COLLEGE OF ARTS AND SCIENCES

ENGINEERING 3+2

Faculty

- Jonas D'Andrea

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, or 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 for the student who wants 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 University 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 a Westminster first-year, students must meet entrance requirements for USC or Washington University.
2. The 3+2 program advisor at Westminster University must recommend them. (To be considered for this recommendation a students 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 of St. Louis 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:

University of Southern California	Washington University of St. Louis
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 University

Students in this program are encouraged to meet with the 3+2 program advisor at Westminster during their first year to ensure satisfaction of all the requirements for their chosen field of engineering during their time at Westminster University and to learn about the coursework that will be required during their two years at the other institution. Students must complete all of their WCore requirements and the following set of engineering core courses:

Requirement Description	Credit Hours	Prerequisites
I. Required Core Courses	**48**	
CHEM 111 Principles of Chemistry I	4	Co-requisites: MATH 144, CHEM 111R recommended
CHEM 112 Principles of Chemistry II	4	CHEM 111
CMPT 201 Introduction to Computer Science	4	Consent of instructor

Requirement Description	Credit Hours	Prerequisites
CMPT 401 Directed Studies (FORTRAN, C++, or Java)	4	
MATH 201 Calculus I	4	MATH 144
MATH 202 Calculus II	4	MATH 201
MATH 203 Multivariate Calculus	4	MATH 202
MATH 363 Differential Equations II	4	MATH 202
PHYS 211 Physics for Scientists and Engineers I	4	MATH 144
PHYS 212 Physics for Scientists and Engineers II	4	Co-requisites: MATH 201/202
PHYS 301 Introduction to Modern Physics	4	PHYS 151 or PHYS 212
WCSAM 203 Linear Algebra	4	
II. Additional classes that may be required, depending on the field of engineering chosen, include:		
BIOL 310 Plant Biology and Lab	4	BIOL 202, 203, 205, and CHEM 112
CHEM 303 Organic Chemistry I	4	CHEM 112
CHEM 304 Organic Chemistry II and Lab	4	CHEM 303
CHEM 306 Quantitative Chemistry and Lab	4	CHEM 112 and PHYS 151 or 211
CHEM 350 Biochemistry and Lab	4	BIOL 205 and CHEM 303; BIOL 204 is strongly recommended
CHEM 421 Quantum Chemistry and Lab (Same as PHYS 410)	4	CHEM 112, MATH 202, PHYS 212, 309
CHEM 422 Thermodynamics and Statistical Mechanics and Lab (Same as PHYS 411)	4	CHEM 112, MATH 202, PHYS 212, 309
CMPT 351 Operating Systems	4	CMPT 251, 306
DATA 220 Modern Statistics	4	
MATH 310 Probability and Statistics	4	MATH 202
MATH 311 Linear Algebra II	4	MATH 210 and MATH 211 or WCSAM 203
MATH 362 Topics in Applied Mathematics	4	MATH 201 and MATH 211, 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
PHYS 411 Thermodynamics and Statistical Mechanics and Lab (Same as CHEM 422)	4	CHEM 112, MATH 202, PHYS 212, 309

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.*

	Fall Semester	**Spring Semester**
Year 1: First-Year See the 3+2 advisor**	MATH 201 Calculus I or higher CHEM 111 Principles of Chemistry I and Lab PHYS 211 Phys for Scientists & Engineers I and Lab Other required WCore courses***	MATH 202 Calculus II or higher CHEM 112 Principles of Chemistry II and Lab PHYS 212 Phys for Scientists & Engineers II and Lab Other required WCore courses
Year 2: Sophomore Review program with advisor	MATH 203 Multivariate Calculus PHYS 301 Introduction to Modern Physics Other required WCore courses	WCSAM 203 Linear Algebra PHYS 309 Mathematical Methods of Physics PHYS 370 Scientific Computing Other required WCore courses
Year 3: Junior Review program with advisor. At the end of Fall semester, apply to desired engineering school. Meet with 3+2 advisor and request letter of recommendation. File for Leave of Absence from Westminster.	PHYS 305 Principles of Optics PHYS 311 Analytic Mechanics Other required WCore courses	PHYS 431 Principles of Electrodynamics Remaining WCore courses
Year 4: First year at engineering school	Summer after completing Year 4: Send copy of transcripts from engineering school to Registrar's Office at Westminster.	
Year 5: Second year at engineering school	Student applies for graduation from both Westminster and the engineering school in the spring.	After spring semester, student receives degrees from the engineering school and from Westminster University.

*Some engineering disciplines require specific pre-engineering classes. These can be taken at the engineering school.

**The current 3+2 advisor is Dr. Jonas D'Andrea, Professor of Mathematics.

***Westminster University requires all first-year 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.

Financial Aid

Merit-based and need-based financial aid is available from Westminster University 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.