AEROSPACE ENGINEERING, EMPHASIS

Mechanical engineering is the application of the principles of engineering and problem-solving techniques from design to manufacturing to the market for any product including aircrafts. Mechanical engineers analyze their work using the principles of motion, force, and energy ensuring that designs function safely, reliably, and efficiently, all at a competitive price. The aeromechanical field is a shared discipline between mechanical engineering and aerospace engineering. It prepares students to deal with the interactions between the flow of air and the mechanical behavior of structures and materials in the flow. Subjects in this discipline include aircraft design, composite materials, finite element stress analysis, dynamics and control of machinery, aerodynamics, and compressible fluid flow.

The U.S. aerospace industry is a major source of technological innovation with substantial spillovers to other industrial and commercial sectors. High wage employment, spreads the benefits of rising productivity throughout the U.S. economy. Employment of engineers with of aerospace competencies is projected to grow 8 percent from 2020 to 2030, about as strong as the average for all occupations.

The aerospace industry is a vibrant and emerging industrial sector in the state of West Virginia. From promising advanced innovators to established giants of the industry, the state's growing cluster of aerospace companies is fueled by a range of advantages. The Mountain State is within easy driving distance of about 40% of the top national buying sectors of aircraft products and defense contractors, corporations, and federal agencies. Additionally, the state is near original equipment manufacturers based in the South, including Airbus, Boeing, Lockheed Martin, and others. In 2019, the aerospace industry supported 4,000 jobs and created a $1.3 billion total economic output in West Virginia. A hidden gem, the state's aerospace industry is built around access to raw materials, development assistance, education, and location.

Cooperative Education

Students may elect to participate in the cooperative education program. Students in the program will have periodic full-time work experiences in their area of interest with participating companies. Information on the program can be obtained from the chair or academic advisor.

Course Requirements

Code	Title	Credit Hours
Core Curriculum [1]		
Core I: Critical Thinking		
FYS 100	First Yr Sem Critical Thinking	3
or FYS 100H	First Year Seminar-Honors	
Two Critical Thinking Courses		6
Core II		
ENG 101	Beginning Composition	3
ENG 201	Advanced Composition (Completion of ENG 201H - English Composition Honors (3 CH) with a C or better also satisfies the university composition requirement)	3
CMM 103	Fund Speech-Communication	3
or CMM 207	Bus & Prof Communication	
Math: (requirement met in major)		
Physical or Natural Science: (requirement met in major)		
Core II Social Science		
Core II Humanities		
Core II Fine Arts		
Additional University Requirements		
Two Writing Intensive courses		6
One Multicultural (m) or International (I) course		3
Mathematics		**16**
MTH 229	Calculus/Analytic Geom I (CT)	
MTH 230	Calculus/Analytic Geom II	
MTH 231	Calculus/Analytic Geom III	
MTH 335	Ordinary Diff Equations	
Science		**12**
CHM 211	Principles of Chemistry I	
PHY 211	University Physics I	
PHY 202	General Physics I Laboratory	
PHY 213	University Physics II	
Engineering		**26**
ENGR 102	Introduction to CAD	
ENGR 103	Freshman Engineering Seminar	
ENGR 104	The Engineering Profession	
ENGR 213	Statics	
ENGR 214	Dynamics	
ENGR 215	Engineering Materials	
ENGR 216	Mech of Deformable Bodies	
ENGR 217	Engineering Career Preparation	
ENGR 219	Engineering Thermodynamics	
ENGR 222	Engr Cost Analysis & Economy	
ENGR 335	Adv Engineering Analysis	
Core Mechanical Engineering		**34**
ME 111	Mech Engineering Computations	
ME 305	Aircraft Systems	
ME 245	Circuits and Instrumentation	
ME 310	Thermodynamics II	
ME 325	Mechanical Engineering Lab-I	
ME 340	Machine Element Design	
ME 350	Heat Transfer	
ME 360	Fluid Dynamics	
ME 312	Flight Mechanics	
ME 422	Flight Stability and Control	
ME 425	Mechanical Engineering Lab-II	
ME 456	Materials for Aerospace	
Capstone Design, Design Elective, and Technical Electives		**16**
ME 452	Capstone Design I [2]	

ME 453	Capstone Design II [3]	
Design Elective		**3**
ME 430	Design of Thermal Systems	
or ME 435	Design of Mechanical System	
Technical Electives		**9**
Students who select aerospace engineering as an area of emphasis must take three of the following courses:		
ME 320	Fluid Power	
ME 445	Hydraulic & Pneumatic Control	
ME 451	Jet Propulsion	
ME 460	Vibrations	
ME 471	Finite Elements Method	
ME 473	Computational Fluid Dynamics	

Other courses may be taken to satisfy this requirement with the approval of the student's advisor and the chair.

[1] *Transfer Students:* Freshman transfer students must complete Core I at Marshall. Core II can be completed with Marshall or transfer courses. Transfers with 26 or more credit hours must complete one CT course but are exempt from the remaining Core I requirements. Core II can be completed with Marshall or transfer courses.

[2] To be eligible to take Senior Capstone I (ME 452), students must have senior standing in mechanical engineering. Senior standing is defined for the B.S.M.E. as having completed the following courses:

- ME 325 - Experimental Design and Thermo-Fluid Lab (2 CH)
- ME 350 - Heat Transfer (3 CH)
- ME 410 - Kinematics & Design of Machines (3 CH) or ME 422- Flight Stability and Control (3 CH)

[3] To be eligible to take the ME 453 Senior Capstone II student must have completed ME 452, and at least one of the Design Electives (ME 430 or ME 435).