

# ELECTRICAL ENGINEERING

— ABET ACCREDITATION CRITERIA APPLY —

The Departmental Requirements for a degree in Electrical Engineering include a core set of courses required of every major and a set of alternative specialty areas from which one sequence must be chosen. Students are required to have a program planning sheet approved by their advisor and the department at least one year prior to graduation. Each program of study is also expected to include both chemistry and physics as part of science and ordinary differential equations as part of math. The specific math and science requirements for EE's are listed below. The program is also to include the equivalent of half a year of engineering design experience.

To place the requirements in context, possible programs of study are given which satisfy all requirements for the BS degree in EE. Students with advanced placement will have greater freedom in course selection than is shown on the example program. Those considering studying at one of the foreign centers should consult the Overseas Study Office as soon as possible for this will add constraints in program planning. All students are expected to consult their faculty advisor, are encouraged to consult the Electrical Engineering Undergraduate Advising Center, and they may find it useful to consult other students when designing their program.

For updated information visit the EE Web site at: <http://ee.stanford.edu/>

## MATH AND SCIENCE REQUIREMENTS:

### MATH:

41, 42, 43, 44	18 Units
130	3 Units

### SCIENCE:

Physics 41, 43, 45, 47	13 Units
Chemistry 31	4 Units
Approved Math or Science Elec.	<u>7 Units</u>

**TOTAL: 45 UNITS**

If a student has 10 units of calculus advanced placement credit (a score of 4 or 5 on the BC calculus advanced placement exam), then Math 51, 52, 53 can be substituted for 43, 44, 103, and 130.

**TECHNOLOGY IN SOCIETY:** 1 approved course

## ENGINEERING FUNDAMENTALS:

E40	5 units
E70X (CS106X)	5 units
3 from approved list	9-12 units
<b>FUNDAMENTAL UNITS</b>	<b>19-22 UNITS</b>

## CORE COURSES REQUIRED OF ALL MAJORS:

Circuits and Systems	EE101, EE102, EE103	11 units
Electronics	EE111, EE112, EE113	11 units
Laboratory	EE121, EE122	6 units
Technical Writing	E102E	1 unit
Fields and Waves	EE141	4 units
<b>TOTAL CORE UNITS:</b>		<b>33 UNITS</b>

## THREE COURSES FROM ONE OF THE SPECIALTY AREAS LISTED BELOW:

Computer Hardware	EE184 (CS107), EE182, (EE183 or EE281), EE271
Computer Software	EE184 (CS107), EE189A (CS108), EE189B (CS194)
Controls	E105, EE205 (E205), EE206 (E206), EE209 (E209)
Electronics	EE133, EE212, EE214, EE216
Fields and Waves	EE142, EE144, EE241, EE242, EE246, EE247, EE252
Signal Processing	EE133, EE261, EE264, EE177 (STAT 116), EE278
<b>TOTAL SPECIALTY UNITS</b>	<b>9-12 UNITS</b>

## ELECTIVES IN ELECTRICAL ENGINEERING: 4-10 UNITS

(Any EE courses to make the total add to 71 units)

## TOTAL ENGINEERING UNITS: 71 UNITS

(Fundamental + Core + EE Specialty + EE Electives)

\* At least one of the following design projects must be included in each program:

EE133, EE144, EE183, EE281, EE189B (CS194), EE206 (E206), EE272A

Each program must include the ABET accreditation requirements of 68 units of Engineering Topics and 8 units of experimentation. The Engineering Topics include Engineering Science and Engineering Design with an integrated design experience through the curriculum and one design project course. All the above courses must be taken for a letter grade. A list of corresponding content for most courses is given in the table on the following page.

The next two tables provide the total units, the division of engineering science and engineering design units, and the experimentation units. Note that with the exception of E70X, the sum of engineering science units and engineering design units gives the total number of units. The experimentation units are counted separately and are used only for the ABET Laboratory units requirement.

Following these tables a generic sample or typical program is provided. The general program is followed by sample programs for each of the EE undergraduate specialty sequences. These examples are provided to assist in planning a complete program. The complete programs are followed by examples of partial or complete School of Engineering Undergraduate Program Sheets. The first shows only the courses required for all EE undergraduates, and the remaining examples show sample programs for each of the EE undergraduate specialty sequences. Students are required to submit a completed Undergraduate Program Sheet to the EE Department for approval at least one year before graduation.

## ENGINEERING SCIENCE, DESIGN AND EXPERIMENTATION UNITS

COURSE AREA	COURSE	TOTAL UNITS	ENGR SCIENCE	ENGR DESIGN	EXPERIMENTATION
<b>FUNDAMENTALS:</b>					
Intro Electronics	E40	5	3	2	2
Computers	E70X (CS106X)	5	2	1	0
Three of the following:	E14 <i>or</i> E15	5	4	1	0
(NOTE: The use of <i>or</i> means that	E20	3	2	1	0
only one of the two courses may	E30	3	3	0	0
be used to fulfill one fundamental.)	E50	3	3	0	0
	E60 <i>or</i>	3	3	0	0
	E62	4	4	0	0
<b>CORE COURSES:</b>					
Intro Circuits	EE101	4	4	0	0
Intro Signals and Systems	EE102	4	3.5	0.5	0
Intro Signal Processing	EE103	3	2.5	0.5	0
Electronics I	EE111	4	4	0	0
Electronics II	EE112	4	3	1	0
Electronic Circuits	EE113	3	1	2	0
Digital Laboratory	EE121	3	1	2	3
Analog Laboratory	EE122	3	1	2	3
Writing	E102E	1	0	0	0
Fields	EE141	4	4	0	0

<b>COURSE AREA</b>	<b>COURSE</b>	<b>TOTAL UNITS</b>	<b>ENGR SCIENCE</b>	<b>ENGR DESIGN</b>	<b>EXPERI-MENTATION</b>
<b>SPECIALTY COURSES:</b>					
Computer Hardware	CS107	5	2	3	0
	EE182	4	2	2	0
	EE183	3	0	3	3
	EE271	3	1.5	1.5	0
	EE281	3	0	3	3
Computer Software	CS107	5	2	3	0
	CS108	4	2	2	0
	CS194	3	0	3	0
Controls	E105	3	1	2	0
	E205	3	1	2	0
	E206	4	0	4	3
	E209	3	0	3	0
Electronics	EE133	3	0	3	2
	EE212	3	2	1	0
	EE214	3	0	3	0
	EE216	3	3	0	0
Fields and Waves	EE142	3	2.5	0.5	0
	EE144	3	1.5	1.5	1.5
	EE241	3	3	0	0
	EE242	3	2.5	0.5	0.5
	EE246	3	1.5	1.5	0
	EE247	3	2	1	0
	EE252	3	2	1	0
Signal Processing	EE133	3	0	3	2
	EE261	3	3	0	0
	EE264	3	1.5	1.5	0
	EE177 (STAT116)	5	5	0	0
	EE278	3	3	0	0
<b>OTHER COURSES</b>	CS193U	3	1.5	1.5	0
	EE282	3	3	0	0

Suggested Four Year Schedule for Electrical Engineering Majors

Autumn		Winter		Spring		
Freshman						
CIV	5	CIV	5	CIV	5	
Writing	3	Writing	3	Math 43	5	
Math 41	5	Math 42	5	Physics 45	3	
Physics 41	3	Physics 43	3			
	16		16		13	45
Sophomore						
E40	5	E70X	5	EE102	4	
Math 44	3	Math 130	3	Math/Sci Elect.	3	
Physics 47	4	EE101	4	Engr. Fund.	3	
GER	5	Chem 31	4	GER	5	
EE100	1					
	18		16		15	49
Junior						
EE103	3	EE112	4	EE113	3	
EE141	4	EE121	3	EE122	3	
EE111	4	E102E	1	GER	4	
Language	5	GER	4	Language	5	
		Language	5			
	16		17		15	48
Senior						
EE specialty	3	EE specialty	3	EE specialty	3	
EE elective	3	EE elective	3	EE elective	3	
Math/Sci Elect.	5	Engr. Fund.	3	GER	5	
		TIS	4	Engr. Fund.	3	
	11		13		14	38
						180

Suggested Four Year Schedule for Computer Hardware Specialty

Autumn		Winter		Spring		
Freshman						
CIV	5	CIV	5	CIV	5	
Writing	3	Writing	3	Math 43	5	
Math 41	5	Math 42	5	Physics 45	3	
Physics 41	3	Physics 43	3			
	16		16		13	45
Sophomore						
E40	5	E70X	5	EE102	4	
Math 44	3	Math 130	3	Math 103	3	
Physics 47	4	EE101	4	E14	3	
Soc 1 (GER 3b)	5	Chem 31	4	Psych 1 (GER 3b)	4	
EE100	1					
	18		16		14	48
Junior						
EE103	3	EE112	4	EE113	3	
EE141	4	EE121	3	EE122	3	
EE111	4	EE182	4	English 150 (GER 3a)	5	
Japanese 1	5	E102E	1	Japanese 3	5	
		Japanese 2	5			
	16		17		16	49
Senior						
EE271	3	EE183	3	EE282	3	
CS107	5	Anthro 1 (GER 4a)	5	Dance 160B (GER 4c)	4	
Stat 116	5	E60	3	E50	3	
		STS110	4			
	13		15		10	38
						180

Suggested Four Year Schedule for Computer Software Specialty

Autumn		Winter		Spring		
Freshman						
CIV	5	CIV	5	CIV	5	
Writing	3	Writing	3	Math 43	5	
Math 41	5	Math 42	5	Physics 45	3	
Physics 41	3	Physics 43	3			
	16		16		13	45
Sophomore						
E40	5	E70X	5	EE102	4	
Math 44	3	Math 130	3	Math 103	3	
Physics 47	4	EE101	4	E14	3	
Soc 1 (GER 3b)	5	Chem 31	4	Psych 1 (GER 3b)	4	
EE100	1					
	18		16		14	48
Junior						
EE103	3	EE112	4	EE113	3	
EE111	4	EE121	3	EE122	3	
CS107	5	CS108	4	English 150 (GER 3a)	5	
Japanese 1	5	E102E	1	Japanese 3	5	
		Japanese 2	5			
	17		17		16	50
Senior						
EE141	4	EE182	4	CS194	3	
CS148	3	Anthro 1 (GER 4a)	5	Dance 160B (GER 4c)	4	
Stat 116	5	E60	3	E50	3	
		STS110	4			
	12		16		10	38
						181

Suggested Four Year Schedule for Controls Specialty					
Autumn		Winter		Spring	
Freshman					
CIV	5	CIV	5	CIV	5
Writing	3	Writing	3	Math 43	5
Math 41	5	Math 42	5	Physics 45	3
Physics 41	3	Physics 43	3		
	16		16		13 45
Sophomore					
E40	5	E70X	5	EE102	4
Math 44	3	Math 130	3	Math 103	3
Physics 47	4	EE101	4	E14	3
Stat 116	5	Chem 31	4	Psych 1 (GER 3b)	4
EE100	1				
	18		16		14 48
Junior					
EE103	3	EE112	4	EE113	3
EE111	4	EE121	3	EE122	3
E105	3	Anthro 1 (GER 4a)	5	Dance 160B (GER 4c)	4
Japanese 1	5	E102E	1	Japanese 3	5
		Japanese 2	5		
	15		18		15 48
Senior					
EE141	4	E206	4	E209	3
E205	3	Soc 1 (GER 3b)	5	English 150 (GER 3a)	5
CS107	5	E60	3	E50	3
		STS110	4		
	12		16		11 39
					180

Suggested Four Year Schedule for the Electronics Specialty

Autumn		Winter		Spring		
Freshman						
CIV	5	CIV	5	CIV	5	
Writing	3	Writing	3	Math 43	5	
Math 41	5	Math 42	5	Physics 45	3	
Physics 41	3	Physics 43	3			
	16		16		13	45
Sophomore						
E40	5	E70X	5	EE102	4	
Math 44	3	Math 130	3	Math 103	3	
Physics 47	4	EE101	4	E14	3	
Soc 1 (GER 3b)	5	Chem 31	4	Psych 1 (GER 3b)	4	
EE100	1					
	18		16		14	48
Junior						
EE103	3	EE112	4	EE113	3	
EE141	4	EE121	3	EE122	3	
EE111	4	Anthro 1 (GER 4a)	5	Dance 160B (GER 4c)	4	
Japanese 1	5	E102E	1	Japanese 3	5	
		Japanese 2	5			
	16		18		15	49
Senior						
EE212	3	EE133	3	EE183	3	
EE216	3	EE182	3	EE271	3	
Stat 116	5	E60	3	English 150 (GER 3a)	5	
		STS110	4	E50	3	
	11		13		14	38
						180

Suggested Four Year Schedule for Fields and Waves Specialty

Autumn		Winter		Spring		
Freshman						
CIV	5	CIV	5	CIV	5	
Writing	3	Writing	3	Math 43	5	
Math 41	5	Math 42	5	Physics 45	3	
Physics 41	3	Physics 43	3			
	16		16		13	45
Sophomore						
E40	5	E70X	5	EE102	4	
Math 44	3	Math 130	3	Math 103	3	
Physics 47	4	EE101	4	E14	3	
Soc 1 (GER 3b)	5	Chem 31	4	Psych 1 (GER 3b)	4	
EE100	1					
	18		16		14	48
Junior						
EE103	3	EE112	4	EE113	3	
EE141	4	EE121	3	EE122	3	
EE111	4	EE142	3	English 150 (GER 3a)	5	
Japanese 1	5	E102E	1	Japanese 3	5	
		Japanese 2	5			
	16		16		16	48
Senior						
EE247	3	EE133	3	EE144	3	
EE261	3	Anthro 1 (GER 4a)	5	EE278	3	
Stat 116	5	E50	3	Dance 160B (GER 4c)	4	
E60	3	STS110	4			
	14		15		10	39
						180

Suggested Four Year Schedule for Signal Processing Specialty

Autumn		Winter		Spring		
Freshman						
CIV	5	CIV	5	CIV	5	
Writing	3	Writing	3	Math 43	5	
Math 41	5	Math 42	5	Physics 45	3	
Physics 41	3	Physics 43	3			
	16		16		13	45
Sophomore						
E40	5	E70X	5	EE102	4	
Math 44	3	Math 130	3	Math 103	3	
Physics 47	4	EE101	4	E14	3	
Soc 1 (GER 3b)	5	Chem 31	4	Psych 1 (GER 3b)	4	
EE100	1					
	18		16		14	48
Junior						
EE103	3	EE112	4	EE113	3	
EE141	4	EE121	3	EE122	3	
EE111	4	Anthro 1 (GER 4a)	5	Dance 160B (GER 4c)	4	
Japanese 1	5	E102E	1	Japanese 3	5	
		Japanese 2	5			
	16		18		15	49
Senior						
EE261	3	EE133	3	EE264	3	
CS107	5	EE203	1	EE278	3	
Stat 116	5	E60	3	English 150 (GER 3a)	5	
		STS110	4	E50	3	
	13		11		14	38
						180

