

Engineering (BS): Mechanical Engineering Systems Concentration

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

The NC State Mechanical Engineering Systems (MES) BSE program is a site-based program located on the campus of Craven Community College in Havelock, North Carolina. Students in the program earn a Bachelor of Science in Engineering with a concentration in Mechanical Engineering Systems. Upon graduation from the MES program, students have the qualifications to apply for any job seeking mechanical engineering applicants.

Curriculum

MES students are drawn from a diverse population that includes not only the traditional college student but also military personnel and civilian staff of FRC-East.

The 10 mechanical engineering courses in the MES program are taught by the nationally recognized NC State MAE faculty in Raleigh and delivered to the MES students in Havelock via interactive high-definition video teleconference.

Local NC State faculty teach the Systems Engineering content, conduct all laboratory experiences, and direct students in the two-semester capstone design experience where they are partnered with an industry sponsor to design and build a solution to a real-world problem. Hands-on laboratory exercises allow students to explore and experience theoretical concepts learned in their courses and practice important modern skills such as manual and computerized measurement techniques, data analysis, design of experiments, and technical communications.

The MES program is located within a short distance of the Naval Air Systems Command's Fleet Readiness Center- East, Cherry Point (FRC-East). FRC-East is North Carolina's largest industrial employer east of interstate highway I-95 and the MES program takes advantage of the synergies afforded by its close location and relationship with the more than 1000 engineers working at FRC-East.

The Mechanical Engineering Systems program is evaluated under the criteria for Mechanical Engineering Programs and is accredited by the Engineering Accreditation Commission of ABET, <https://www.abet.org>.

Admissions

Students in the MES program typically begin by taking their general education courses such as physics, chemistry, calculus, and the humanities at one of North Carolina's Community Colleges or from another approved university program. Once students satisfy all transfer requirements, they apply for acceptance into the College of Engineering at NC State as a transfer student majoring in the MES program. Current NCSU engineering students can pursue the MES program if they are willing to relocate to the Havelock area. For more information on admissions, go to our website (<https://www.engr.ncsu.edu/mes/programs/#mechanical-engineering-systems-bachelor-of-science-in-engineering-program>).

Program Educational Objectives

Alumni of the BSE with a concentration in mechanical engineering systems will attain the following objectives within 3-5 years of graduating:

1. Be engaged in the professional practice of engineering or be enrolled in graduate school.
2. Establish themselves as problem solvers in the workplace through the practical application of engineering and systems knowledge and skills.
3. Function effectively in a professional environment by utilizing written and oral communication, teamwork, project management, and leadership skills.
4. Continuously improve and expand their technical and professional skills through formal study, as well as through informal means.

Plan Requirements

Code	Title	Hours	Counts towards
College Requirements			
E 101	Introduction to Engineering & Problem Solving	1	
EC 205	Fundamentals of Economics	3	
or EC 201	Principles of Microeconomics		
or ARE 201	Introduction to Agricultural & Resource Economics		
Math			
MA 141 & MA 241 & MA 242	Calculus I and Calculus II and Calculus III	12	
MA 341	Applied Differential Equations I	3	
MA 305	Introductory Linear Algebra and Matrices	3	
Sciences			
CH 101 & CH 102	Chemistry - A Molecular Science and General Chemistry Laboratory	4	
PY 205 & PY 206	Physics for Engineers and Scientists I and Physics for Engineers and Scientists I Laboratory	4	
PY 208 & PY 209	Physics for Engineers and Scientists II and Physics for Engineers and Scientists II Laboratory	4	

Major			ECE 331	Principles of Electrical Engineering	3
MAE 201	Engineering Thermodynamics I	3	ENG 331	Communication for Engineering and Technology	3
MAE 206	Engineering Statics	3	MSE 201	Structure and Properties of Engineering Materials	3
MAE 208	Engineering Dynamics	3	Engineering Ethics:		3
MAE 214	Solid Mechanics	3	PHI 214	Issues in Business Ethics	
MAE 308	Fluid Mechanics	3	or PHI 221	Contemporary Moral Issues	
MAE 310	Heat Transfer Fundamentals	3	or PHI 375	Ethics	
MAE 315	Dynamics of Machines	3	GEP Courses		
MAE 316	Strength of Mechanical Components	3	ENG 101	Academic Writing and Research	4
MAE 412	Design of Thermal System	3	GEP Humanities (http://catalog.ncsu.edu/undergraduate/gep-category-requirements/gep-humanities/)		3
MAE 413	Design of Mechanical Systems	3	GEP Social Sciences (http://catalog.ncsu.edu/undergraduate/gep-category-requirements/gep-social-sciences/)		3
MAE 435	Principles of Automatic Control	3	GEP Health and Exercise Studies (http://catalog.ncsu.edu/undergraduate/gep-category-requirements/gep-health-exercise-studies/)		2
MES 200	Introduction to Mechanical Engineering Systems	2	GEP Additional Breadth (http://catalog.ncsu.edu/undergraduate/gep-category-requirements/) (Humanities/Social Sciences/Visual and Performing Arts)		3
MES 201	Mechanical Engineering Systems Lab I	2	GEP Interdisciplinary Perspectives (http://catalog.ncsu.edu/undergraduate/gep-category-requirements/gep-interdisciplinary-perspectives/)		5
MES 300	Systems Engineering	3	GEP U.S. Diversity (http://catalog.ncsu.edu/undergraduate/gep-category-requirements/gep-us-diversity/) (verify requirement)		
MES 301	Mechanical Engineering Systems Lab II	2	GEP Global Knowledge (http://catalog.ncsu.edu/undergraduate/gep-category-requirements/gep-global-knowledge/) (verify requirement)		
MES 302	Mechanical Engineering Systems Lab III	2	Foreign Language Proficiency (http://catalog.ncsu.edu/undergraduate/gep-category-requirements/foreign-language-proficiency/) (verify requirement)		
MES 400	Mechanical Engineering Systems Lab IV	2			
MES 401	MES Capstone Design I	3	Total Hours		
MES 403	MES Capstone Design II	3	124		
Other Major			Semester Sequence		
CSC 111	Introduction to Computing: Python	3			
or CSC 113	Introduction to Computing - MATLAB				
or CSC 116	Introduction to Computing - Java				
GC 120	Foundations of Graphics	3			

This is a sample.

First Year

Fall Semester		Hours
CH 101 & CH 102	Chemistry - A Molecular Science and General Chemistry Laboratory ²	4
E 101	Introduction to Engineering & Problem Solving ¹	1
ENG 101	Academic Writing and Research ¹	4
MA 141	Calculus I ²	4
GC 120	Foundations of Graphics	3
Hours		16

Spring Semester

MA 241	Calculus II ²	4
PY 205 & PY 206	Physics for Engineers and Scientists I and Physics for Engineers and Scientists I Laboratory ²	4
GEP Health and Exercise Studies (http://catalog.ncsu.edu/undergraduate/gep-category-requirements/gep-health-exercise-studies/)		1
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EC 205	Fundamentals of Economics	3
MA 305	Introductory Linear Algebra and Matrices	3
Hours		16

Second Year

Fall Semester		Hours
MAE 206	Engineering Statics ¹	3
MSE 201	Structure and Properties of Engineering Materials	3
MA 242	Calculus III	4
PY 208 & PY 209	Physics for Engineers and Scientists II and Physics for Engineers and Scientists II Laboratory	4
MES 200	Introduction to Mechanical Engineering Systems	2
Hours		16

Spring Semester

MAE 208	Engineering Dynamics ¹	3
MAE 214	Solid Mechanics ¹	3
MA 341	Applied Differential Equations I	3
MES 201	Mechanical Engineering Systems Lab I	2
CSC 111 or CSC 113 or CSC 116	Introduction to Computing: Python or Introduction to Computing - MATLAB or Introduction to Computing - Java	3
Select one of the following Ethics courses:		3
PHI 214	Issues in Business Ethics	
PHI 221	Contemporary Moral Issues	
PHI 375	Ethics	
Hours		17

Third Year

Fall Semester		Hours
MAE 201	Engineering Thermodynamics I ¹	3
MAE 308	Fluid Mechanics	3

MAE 315	Dynamics of Machines	3
MES 301	Mechanical Engineering Systems Lab II	2
ENG 331	Communication for Engineering and Technology	3
Hours		14

Spring Semester

MAE 316	Strength of Mechanical Components	3
MES 300	Systems Engineering	3
MAE 435	Principles of Automatic Control	3
MES 302	Mechanical Engineering Systems Lab III	2
GEP Additional Breadth (http://catalog.ncsu.edu/undergraduate/gep-category-requirements/) (HUM/SS/VPA)		3
Hours		14

Fourth Year

Fall Semester		Hours
MAE 413	Design of Mechanical Systems ((Mech. Engr. Analysis)) ¹	3
MAE 310	Heat Transfer Fundamentals	3
MES 401	MES Capstone Design I	3
MES 400	Mechanical Engineering Systems Lab IV	2
GEP Humanities (http://catalog.ncsu.edu/undergraduate/gep-category-requirements/gep-humanities/)		3
GEP Social Sciences (http://catalog.ncsu.edu/undergraduate/gep-category-requirements/gep-social-sciences/)		3
Hours		17

Spring Semester

MAE 412	Design of Thermal System ¹	3
MES 403	MES Capstone Design II	3
ECE 331	Principles of Electrical Engineering	3
GEP Interdisciplinary Perspectives (http://catalog.ncsu.edu/undergraduate/gep-category-requirements/gep-interdisciplinary-perspectives/)		3
GEP Interdisciplinary Perspectives (http://catalog.ncsu.edu/undergraduate/gep-category-requirements/gep-interdisciplinary-perspectives/)		2-3
Hours		14
Total Hours		124

¹ A grade of C- or higher is required.

² A grade of C (2.0) or higher is required.

Career Opportunities

In the MES program, you will receive a solid foundation in mechanical engineering principles including structural mechanics, materials, fluid mechanics, dynamics, vibrations, controls, thermal sciences, mechanical design, and thermal design. You will also receive training in the formal systems engineering approach to the design and realization of integrated systems. Your training in formal systems engineering gives you the ability to understand and work through the broad complex issues involved with integrated systems. Your training in mechanical engineering principles gives you the skill and confidence required to understand and solve detailed technical problems. The unique combination of these skills allows you to be well prepared to meet the technical and non-technical challenges of today's engineering workplace.