



## SYSTEMS AND CONTROL ENGINEERING

### Dual Degree Program Course Requirements

Engineering Requirements for all majors/departments		
Course Code	Course Title	Semester Credit Hours
CHEM 105	Principles of Chemistry I	3
CHEM 106	Principles of Chemistry II	3
CHEM 113	Principles of Chemistry Lab	2
ENGR 131	Elementary Computer Programming (JAVA)	3
MATH 121	Calculus for Science and Engineering I	4
MATH 122	Calculus for Science and Engineering II	4
MATH 223	Calculus for Science and Engineering III	3
MATH 224	Elementary Differential Equations	3
PHYS 121	General Physics I	4
PHYS 122	General Physics II	4
	Humanities and Social Science (including college level writing proficiency)	22
	Physical Education (2 semesters)	0
		<b>55</b>



The Systems and Control Engineering Department recommends that the following courses be taken prior to beginning the Dual Degree Program at Case Western Reserve University. If the courses cannot be fulfilled, they will be integrated into the curriculum, which may possibly extend the program timeline.

### Recommended Engineering Courses for Systems and Control Engineering

Course Code	Course Title	Semester Credit Hours	Description
ENGR 200	Statics and Strength of Materials	3	An introduction to the analysis, behavior and design of mechanical/structural systems. Course topics include: concepts of equilibrium; geometric properties and distributed forces; stress, strain and mechanical properties of materials; and, linear elastic behavior of elements. Prereq: PHYS 121.
ENGR 210	Introduction to Circuits and Instrumentation	4	Modeling and circuit analysis of analog and digital circuits. Fundamental concepts in circuit analysis: voltage and current sources; Kirchhoff's Laws; Thevenin and Norton equivalent circuits, inductors capacitors, and transformers; modeling sensors and amplifiers and measuring DC device characteristics; characterization and measurement of time dependent waveforms; transient behavior of circuits; frequency dependent behavior of devices and amplifiers; frequency measurements; AC power and power measurements; noise in real electronic systems; electronic devices as switches; digital logic circuits; introduction to computer interfaces; and analog/digital systems for measurement and control. Prereq: MATH 122. Coreq: PHYS 122.
ENGR 225	Thermodynamics, Fluid Dynamics, Heat and Mass Transfer	4	Elementary thermodynamic concepts: first and second laws, and equilibrium. Basic fluid dynamics, heat transfer, and mass transfer: microscopic and macroscopic perspectives. Prereq: CHEM 111, ENGR 145, and PHYS 121. Coreq: MATH 223.
STAT 312	Statistics for Engineering & Science	3	For advanced undergraduate students in engineering, physical sciences, life sciences. Comprehensive introduction to probability models and statistical methods of analyzing data with the object of formulating statistical models and choosing appropriate methods for inference from experimental and observational data and for testing the model's validity. Balanced approach with equal emphasis on probability, fundamental concepts of statistics, point and interval estimation, hypothesis testing, analysis of variance, design of experiments, and regression modeling. Note: Credit given for only one (1) of STAT 312, 313, 333, 433. Prereq: MATH 122 or equivalent.

## Sample Course Sequence for Systems and Control Engineering

### Fall Year 1

Subject Code	Course Number	Course Title	Hours per Week		Semester Credit Hours
			Class	Lab	
ENGL	398N	Professional Communication	4	0	4
STAT	312	Statistics for Engineering and Science	3	0	3
EECS	352	Engineering, Economics, and Decision	3	0	3
EECS	342	Introduction to Global Systems	3	0	3
EECS	246	Signals and Systems	3	2	4
			16	2	17

### Spring Year 1

Subject Code	Course Number	Course Title	Hours per Week		Semester Credit Hours
			Class	Lab	
ENGR	210	Circuits and Instrumentation	3	2	4
ENGR	225	Thermo, Fluid Dynamics, Mass & Heat Transfer	4	0	4
EECS	281	Computer Org, Logic Design	3	2	4
EECS	313	Signal Processing	3	0	3
		Approved Technical Elective	3	0	3
			16	4	18

### Fall Year 2

Subject Code	Course Number	Course Title	Hours per Week		Semester Credit Hours
			Class	Lab	
EECS	324	Simulation Methods	3	0	3
EECS	398	Senior Project Lab1	0	8	4
ENGR	200	Statics and Strength of Materials	3	0	3
		Approved Technical Elective	3	0	3
			9	8	13

### Spring Year 2

Subject Code	Course Number	Course Title	Hours per Week		Semester Credit Hours
			Class	Lab	
EECS	304	Control Engineering I	3	0	3
EECS	305	Control Lab I	0	2	1
EECS	346	Engineering Optimization	3	0	3
EECS	399	Senior Project Lab	0	8	4
		Approved Technical Elective	3	0	3
		Approved Technical Elective	3	0	3
			12	10	17

**Please Note:** The course sequence serves as an example of the classes necessary to complete the Dual Degree Program. Courses and the semesters taken will be based on the student's transfer credit and discussion with the Case Western Reserve University faculty advisor.