



B.S. in Mechanical Engineering & Physics (dual degree)

Academic Plan of Study

William States Lee College of Engineering + College of Liberal Arts & Sciences
Dept. of Mechanical Engineering and Engineering Science + Dept. of Physics &
Optical Science

mees.uncc.edu & physics.uncc.edu

PROGRAM SUMMARY

- **Credit Hours:** 132-137 (depending on electives and concentrations)
 - **Concentrations:** Students with concentrations in Energy Engineering or Motorsports Engineering for their B.S.M.E degrees are eligible for the dual degree. Students with a concentration have one additional credit hour.
 - **Declaring the Major:** Students should declare a dual degree in Physics and Engineering during their freshman or sophomore year.
 - **Advising (For the Major):** (Engineering) Dr. Kevin Lawton, kmlawton@uncc.edu or another Mechanical Engineering advisor; (Physics) Dr. Tom Suleski, tsuleski@uncc.edu
 - **Advising (For General Education):** Engineering Advisor
 - **Minimum Grades/GPA:** Students must have a 2.0 or higher average in Physics courses to graduate. A “C” or better is required in most PHYS classes before students can progress to the next PHYS course. Students must have a 2.0 overall GPA as well as in engineering courses.
 - **Teacher Licensure:** No
 - **Evening Classes Available:** Yes (lower level only)
 - **Weekend Classes Available:** No
 - **Other Information:** N/A
 - **Contact(s):** (Engineering) Dr. Kevin Lawton, kmlawton@uncc.edu; (Physics) Dr. Tom Suleski, tsuleski@uncc.edu
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PROGRAM REQUIREMENTS

The Department of Physics and Optical Science offers three dual degree opportunities with the College of Engineering to broaden and enhance the education of students in engineering degree programs. To obtain a dual B.S. degree in Mechanical Engineering and Physics, an undergraduate student must complete all requirements for the B.S.M.E. degree as established by the Department of Mechanical Engineering. In addition, the student must complete 12 hours of upper division physics courses specified by the Department of Physics and Optical Science with an average grade of C or above. To meet the upper division physics requirement, students must complete the following courses: PHYS 3141 (Introduction to Modern Physics), PHYS 4231 (Electromagnetic Theory I), PHYS 4241 (Quantum Mechanics I), and 3 elective hours (at the 3000-4000 level) chosen from a list of approved courses available from the Department of Physics and Optical Science. These 3 hours of PHYS elective credit must be taken under a PHYS course number. It is strongly suggested that students take PHYS 3220 (Mathematical Methods in Physics) as the elective course unless a student is also a Math major or minor. A B.S. in Physics under this program will be awarded at the same time as or after the B.S.M.E. The B.S. Physics degree will not be awarded in advance of the engineering degree. Students completing the dual degree complete the “W” in the PHYS major requirement through their Engineering degree requirements. Students in this dual degree program are not required to fulfill the College of Liberal Arts and Sciences foreign language requirement (see the CLAS General Education section in the *Catalog* for additional information).

Areas	Credit Hours	Description
Pre-Major/ Prerequisites	0	Not applicable
Major (Physics)	12	These hours are in addition to physics classes required by the engineering major.
Major (Mechanical Engineering)	93-95	These hours depend on the course in freshman writing (UWRT 1103 or 1104) and if the student has an optional concentration.
General Education (not satisfied by other major requirements)	12	These hours do not include those requirements which are satisfied within the major(s). Students with an associate's degree are exempt from most General Education requirements.
Related Work	0	Not applicable
Foreign Language	0	Not applicable
Science Elective	3	Chosen from BIOL 1110, BIOL 2120, CHEM 1252, GEOL 1200 or PHYS 1130
Math Elective	3	*
Electives	12	**Four technical electives provide depth of learning in chosen areas, one of which may be approved to be outside of MEGR courses
Total Credit Hours	132-137	

*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 in 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

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	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 2241	Calculus III	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 2171	Differential Equations	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
PHYS 3141	Introduction to Modern Physics	3			(Also available in the summer)
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			
PHYS XXXX	PHYS Elective (must be 3000-4000 level and from approved list)	3			(PHYS 3220 strongly suggested –see PHYS Advisor)
XXXX XXXX	Mechanical Engineering Elective	3			
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	
PHYS 4231	Electromagnetic Theory I	3			
XXXX XXXX	Mechanical Engineering Elective	3			
LBST 2101, 2102, or 22XX	Themes in general education	3	X		
MEGR 3216	Thermal/Fluid Design	3			
28 Credit Hours for Year					

Additional Semester					
Course Number	Course Title	Credit Hours	General Education	W/O Course	Notes
<i>Fall Semester</i>					
XXXX XXXX	Mechanical Engineering Elective	3			
XXXX XXXX	Mechanical Engineering Elective	3			
MATH XXXX	Math Elective	3			
PHYS 4241	Quantum Mechanics I	3			
12 Credit Hours for Year					

Other layouts are possible, particularly with summer courses. For whatever layout students choose, they must abide by the prerequisites and progression policies of both departments.

ADVISING RESOURCES

- General Education Requirements for ALL Students: ucol.uncc.edu/general-education
- Undergraduate Catalog: catalog.uncc.edu
- Central Advising website: advising.uncc.edu
- College of Liberal Arts & Sciences advising website: clas.uncc.edu/students/Advising-News/
- William States Lee College of Engineering advising website: <http://engr.uncc.edu/current-students/advising>
- University Advising Center website: advisingcenter.uncc.edu