# Computer Engineering- B.S.

## Curriculum

Computer Engineering is an interdisciplinary degree program that combines the knowledge core of engineering disciplines with mathematics and computer science to solve problems.

The computer engineering curriculum includes the science and technology of software and hardware design, embedded systems, computer architecture, and VLSI in addition to signal processing, solid state devices and microcontroller applications.

Graduates of the Computer Engineering B.S. degree program are prepared for careers in the computer systems industry, focusing on computer systems design and hardware engineering, and have career opportunities in research, design and development in a variety of industries.

Upon completion of the program, graduates are expected to:

- Apply knowledge of mathematics, science, engineering and technology as required by the field of computer engineering.
- Use math, sciences, and engineering processes to analyze problems, formulate solutions, conduct experiments, and interpret data.
- Communicate engineering and scientific information using oral and written arguments and visual presentation.
- Recognize and evaluate ethical, global and social impacts of computer engineering innovation.
- Integrate scientific knowledge, problem-solving skills, and engineering tools to design software and hardware for computer systems.

### Computer Engineering

A four-year program leading to a bachelor of science degree

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| **Engineering Foundations** | | |
| ENGN1015 | Introduction to Engineering | 3 |
| ENGN2001 | Digital Logic Design | 4 |
| ENGN2009 | C Programming for Engineering | 4 |
| **Major Courses** | | |
| CENG4030 | Digital Integrated Circuit Design | 3 |
| CSIS1112 | Computer Science II | 3 |
| CSIS2018 | Advanced Data Structures | 3 |
| CSIS2023 | Survey of Programming Languages | 3 |
| CYB2010 | Computer Architecture with Assembly Language Programming | 3 |
| ENGN2085 | Introduction to Embedded Systems | 3 |
| ENGN2101 | Linear Circuit Theory | 3 |
| ENGN2102 | Linear Circuit Theory Lab | 1 |
| ENGN3100 | Parametric Engineering Design | 3 |
| ENGN3150 | Solid State Devices | 3 |
| ENGN3151 | Solid State Devices Lab | 1 |
| ENGN3180 | Microelectronics Design | 3 |
| ENGN4030 | Digital Signal Processing | 3 |
| ENGN4140 | Capstone Design I | 3 |
| ENGN4145 | Capstone Design II | 3 |
| **Major Electives** | | |
| Choose 6 credits of the following: | | 6 |
| CSIS, CYB, ENGN, IDES, ITEC, MATH: 2000 level or higher | | |
| **Applied/Experiential Learning** | | |
| Choose 6 credits from the following: | | 6 |
| DEE3999 Directed Experiential Education [D] | | |
| TECX4099 College of Engineering & Design Internship [Ic] | | |
| TECX4190 Technical Solutions Design Project | | |
| **Related Professional Studies** | | |
| CAR0010 | Career Management | 1 |
| FYS1020 | First-Year Seminar | 1 |
| MATH2040 | Calculus II | 3 |
| MATH2220 | Linear Algebra | 3 |
| Choose one of the following: | | 4 |
| PHY1022 & PHY1026 | General Physics II and General Physics II Laboratory | |
| PHY2022 & PHY2026 | Physics II and Physics II Laboratory | |
| **A&S Core Experience** | | |
| Communications Foundation Courses | | 9 |
| ENG1020 | Rhetoric & Composition I | |
| ENG1021 | Rhetoric & Composition II | |
| ENG1030 | Communication Skills | |
| Integrative Learning | | 6 |
| Two ILS courses, one at the 2000 level, and one at the 4000 level | | |
| Arts & Humanities | | 6 |
| PHIL3240 | Ethics: A Global Perspective | |
| One course from ART, HIST, HUM, LIT, or REL | | |
| Mathematics | | 6 |
| MATH1040 | Calculus I (or higher, based on student's placement) * | |
| MATH2001 | Statistics I | |
| Science | | |
| Choose one of the following: | | 4 |
| PHY1011 & PHY1016 | General Physics I and General Physics I Laboratory | |
| PHY2011 & PHY2016 | Physics I and Physics I Laboratory | |
| Social Sciences | | 6 |
| Two courses from ANTH, ECON, GEND, LEAD, PSCI, PSYC, RES or SOC | | |
| A&S Electives | | 6 |
| MATH2020 | Discrete Mathematics | |
| MATH2043 | Ordinary Differential Equations | |
| **Free Electives** # | | |
| 6 credits selected from 1000-4999 numbered offerings within the university | | 6 |
| **Total Credits** | | **125.0** |

* Students that do not place in MATH1040 Calculus I will need to take an extra course(s), MATH1020 Fundamentals of Algebra and/or MATH1030 Precalculus, as prerequisite(s). If needed one, or both, will count as a free elective(s).

[D] Directed Experiential Education (DEE) opportunities are based on project availability with community partners and student eligibility. For more information, visit Experiential Education & Career Services (EE&CS).

[Ic] Typically, internships require a minimum of six credits. Students interested in a 9 or 12-credit internship can apply additional experiential learning and free elective credits, if available. Students are strongly encouraged to contact a faculty advisor before scheduling internship and free elective credits.

# In addition to classes, free elective credits may be applied to a number of options such as internship, study abroad, Directed Experiential Education courses and courses in a specialization or minor as relevant. For students who qualify for the J2 program, up to four graduate courses may apply. Students are strongly encouraged to contact a faculty advisor before scheduling free elective credits.

Note: Students must pass MATH0010 Pre-Algebra or have equivalent placement scores to enroll in required math courses.

Note: Students must pass ENG0001 Writing Workshop or have equivalent placement scores to enroll in ILS 2000-level courses.

In collaboration with academic colleges across all JWU campuses, JWU Global Study Abroad programs offer a variety of international, domestic, and digital options for major, minor, free electives, experiential learning, and transferable courses. There are many affordable options for students during a semester, winter session, spring and/or summer breaks. Faculty-led, exchange, affiliate, and direct-enroll programs range in duration from one week to a full semester or full year. Financial aid may be applied, and some partners offer external scholarships. Premiere programs do not qualify for JWU scholarships or grants; however federal aid is available. Visit the study abroad website for information, program descriptions and online applications. Where will you go? Wherever you decide, make the best of your educational journey!

## Accelerated Program Options

### J2 Program

The JWU J2 program allows qualified students enrolled in a matriculating undergraduate program to take graduate level courses at JWU. Students interested in pursuing this option should meet with their academic advisor to discuss their interest, qualifications, and plans. The undergraduate student may take up to four graduate courses (maximum 12 credits) and are limited to 6 credits a semester and 3 credits per session (Fall Session I and Fall Session II).

The completion of graduate credits to fulfill undergraduate program requirements does not guarantee acceptance into the graduate program after completion of the baccalaureate degree. Matriculating undergraduate students who wish to formally enroll in a graduate program, must fulfill all requirements for entrance into the intended graduate program and complete a graduate program application.

**Note:** Not all graduate courses are included as part of this policy. Courses offered as part of the Masters of Arts in Teaching, Masters of Education, Masters of Science in Physician Assistant Studies and doctoral courses are excluded from this policy and are restricted to program majors only. Additional courses and/or programs as determined by individual colleges may also have restricted access.

**Eligibility Criteria:**

To be eligible to enroll in graduate level courses (excludes: Masters of Arts in Teaching, Masters of Education, Masters of Science in Physician Assistant Studies, doctoral courses and other programs as outlined by the colleges).

Undergraduate students must meet the following criteria:

- Undergraduate cumulative GPA of 3.00 or higher
- Completed & registered undergraduate credits at least 90 credits
- Meet the individual course prerequisites

**Appeal to Eligibility Criteria:** College Dean or designee will receive a copy of the Petition Form, Student's GPS and email requesting appeal if the student requests to appeal the GPA or earned/registered credit criteria. College Dean / designee will review and determine approval.

These courses carry graduate credit and will replace undergraduate degree requirements when applicable, traditionally free-electives (maximum of 12 credits). The course will be applied to the undergraduate degree in the order in which they are taken (if required) and will also be applied towards both the students undergraduate and graduate GPA.

Students should maintain enrollment in at least 12 credits of undergraduate coursework to maintain full-time status; graduate course enrollment is not calculated into undergraduate full-time status. For students already attending full-time as undergraduates (12 credits or more) and paying the full-time tuition, the graduate credits will be included in full-time tuition fee. Students attending part-time (11 credits or less) will pay the cost per-credit undergraduate tuition for the graduate course.

Course registration will be based on space availability and students enrolled in graduate level courses will be required to maintain good academic standing at the undergraduate and graduate level.