

# DOUBLE MAJOR (B.S.) IN ENGINEERING AND PHYSICS

This program provides biomedical, chemical and life science, electrical, computer, mechanical, and nuclear engineering majors the opportunity to earn a double major in physics, requiring an additional nine to 17 credits beyond the hours required for the primary engineering major. The requirements for the double major are the same as those in the program description for the Bachelor of Science in Physics. Within the double major, a select number of engineering courses are acceptable substitutes for required physics courses.

The lists below show the total credits and required courses necessary – beyond what can be used as requirements for that major – for students to complete a double major in physics. In addition, the courses that are used from the primary engineering major toward fulfillment of the physics major are provided.

**Biomedical engineering** (17 credits): Additional courses are MATH 307, PHYS 301, PHYS 320, PHYS 376, PHYS 380 and PHYZ 320 (one credit).

Courses used that are required for the biomedical engineering major include: EGRB 303 replaces PHYS 340; EGRB 401 and EGRB 402 replace PHYS 450 and PHYS 490; and EGRB 427 counts as an upper-level physics elective.\* PHYS 207 and PHYS 208 also are required physics courses, and MATH 310 and STAT 441 count as upper-level physics electives.\*

**Chemical and life science engineering** (13 credits): Additional courses are PHYS 301, PHYS 320, PHYS 376, PHYS 380 and PHYZ 320 (one credit).

Courses used that are required for the chemical or life science engineering major include: CLSE 305 replaces PHYS 340; ENGR 402, ENGR 403, CLSE 402 and CLSE 403 replace PHYS 450 and PHYS 490; and CLSE 301 and CLSE 302 count as upper-level physics electives.\* PHYS 207 and PHYS 208 are also required physics courses, and STAT 441 counts as an upper-level physics elective.\*

**Computer engineering** (nine credits): Additional courses are PHYS 301, PHYS 340 and PHYS 380.

Courses used that can be taken to complete the computer engineering major include: EGRE 309 (computer engineering elective) replaces PHYS 376; and ENGR 402, ENGR 403 and one selection from EGRE 404 and EGRE 405 (both) or EGRE 406 and EGRE 407 (both) replace PHYS 450 and PHYS 490. EGRE 306 and EGRE 310 also count as an upper-level physics electives,\* and the two remaining credits of upper-level physics electives\* can be chosen from EGRE 303, EGRE 307, EGRE 334 and EGRE 521. MATH 307, PHYS 320 and PHYZ 320 (one credit) are required for physics and can be used as technical electives for computer engineering. PHYS 207 and PHYS 208 are also required physics courses.

**Electrical engineering** (nine credits): Additional courses are PHYS 301, PHYS 340 and PHYS 380.

Courses used that can be taken to complete the electrical engineering major include: EGRE 309 replaces PHYS 376; and ENGR 402, ENGR 403, and one selection from EGRE 404 and EGRE 405 (both) or EGRE 406 and EGRE 407 (both) replace PHYS 450 and PHYS 490. EGRE 303, EGRE 306 and EGRE 310 also count as upper-level physics electives.\* PHYS 320 and PHYZ 320 (one credit) are required for

physics and can be used as technical electives for electrical engineering. PHYS 207 and PHYS 208 are required physics courses.

**Mechanical engineering** (13 credits): Additional courses are PHYS 301, PHYS 320, PHYS 376, PHYS 380 and PHYZ 320 (one credit).

Courses used that can be taken to complete the mechanical engineering major include: EGMN 302 replaces PHYS 340; and ENGR 402, ENGR 403, EGMN 402 and EGMN 403 replace PHYS 450 and PHYS 490. Taken together, EGMN 301, EGMN 309, and either STAT 441 or EGMN 351 satisfy the upper-level physics elective requirement.\* PHYS 207 and PHYS 208 are required physics courses.

Mechanical engineering majors should consult with an adviser to determine whether any upper-level physics courses can be used to satisfy mechanical engineering technical elective or nuclear engineering elective requirements.

\* Any physics/physics-related elective course as listed in the bulletin description for the B.S. in Physics.

With regard to general education requirements, students must fulfill the requirements of their primary engineering major. Any student interested in a physics double major should contact the physics department at (804) 828-1818 or [physics@vcu.edu](mailto:physics@vcu.edu).