Computer Engineering BS Degree

A new Bachelor of Science (BS) degree in Computer Engineering (CompE) will be offered by the University of Hawai'i at Mānoa, effective fall 2010. The curriculum will be devoted to computer hardware and software, computer organization and architecture, computer security, software engineering, computer networks and Internet technology, embedded systems, computer-aided design, multi-core and parallel computing, wireless networks, as well as other topics. The program is in the Department of Electrical Engineering in the College of Engineering. It was approved by the University of Hawai'i Board of Regents in November 2009 and jointly proposed by the Department of Electrical Engineering and the Department of Information and Computer Sciences (College of Natural Sciences).

Admissions

A completed UH Mānoa application form must be submitted to the UH Mānoa Admissions & Records office:

> http://manoa.hawaii.edu/admissions/undergrad/apply/freshman.html

Applicants for admission to UH Mānoa as freshmen must submit, with their applications, official Scholastic Aptitude Test (SAT) or American College Test (ACT) scores, and high school transcripts.

Besides meeting the UH Mānoa requirements, the College of Engineering additionally requires that the student has taken: Algebra, Trigonometry, Analytic Geometry, Physics, and Chemistry.   Acceptance into the program is on a case by cases basis, and there is some flexibility in the requirements.

Financial Aid

The University and College have a number of opportunities for financial assistance:

> http://www.eng.hawaii.edu/prospective-students/scholarships-financial-aid

Facilities

The Departments of Electrical Engineering and Information and Computer Sciences are located in Holmes Hall and the Pacific Ocean Sciences and Technology (POST) building. There are a number of instructional and research laboratories including a computer circuits laboratory, all of which have hardware development systems and computer aided software tools that are used in industry. Both departments maintain computers and servers for instruction and research.

Curriculum

The Computer Engineering (CompE) BS degree program requires a minimum of 124 credit hours which includes

- College of Engineering Requirements (51 credit hours) which includes calculus, chemistry, physics, economics, speech, and UH Mānoa General Education requirements.
- Department Requirements (72 credit hours)
    - o CompE Core Courses (66 credit hours)
    - o CompE Technical Electives (6 credit hours)

CompE Core Courses

Students must complete a total of 66 credit hours including the following (credit hours are shown in parentheses):

- EE 160 Programming for Engineers (4)
- EE 205 Object-Oriented Programming (3)
- EE 211 Basic Circuit Analysis I (4)
- EE 213 Basic Circuit Analysis II (4)
- EE 260 Introduction to Digital Design (4)
- EE 315 Signal and System Analysis (3)
- EE 323 Microelectronic Circuits I/Lab (3/1)
- EE 324 Physical Electronics (3)
- EE 342 EE Probability and Statistics (3)
- EE 361/361L Digital Systems and Computer Design/Lab (3/1)
- EE 366 CMOS VLSI Design (4)
- EE 367/367L Computer Data Structures and Algorithms/Lab (3/1)
- EE 371 Engineering Electromagnetics I (3)
- EE 495 Ethics in Electrical Engineering (1)
- ICS 141 Introduction to Discrete Math for Computer Scientists I (3)
- PHYS 274 General Physics III (3)
- Engineering Breadth (3) -- see description below
- MATH 307 Linear Algebra and Differential Equations (3)
- Project courses: EE 296 Sophomore Project (1), EE 396 Junior Project (2), and EE 496 Senior Capstone Design (3). EE 496 is the senior level capstone design course and requires a significant design effort.

CompE Technical Electives

There is a requirement of a minimum of 6 credit hours of technical electives. They may be all from the following list of EE and ICS courses. Alternatively, they may be composed of 3 credit hours from the list and 3 credit hours of an EE course that is at the 300 level or higher.

- EE 344 Network I (or ICS 451)
- EE 406 Introduction to Computer and Network Security
- EE 449 Computer Communication Networks (or ICS 451)
- EE 461 Computer Architecture (or ICS 431)
- EE 467 Object Oriented Software Engineering
- EE 468 Introduction to Operating Systems (or ICS 412)
- EE 469 Wireless Data Networks
- EE 491 Special Topics in Electrical Engineering (E, F, G)
- ICS 311 Algorithms
- ICS 313 Programming Language Theory
- ICS 321 Data Storage & Retrieval
- ICS 413 Software Engineering I
- ICS 414 Software Engineering II
- ICS 415 Introduction to Programming for the Web
- ICS 421 Database Systems
- ICS 424 Application Frameworks
- ICS 425 Computer Security and Ethics
- ICS 426 Computer System Security
- ICS 432 Concurrent and High-Performance Programming
- ICS 441 Theory of Computation
- ICS 442 Analytical Models and Methods
- ICS 461 Artificial Intelligence I
- ICS 464 Human Computer Interaction I
- ICS 465 Introduction to Hypermedia
- ICS 466 Design for Mobile Devices
- ICS 469 Introduction to Cognitive Science
- ICS 481 Introduction to Computer Graphics

Note that ICS courses from the list may have prerequisite courses that are not part of the computer engineering curriculum. These courses used as technical electives will require more credit hours to complete the program.

Engineering Breadth Requirement

The *Engineering Breadth* requirement is satisfied by CEE 270 Applied Mechanics I, ME 311 Thermodynamics, or a CEE, ME, OE, or BE course that is at the 300 level or higher. It may also be satisfied by a physical or biological science course that is at the 300 level or higher and approved by the Department's Undergraduate Curriculum Committee (UCC). The following is the current list of approved courses:

- Biochemistry (BIOC)
    - o BIOC 341 Elements of Biochemistry (3)
    - o BIOC 441 Basic Biochemistry (4)
- Chemistry (CHEM)
    - o CHEM 351 Physical Chemistry I (3)
- Microbiology (MICR)
    - o MICR 351 Biology of Microorganisms (3)
    - o MICR 394 Marine Biotechnology (3)
    - o MICR 485 Microbes and Their Environment (3)
- Molecular Biosciences and Biosystems Engineering (MBBE)
    - o MBBE 401 Molecular Biotechnology (3)
    - o MBBE 402 Principles of Biochemistry (4)
    - o MBBE 412 Environmental Biochemistry (3)
- Physics (PHYS)
    - o PHYS 310 Theoretical Mechanics I (3)
    - o PHYS 350 Electricity and Magnetism (3)
    - o PHYS 430 Thermodynamics and Statistical Mechanics (3)
    - o PHYS 460 Physical Optics(3)

Career Opportunities

Computer engineers may find work as design engineers, consultants, sales and customer support personnel, managers, test engineers, or in manufacturing. They may also continue with graduate education leading to an MS or PhD degree.

Contact Information

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