

Hardware Curriculum Track

Description

This track emphasizes the design of hardware done by computer engineers. If you are interested in working for a company that designs computer hardware you should consider following this curriculum track. This would also be a good track if you want to work with real-time or embedded systems. Real-time systems have time constraints that must be met and often require awareness of the hardware to meet those requirements. Embedded systems contain one or more computers that have responsibility for controlling the device. These systems require interfacing to outside of the computer to read sensors or control physical devices. If you work with these systems you will benefit from an increased understanding of hardware design because your software will usually interface with other hardware devices. You may also work closely with the hardware designers as the team debugs the hardware and software simultaneously.

Software Engineering courses

The following three software engineering courses are relevant to this curriculum track. These courses are also the Embedded Systems application domain courses.

- 4010-461 Real-Time and Embedded Systems
- 4010-462 Modeling of Real-Time Systems
- 4010-463 Performance Engineering of Real-Time and Embedded Systems

Application Domains

If you are interested in this track you should consider choosing either the Computer Engineering or Embedded Systems application domains.

Courses in Other Programs

One of your required courses is 0306-340 Engineering Fundamentals of Computer Systems. With prior approval, you can substitute 0306-341 Introduction to Digital Systems for that course. This will give you a more in depth study of digital systems hardware. If you make this substitution, you are encouraged to take, at least, 0306-250 Assembly Language Programming in addition.

Computer Engineering has several courses relevant to this curriculum track. In addition to the three courses in the Computer Engineering application domain (0306-351 Hardware Description Languages, 0306-561 Digital Systems Design, 0306-620 Design Automation of Digital Systems), you can consider taking any other Computer Engineering course for which you have the prerequisites. The courses are listed in the course catalog and in the *Elective Courses* section of the Computer Engineering Minor description.

Related Minors

If you are interested in this curriculum track you can easily pursue a minor in Computer Engineering. This minor requires you to take 0306-341 Introduction to Digital Systems, 0306-250 Assembly Language, and 0306-550 Computer Organization. You should plan to substitute

0306-341 Introduction to Digital Systems for your required 0306-340 Engineering Fundamentals of Computer Systems. You will then need to take the other two required minor courses and two elective courses.

Arranging your Track and Scheduling

This curriculum track has a lot of flexibility because there are related application domains and all the courses are from engineering programs.

To pursue an interest in this curriculum track, you should take the Embedded Systems or Computer Engineering application domain. You can fit both sets of courses into your program by selecting one of those application domains and taking the courses in the other domain as your engineering electives.

Beyond that you can continue gaining depth in computer engineering by taking more courses from that program. The following choices would maximize the number of computer engineering courses you could take within the software engineering program and give you a minor in computer engineering.

1. Take Physics as your lab science sequence. This is needed for the Computer Engineering courses.
2. Substitute 0306-341 Introduction to Digital Systems for 0306-340 Engineering Fundamentals of Computer Systems.
3. Choose the Computer Engineering application domain.
4. Take 0306-250 Assembly Language, 0306-550 Computer Organization, and one other computer engineering course as your engineering electives.
5. Take two of the three real-time and embedded systems courses as your software engineering design elective and undesignated software engineering elective.

Most computer engineering courses are offered twice per year including some in the summer term. The software engineering real-time and embedded systems courses are each offered only once per year. It is not required but is beneficial to take the three courses in order. You should plan to take 4010-441 Principles of Concurrent Software Systems and 0306-341 Introduction to Digital Systems early in your program to start the prerequisite courses for both the more advanced Computer Engineering courses and the courses in the Embedded Systems application domain.

Planning for a Minor

Before embarking on a minor you should meet with the department sponsoring the minor to register and review scheduling strategies. There may be a need to coordinate your co-op blocks based on the quarters in which courses are typically offered as well as considering course pre-requisite chains required within the minor.