

COMPUTER ENGINEERING - BACHELOR OF SCIENCE IN COMPUTER ENGINEERING

Overview

The Bachelor of Science in Computer Engineering program of the Klipsch School is accredited by the Engineering Accreditation Commission of ABET, Inc. This particular program gives students the opportunity to explore more deeply the area of **computer Engineering**.

Electrical Engineering Program Educational Objectives

Below are the program educational objectives (PEOs) that describe the expected accomplishments of graduate during their first few years after graduation.

1. Our graduates will obtain relevant, productive employment in the private sector, government and/or pursue an advanced degree.
2. Our graduates will be using their engineering foundation to innovate solutions to the problems of the real world.

Requirements (124 credits)

Students must complete all University degree requirements, which include: General Education requirements, Viewing a Wider World requirements, and elective credits to total at least 124 credits with 48 credits in courses numbered 300/3000 or above. Developmental coursework will not count towards the degree requirements and/or elective credits, but may be needed in order to take the necessary English and Mathematics coursework.

| Prefix | Title | Credits |
|--|--|---------|
| General Education | | |
| <i>Area I: Communications</i> | | |
| <i>English Composition - Level 1</i> | | |
| ENGL 1110G | Composition I | 4 |
| <i>English Composition - Level 2²</i> | | |
| <i>Oral Communication²</i> | | |
| <i>Area II: Mathematics</i> | | |
| MATH 1511G | Calculus and Analytic Geometry I ¹ | 4 |
| <i>Area III: Laboratory Sciences</i> | | |
| CHEM 1215G | General Chemistry I Lecture and Laboratory for STEM Majors | 4 |
| PHYS 1310G & PHYS 1310L | Calculus -Based Physics I and Calculus -Based Physics I Lab | 4 |
| <i>Area IV: Social/Behavioral Sciences (3 credits)²</i> | | |
| <i>Area V: Humanities²</i> | | |
| <i>Area VI: Creative and Fine Arts²</i> | | |
| <i>General Education Elective</i> | | |
| MATH 1521G | Calculus and Analytic Geometry II (Required Mathematics and Natural Science) | 4 |
| Viewing A Wider World | | |
| Viewing a Wider World Electives ³ | | |
| Departmental/College Requirements | | |
| <i>Program Specific Requirements</i> | | |
| <i>Mathematics and Natural Science</i> | | |
| PHYS 1320G & PHYS 1320L | Calculus -Based Physics II and Calculus -Based Physics II Lab | 4 |
| ENGR 190 | Introduction to Engineering Mathematics | 4 |

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|---|---|------------|
| E E 200 | Linear Algebra, Probability and Statistics Applications | 4 |
| C S 278 | Discrete Mathematics for Computer Science | 4 |
| <i>Required Course (Electrical and Computer Engineering & Computer Science)</i> | | |
| ENGR 120 | DC Circuit Analysis | 4 |
| ENGR 130 | Digital Logic | 4 |
| ENGR 140 | Introduction to Programming and Embedded Systems | 4 |
| E E 362 | Introduction to Computer Organization | 4 |
| E E 462 | Computer Systems Architecture | 3 |
| E E 490 | Selected Topics (Electronic Devices) | 2 |
| E E 490 | Selected Topics (Digital VLSI) | 2 |
| E E 490 | Selected Topics (Computer Engineering Cornerstone) | 2 |
| ENGR 401 | Engineering Capstone I | 3 |
| ENGR 402 | Engineering Capstone II | 3 |
| C S 172 | Computer Science I | 4 |
| C S 271 | Object Oriented Programming | 4 |
| C S 272 | Introduction to Data Structures | 4 |
| C S 343 | Algorithm Design & Implementation ⁴ | 3 |
| C S 370 | Compilers and Automata Theory | 4 |
| C S 371 | Software Development | 4 |
| C S 419 | Computing Ethics and Social Implications of Computing | 1 |
| C S 474 | Operating Systems I | 3 |
| <i>ECE & CS Electives: Choose three courses from the following (two must be ECE courses):</i> | | |
| E E 409 | Hardware & Software Codesign | |
| E E 412 | ASIC Design | |
| E E 443 | Mobile Application Development | |
| E E 458 | Hardware Security and Trust | |
| E E 465 | Machine Learning I | |
| E E 467 | ARM SOC Design | |
| E E 406 | Quantum Computing | |
| E E 490 | Selected Topics (Applications of Parallel Computing XSEDE Collaborative Course) | |
| CHME 467 | Nanoscience and Nanotechnology | |
| C S 471 | Programming Language Structure I | |
| C S 478 | Computer Security | |
| C S 482 | Database Management Systems I | |
| C S 484 | Computer Networks I | |
| C S 487 | Applied Machine Learning I | |
| C S 491 | Parallel Programming | |
| C S 493 | Algorithm Design and Implementation | |
| C S 496 | Cloud and Edge Computing | |
| MATH 3140 | Introduction to Numerical Methods | |
| Second Language Requirement (none required) | | |
| Electives to bring total credits to 124 | | |
| Total Credits | | 124 |

¹ MATH 1511G Calculus and Analytic Geometry I is required for the degree but students may need to take any prerequisites needed to enter MATH 1511G first.

² See the General Education (<https://catalogs.nmsu.edu/nmsu/general-education-viewing-wider-world/>) section of the catalog for a full list of courses.

³

See the Viewing a Wider World (<https://catalogs.nmsu.edu/nmsu/general-education-viewing-wider-world/#viewingawiderworldtext>) section of the catalog for a full list of courses.

⁴ Or could be replaced with C S 372 Data Structures and Algorithms

A Suggested Plan of Study for Students

This roadmap assumes student placement in MATH 1511G and ENGL 1110G. The contents and order of this roadmap may vary depending on initial student placement in mathematics and English. It is only a suggested plan of study for students and is not intended as a contract. Course availability may vary from fall to spring semester and may be subject to modification or change.

First Year

| Fall | | Credits |
|----------------|--|-----------|
| ENGR 190 | Introduction to Engineering Mathematics | 4 |
| ENGL 1110G | Composition I | 4 |
| ENGR 130 | Digital Logic | 4 |
| ENGR 140 | Introduction to Programming and Embedded Systems | 4 |
| Credits | | 16 |

Spring

| | | |
|----------------|---|-----------|
| MATH 1511G | Calculus and Analytic Geometry I ² | 4 |
| COMM 1115G | Introduction to Communication ² | 3 |
| ENGR 120 | DC Circuit Analysis | 4 |
| C S 172 | Computer Science I | 4 |
| Credits | | 15 |

Second Year

| Fall | | Credits |
|-------------------------|---|-----------|
| MATH 1521G | Calculus and Analytic Geometry II | 4 |
| PHYS 1310G & PHYS 1310L | Calculus -Based Physics I and Calculus -Based Physics I Lab | 4 |
| E E 200 | Linear Algebra, Probability and Statistics Applications | 4 |
| C S 271 | Object Oriented Programming | 4 |
| Credits | | 16 |

Spring

| | | |
|-------------------------|--|-----------|
| PHYS 1320G & PHYS 1320L | Calculus -Based Physics II and Calculus -Based Physics II Lab | 4 |
| ENGL 2210G | Professional and Technical Communication Honors ^{English Composition Level 2} | 3 |
| C S 272 | Introduction to Data Structures | 4 |
| C S 278 | Discrete Mathematics for Computer Science | 4 |
| Credits | | 15 |

Third Year

| Fall | | Credits |
|-------------------------------|---------------------------------------|-----------|
| General Ed/VWW ^{2,3} | | 3 |
| General Ed/VWW ^{2,3} | | 3 |
| E E 362 | Introduction to Computer Organization | 4 |
| C S 371 | Software Development | 4 |
| E E 490 | Selected Topics (Electronic Devices) | 2 |
| Credits | | 16 |

Spring

| | | |
|-------------------------------|---|---|
| General Ed/VWW ^{2,3} | | 3 |
| CHEM 1215G | General Chemistry I Lecture and Laboratory for STEM Majors ² | 4 |
| C S 343 | Algorithm Design & Implementation | 3 |
| C S 370 | Compilers and Automata Theory | 4 |

| | | |
|--|---|------------|
| E E 490 | Selected Topics (Computer Engineering Cornerstone) | 2 |
| Credits | | 16 |
| Fourth Year | | |
| Fall | | |
| ENGR 401 | Engineering Capstone I | 3 |
| E E 490 | Selected Topics (Digital VLSI) | 2 |
| E E 462 | Computer Systems Architecture | 3 |
| Comp Engineering Elective 1 ⁴ | | 3 |
| C S 474 | Operating Systems I | 3 |
| Credits | | 14 |
| Spring | | |
| ENGR 402 | Engineering Capstone II | 3 |
| Comp Engineering Elective 2 ⁴ | | 3 |
| Comp Engineering Elective 3 ⁴ | | 3 |
| General Ed/VWW ^{2,3} | | 3 |
| General Ed/VWW ^{2,3} | | 3 |
| C S 419 | Computing Ethics and Social Implications of Computing | 1 |
| Credits | | 16 |
| Total Credits | | 124 |

¹ MATH 1511G Calculus and Analytic Geometry I is required for the degree but students may need to take any prerequisites needed to enter MATH 1511G Calculus and Analytic Geometry I first.

² See the General Education and Viewing a Wider World (<https://catalogs.nmsu.edu/nmsu/general-education-viewing-wider-world/>) section of the catalog for a full list of courses.

³ Depending on availability of specific courses in the fall or spring semester, students may need to reorganize the Comp Engineering Electives, STEM electives, and/or Gen Ed/VWW electives in their junior and senior year. Students are strongly advised to consult with their ECE Faculty Mentor for assistance in planning their final year.

⁴ Computer Engineering Elective Courses:

- E E 412 ASIC Design, E E 409 Hardware & Software Codesign, E E 458 Hardware Security and Trust, E E 467 ARM SOC Design, E E 490 Selected Topics, E E 490 Applications of Parallel Computing XSEDE Collaborative Course, E E 465 Machine Learning I
- CHME 467 Nanoscience and Nanotechnology
- C S 478 Computer Security, C S 482 Database Management Systems I, C S 487 Applied Machine Learning IC S 491 Parallel Programming C S 488 Introduction to Data Mining C S 471 Programming Language Structure IC S 475 Artificial Intelligence IC S 476 Computer Graphics IC S 383 Introduction to Deep Learning C S 384 Graph Data Mining C S 477 Digital Game Design C S 481 Visual Programming C S 485 Human-Centered Computing C S 496 Cloud and Edge Computing