Engineering (BS): Mechatronics Concentration

To see more about what you will learn in this program, visit the Learning Outcomes website (https://apps.oirp.ncsu.edu/pgas/).

For more information about this department, including contact information, visit the department (https://engineering.unca.edu/).

The Joint Mechatronics Engineering curriculum (JEM) combines the best that two nationally recognized universities have to offer. From NC State University comes the engineering component comprising course work from the Departments of Mechanical and Aerospace Engineering (MAE), Electrical and Computer Engineering (ECE), and mechatronics courses taught by NC State University faculty on the campus of the University of North Carolina at Asheville. From the University of North Carolina at Asheville comes a Humanities and Social Science component with a rich liberal arts foundation and mechatronics courses taught by UNC Asheville faculty and staff. Hands-on laboratories are integral to the engineering course work. As an NC State site-based engineering program, students must attend classes on the campus of UNC Asheville. Transfer students should contact the program office in Asheville for information about the transfer of courses from other educational institutions.

Mechatronics engineering focuses on the precision control of mechanical and machine systems. In today’s modern engineering systems, control is achieved electronically through sensors, actuators and microprocessors. The marriage of modern control systems with mechanical devices is key to the design and development of high-performance engineering systems. Just a few examples of computer-controlled mechanical systems are robots, engine-fuel systems, hybrid automobiles, autonomous aerospace vehicles, stair-climbing wheelchairs, garage door openers and alternative power generation systems. Through modern mechatronics engineering, new avenues of thinking and design can greatly enhance the utility, performance, and efficiency of modern machinery.

Program Educational Objectives

Within a few years of graduation, successful alumni of the Joint NC State - UNC Asheville BSE - Mechatronics Concentration degree should:

1. Attain productive professional careers in mechatronics engineering or related fields.
2. Function in the workplace with appropriate professional and ethical responsibilities.
3. Make decisions with accountability for the social and environmental impact of their engineering practices.
4. Interact effectively with a diversity of individuals while viewing their own work in the broader context of our global society.
5. Attain technical excellence by engaging in life-long learning.


Specific curriculum requirements are available on the Mechatronics webpage (https://www.engr.ncsu.edu/mechatronics/joint/).
## Fourth Year
### Fall Semester
- HUM 324 4
- MAE 308 Fluid Mechanics 3
- MAE 310 Heat Transfer Fundamentals 3
- JEM 484 Senior Design Project in Mechatronics Engineering I 3
- Approved Advised Elective 4

| Total Hours | 16 |

### Spring Semester
- HUM 414 or LA 478 4
- STAT 225 4
- JEM 485 Senior Design Project in Mechatronics Engineering II 3
- MAE 316 Strength of Mechanical Components 3

| Total Hours | 14 |

A grade of C or higher is required.

## Semester Sequence

This is a sample.

### First Year
#### Fall Semester
- MA 191 4
- LANG 120 4
- CH 132 3
- E 101 Introduction to Engineering & Problem Solving 1
- JEM 123 Introduction to Computer Aided Design for Mechatronics Engineering 1
- Dept 178 LAC: First Year Seminar 3

| Total Hours | 16 |

#### Spring Semester
- MA 192 4
- PY 221 4
- HUM 123 4
- ECE 109 Introduction to Computer Systems 3
- JEM 180 Introduction to Mechatronics Laboratory 2

| Total Hours | 17 |

### Second Year
#### Fall Semester
- PY 222 4
- ECE 200 Introduction to Signals, Circuits and Systems 4
- ECE 209 Computer Systems Programming 3
- MAE 206 Engineering Statics 3

### Third Year
#### Fall Semester
- MAE 208 Engineering Dynamics 3
- JEM 420 Mechatronics Systems Modeling 3
- MAE 201 Engineering Thermodynamics I 3
- MAE 315 Dynamics of Machines 3

| Total Hours | 12 |

#### Spring Semester
- ECE 310 Design of Complex Digital Systems 3
- JEM 360 Advanced Mechatronics Design Laboratory 2
- MAE 214 Solid Mechanics 3
- MAE 435 Principles of Automatic Control 3
- HUM 214 4

| Total Hours | 15 |

### Fourth Year
#### Fall Semester
- MAE 310 Heat Transfer Fundamentals 3
- Approved Elective 3
- JEM 484 Senior Design Project in Mechatronics Engineering I 3
- HUM 324 4

| Total Hours | 16 |

#### Spring Semester
- JEM 485 Senior Design Project in Mechatronics Engineering II 3
- MAE 316 Strength of Mechanical Components 3
- LA 478 4
- ST 225 4

| Total Hours | 14 |

A grade of C- or higher is required.

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1. A grade of C or higher is required.
2. A grade of C- or higher is required.
3. May be separated into one ARTS course and one DI course.
4. Discuss options for Approved Advised Elective with Program Associate Director.

> All students must also satisfy the UNCA second language requirement through coursework or proficiency testing.