# B.S. COMPUTER ENGINEERING / M.S. ELECTRICAL AND COMPUTER ENGINEERING

## Overview

This is a structured and integrated program of 154 credit hours. Students may pursue this program from either of the undergraduate options available for Computer Engineering Majors. It includes two required courses, ECE 715 and ECE 716 as well as the selection of advanced technical electives.

- At least 30 credit hours must be at the graduate (600 or 700) level. Of these, at least 12 credit hours must be in courses open to graduate students only (700 level).
- Interested Computer Engineering juniors with cumulative GPA above 3.0 may declare their intent to participate by submitting an official application to the Departmental Graduate Committee for admission into the M.S.E.C.E. portion of the program.
- A student wishing to drop out of the five-year program without the M.S.E.C.E. degree could receive the B.S.Cp.E. degree after completing all its requirements, including the senior design project.
- All students must take the Graduate Record Examination (G.R.E.) before beginning their fifth-year courses.
- To qualify for the M.S.E.C.E. degree, students must meet all the pertinent Graduate School requirements, including an acceptable GRE score and a minimum of 3.0 GPA in the 30 credit hours applied towards the M.S.E.C.E. degree.
- The student is awarded both the B.S.Cp.E. and the M.S.E.C.E. degrees after the requirements for both degrees are satisfied.

For more information about the BS/MS Program please refer to the College of Engineering Section (http://bulletin.miami.edu/undergraduate-academic-programs/engineering/#fiveyearbsmsprogramtext).

## Software Engineering Option

This is a structured and integrated program of 155 credit hours. Students may pursue this program from either of the undergraduate options available for Computer Engineering Majors. It includes two required courses, ECE 715 and ECE 716 as well as the selection of advanced technical electives.

- At least 30 credit hours must be at the graduate (600 or 700) level. Of these, at least 12 credit hours must be at 700 level. More specifically, in addition to ECE 715 (M.S. Design Project I) and ECE 716 (M.S. Design Project II), at least 6 credit hours must be in courses open to graduate students only (700 level).
- Interested Computer Engineering juniors with cumulative GPA above 3.0 may declare their intent to participate by submitting an official application to the Departmental Graduate Committee for admission into the M.S.E.C.E. portion of the program.
- A student wishing to drop out of the five-year program without the M.S.E.C.E. degree could receive the B.S.Cp.E. degree after completing all its requirements, including the senior design project.
- To qualify for the M.S.E.C.E. degree, students must meet all the pertinent Graduate School requirements, including an acceptable GRE score and a minimum of 3.0 GPA in the 30 credit hours applied towards the M.S.E.C.E. degree.
- The student is awarded both the B.S.Cp.E. and the M.S.E.C.E. degrees after the requirements for both degrees are satisfied.

For more information about the BS/MS Program please refer to the College of Engineering Section (http://bulletin.miami.edu/undergraduate-academic-programs/engineering/#fiveyearbsmsprogramtext).

## Admission Requirements

- Interested Computer Engineering juniors with cumulative GPA above 3.0 may declare their intent to participate by submitting an official application to the Departmental Graduate Committee for admission into the M.S.E.C.E. portion of the program.
- To qualify for the M.S.E.C.E. degree, students must meet all the pertinent Graduate School requirements, including an acceptable GRE score and a minimum of 3.0 GPA in the 30 credit hours applied towards the M.S.E.C.E. degree.

## Curriculum Requirements: B.S. Computer Engineering / M.S. Electrical and Computer Engineering

| Code | Title | Credit Hours |
| --- | --- | --- |
| BS IN COMPUTER ENGINEERING REQUIREMENTS (124 CREDIT HOURS) | | |
| Engineering Courses | | |
| EGN 123 | Computing and Digital Solutions for the future | 3 |
| ECE 118 | Introduction to Programming | 3 |
| ECE 112 | Introduction to Engineering II | 2 |
| ECE 201 | Electrical Circuit Theory | 3 |
| ECE 202 | Electronics I | 3 |

| ECE 203 | Electrical Circuits Laboratory | 1 |
|---|---|---|
| ECE 206 | Circuits, Signals, and Systems | 3 |
| ECE 211 | Logic Design | 3 |
| ECE 212 | Processors: Hardware, Software, and Interfacing | 3 |
| ECE 218 | Data Structures | 3 |
| ECE 302 | Electronics II | 3 |
| ECE 303 | Electronics Laboratory | 1 |
| ECE 315 | Digital Design Laboratory | 1 |
| ECE 316 | Structured Digital Design | 1 |
| ECE 318 | Algorithms | 3 |
| ECE 322 | Systems Programming | 3 |
| ECE 414 | Computer Organization and Design | 3 |
| ECE 417 | Embedded Microprocessor System Design | 3 |
| ECE 421 | Computer Operating Systems | 3 |
| ECE 454 | Digital System Design and Testing | 3 |
| ECE 455 | Design-for-Testability Laboratory | 1 |
| ECE 467 | Database Design and Management | 3 |
| ECE 481 | Senior Project I | 1 |
| CE Technical Electives [1] | | 6 |
| ECE Technical Elective [1] | | 3 |
| **Math and Science Courses** | | |
| ECE 310 | Introduction to Engineering Probability | 3 |
| MTH 151 | Calculus I for Engineers | 5 |
| MTH 162 | Calculus II | 4 |
| MTH 210 | Introduction to Linear Algebra | 3 |
| MTH 309 | Discrete Mathematics I | 3 |
| MTH 311 | Introduction to Ordinary Differential Equations | 3 |
| PHY 221 | University Physics I | 3 |
| PHY 222 | University Physics II | 3 |
| or PHY 223 | University Physics III | |
| PHY 224 | University Physics II Lab | 1 |
| or PHY 225 | University Physics III Lab | |
| Basic Science Electives | | 6 |
| Basic Science Lab Elective | | 1 |
| **General Education Requirements** | | |
| Written Communication Skills: | | |
| WRS 105 | First-Year Writing I | 3 |
| WRS 107 | First-Year Writing II: STEM | 3 |
| Quantitative Skills: | | |
| MTH 151 | Calculus I for Engineers (fulfilled through the major) | |
| Areas of Knowledge: | | |
| Arts and Humanities Cognate | | 9 |
| People and Society Cognate | | 9 |
| STEM Cognate (9 credits) (fulfilled through the major) | | |
| **M.S. IN ELECTRICAL AND COMPUTER ENGINEERING REQUIREMENTS (30 CREDIT HOURS)** | | |
| ECE 715 | M.S. Design Project I | 3 |
| ECE 716 | M.S. Design Project II | 3 |
| SE 600 Level Electives [1,3] | | 6 |
| CE 600 Level Electives [1,3] | | 12 |
| 700 Level Technical Elective [1,3] | | 6 |
| **Total Credit Hours** | | **154** |

# Curriculum Requirements: B.S. Computer Engineering / M.S. Electrical and Computer Engineering - Software Option

| Code | Title | Credit Hours |
|---|---|---|
| **BS IN COMPUTER ENGINEERING REQUIREMENTS (124 CREDIT HOURS)** | | |
| **Engineering Courses** | | |
| EGN 123 | Computing and Digital Solutions for the future | 3 |
| ECE 112 | Introduction to Engineering II | 2 |
| ECE 118 | Introduction to Programming | 3 |
| ECE 201 | Electrical Circuit Theory | 3 |
| ECE 202 | Electronics I | 3 |
| ECE 203 | Electrical Circuits Laboratory | 1 |
| ECE 211 | Logic Design | 3 |
| ECE 212 | Processors: Hardware, Software, and Interfacing | 3 |
| ECE 218 | Data Structures | 3 |
| ECE 315 | Digital Design Laboratory | 1 |
| ECE 316 | Structured Digital Design | 1 |
| ECE 318 | Algorithms | 3 |
| ECE 322 | Systems Programming | 3 |
| ECE 412 | Software Engineering and Architecture | 3 |
| ECE 413 | Software Design and Verification | 3 |
| ECE 414 | Computer Organization and Design | 3 |
| ECE 417 | Embedded Microprocessor System Design | 3 |
| ECE 470 | Network Client-Server Programming | 3 |
| ECE 481 | Senior Project I | 1 |
| SE Technical Electives [1] | | 9 |
| **Computer Science Credits** | | |
| ECE 421 | Computer Operating Systems | 3 |
| or CSC 421 | Principles of Computer Operating Systems | |
| ECE 467 | Database Design and Management | 3 |
| or CSC 423 | Database Systems | |
| CSC 317 | Data Structures and Algorithm Analysis | 3 |
| CSC 419 | Programming Languages | 3 |
| **Math and Science Courses** | | |
| ECE 310 | Introduction to Engineering Probability | 3 |
| MTH 151 | Calculus I for Engineers | 5 |
| MTH 162 | Calculus II | 4 |
| MTH 210 | Introduction to Linear Algebra | 3 |
| MTH 309 | Discrete Mathematics I | 3 |
| PHY 221 | University Physics I | 3 |
| PHY 222 | University Physics II | 3 |
| or PHY 223 | University Physics III | |
| PHY 224 | University Physics II Lab | 1 |
| or PHY 225 | University Physics III Lab | |
| Basic Science Electives | | 6 |
| Basic Science Lab Elective | | 1 |
| **General Education Requirements** | | |
| Written Communication Skills: | | |
| WRS 105 | First-Year Writing I | 3 |
| WRS 107 | First-Year Writing II: STEM | 3 |
| Quantitative Skills: | | |
| MTH 151 | Calculus I for Engineers (fulfilled through the major) | |

| Areas of Knowledge: | | |
| --- | --- | --- |
| Arts and Humanities Cognate | | 9 |
| People and Society Cognate | | 9 |
| STEM Cognate (9 credits) (fulfilled through the major) | | |
| **M.S. IN ELECTRICAL AND COMPUTER ENGINEERING REQUIREMENTS (30 CREDIT HOURS)** | | |
| ECE 715 | M.S. Design Project I | 3 |
| ECE 716 | M.S. Design Project II | 3 |
| SE 600 Level Electives [1,3] | | 6 |
| CE 600 Level Electives [1,3] | | 12 |
| 700 Level Technical Elective [1,3] | | 6 |
| **Total Credit Hours** | | **155** |

# Suggested Plan of Study: B.S. Computer Engineering / M.S. Electrical and Computer Engineering

| Freshman Year | | |
| --- | --- | --- |
| **Fall** | | **Credit Hours** |
| EGN 123 | Computing and Digital Solutions for the future | 3 |
| ECE 118 | Introduction to Programming | 3 |
| WRS 105 | First-Year Writing I | 3 |
| MTH 151 | Calculus I for Engineers | 5 |
| | **Credit Hours** | **14** |
| **Spring** | | |
| ECE 112 | Introduction to Engineering II | 2 |
| ECE 218 | Data Structures | 3 |
| WRS 107 | First-Year Writing II: STEM | 3 |
| MTH 162 | Calculus II | 4 |
| PHY 221 | University Physics I | 3 |
| People and Society Cognate [1] | | 3 |
| | **Credit Hours** | **18** |
| **Sophomore Year** | | |
| **Fall** | | |
| ECE 211 | Logic Design | 3 |
| ECE 318 | Algorithms | 3 |
| MTH 210 | Introduction to Linear Algebra | 3 |
| PHY 222 or 223 | University Physics II or University Physics III | 3 |
| PHY 224 or 225 | University Physics II Lab or University Physics III Lab | 1 |
| Arts and Humanities Cognate [1] | | 3 |
| | **Credit Hours** | **16** |
| **Spring** | | |
| ECE 201 | Electrical Circuit Theory | 3 |
| ECE 212 | Processors: Hardware, Software, and Interfacing | 3 |
| ECE 315 | Digital Design Laboratory | 1 |
| ECE 310 | Introduction to Engineering Probability | 3 |
| MTH 309 | Discrete Mathematics I | 3 |
| People and Society Cognate [1] | | 3 |
| | **Credit Hours** | **16** |
| **Junior Year** | | |
| **Fall** | | |
| ECE 202 | Electronics I | 3 |
| ECE 203 | Electrical Circuits Laboratory | 1 |

| | | |
|---|---|---|
| ECE 316 | Structured Digital Design | 1 |
| ECE 322 | Systems Programming | 3 |
| ECE 414 | Computer Organization and Design | 3 |
| Basic Science Elective [1] | | 3 |
| Arts and Humanities Cognate [1] | | 3 |
| | **Credit Hours** | **17** |
| **Spring** | | |
| ECE 302 | Electronics II | 3 |
| ECE 303 | Electronics Laboratory | 1 |
| ECE 454 | Digital System Design and Testing | 3 |
| ECE 455 | Design-for-Testability Laboratory | 1 |
| ECE 467 | Database Design and Management | 3 |
| MTH 311 | Introduction to Ordinary Differential Equations | 3 |
| Basic Science Elective [1] | | 3 |
| Basic Science Lab Elective [1] | | 1 |
| | **Credit Hours** | **18** |
| **Senior Year** | | |
| **Fall** | | |
| ECE 206 | Circuits, Signals, and Systems | 3 |
| ECE 417 | Embedded Microprocessor System Design | 3 |
| ECE 481 | Senior Project I [2] | 1 |
| SE 600 Level Elective [1,3] | | 3 |
| SE 600 Level Elective [1,3] | | 3 |
| Arts and Humanities Cognate [1] | | 3 |
| People and Society Cognate [1] | | 3 |
| | **Credit Hours** | **19** |
| **Spring** | | |
| ECE 421 | Computer Operating Systems | 3 |
| CE Technical Elective [1] | | 3 |
| CE Technical Elective [1] | | 3 |
| ECE Technical Elective [1] | | 3 |
| CE 600 Level Elective [1,3] | | 3 |
| CE 600 Level Elective [1,3] | | 3 |
| | **Credit Hours** | **18** |
| **Fifth Year** | | |
| **Fall** | | |
| ECE 715 | M.S. Design Project I | 3 |
| CE 600 Level Elective [1,3] | | 3 |
| 700 Level Technical Elective [1,3] | | 3 |
| | **Credit Hours** | **9** |
| **Spring** | | |
| ECE 716 | M.S. Design Project II | 3 |
| CE 600 Level Elective [1,3] | | 3 |
| 700 Level Technical Elective [1,3] | | 3 |
| | **Credit Hours** | **9** |
| | **Total Credit Hours** | **154** |

[1]   See description of electives under the Departmental Electives Section.
[2]   Offered only in the Fall semester.
[3]   Should be taken as Graduate (G) courses.

## Suggested Plan of Study: B.S. Computer Engineering / M.S. Electrical and Computer Engineering - Software Option

| Freshman Year | | |
|---|---|---|
| **Fall** | | **Credit Hours** |
| EGN 123 | Computing and Digital Solutions for the future | 3 |
| ECE 118 | Introduction to Programming | 3 |
| WRS 105 | First-Year Writing I | 3 |
| MTH 151 | Calculus I for Engineers | 5 |
| | **Credit Hours** | **14** |
| **Spring** | | |
| ECE 112 | Introduction to Engineering II | 2 |
| ECE 218 | Data Structures | 3 |
| WRS 107 | First-Year Writing II: STEM | 3 |
| MTH 162 | Calculus II | 4 |
| PHY 221 | University Physics I | 3 |
| | **Credit Hours** | **15** |
| **Sophomore Year** | | |
| **Fall** | | |
| ECE 211 | Logic Design | 3 |
| ECE 318 | Algorithms | 3 |
| MTH 210 | Introduction to Linear Algebra | 3 |
| PHY 222 or 223 | University Physics II or University Physics III | 3 |
| PHY 224 or 225 | University Physics II Lab or University Physics III Lab | 1 |
| Arts and Humanities Cognate [1] | | 3 |
| | **Credit Hours** | **16** |
| **Spring** | | |
| ECE 201 | Electrical Circuit Theory | 3 |
| ECE 212 | Processors: Hardware, Software, and Interfacing | 3 |
| ECE 315 | Digital Design Laboratory | 1 |
| ECE 310 | Introduction to Engineering Probability | 3 |
| MTH 309 | Discrete Mathematics I | 3 |
| People and Society Cognate [1] | | 3 |
| | **Credit Hours** | **16** |
| **Junior Year** | | |
| **Fall** | | |
| ECE 202 | Electronics I | 3 |
| ECE 203 | Electrical Circuits Laboratory | 1 |
| ECE 322 | Systems Programming | 3 |
| ECE 412 | Software Engineering and Architecture | 3 |
| ECE 414 | Computer Organization and Design | 3 |
| Basic Science Elective [1] | | 3 |
| Basic Science Lab Elective | | 1 |
| | **Credit Hours** | **17** |
| **Spring** | | |
| ECE 316 | Structured Digital Design | 1 |
| ECE 413 | Software Design and Verification | 3 |
| ECE 421 or CSC 421 | Computer Operating Systems or Principles of Computer Operating Systems | 3 |
| ECE 467 or CSC 423 | Database Design and Management or Database Systems | 3 |

| | | |
|---|---|---:|
| SE Technical Elective | | 3 |
| Basic Science Elective [1] | | 3 |
| People and Society Cognate [1] | | 3 |
| | **Credit Hours** | **19** |
| **Senior Year** | | |
| **Fall** | | |
| ECE 417 | Embedded Microprocessor System Design | 3 |
| ECE 481 | Senior Project I [2] | 1 |
| CSC 317 | Data Structures and Algorithm Analysis | 3 |
| SE 600 Level Elective [1,3] | | 3 |
| SE 600 Level Elective [1,3] | | 3 |
| Arts and Humanities Cognate [1] | | 3 |
| Arst and Humanities Cognate [1] | | 3 |
| | **Credit Hours** | **19** |
| **Spring** | | |
| ECE 470 | Network Client-Server Programming | 3 |
| CSC 419 | Programming Languages | 3 |
| SE Technical Elective [1] | | 3 |
| SE Technical Elective [1] | | 3 |
| CE 600 Level Elective [1,3] | | 3 |
| People and Society Cognate [1] | | 3 |
| | **Credit Hours** | **18** |
| **Fifth Year** | | |
| **Fall** | | |
| ECE 715 | M.S. Design Project I | 3 |
| CE 600 Level Elective [1] | | 3 |
| CE 600 Level Elective [1] | | 3 |
| 700 Level Technical Elective [1] | | 3 |
| | **Credit Hours** | **12** |
| **Spring** | | |
| ECE 716 | M.S. Design Project II | 3 |
| CE 600 Level Elective [1] | | 3 |
| 700 Level Technical Elective [1] | | 3 |
| | **Credit Hours** | **9** |
| | **Total Credit Hours** | **155** |