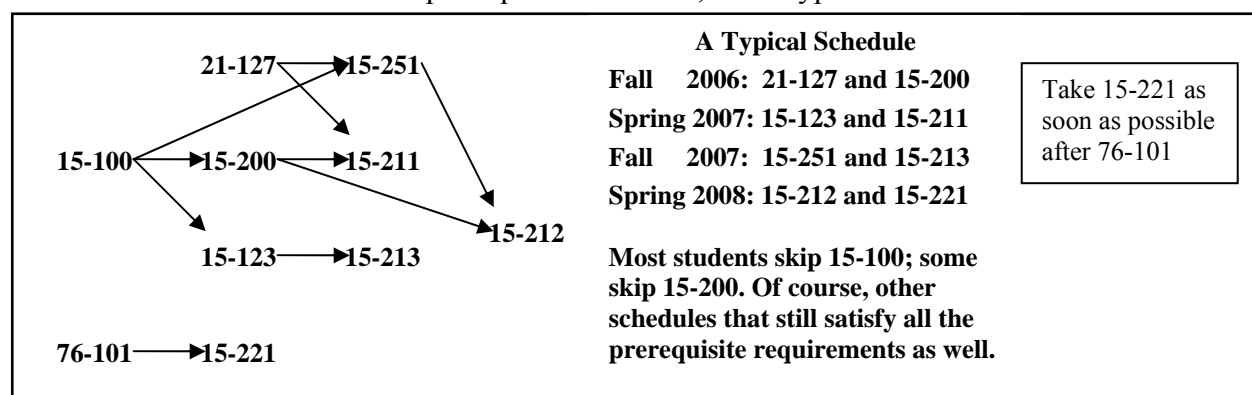
- five math courses (two calculus, matrix algebra, discrete mathematics, probability)
- four science/engineering courses (at least two from the same department), including a lab
- a freshman writing course and a CS technical writing course
- three humanities breadth requirements

The reason for this advice is threefold:

- these course are requirements
- freshmen and sophomores can get into these courses easily
- satisfying these requirements during your first four semesters here gives you flexibility when scheduling your last four semesters: it allows you to take electives, take graduate courses, perform independent research, work on a research project and write a thesis

2. How do all the prerequisites for the first two years of my CS courses fit together? What is a typical semester schedule including these courses.

SCS is making some fundamental changes this year to the freshman/sophomore curriculum, so asking upperclassmen might not yield much good advice. Here is a picture to help you understand the new courses and prerequisite structure, and a typical schedule.



3. I am not sure what Programming course to take during my first semester. What are my options; what do you recommend; what if I make a mistake?

There is an entire form that you will fill out to help you better understand your programming course placement. We will make a recommendation to you based on your completion of this form (along with any AP/IB scores that we receive). There are three basic options

- 15-100: for students with no or little programming
- 15-200: for students with some programming, who understand variables, declarations, expressions, control structures, classes (instance variables, constructors, and methods), and arrays (e.g., scored 3-5 on the AP/CS A exam, or 2-4 on the AP/CS AB exam)
- 15-123: for students with a lot of Java programming, who understand the material above, and interfaces, inheritance, exceptions, using/implementing collection classes, big-O notation, (recursive) manipulation of linked-lists and trees, and graphs (e.g., scored 5 on the AP/CS AB exam; note this course follows 15-200, although it is numbered lower)
- 15-211/212/213: for special students demonstrating mastery of 15-100/200/123 material

To allow students to sort themselves out between 15-100 and 15-200, these classes are scheduled at the same time; likewise for 15-123 and 15-211. So, it will be easy to move down, from one course to the other, during the first few weeks of the semester. Aim high. Last year of the ~140 incoming students, about 25 started in 15-100 in the fall semester, about 60 in 15-200, about 40 in 15-123, and about 15 in 15-211/212/213. A few dozen students moved down.

4. What courses *must* I take as an incoming SCS Freshman? If I want to take a course whose time conflicts with 15-128, can I schedule both at the same time and just go to one or the other (or alternate attendance), keeping in touch with my friends in these classes to help me keep up?

You must register for the Freshman Immigration Course (15-128), which is 1 unit course, and Computer Skills Workshop (99-101) which is a 3 unit course. You must attend 15-128: it is the one time that ALL incoming SCS freshmen will be together. We are very serious about attending this course (a form or roll is taken). I will check your schedule two weeks into the fall semester; if I find a conflict with 15-128, I will drop you from the conflicting course.

5. I have AP/IB (or transfer) credit for Calculus I and II, and I think I did well on the On-Line Calculus Placement Exam. What Mathematics course should I take during my first semester?

Besides a year of calculus, SCS requires Discrete Math (21-127), Matrix Algebra (21-241) and Probability (36-217 or 36-225); we also advise our students to take Calculus in Three Dimensions (21-259): although this course is not required for graduation, it serves as a prerequisite for many popular CS electives (e.g., Robotics, Computer Graphics).

6. I have AP/IB (or transfer) credit for four semesters of Physics Chemistry/Biology, so I have finished my four science/engineering requirements. What should I take during my first semester?

Here are several ideas:

- if you are considering a minor in Chemistry/Physics/Biology, consider taking the next course in that sequence
- if you are considering a minor in some other discipline, try to take the courses you need to start that minor
- you can take a second humanities course to satisfy another “breadth requirement” or one of your “elective” requirements
- you can take a course for fun, in area that interests you –or maybe in an area you have never studied before; college is a great place to develop new and unexpected interests

7. I have AP/IB (or transfer) credit for all of the following requirements:

- 15-100/15-200
- Calculus 1, 2, 3-d, and Matrix Algebra
- four Science/Engineering courses
- three Humanities breadth requirements

What should I take during my first semester?

A vacation! Seriously, you most likely want to take 15-123 and 21-127 (if place out of 21-127, you can take 15-211 instead). You should also take the freshman writing course, Interpretation and Argument (76-101). You now have 27 units in your schedule. Added to this will be 1 unit for the Freshman Immigration Course (15-128) and 3 units for Computer Skills Workshop (99-101). You now have 31 units in your schedule. You have at least 5, and at most 26 units with which you can work: remember minimum/maximum units for freshmen are 36/57, with most students coming in at about 49 units (5 nine-unit courses + 15-128 and 99-101). You must eventually complete a probability course, 15-221 (a CS technical writing course; but, it has 76-101 as a prerequisite) and three electives from Humanities or Fine Arts, so you could start fulfilling those requirements. If you register for two more courses, at 9 units each, it would bring your total to 49 units. You are way ahead of the game. I suggest that you scour the course schedule for other interesting courses.

8. Can I take French, German, Japanese, Russian, etc. during my first semester at CMU?

There are many foreign language courses available at CMU, although incoming freshmen often have a tough time registering for one. In fact, before you can register for any Modern Language course, you must first talk to someone in the Modern Language Department: if you have previous experience in a language, you must be tested for placement, and you may be able to take an upper-level course, depending on whether seats are available. Your Orientation Counselor will be able to direct you to the Modern Language office on campus. Also, you may want to visit their website at <http://ml.hss.cmu.edu/mlrc>; for special information on placements, see the url: <http://ml.hss.cmu.edu/mlrc/information/pl/placement.html>

9. I want to take 6 courses (not including 15-128 and 99-101) during my first semester at CMU. I'm very bright and highly motivated. Can I do that?

No, you cannot. As stated before, you must take at least 36 units and at most 57 units. As stated in FAQ 4, you are required to take 4 units (15-128 and 99-101). This leaves you with a maximum of 53 units to schedule. Six courses, with at 9 units each, totals 54 units, which is one too many, and we will not grant you an exception. As you prove yourself at CMU, we can discuss the number of courses that you should take each semester; there are even some university rules governing this issue, with an automatic increase of 12 units granted for a GPA ≥ 3.0 (there are some other special rules that apply, which we will discuss at the end of the fall semester).

10. When can I start registration?

There is an on-line check-list that involves you reading many documents and filling out many forms. When you are done with all these activities, you will send me email. At that point I will check all your forms (and that I have received all your AP/IB (or transfer) credits), remove the "hold" from your registration, and email you any final advice that I have based on these forms. For most students, this event occurs during the last week of July or first week on August. The earlier you complete your forms, the earlier you can register, and the more likely you can get into popular classes. Expect to be shut out of one or two non-majors classes; be flexible in your planning and choose backup courses. For example, we have reservations in the fall semester for only about half of you in 76-101; the other half of you will take this course in the spring semester; see FAQ 4 for more details.

11. Do I have to finish registering for all my courses over the summer?

No. Although some students will complete their registration over the summer, the average student will arrive at CMU still needing to schedule 1-2 courses. You will be able to meet with me at various times during the week of Freshman Orientation, to discuss your schedule and finish your registration. In fact, on Academic Day (the one day that all SCS students get together, typically a Thursday), you will hear a presentation from the upperclassmen about courses and registration. Later that day, you will have time reserved to rearrange/complete your schedule (in a room with me and a few other advisors) based on what you hear. By the end of that day, about 80% of you will have finished registration.

12. If I'm not done on Academic Day, how can I add the remaining courses that I need to complete my schedule?

You can continue to register for classes during the first two weeks of school. Technically you can register for classes up to and including the 10th weekday of the semester. Based on statistics that I collected last year, most students are completely registered by the 3rd day of classes: in this case, you'll miss at most one class meeting. In fact, I strongly advise you to attend any class for which you are trying to register, and immediately visit the professor during his/her office hours to discuss you adding his/her class. You are your own best advocate, but I'll be glad to help you in whatever way I can.

13. I am worried about the workload at CMU. Should I start my first semester light and later add a course, or start with a heavy load and drop a course?

My best advice is to register for five "normal" courses (~9 units each), plus 15-128 and 99-101 (1+3 units), for a total of 7 courses and ~49 units. If you find that this load is too heavy, you can drop one course. At CMU, if you drop a course early enough (by the 3rd month of a 4 month semester), it totally disappears from your transcript, as if you never took the course in the first place; if you drop after this date, it appears on your transcript at a W –withdrawl– but does not figure into computing your grade point average. Of course, dropping a course should not be the first thing you do if you run into a time crunch, but it is an option that many students take. We will talk about dropping courses more during 15-128. Remember that you must always carry at least 36 units (the registration system won't let you drop below this threshold). And, it is always easier to drop a course than add one. But if you ultimately are going to drop a class, you should try to diagnose the problem quickly and drop it before your grades in other courses are compromised by too heavy of a workload.

There are a tremendous number of activities at CMU outside of academics, so you shouldn't worry much about having a workload that it too light. You'll find many useful activities with which to fill your time.