

Rationale for Changes in Engineering Admission and Graduation Requirements

Glossary

C - an older, but powerful computing language that is very concise; a major application is putting code onto chips in many devices (your car, kitchen, phone, etc.)

C++ a more recent (1979) extension of C, with many more features.

Python - a recent (1989) programming language, considered easier for beginning programmers than C++

Excel - a powerful spreadsheet application; most are familiar with it.

MATLAB - a problem solving application favored for many engineering problems; has some features of both an application and a programming language.

Programming needs for Engineering Students

Throughout its 60+ year history, computing needs for engineering students, and for various engineering majors, has seen continued change and discussion throughout engineering schools due to the rapid progress in the computing field.

Until the mid-2000s, our students had two computing entry points:

- Computer Science, Computer Engineering and Electrical Engineering majors took CSE 231, a four credit course in C++, with the first two majors following with CSE 232, another four credit C++ course.
- Other engineering majors took CSE 131, a three credit MATLAB course.

Electrical engineering majors have always been in a somewhat unique position, needing both C programming and MATLAB. This was managed by taking C++ in CSE 231, which provided sufficient experience to program in the more austere C language, and learning some MATLAB in context in other courses.

In the late 2000s, several changes occurred:

- CSE 231 switched from C++ to Python, leaving electrical engineers without C or C++
- MATLAB moved from CSE 131 (3 cr) to EGR 102 (2 cr)
- Electrical Engineering students then took EGR 102 (MATLAB) followed by a new one credit C course (CSE 251).

Recent assessments have indicated that the one credit C course was insufficient, and that MATLAB could be returned to teaching as modules in subsequent courses. Hence, CSE 251 (1 credit) is being replaced with CSE 220 (3 credits), and Electrical Engineers will not take EGR 102.

This leads to changing from two computing entry points to three:

- Computer Science and Computer Engineers start with CSE 231 (4 credits of Python)
- Electrical Engineers will start with CSE 220 (3 credits of C)
- The other seven majors will start with EGR 102.

Hence, the college admission and graduation requirements need to add CSE 220 to account for the above.

Impact on students

Dropping CSE 251 (1) and starting CSE 220 (3) at the same time would disadvantage EE students who had taken EGR 102 (2) and would now need CSE 220 (3) rather than CSE 251 (1), requiring two additional credits.

To mitigate this situation, the old CSE 251 and the new CSE 220 will both be offered in fall and spring for the 2013-14 academic year. EE students who have completed EGR 102 will have two semesters to complete CSE 251 before it is dropped. If they do not do so, they would then be held to CSE 220.

Regarding other students who may change engineering majors, this has always been the case. If a student has had a more "rigorous and robust" computing experience, and is moving to a major requiring a different language, the requirement is waived but the student is advised of the pros and cons of taking the course or learning by other means. If moving in the direction of the more rigorous computing experience, the student is held to the requirement of their new major.

Thomas F. Wolff, Ph.D., P.E.
Associate Dean for Undergraduate Studies
Michigan State University
College of Engineering
428 S. Shaw, Room 1415
East Lansing, MI 48824-1226