

PROGRAM SUMMARY

- **Credit Hours:** 123 hours (or 124 hours with a concentration)
 - **Concentrations:** Motorsports Engineering; Energy Engineering; Biomedical Engineering
 - **Declaring the Major:** Freshmen can request entry into the major when applying to the university, but must complete the freshman curriculum within three semesters with a minimum overall GPA of 2.50. Transfer students are required to have a minimum overall GPA of 3.0 and a grade of C or higher in pre-calculus trigonometry or higher math. *Due to high demand and limited space, admission to the major of mechanical engineering is competitive. The minimum GPA requirements stated above do not guarantee acceptance into the major.*
 - **Advising (For the Major):** Participation in academic advising is mandatory. Freshmen are advised by the Office of Student Development and Success, while sophomores and upper classmen are advised within the department.
 - **Advising (For General Education):** General education and major requirements are addressed in academic advising.
 - **Minimum Grades/GPA:** Students are required to maintain from the sophomore year through graduation: 2.00 overall GPA and 2.00 major GPA. Students are also required to successfully complete courses within two attempts.
 - **Teacher Licensure:** No
 - **Evening Classes Available:** Some evening classes are available.
 - **Weekend Classes Available:** No
 - **Other Information:** All incoming College of Engineering students are required to own a laptop. Details on this policy and recommended specifications are found on the Mosaic Computing website: <http://engrmosaic.uncc.edu/>.
 - **Contact(s):** Department of Mechanical Engineering and Engineering Science, Duke Centennial Hall 380, 704-687-8253
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PROGRAM REQUIREMENTS

The Bachelor of Science in Mechanical Engineering program is accredited by ABET. The BSME curriculum is a four-year curriculum that prepares graduates for careers in the field of mechanical engineering and/or further studies at the graduate level.

Mechanical engineering is possibly the broadest of the engineering disciplines. Among the major concerns of the mechanical engineer are problems related to conversion, utilization, and conservation of our limited energy resources. Additional important areas for the mechanical engineer include the design and analysis of machines, structures, and manufacturing processes related to the industrial output of the nation. Increasingly, this design and analysis is computer based using the techniques of computer-aided design (CAD/CAM).

A sound understanding of the engineering sciences is fundamental to the education of engineers in every discipline. The engineering sciences are generally identified as those areas of engineering that emphasize the application of the fundamental principles of the physical sciences, primarily physics and chemistry, to engineering problems. Some classical and emerging engineering areas that fall within this field include thermodynamics, fluid mechanics, engineering mechanics, engineering materials, nuclear and chemical sciences, microelectronics theory and fabrication, manufacturing, metrology, and the solid state sciences.

Minimum criteria for continuation and graduation are:

- a minimum overall GPA of 2.00
- a minimum GPA of 2.00 in engineering courses
- successful completion of all courses within two attempts

Concentrations within the program include Biomedical Engineering, Motorsports Engineering and Energy Engineering. For each concentration, students take an additional one-credit course and focus their technical electives and senior design work within the given area.

The Energy Engineering concentration is intended for students interested in specialized and systematic training and education in the area of power generation. Students completing the requirements described in this program will receive a special designation on their transcripts showing that they have completed the Energy Engineering concentration. Students must apply for admission and may enter the program during their sophomore or junior years only. To be admitted to the concentration, students must have completed Physics I (PHYS 2101 and 2101L), Calculus I, II, and III (MATH 1241, 1242, and 2241), and Engineering Mechanics I (MEGR 2141), all with a

grade of C or above and have a minimum GPA of 3.0. In order to remain in the concentration a minimum (overall and program) GPA of 3.0 must be maintained.

The Motorsports Engineering concentration is intended for students interested in specialized and systematic training and education in the area of automotive engineering as it pertains to motorsports. Students completing the requirements described in this program will receive a special designation on their transcripts showing that they have completed the Motorsports Engineering concentration. Students must apply for admission and may enter the program during the sophomore or junior years only. To be admitted to the concentration students must have completed PHYS 2101, PHYS 2101L, MATH 1242, ENGR 1202, and UWRT 1103 or UWRT 1104, all with grades of C or above and have a minimum GPA of 2.5.

The Biomedical Engineering concentration is intended for students interested in specialized and systematic training and education in the area of biomedical engineering. Students completing the requirements described in this program will receive a special designation on their transcripts showing that they have completed the Biomedical Engineering concentration. Students may declare the concentration as entering freshmen, or they may apply for admission to the concentration during their freshman, sophomore or junior years only. In order to remain in the concentration a minimum overall GPA of 3.0 must be maintained.

Areas	Credit Hours	Description
Pre-Major/ Prerequisites	0	DNA
Major	93	Required courses also fulfill the General Education Communication Skills requirements (Written and Oral Communication).
General Education <i>(not satisfied by other major requirements)</i>	12	Four LBST courses fulfill the General Education Liberal Education requirements and are chosen from: LBST 110X, LBST 2101, LBST 2102, LBST 221X, and LBST 2301. See details in the General Education section of the current academic catalog.
Related Work	0	DNA
Foreign Language	0	DNA
Science Elective	3	Chosen from BIOL 1110, BIOL 2120, CHEM 1252, GEOL 1200 or PHYS 1130
Math Elective	3	*
Technical Electives	12	**Four technical electives provide depth of learning in chosen areas.
Total Credit Hours	123	124 hours with a concentration in Motorsports Engineering, Biomedical Engineering, or Energy Engineering

*All MEGR students are required to complete: a) a math elective and b) a course with appropriate statistics content. Option 1 for fulfilling the combination of the math elective and the statistics requirement is STAT 3128. Option 2 is to use the technical elective MEGR 3282 to fulfill the statistics requirement while also taking MATH 2164 or MATH 3171 as the math elective. The math elective will not also count as a technical elective. For either option, five courses are required to fulfill the requirements of math, statistics and technical electives.

Option 1 – STAT 3128 fulfills math elective and statistics requirements (plus students will need four technical electives).

Option 2 – MEGR 3282 plus MATH 2164 or MATH 3171 (plus students will need three additional technical electives).

Biomedical Engineering students are required to fulfill the math elective via option 1 and the science elective via BIOL 1110 or BIOL 2120.

**At least three of the four courses that are required as technical electives must be courses with a MEGR course designation. Courses that are approved as technical electives are listed below. In parentheses beside each course are designations for approval as an elective for a given concentration (B – Biomedical Engineering, E – Energy Engineering, and M – Motorsports Engineering). Technical electives that are planned to be offered the following semester will be available on a list in the Mechanical Engineering office.

Approved technical electives with MEGR designations are: MEGR 3162, MEGR 3210 (E, M), MEGR 3211 (M), MEGR 3214 (E), MEGR 3222, MEGR 3225 (B, E, M), MEGR 3231 (M), MEGR 3232 (B), MEGR 3233 (B), MEGR 3234 (B), MEGR 3235, MEGR 3236 (B), MEGR 3241 (M), MEGR 3242 (M), MEGR 3243 (M), MEGR 3282 (E, M), MEGR 3451 (E), MEGR 3452 (E), MEGR 4127 and MEGR 4143.

Approved technical electives with non-MEGR designations are: BIOL 3161 (B), MATH 3171 (which may count as either a Math elective or a technical elective, but not both), PHYS 3220, PHYS 4110 (B), PHYS 4140, PHYS 4232, PHYS 4242, and PHYS 4271. New technical electives may be offered as MEGR 3090, MEGR 3092, or MEGR 3094, and their descriptions are available in the Mechanical Engineering office.

PLAN OF STUDY - BSME

Freshman Year					
Course Number	Course Title	Credit Hours	General Education	W/O Course	Notes
<i>Fall Semester</i>					
ENGR 1201	Introduction to Engineering I	2			Grade of C or better required
CHEM 1251	Chemistry I	3	X		Grade of C or better required
CHEM 1251L	Chemistry I Lab	1	X		Grade of C or better required
MATH 1241	Calculus I	3	X		Grade of C or better required
XXXX XXXX	Science Elective	3			
LBST 11XX	LBST 1100 Series: Arts and Society	3	X		
<i>Spring Semester</i>					
ENGR 1202	Introduction to Engineering II	2			Grade of C or better required
PHYS 2101	Physics I	3	X		Grade of C or better required
PHYS 2101L	Physics I Lab	1			Grade of C or better required
MATH 1242	Calculus II	3	X		Grade of C or better required
UWRT 1103 or 1104	Writing and Inquiry in Academic Contexts	3 or 4	X		Grade of C or better required
LBST 2101, 2102 or 221x	Themes in general education	3	X		

30 or 31 Credit Hours for Year

Sophomore Year					
Course Number	Course Title	Credit Hours	General Education	W/O Course	Notes
<i>Fall Semester</i>					
PHYS 2102	Physics II	3			Grade of C or better required
PHYS 2102L	Physics II Lab	1			Grade of C or better required
MEGR 2141	Engineering Mechanics I	3			Grade of C or better required
MATH 2171	Differential Equations	3			Grade of C or better required
ECON 2101 or 2102	Macro Economics or Micro Economics	3	X		
LBST 2301	Critical Thinking and Communication for 2017 Gen Ed; LBST 2101, 2102, or 221X for 2003 Gen Ed	3	X		
<i>Spring Semester</i>					
MEGR 2180	Manufacturing Systems	3			Grade of C or better required
MEGR 2156	Design Projects Laboratory I	2			Grade of C or better required
MEGR 2144	Introduction to Solid Mechanics	3			Grade of C or better required
MATH 2241	Calculus III	3			Grade of C or better required
ECGR 2161	Basic Electrical Engineering	3			Grade of C or better required
MEGR 2240	Computational Methods for Engineers	3			Grade of C or better required

33 Credit Hours for Year

Junior Year					
Course Number	Course Title	Credit Hours	General Education	W/O Course	Notes
<i>Fall Semester</i>					
MEGR 3111	Thermodynamics I	3			Grade of C or better required
MEGR 3121	Dynamic Systems I	3			Grade of C or better required
MEGR 3161	Introduction to Engineering Materials	3			Grade of C or better required
XXXX XXXX	Mechanical Engineering Technical Elective	3			May also be taken in the seventh semester
MEGR 3171	Introduction to Measurements and Instrumentation	2			
MEGR 3171L	Instrumentation Laboratory	2	X	W	Grade of C or better required
<i>Spring Semester</i>					
MEGR 3112	Thermodynamics II	3			Grade of C or better required
MEGR 3122	Dynamic Systems II	3			Grade of C or better required
MEGR 3116	Introduction to Heat Transfer	3			Grade of C or better required
MEGR 3156	Design Projects Lab II	2			Grade of C or better required
MEGR 3114	Fluid Mechanics	3			Grade of C or better required
MEGR 3152	Mechanics and Materials Laboratory	2	X	W	

32 Credit Hours for Year

Senior Year					
Course Number	Course Title	Credit Hours	General Education	W/O Course	Notes
<i>Fall Semester</i>					
MEGR 3255	Senior Design I	2			
XXXX XXXX	Mechanical Engineering Technical Elective	3			
MATH XXXX	Math Elective	3			May also be taken in the fifth semester
MEGR 3221	Machine Analysis and Design I	3			
MEGR 3251	Thermal/Fluids Laboratory	2	X	W	
ENGR 3295	Professional Development	1			
<i>Spring Semester</i>					
MEGR 3256	Senior Design II	2	X	O	
XXXX XXXX	Mechanical Engineering Technical Elective	3			
XXXX XXXX	Mechanical Engineering Technical Elective	3			
LBST 2101, 2102 or 221x	Themes in general education	3	X		
MEGR 3216	Thermal/Fluid Design	3			

PLAN OF STUDY – BSME WITH CONCENTRATION IN MOTORSPORTS ENGINEERING

Freshman Year					
Course Number	Course Title	Credit Hours	General Education	W/O Course	Notes
<i>Fall Semester</i>					
ENGR 1201	Introduction to Engineering I	2			Grade of C or better required
CHEM 1251	Chemistry I	3	X		Grade of C or better required
CHEM 1251L	Chemistry I Lab	1	X		Grade of C or better required
MATH 1241	Calculus I	3	X		Grade of C or better required
XXXX XXXX	Science Elective	3			
LBST 11XX	LBST 1100 Series: Arts and Society	3	X		
<i>Spring Semester</i>					
ENGR 1202	Introduction to Engineering II	2			Grade of C or better required
PHYS 2101	Physics I	3	X		Grade of C or better required
PHYS 2101L	Physics I Lab	1			Grade of C or better required
MATH 1242	Calculus II	3	X		Grade of C or better required
UWRT 1103 or 1104	Writing and Inquiry in Academic Contexts	3 or 4	X		Grade of C or better required
LBST 2101, 2102 or 221x	Themes in general education	3	X		

30 or 31 Credit Hours for Year

Sophomore Year					
Course Number	Course Title	Credit Hours	General Education	W/O Course	Notes
<i>Fall Semester</i>					
PHYS 2102	Physics II	3			Grade of C or better required
PHYS 2102L	Physics II Lab	1			Grade of C or better required
MEGR 2141	Engineering Mechanics I	3			Grade of C or better required
MATH 2171	Differential Equations	3			Grade of C or better required
ECON 2101 or 2102	Macro Economics or Micro Economics	3	X		
LBST 2301	Critical Thinking and Communication for 2017 Gen Ed; LBST 2101, 2102, or 221X for 2003 Gen Ed	3	X		
MEGR 2299	Introduction to Motorsports Engineering	1			Grade of C or better required
<i>Spring Semester</i>					
MEGR 2180	Manufacturing Systems	3			Grade of C or better required
MEGR 2156	Design Projects Laboratory I	2			Grade of C or better required
MEGR 2144	Introduction to Solid Mechanics	3			Grade of C or better required
MATH 2241	Calculus III	3			Grade of C or better required
ECGR 2161	Basic Electrical Engineering	3			Grade of C or better required
MEGR 2240	Computational Methods for Engineers	3			Grade of C or better required

34 Credit Hours for Year

Junior Year					
Course Number	Course Title	Credit Hours	General Education	W/O Course	Notes
<i>Fall Semester</i>					
MEGR 3111	Thermodynamics I	3			Grade of C or better required
MEGR 3121	Dynamic Systems I	3			Grade of C or better required
MEGR 3161	Introduction to Engineering Materials	3			Grade of C or better required
XXXX XXXX	Motorsports Technical Elective	3			May also be taken in the seventh semester
MEGR 3171	Introduction to Measurements and Instrumentation	2			
MEGR 3171L	Instrumentation Laboratory	2	X	W	Grade of C or better required
<i>Spring Semester</i>					
MEGR 3112	Thermodynamics II	3			Grade of C or better required
MEGR 3122	Dynamic Systems II	3			Grade of C or better required
MEGR 3116	Introduction to Heat Transfer	3			Grade of C or better required
MEGR 3156	Design Projects Lab II	2			Grade of C or better required
MEGR 3114	Fluid Mechanics	3			Grade of C or better required
MEGR 3152	Mechanics and Materials Laboratory	2	X	W	

32 Credit Hours for Year

Senior Year					
Course Number	Course Title	Credit Hours	General Education	W/O Course	Notes
<i>Fall Semester</i>					
MEGR 3355	Motorsports Senior Design I	2			
XXXX XXXX	Motorsports Technical Elective	3			
MATH XXXX	Math Elective	3			May also be taken in the fifth semester
MEGR 3221	Machine Analysis and Design I	3			
MEGR 3251	Thermal/Fluids Laboratory	2	X	W	
ENGR 3295	Professional Development	1			
<i>Spring Semester</i>					
MEGR 3356	Motorsports Senior Design II	2	X	O	

XXXX XXXX	Motorsports Technical Elective	3		
XXXX XXXX	Motorsports Technical Elective	3		
LBST 2101, 2102 or 221x	Themes in general education	3	X	
MEGR 3216	Thermal/Fluid Design	3		

28 Credit Hours for Year

PLAN OF STUDY – BSME WITH CONCENTRATION IN ENERGY ENGINEERING

Freshman Year					
Course Number	Course Title	Credit Hours	General Education	W/O Course	Notes
<i>Fall Semester</i>					
ENGR 1201	Introduction to Engineering I	2			Grade of C or better required
CHEM 1251	Chemistry I	3	X		Grade of C or better required
CHEM 1251L	Chemistry I Lab	1	X		Grade of C or better required
MATH 1241	Calculus I	3	X		Grade of C or better required
XXXX XXXX	Science Elective	3			
LBST 11XX	LBST 1100 Series: Arts and Society	3	X		
<i>Spring Semester</i>					
ENGR 1202	Introduction to Engineering II	2			Grade of C or better required
PHYS 2101	Physics I	3	X		Grade of C or better required
PHYS 2101L	Physics I Lab	1			Grade of C or better required
MATH 1242	Calculus II	3	X		Grade of C or better required
UWRT 1103 or 1104	Writing and Inquiry in Academic Contexts	3 or 4	X		Grade of C or better required
LBST 2101, 2102 or 221x	Themes in general education	3	X		

30 or 31 Credit Hours for Year

Sophomore Year					
Course Number	Course Title	Credit Hours	General Education	W/O Course	Notes
<i>Fall Semester</i>					
PHYS 2102	Physics II	3			Grade of C or better required
PHYS 2102L	Physics II Lab	1			Grade of C or better required
MEGR 2141	Engineering Mechanics I	3			Grade of C or better required
MATH 2171	Differential Equations	3			Grade of C or better required
ECON 2101 or 2102	Macro Economics or Micro Economics	3	X		
LBST 2301	Critical Thinking and Communication for 2017 Gen Ed; LBST 2101, 2102, or 221X for 2003 Gen Ed	3	X		
<i>Spring Semester</i>					
MEGR 2180	Manufacturing Systems	3			Grade of C or better required
MEGR 2156	Design Projects Laboratory I	2			Grade of C or better required
MEGR 2144	Introduction to Solid Mechanics	3			Grade of C or better required
MATH 2241	Calculus III	3			Grade of C or better required
ECGR 2161	Basic Electrical Engineering	3			Grade of C or better required
MEGR 2240	Computational Methods for Engineers	3			Grade of C or better required
MEGR 2499	Introduction to Energy Engineering	1			Grade of C or better required

34 Credit Hours for Year

Junior Year					
Course Number	Course Title	Credit Hours	General Education	W/O Course	Notes
<i>Fall Semester</i>					
MEGR 3111	Thermodynamics I	3			Grade of C or better required
MEGR 3121	Dynamic Systems I	3			Grade of C or better required
MEGR 3161	Introduction to Engineering Materials	3			Grade of C or better required
XXXX XXXX	Energy Technical Elective	3			May also be taken in the seventh semester
MEGR 3171	Introduction to Measurements and Instrumentation	2			
MEGR 3171L	Instrumentation Laboratory	2	X	W	Grade of C or better required
<i>Spring Semester</i>					
MEGR 3112	Thermodynamics II	3			Grade of C or better required
MEGR 3122	Dynamic Systems II	3			Grade of C or better required
MEGR 3116	Introduction to Heat Transfer	3			Grade of C or better required
MEGR 3156	Design Projects Lab II	2			Grade of C or better required
MEGR 3114	Fluid Mechanics	3			Grade of C or better required
MEGR 3152	Mechanics and Materials Laboratory	2	X	W	

32 Credit Hours for Year

Senior Year					
Course Number	Course Title	Credit Hours	General Education	W/O Course	Notes
<i>Fall Semester</i>					
MEGR 3455	Energy Senior Design I	2			
XXXX XXXX	Energy Technical Elective	3			
MATH XXXX	Math Elective	3			May also be taken in the fifth semester

MEGR 3221	Machine Analysis and Design I	3		
MEGR 3251	Thermal/Fluids Laboratory	2	X	W
ENGR 3295	Professional Development	1		
Spring Semester				
MEGR 3456	Energy Senior Design II	2	X	O
XXXX XXXX	Energy Technical Elective	3		
XXXX XXXX	Energy Technical Elective	3		
LBST 2101, 2102 or 221x	Themes in general education	3	X	
MEGR 3216	Thermal/Fluid Design	3		

28 Credit Hours for Year

PLAN OF STUDY – BSME WITH CONCENTRATION IN BIOMEDICAL ENGINEERING

Freshman Year					
Course Number	Course Title	Credit Hours	General Education	W/O Course	Notes
Fall Semester					
ENGR 1201	Introduction to Engineering I	2			Grade of C or better required
CHEM 1251	Chemistry I	3	X		Grade of C or better required
CHEM 1251L	Chemistry I Lab	1	X		Grade of C or better required
MATH 1241	Calculus I	3	X		Grade of C or better required
XXXX XXXX	Science Elective	3			
LBST 11XX	LBST 1100 Series: Arts and Society	3	X		
Spring Semester					
ENGR 1202	Introduction to Engineering II	2			Grade of C or better required
PHYS 2101	Physics I	3	X		Grade of C or better required
PHYS 2101L	Physics I Lab	1			Grade of C or better required
MATH 1242	Calculus II	3	X		Grade of C or better required
UWRT 1103 or 1104	Writing and Inquiry in Academic Contexts	3 or 4	X		Grade of C or better required
LBST 2101, 2102 or 221x	Themes in general education	3	X		

30 or 31 Credit Hours for Year

Sophomore Year					
Course Number	Course Title	Credit Hours	General Education	W/O Course	Notes
Fall Semester					
PHYS 2102	Physics II	3			Grade of C or better required
PHYS 2102L	Physics II Lab	1			Grade of C or better required
MEGR 2141	Engineering Mechanics I	3			Grade of C or better required
MATH 2171	Differential Equations	3			Grade of C or better required
ECON 2101 or 2102	Macro Economics or Micro Economics	3	X		
LBST 2301	Critical Thinking and Communication for 2017 Gen Ed; LBST 2101, 2102, or 221X for 2003 Gen Ed	3	X		
Spring Semester					
MEGR 2180	Manufacturing Systems	3			Grade of C or better required
MEGR 2156	Design Projects Laboratory I	2			Grade of C or better required
MEGR 2144	Introduction to Solid Mechanics	3			Grade of C or better required
MATH 2241	Calculus III	3			Grade of C or better required
ECGR 2161	Basic Electrical Engineering	3			Grade of C or better required
MEGR 2240	Computational Methods for Engineers	3			Grade of C or better required
MEGR 2279	Introduction to Biomedical Engineering	1			Grade of C or better required

34 Credit Hours for Year

Junior Year					
Course Number	Course Title	Credit Hours	General Education	W/O Course	Notes
Fall Semester					
MEGR 3111	Thermodynamics I	3			Grade of C or better required
MEGR 3121	Dynamic Systems I	3			Grade of C or better required
MEGR 3161	Introduction to Engineering Materials	3			Grade of C or better required
XXXX XXXX	Biomedical Technical Elective	3			May also be taken in the seventh semester
MEGR 3171	Introduction to Measurements and Instrumentation	2			
MEGR 3171L	Instrumentation Laboratory	2	X	W	Grade of C or better required
Spring Semester					
MEGR 3112	Thermodynamics II	3			Grade of C or better required
MEGR 3122	Dynamic Systems II	3			Grade of C or better required
MEGR 3116	Introduction to Heat Transfer	3			Grade of C or better required
MEGR 3156	Design Projects Lab II	2			Grade of C or better required
MEGR 3114	Fluid Mechanics	3			Grade of C or better required
MEGR 3152	Mechanics and Materials Laboratory	2	X	W	

32 Credit Hours for Year

Senior Year					
Course Number	Course Title	Credit Hours	General Education	W/O Course	Notes
Fall Semester					
MEGR 3275	Biomedical Senior Design I	2			
XXXX XXXX	Biomedical Technical Elective	3			

MATH XXXX	Math Elective	3			May also be taken in the fifth semester
MEGR 3221	Machine Analysis and Design I	3			
MEGR 3251	Thermal/Fluids Laboratory	2	X	W	
ENGR 3295	Professional Development	1			
<i>Spring Semester</i>					
MEGR 3276	Biomedical Senior Design II	2	X	O	
XXXX XXXX	Biomedical Technical Elective	3			
XXXX XXXX	Biomedical Technical Elective	3			
LBST 2101, 2102 or 221x	Themes in general education	3	X		
MEGR 3216	Thermal/Fluid Design	3			

28 Credit Hours for Year

ADVISING RESOURCES

- General Education Requirements for ALL Students: ucol.uncc.edu/general-education
- Undergraduate Catalog: catalog.uncc.edu
- Central Advising website: advising.uncc.edu
- William States Lee College of Engineering advising website: coe.uncc.edu/current-students/advising.html
- University Advising Center website: advisingcenter.uncc.edu