

Engineering (BS): Mechatronics Concentration

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

The Joint NC State/UNC Asheville Engineering Mechatronics 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 Asheville. From UNC Asheville comes a Humanities and Social Science component with a rich liberal arts foundation and mechatronics courses taught by UNC Asheville 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 is a unique, interdisciplinary field of study drawing on coursework in mechanical engineering, electrical engineering, and computer science. A vast array of products and systems incorporate aspects of each of these disciplines - in varying degrees - and the program goal is to produce graduates with significant proficiency in each to participate successfully in design efforts. Through 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 BS in E - Mechatronics Concentration degree should:

1. Attain productive professional careers in mechatronics engineering or related fields.
2. Be committed to upholding and advancing the integrity of the engineering profession.
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.

The Joint BS in Engineering - Mechatronics Concentration degree is accredited by the Engineering Accreditation Commission of ABET, <https://www.abet.org>.

Specific curriculum requirements are available on the Mechatronics webpage (<https://www.engr.ncsu.edu/mechatronics/joint/>).

Plan Requirements

First Year

Fall Semester	Hours
MATH 191 ¹	4
LANG 120 ²	4

CHEM 132 ¹		3
CHEM 111 ¹		1
FYS 178		3
E 101	Introduction to Engineering & Problem Solving	1
JEM 123	Introduction to Computer Aided Design for Mechatronics Engineering	1
Hours		17

Spring Semester

MATH 192 ¹		4
PHYS 221 ¹		4
HUM 124		4
ECE 109	Introduction to Computer Systems ²	3
JEM 180	Introduction to Mechatronics Laboratory	2
Hours		17

Second Year

Fall Semester

MATH 291		4
PHYS 222		4
ECE 200	Introduction to Signals, Circuits and Systems ²	4
ECE 209	Computer Systems Programming ²	3
MAE 206	Engineering Statics ²	3
Hours		18

Spring Semester

ECON 104		3
ECE 211	Electric Circuits ²	4
ECE 212	Fundamentals of Logic Design ²	3
ECE 220	Analytical Foundations of Electrical and Computer Engineering ²	3
MAE 208	Engineering Dynamics ²	3
Hours		16

Third Year

Fall Semester

Course designated ARTS and DI ³		3
ECE 306	Introduction to Embedded Systems	3
JEM 420	Mechatronics Systems Modeling	3
MAE 201	Thermal-Fluid Sciences ²	3
MAE 315	Fundamentals of Vibrations	3
Hours		15

Spring Semester

HUM 214		4
ECE 310	Design of Complex Digital Systems	3
JEM 360	Advanced Mechatronics Design Laboratory	2
MAE 214	Solid Mechanics ²	3
MAE 435	Principles of Automatic Control	3
Hours		15

Fourth Year

Fall Semester

HUM 324 or LA 378 - see UNCA req's		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		3
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
Hours		14
Total Hours		128

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.

Semester Sequence

This is a sample.

First Year

Fall Semester		Hours
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LANG 120		4
CHEM 132		3
CHEM 111		1
FYS 178		3
E 101	Introduction to Engineering & Problem Solving	1
JEM 123	Introduction to Computer Aided Design for Mechatronics Engineering	1
Hours		17

Spring Semester

MATH 192		4
PHYS 221		4
HUM 124		4
ECE 109	Introduction to Computer Systems	3
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Second Year

Fall Semester

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PHYS 222		4
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Career Opportunities

Career Titles

- Aeronautical & Aerospace Engineer
- Aerospace Engineering Technician
- Agricultural Engineer
- Airport Engineer
- Automotive Engineer
- Biomedical Engineer
- Ceramic Engineer
- Chemical Engineer
- Civil Engineer
- Civil Engineering Technician
- Clinical Data Managers

- Computer Network Architects
- Computer Systems Engineer
- Cost Analysis Engineer
- Cost Estimator
- Electronics Engineer
- Energy Engineer
- Engineering Professor
- Environmental Engineer
- Factory Layout Engineer
- Fire Prevention Engineer
- Human Factors Engineers and Ergonomists
- Industrial Engineer
- Industrial Engineering Technician
- Industrial Safety and Health Engineer
- Irrigation Engineer
- Logistics Engineers
- Marine Engineer
- Marine Surveyor
- Materials Engineer
- Mechanical Engineer
- Mechanical Engineering Technician
- Meteorologist
- Mining Engineer
- Model Maker
- Natural Sciences Managers
- Nuclear Engineer
- Nuclear Fuels Research Engineer
- Operating Engineer
- Petroleum Engineer
- Photogrammetrist
- Physicist
- Product Safety Engineer
- Quality Control Managers
- Radiation Protection Engineer
- Sanitary Engineer
- Ship Engineers
- Software Developers - Applications
- Soil Engineer
- Solar Energy Systems Designer
- Solar Energy Systems Engineers
- Sound Engineering Technicians
- Structural Engineer
- Surveying Technicians
- Surveyor
- Sustainability Specialists
- Tool and Machine Designer
- Transportation Engineer
- Urban and Regional Planner
- Wind Energy Engineer

Explore North Carolina's central online resource for students, parents, educators, job seekers and career counselors looking for high quality job and career information.

Occupational Outlook Handbook (<https://www.bls.gov/ooh/>)

Browse the Occupational Outlook Handbook published by the Bureau of Labor Statistics to view state and area employment and wage statistics. You can also identify and compare similar occupations based on your interests.

Career One Stop Videos (<https://www.careeronestop.org/>)

View videos that provide career details and information on wages, employment trends, skills needed, and more for any occupation. Sponsored by the U.S. Department of Labor.

Focus 2 Career Assessment (<https://careers.dasa.ncsu.edu/explore-careers/career-assessments/>) (NC State student email address required)

This career, major and education planning system is available to current NC State students to learn about how your values, interests, competencies, and personality fit into the NC State majors and your future career. An NC State email address is required to create an account. Make an appointment with your career counselor (<https://careers.dasa.ncsu.edu/about/hours-appointments/>) to discuss the results.

Focus 2 Apply Assessment (<https://www.focus2career.com/Portal/Register.cfm?SID=1929>) (Available to prospective students)

A career assessment tool designed to support prospective students in exploring and choosing the right major and career path based on your unique personality, interests, skills and values. Get started with Focus 2 Apply and see how it can guide your journey at NC State.

Learn More About Careers

NCcareers.org (<https://nccareers.org/>)