

SCHOOL OF ARTS AND SCIENCES

ENGINEERING 3-2

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Objectives

Westminster offers a 3-2 Engineering Program in conjunction with the University of Southern California, in Los Angeles, California (USC), and Washington University in St. Louis, Missouri. Students who successfully complete the requirements for this program will earn two degrees:

- A Bachelor of Science or Arts with a major either in Biology, Chemistry, Computer Science, Physics, and Mathematics. (Students may pursue other majors, but it may take them longer than 5 years to complete the two degrees.)
- A Bachelor of Science in an engineering discipline from either Washington University or USC.

The 3-2 program is perfect students who want to enhance and broaden their undergraduate education as a prelude to the focused work of engineering school. In all their pre-engineering classes, students receive the benefits of Westminster's small class sizes and tradition of teaching excellence. Westminster's math and science programs offer "learning communities" that couple courses like math and biology and utilize group-based, hands-on learning. Moreover, students often develop close nurturing relationships with faculty and their peers at Westminster that might not happen at a larger school.

Under the 3-2 program, a student attends Westminster College for approximately three years and then transfers to either the University of Southern California (USC) or Washington University for an additional two years of study in the selected engineering discipline.

- (1) As Westminster freshman, students must meet entrance requirements for USC or Washington University.
- (2) The 3-2 program advisor at Westminster College must recommend them. (To be considered for this recommendation a student must satisfy all the program requirements listed below, maintain a cumulative grade point average of 3.00, and maintain a 3.00 average in the major courses.)
- (3) Students must complete at least four semesters of full-time study at Westminster before transferring to the engineering school.
- (4) Students must have completed 12 upper division credits in their major prior to transfer. Students who complete the 3-2 program by transferring to either USC or Washington University automatically have the Westminster residency requirement waived. (Westminster requires that the last 36 hours of course work be completed at Westminster.)
- (5) Students must file a Leave of Absence Request with the Registrar's Office.

Fields of Engineering Offered by the University of Southern California and Washington University:

Astronautics/Space Technology	Chemical
Biomedical	Civil
Chemical/Materials Science	Computer Science
Civil/Environmental	Computer Engineering
Computer Science	Electrical
Electrical	Mechanical
Industrial and Systems Engineering	System Science & Engineering

After successful completion of both portions of the program the student is awarded degrees from both institutions.

Program Requirements at Westminster College

Students in this program are encouraged to meet with the program director at Westminster College during their freshman year to ensure satisfaction of all the requirements for their chosen field of engineering during their time at Westminster College and to learn about the coursework that will be required during their two years at the university. Students must complete all their WCore requirements and the following set of engineering core courses:

REQUIREMENT DESCRIPTIONS			CREDIT HOURS	PREREQUISITES
I. Required Core Courses			48	
CHEM	111, 112	Principles of Chemistry I and II and Lab (4, 4)		corequisites for CHEM 111: CHEM 111R recommended; MATH 144 required/prerequisite for CHEM 112: CHEM 111
CMPT	201	Introduction to Computer Science (4)		Co-requisite: MATH 101 or 105 and current computer literacy skills.

CMPT	401	Directed Studies (FORTRAN, C++, or Java) (4)		
MATH	201, 202	Calculus I and II (4, 4)		MATH 144; MATH 201 is a prerequisite for MATH 202.
MATH	203	Multivariate Calculus (4)		MATH 202
MATH	363	Differential Equations II (4)		MATH 202
PHYS	211, 212	Physics for Scientists and Engineers I and II and Lab (4, 4)		PHYS 211 prerequisite: MATH 144 PHYS 212 prerequisite: PHYS 211 co-requisites: MATH 201/202
PHYS	301	Introduction to Modern Physics (4)		PHYS 151 or PHYS 212
WCSAM	203	Linear Algebra (4)		

Additional classes that may be required, depending on the field of engineering chosen, include:

REQUIREMENT DESCRIPTIONS			PREREQUISITES
BIOL	310	General Botany and Lab (4)	BIOL 202, 203, 205; CHEM 111
CHEM	303, 304	Organic Chemistry I and II and Lab (4, 4)	CHEM 112; CHEM 303 is a prerequisite for CHEM 304.
CHEM	306	Quantitative Chemistry and Lab (4)	CHEM 112 and PHYS 151 or 211.
CHEM	350	Biochemistry and Lab (4)	BIOL 205; CHEM 304. BIOL 204 is strongly recommended.
CHEM	421, 422	Quantum Chemistry & Lab, Thermodynamics and Statistical Mechanics & Lab	CHEM 112, MATH 202, PHYS 212, 309. Same as PHYS 410.
CMPT	351	Operating Systems (4)	CMPT 251, 306
DATA	220	Introduction to Statistics (4)	
MATH	310	Probability and Statistics (4)	MATH 202
MATH	311	Linear Algebra II (4)	MATH 210 and either Math 211 or WCSAM 203
MATH	362	Topics in Applied Mathematics (4)	MATH 201, and either MATH 211 or WCSAM 203 or Phys 309
PHYS	309	Mathematical Methods for Physics (4)	MATH 202 and PHYS 211
PHYS	311	Analytical Mechanics (4)	MATH 203, PHYS 212, 309
PHYS	410	Quantum Mechanics (Same as CHEM 421) (4)	CHEM 112; MATH 202; PHYS 212, 309. Same as CHEM 421.
PHYS	411	Thermodynamics and Statistical Mechanics and Lab (Same as CHEM 422) (4)	CHEM 112; MATH 202; PHYS 212; 309. Same as CHEM 422.

Sample Student Timetable

In order for the student to complete the dual degree program in five years, it is important to follow closely the timetable set up by the advisor. The following is a sample timetable for a student majoring in Physics at Westminster and desiring a dual degree in Electrical Engineering. A particular student's course schedule will depend upon their prior coursework, their major at Westminster, the desired engineering discipline, and the specific requirements of the engineering school.*

*Some engineering disciplines require specific pre-engineering classes. These can be taken at the engineering school.**The current 3/2 advisor is Dr. Peter Conwell, Assistant Professor of Physics.***Westminster College requires all freshmen to enroll in one learning community. These are classes linked with a common theme. Typically at least one of these courses will satisfy a WCore requirement. ^Typically taught every other year ^^Taught every other year

Financial Aid

Merit-based and need-based financial aid is available from Westminster College and the engineering schools. However, these programs are not linked. Students receiving financial aid from Westminster must reapply for financial aid at the engineering school.