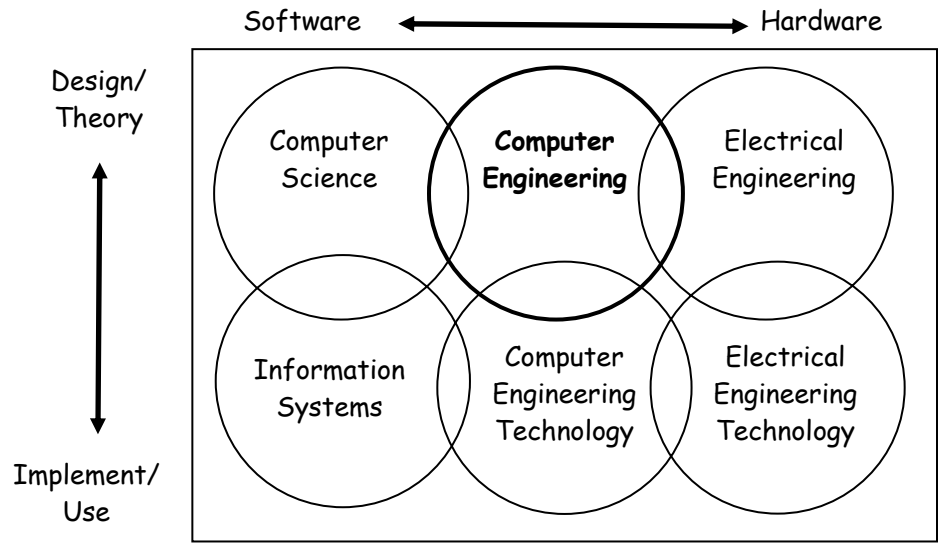
# Computer Engineering

**What does a computer engineer do?**

Computer engineers design, develop, and manage systems that process, store, and transmit information. These systems include personal computers, workstations, mainframe computers, computer networks, and all of their various components. Computer engineers are particularly involved in the design and development of "embedded" computers used in aircraft, automobiles, communication switching systems, biomedical instruments, industrial robots, and household appliances. Designing these systems raises both hardware and software issues; a computer engineer typically has the hardware background of an electrical engineer and the software background of a computer scientist. Computer engineers can choose to specialize in areas such as very large scale integrated (VLSI) systems design, embedded systems, electronic design automation and networks, and communications.

**IPFW Computer B.S. Degrees**: The College of Engineering, Technology, and Computer Science (ETCS) at IPFW offers a range of computer related degrees. The diagram below shows the primary focus of the six B.S degrees currently offered.




**Job Outlook:** The computer engineering program at IPFW was recently started in response to the advice of the engineering department's Industrial Advisory Board. The need for computer engineers to design the "hidden" computer systems in our cars, networks and appliances is continuing to grow.

According to the National Association of Colleges and Employers, the average starting offer nationally to computer engineering graduates in 2007 was $55,920.

**Computer Engineering Curriculum:** In addition to the common first year engineering curriculum, the computer engineering program includes courses in mathematics (e.g., differential equations, linear algebra, discrete mathematics), computer and electrical hardware (e.g., linear circuit analysis, digital systems design) and computer software (e.g., data structures and real-time embedded operating systems).

# Engineering Curriculum at IPFW

**Engineering Majors:** IPFW currently has four undergraduate engineering majors: civil, computer, electrical, and mechanical engineering. IPFW also has a range of engineering technology and computer science programs.

**High School Preparation:** The ideal preparation for any of the engineering programs includes four years of high school mathematics, one year of physics, one year of chemistry and four years of English. Students should be "calculus ready" (i.e., have sufficient algebra, geometry, and trigonometry to begin calculus in their first semester.)

**First-Year Engineering Curriculum:** All engineering majors have the following common first year curriculum for students who are ready to begin calculus.

| First Semester | | | Second Semester | | |
|---|---|---|---|---|---|
| **Course #** | **Course Title** | **Credits** | **Course #** | **Course Title** | **Credits** |
| MA 165 | Analytic Geometry and Calculus I | 4 | MA 166 | Analytic Geometry and Calculus II | 4 |
| CHM 115 | General Chemistry I | 4 | PHYS 152 | Mechanics | 5 |
| ENGR 101 | Introduction to Engineering | 1 | ENGR 199 | Introduction to Engineering Design | 3 |
| ENGR 120 | Graphical Communications and Spatial Analysis | 2 | COM 114 | Fundamentals of Speech | 3 |
| ENGR 121 | Computer Tools for Engineers | 2 | | | |
| ENG W131 | Elementary Composition | 3 | | | |
| | Total | 16 | | Total | 15 |

The standard engineering program begins with MA 165: Analytic Geometry and Calculus I. Students who need to complete other mathematics courses before they will be ready for calculus can pursue an engineering major at IPFW. However, it will take them more than four years to complete an engineering degree.

**Engineering Coursework:** After completion of the common first-year curriculum, students take courses according to their selected majors. Students take both lecture and laboratory courses. The curriculum is structured to emphasize problem solving and design, as well as computers, communication, and teamwork.

All engineering majors at IPFW culminate with a one-year senior design project. These projects are completed by small groups under the supervision of a faculty advisor and require students to design, build and test a complete system. Projects are often sponsored by local industry.

**For additional information:** see the engineering department's website at www.engr.ipfw.edu. You may also want to visit the Sloan Career Cornerstone Center at www.careercornerstone.org for additional information on engineering careers.