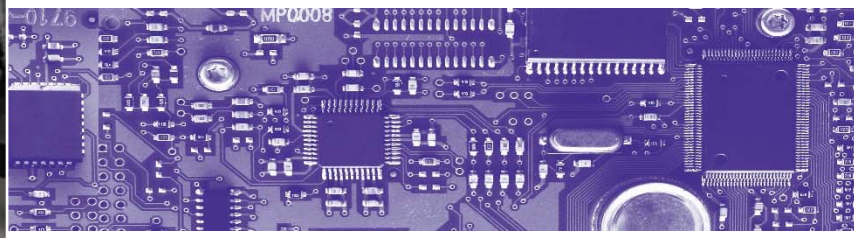

Undergraduate Curriculum Guide

for

Electrical & Computer Engineering

12/2015

KANSAS STATE UNIVERSITY | Electrical and Computer Engineering

ELECTRICAL ENGINEERING
Curriculum for Bachelor of Science in Electrical Engineering
(129 hours total)
Effective Fall 2015

Accredited by the Engineering Accreditation Commission of ABET (http://www.abet.org)

Fall Semester Courses		Sem Hrs		Spring Semester Courses		Sem Hrs
FRESHMAN						
ENGL	100 Exposit Writing 1*	3		ECON	110 Prin Macroecon	3
SPCH	105 Public Speaking 1A	2		PHYS	213 Engg Physics 1	5
CHM	210 Chemistry 1	4		MATH	221 Anal Geom Calc 2	4
MATH	220 Anal Geom Calc 1	4		CHM	230 Chemistry 2 or	4
ECE	210 Intro to Electrical Engg	3		BIOL	198 Prin of Biology	
ECE	015 New Student Assembly	0		ECE	115 New Student Dsn Proj	1
	TOTAL	16			TOTAL	17
SOPHOMORE						
ECE	241 Intro to Computer Engg	3		CIS	209 C Prog for Engineers	3
MATH	240 Elem Diff Equations	4		MATH	222 Anal Geom Calc 3	4
PHYS	214 Engg Physics 2	5		ECE	511 Circuit Theory 2	3
ECE	410 Circuit Theory 1	3		ECE	525 Electronics 1	3
CHE	354 Basic Materials	1		STAT	510 Intro to Prob & Stat	3
CHE	356 Electronic Materials	1				
	TOTAL	17			TOTAL	16
JUNIOR						
ECE	431 Microcontrollers	3		ECE	502 Electronics Lab	2
ECE	526 Electronics 2	3		ECE	512 Linear Systems	3
ECE	557 Electromagnetics	4		ECE	581 Energy Conversion 1	3
ECE	540 App Sci Computing	3		ENGL	415 Writ Comm Engr	3
Humanities / Social Sci Elective**		3		Humanities / Social Sci Elective**		3
				Technical Electives***		3
	TOTAL	16			TOTAL	17
SENIOR						
ECE	530 Control Sys Design	3		ME	513 Thermo 1	3
CE	530 Statics & Dynamics	3		Humanities / Social Sci Elective**		3
ECE	590 Senior Design Exp	3		Technical Electives***		9
Technical Electives***		6				
	TOTAL	15			TOTAL	15

*Students must complete the appropriate prerequisite credits for ENGL 415, but may apply only 3 hours of ENGL 415 prerequisite credits toward degree requirements.

**Humanities and Social Science electives are to be selected from the approved College of Engineering H&SS list. Students should select these courses as needed to complete the requirements of the K-State 8 General Education program.

***Technical Electives must be selected to complete one of the areas of emphasis. Technical Electives must come from the approved technical electives list.

ECE C-prerequisite Policy:

For the good and benefit of the student and their future employer, the ECE department enforces a C-prerequisite policy for all courses listed by number in the curriculum and for any in-major technical elective course applied toward the degree. A grade of C or better must be earned in all prerequisites to such a course before enrolling in that course.

ECE Transfer Course Policy:

No more than twelve (12) credit hours of courses in electrical and computer engineering may be transferred to Kansas State University for credit toward a bachelor degree in either electrical engineering or computer engineering. Further, those courses selected for transfer credit must be equivalent to courses in the list below and must be such that the prerequisites for the listed course are also satisfied. Any courses transferred must be taken from ABET accredited programs: ECE 210, ECE 241, ECE 410, ECE 525, ECE 557, ECE 581.

Advisor:
Printed:

ELECTRICAL ENGINEERING - General Option (129 hours)

Effective Spring 2016 (www.ece.ksu.edu)

DOE:
Class:
Flowchart: 71
Hours:

FRESHMAN		SOPHOMORE		JUNIOR		SENIOR	
ENGL 100 (3) Expo Writ 1	ECON 110 (3) Macroeconomics	CHE 354 (1) Basic Materials PR: CHM 210** PR/conc: PHYS 213**		H & SS (3) b.	H & SS (3) b.		H&SS (3) b.
ECE 015 (0) New Student Assem	ECE 115 (1) New Student Dsn Proj	CHE 356 (1) Electronic Materials PR: CHE 354**	STAT 510 (3) Prob & Stat PR: MATH 221**	ECE 557 (4) EM Theory 1 PR: ECE 410** PR: MATH 222** PR: PHYS 214**	ENGL 415 (3) Writ Comm PR: ENGL 100**	ECE 590 (3) Senior Design Exp PR: ECE 511**, 525**, 540** PR: ENGL 415**	
MATH 220 (4) Anal Geo & Calc 1	MATH 221 (4) Anal Geo & Calc 2 PR: MATH 220**	MATH 240 (4) Diff Eq PR: MATH 221**	MATH 222 (4) Anal Geo & Calc 3 PR: MATH 221**	ECE 540 (3) App Sci Comp PR: STAT 510** PR: CIS 209** or 308**	Tech Elec (3) a.	Tech Elec (6) a.	Tech Elec (9) a.
COMM 105 (2) Public Spkg	PHYS 213 (5) Engg Physics 1 PR/Conc: MATH 221**	PHYS 214 (5) Engg Phys II PR: PHYS 213** PR: MATH 221**	CIS 209 (3) C Prog for Engg PR: MATH 220**		ECE 502 (2) Electronics Lab PR: ECE 511** PR/Conc: ECE 526**		
ECE 210 (3) Intro to EE PR/Conc: MATH 220**		ECE 410 (3) Cir Thry I PR: MATH 221** PR: ECE 210**	ECE 511 (3) Cir Thry II PR: ECE 410** PR: MATH 240**	ECE 431 (3) Microcontrollers PR: ECE 241** PR: CIS 200 or 209**	ECE 512 (3) Linear Sys PR: ECE 511** PR: ECE 540**	ECE 530 (3) Cont Sys Des PR: MATH 240** PR: ECE 512**	
CHM 210 (4) Chem I	CHM 230 (4) or BIOL 198	ECE 241 (3) Int Cmp Engg	ECE 525 (3) Electronics 1 PR: ECE 410** or 519**	ECE 526 (3) Electronics 2 PR: ECE 511** PR: ECE 525**	ECE 581 (3) Eng Conv 1 PR: ECE 410** or 519**	CE 530 (3) Stat & Dyn PR: MATH 222** PR: PHYS 213**	ME 513 (3) Thermo 1 PR: MATH 222** PR: PHYS 213**

NOTE: PREREQUISITES ARE SHOWN IN THE COURSE BLOCK.
a. Technical electives must be selected to complete one of the areas of emphasis. Technical Electives must come from the approved ECE Technical Electives List.
b. Humanities and Social Science (H & SS) electives must be selected from the list of courses approved by the College of Engineering.
Students should select these courses as needed to complete the requirements for the K-State 8 Gen Ed Pgm.

** Denotes C or better must be earned in prerequisite course

Currently Enrolled Passed Retaken Failed Warning

COMPUTER ENGINEERING
Curriculum for Bachelor of Science in Computer Engineering
(129 hours total)
Effective Fall 2015

Accredited by the Engineering Accreditation Commission of ABET (http://www.abet.org)

Fall Semester Courses		Sem Hrs		**Spring Semester Course**		Sem Hrs
			FRESHMAN			
ENGL	100 Exposit Writing 1*	3		PHYS	213 Engg Physics 1	5
SPCH	105 Public Speaking 1A	2		MATH	221 Anal Geom Calc 2	4
CHM	210 Chemistry 1	4		CIS	200 Fund Comp Prog	4
MATH	220 Anal Geom Calc 1	4		ECE	210 Intro to Electrical Engg	3
ECE	241 Intro to Computer Engg	3		ECE	115 New Student Dsn Proj	1
ECE	015 New Student Assembly	0				
	TOTAL	16			TOTAL	17
			SOPHOMORE			
ECE	441 Des Dig Sys	3		MATH	222 Anal Geom Calc 3	4
PHYS	214 Engg Physics 2	5		STAT	510 Intro to Prob & Stat	3
MATH	240 Elem Diff Equations	4		ECON	110 Prin Macroecon	3
CIS	300 Prog/Data Structures	3		CIS	308 C/C++ Language Lab	1
				ECE	431 Microcontrollers	3
				ECE	410 Circuit Theory 1	3
	TOTAL	15			TOTAL	17
			JUNIOR			
CIS	501 Sft Arch & Design	3		ECE	512 Linear Systems	3
ECE	511 Circuit Theory 2	3		ECE	557 Electromagnetics	4
ECE	525 Electronics 1	3		ECE	649 Computer Design 1	3
MATH	510 Discrete Math	3		ENGL	415 Writ Comm Engr	3
ECE	540 App Sci Computing	3		Humanities / Social Sci Elective**		3
Humanities / Social Sci Elective**		3				
	TOTAL	18			TOTAL	16
			SENIOR			
CIS	520 Operating Systems 1****	3		ECE	631 Microcmptr Sys Dsn****	3
ECE	590 Senior Design Exp	3		ECE	645 Digital Electronics****	3
ECE	643 Comp Engg Des Lab****	3		Humanities / Social Sci Elective**		3
ECE	542 Computer Networking****	3		Technical Electives***		6
Technical Electives***		3				
	TOTAL	15			TOTAL	15

*Students must complete the appropriate prerequisite credits for ENGL 415, but may apply only 3 hours of ENGL 415 prerequisite credits toward degree requirements.

**Humanities and Social Science electives are to be selected from the approved College of Engineering H&SS list. Students should select these courses as needed to complete the requirements of the K-State 8 General Education program.

***Technical Electives must be selected from the list of accepted courses.

****Offered only in semester shown in curriculum

ECE C-prerequisite Policy:

For the good and benefit of the student and their future employer, the ECE department enforces a C-prerequisite policy for all courses listed by number in the curriculum and for any in-major technical elective course applied toward the degree. A grade of C or better must be earned in all prerequisites to such a course before enrolling in that course.

ECE Transfer Course Policy:

No more than twelve (12) credit hours of courses in electrical and computer engineering may be transferred to Kansas State University for credit toward a bachelor degree in either electrical engineering or computer engineering. Further, those courses selected for transfer credit must be equivalent to courses in the list below and must be such that the prerequisites for the listed course are also satisfied. Any courses transferred must be taken from ABET accredited programs: ECE 210, ECE 241, ECE 410, ECE 525, ECE 557, ECE 581.

Advisor:
Printed:

COMPUTER ENGINEERING (129 hours)

Effective Fall 2015 (www.ece.ksu.edu)

DOE:
Class:
Flowchart: 45
Hours:

FRESHMAN		SOPHOMORE		JUNIOR		SENIOR	
ECE 015 (0) New Student Assem	ECE 115 (1) New Student Dsn Proj		ECON 110 (3) Macroeconomics	H & SS (3) Gen Ed b.	H & SS (3) Gen Ed b.		H & SS (3) Gen Ed b.
ENGL 100 (3) Expo Writ 1			STAT 510 (3) Prob & Stat PR: MATH 221**	ECE 540 (3) Appl Sci Comp PR: STAT 510** PR: CIS 209 or 308**	ENGL 415 (3) Writ Comm PR: ENGL 100**	ECE 590 (3) Senior Design Exp PR: ECE 511, 525, 540** PR: ENGL 415**	ECE 631 (3) Microcomp Sys Design PR: ECE 431, ECE 525** PR: CIS 308 or 209
MATH 220 (4) Anal Geo & Calc 1	MATH 221 (4) Anal Geo & Calc 2 PR: MATH 220**	MATH 240 (4) Diff Eq PR: MATH 221**	MATH 222 (4) Anal Geo & Calc 3 PR: MATH 221**	ECE 525 (3) Electronics I PR: ECE 410** or 519**	ECE 649 (3) Comp Design 1 PR: ECE 441**	Tech Elec (3) a.	Tech Elec (6) a.
CHM 210 (4) Chem I	PHYS 213 (5) Engg Physics I PR/Conc: MATH 221**	PHYS 214 (5) Engg Phys II PR: PHYS 213** PR: MATH 221**	ECE 431 (3) Microcontrollers PR: ECE 241** PR: CIS 200**	MATH 510 (3) Discrete Math PR: MATH 221**	ECE 557 (4) Electromagnetics PR: PHYS 214** PR: ECE 410** PR: MATH 222**	ECE 542 (3) Computer Networking PR: ECE 241** PR: programming language	ECE 645 (3) Digital Electronics PR: ECE 441**, ECE 525**, PR: ECE 511**
COMM 105 (2) Public Speaking	ECE 210 (3) Intro EE PR/Conc: MATH 220**	ECE 441 (3) Des Dig Sys PR: ECE 210** PR: ECE 241**	ECE 410 (3) Cir Thry I PR: MATH 221** PR: ECE 210**	ECE 511 (3) Cir Thry II PR: MATH 240** PR: ECE 410**	ECE 512 (3) Linear Sys PR: ECE 511**, ECE 540**	ECE 643 (3) CMPEN Design Lab PR: ECE 441** PR/Conc: ECE 649** PR: CIS 209 or 308**	
ECE 241 (3) Intro Cmpt Engg	CIS 200 (4) Prog Fund PR: ECE 241**	CIS 300 (3) Data/Prog Structures PR: CIS 200**	CIS 308 (1) C/C++ Lab PR: CIS 300**	CIS 501 (3) Sft Arch & Design PR: CIS 300**		CIS 520 (3) Operating Sys 1 PR: ECE 431** PR: CIS 308, 501**	

NOTE: PREREQUISITES ARE LISTED IN THE COURSE BLOCK.
a. Technical Electives must be selected from the list of approved technical electives.
b. Humanities and Social Science (H & SS) electrives must be selected from the list of courses approved by the College of Engineering. Students should select these courses as needed to complete the requirements for the K-State 8 Gen Ed Pgm.

** Denotes C or better must be earned in prerequisite course

Currently Enrolled Passed Retaken Failed Warning

ECE Programs

Electrical Engineering

Each student in Electrical Engineering must select an area of emphasis during their sophomore or junior years. See the area of emphasis descriptions below and refer to the ***Required and Suggested Courses and Technical Electives Table*** for applicable courses.

Bioengineering

The bioengineering area of emphasis applies electrical engineering domain expertise to challenges faced by the health care and life science communities. The area targets the development of (a) hardware and software for the acquisition, analysis, and presentation of biomedical data and (b) mathematical and computational tools for the simulation and analysis of biological systems. Some courses emphasize emerging consumer technologies whose mobile, wireless capabilities advance the use of telemedicine, intelligent wearable systems, and home care tools as supplements to traditional hospital-based health care. Others focus on applications of complex-system and control theory to model, analyze, and optimize biological systems at different time and space scales. Students in this area value the positive impact that engineering can make on quality of life for all individuals, including vulnerable elderly, disabled, and rural populations.

Electronics and Communications

Selecting the electronics and communications emphasis lets students focus on the technologies underlying a nearly limitless array of electronic devices used in daily life. From cellular phones, to computers, to the design of integrated circuit devices, this focus area prepares you for designing and building hardware to make new products of the future possible. The emphasis includes required courses in wireless systems and digital signal processing, plus a culminating design experience with project construction and laboratory work. Students in this area will be prepared for careers ranging from work in advanced government labs and national defense, to companies that design and build products for the next generation.

Power Systems

The electric power industry is in the midst of exciting change. What was once a largely passive system is being redesigned to incorporate sensors, smart devices, advanced computer controls at many levels, and efficient handling of large amounts of electrical energy. Courses focus on modeling of different components of the system, design and operation of large interconnected power systems, fault analysis and protection, power electronics technologies for control of power devices, and renewable energy technologies. Students are exposed to smart grid concepts and various computer tools needed for analysis and design of efficient power systems. Students engaged in this area expect to work on challenging problems related to the delivery of large amounts of electrical energy in a safe, reliable, economical, clean, and sustainable manner.

Computer Engineering

Computer engineering covers the design and application of computers and associated software development. The curriculum includes the basics of computer's internal circuits and structures, the application of microcontrollers and processors, and how computers communicate with other computers and devices through networking. Students in this program will learn how to design basic digital hardware through use of digital circuits employing Boolean logic. A major component of the program also focuses on embedded systems, in which a computer is used to implement dedicated tasks, usually with real-time computing restraints. Computer communication is an important part of computer engineering with courses describing compression and packetization of data.

Examples of systems and devices that are designed by computer engineers include microwave ovens, automobiles, tractors, HDTVs, DVRs, GPSs, internet routers, video game systems, and cellular phones. In fact, if a device contains electronics, it most likely contains one or more computers and computer engineers are an important part of their development.

Required and Suggested Courses and Technical Electives

Course	Semester	Description	Electrical Engineering			Computer Engineering
			Bioengineering	Electronics and Communications	Power Systems	
CIS 450	F,S	Computer Arch and Operations (3)				•
CIS 525	F	Telecomm and Data Comm Systems (3)				•
CIS 551	F	Intro to Computer and Information Security (3)				•
ECE 441	F,S	Design of Digital Systems (3)		•		Δ
ECE 530	F,S	Control Systems Design (3)				•
ECE 542	F	Computer Networking (3)		•		Δ
ECE 571	S	Intro to Biomedical Engineering	Δ			
ECE 624	F	Power Electronics (3)			Δ	
ECE 628	Demand	Electronic Instrumentation (3)	•			
ECE 631	S	Microcomputer System Design (3)	•	Δ^{D1}		Δ^{D}
ECE 636	Demand	Intro to Computer Graphics (3)				•
ECE 641	S	Advanced Digital Design using Logic Synthesis (3)		•		•
ECE 643	F	CMPEN Design Lab (3)				Δ^{D}
ECE 645	S	Digital Electronics (3)		•		Δ
ECE 647	F	Digital Signal Processing (3)	•	Δ		•
ECE 648	F	Multimedia Compression (3)				•
ECE 649	F,S	Computer Design 1 (3)		•		Δ
ECE 660	S	Communication Systems 1 (3)	•	Δ	•	•
ECE 662	Every 3rd sem.	Design of Communication Circuits (3)	•	Δ^{D1}		
ECE 670	F	Engineering Appllications of Machine Intelligence (3)			•	•
ECE 681	F	Wind and Solar Engg. (3)			•	
ECE 684	S	Power Lab (3)			Δ	
ECE 685	F	Power Systems Design (3)			Δ^{D}	
ECE 686	S	Power Systems Protection (3)			•	
ECE 694	F	Optoelectronics (3)		•		
ECE 696	Every 3rd sem.	Integrated Circuit Design (3)		Δ^{D1}		
ECE 715	F	Electroacoustics (3)	•	•		
ECE 722	S	Audio Engineering (3)	•	•		
ECE 724	S	Analog Electronics (3)	•	•		
ECE 728	Demand	Mixed Signal Measurements (3)	•	•		
ECE 730	Demand	Control Systems Analysis and Design (3)	•		•	
ECE 731	Demand	Advanced Microcomputer System Design (3)				•
ECE 733	Demand	Real-Time Embedded Systems Design (3)	•			•
ECE 736	Demand	Discrete-Time and Computer-Control Systems (3)				•
ECE 746	Demand	Fault Diagnosis in Digital Systems (3)				•
ECE 747	Demand	Advanced Digital Filtering (3)	•	•		•
ECE 749	F	Computer Design 2 (3)				•
ECE 760	S	Wireless Communications (3)	•	•		
ECE 764	Every 3rd sem.	Design of Microwave Circuits (3)		Δ^{D1}		
ECE 772	F	Theory and Tech of Bioinstrumentation (2)	Δ			
ECE 773	F	Bioinstrumentation Design Lab (1)	Δ^{D}			

Δ = Required • = Recommended [1] = Choose at least 1 course D = Denotes design course

Technical electives may aslo be taken from other departments and colleges. See DARS report for complete list.

12/2015

Technical Electives
for Electrical and Computer Engineering students

Department	Acceptable Courses	Maximum Hours
ARTS AND SCIENCES		
• *Biochemistry*	Above 499	No limit
• *Biology*	Above 197	No limit
• *Chemistry*	Above 230 [A]	No limit
• *Geology*	Any course	No limit
• *Mathematics*	Any course with MATH 221 as a prerequisite and 551	No limit
• *Physics*	Above 515	No limit
• *Statistics*	Above 499 except 702	No limit
BUSINESS *ADMINISTRATION*		
• *Accounting*	Any course	6 total from the four depts. listed
• *Finance*	Any course	
• *Management*	Any course	
• *Marketing*	Any course	
ENGINEERING		
• *Biological and Agricultural*	510 or above	No limit
• *Architectural*	411 or above	No limit
• *Construction Science*	500 or above	No limit
• *Chemical*	350 or above	No limit
• *Civil*	300 or above [B]	No limit
• *Computer and Information Sciences*	300 or above [C]	No limit
• *Electrical and Computer*	[D]	No limit
• *General*	[E]	No limit
• *Industrial and Manufacturing Systems*	241 or above	No limit
• *Mechanical*	ME 212 or above [F]	No limit
• *Nuclear*	Above NE 385	No limit
VETERINARY MEDICINE		
	Any course	No limit

Technical Electives for Electrical and Computer Engineering students must be chosen to satisfy degree requirements.

[A] CHM 230 is acceptable for B.S. degree in Computer Engineering.

[B] If CE 333 and ME 512 are both taken, credit will be given for CE 530 along with 3 hours of technical elective credit. Taking CE 333 or ME 512 alone will not count for CE 530 credit.

[C] CIS 200 and 308 are acceptable for a maximum of two credit hours for EE students.

[D] ECE 441, 571 and 600 or above are acceptable for B.S. degree in Electrical Engineering. ECE 502, 526, 530, 571, 581, and 600 or above are acceptable for B.S. degree in Computer Engineering.

[E] Any course except applicable Humanities and Social Sci. Electives, DEN 201, and DEN 202.

[F] Except for those courses not open to engineering majors.

K-STATE 8 Information for ECE students

The K-STATE 8 general education program helps students widen their perspectives, explore relationships among subjects and build critical and analytical thinking skills. K-STATE 8 exposes students to a broad range of knowledge in different academic areas. The program shapes well-rounded thinkers and helps prepare students for careers, graduate school and other post-graduate experiences.

What are the requirements for the K-STATE 8 General Education Program?

Each student must successfully complete credit-bearing courses or experiences to cover all of the K-STATE 8 areas. Some of the K-STATE 8 areas may be covered in the student's major. The intent of the K-STATE 8 is for students to explore the perspectives of disciplines that may be quite different from those of their own majors. For that reason, a minimum of four different course prefixes (e.g., AGEC, MATH, FSHS) must be represented in the fulfillment of the K-STATE 8 requirements. The K-STATE 8 areas include:

- *Aesthetic Experience and Interpretive Understanding*
- *Empirical and Quantitative Reasoning*
- *Ethical Reasoning and Responsibility*
- *Global Issues and Perspectives*
- *Historical Perspectives*
- *Human Diversity within the US*
- *Natural and Physical Sciences*
- *Social Sciences*

K-STATE 8 and ECE

Since both the electrical and computer engineering curriculums are well defined, the incorporation of the K-STATE 8 system is rather simple. The table below shows the K-STATE 8 areas that are covered by the required courses of the ECE curriculum.

K-State 8 Area	EE	CMPEN
Aesthetic Experience and Interpretive Understanding	H&SS	H&SS
Empirical and Quantitative Reasoning	MATH 220	MATH 220
Ethical Reasoning and Responsibility	ECE 590	ECE 590
Global Issues and Perspectives	ECON 110	ECON 110
Historical Perspectives	H&SS	H&SS
Human Diversity within the U.S.	H&SS	H&SS
Natural and Physical Sciences	CHM 210	CHM 210
Social Sciences	ECON 110	ECON 110

The boxes that are labeled H&SS are humanities and social science courses that the student is free to choose within the approved College of Engineering H&SS course list. These courses must be chosen to cover the three remaining K-STATE 8 required areas not covered by the ECE required courses. Therefore the student must simultaneously choose H&SS courses from the approved College of Engineering H&SS list and cross-reference the chosen course's K-STATE 8 tags with the unfulfilled requirements.

K-STATE 8 course tag information can be found at: http://www.k-state.edu/kstate8/lists/index.html

College of Engineering

Humanities and Social Science Electives Course List

Each engineering student is required to take a minimum of 9 credit hours of humanities and social science (H & SS) courses, 3 of which are a required economics course, in order to add breadth to their education and to help prepare for a more effective role in society. All H & SS courses applied towards degree requirements must be taken for a letter grade and also be selected from the most recent list of H & SS electives approved by the engineering faculty (see information below). Humanities is the branch of learning regarded as having primarily a cultural character and usually includes languages, literature, history, and philosophy. Social Science is the branch of science that deals with the institutions and functioning of human society and with the interpersonal relationships of individuals as members of society.

Be sure to consider K-State 8 requirements when selecting your electives. Use your DARS report, your advisor, and the K-State 8 requirements (www.K-State.edu/kstate8/). However, be sure to note that some courses are similar and therefore, only one of these courses can be used towards the degree requirements. [1, 2]

Check with Student Services to make sure the date located in the lower right hand of this document is the latest updated document.

College	Approved Courses	
Architecture	The following courses in History or Appreciation of Architecture: ARCH 240, 290[2], 301[2]	
	LAR	LAR 322
	ENVD	ENVD 210
Agriculture	AGEC	AGEC 315
	ASI	ASI 303
	PLPTH	PLPTH 300
Arts & Sciences	AERO	Upon completion of all courses required for AERO program, 4 hours of humanities and social sciences may be awarded.
	AMETH	Any course
	ANTH	Any of the following Cultural Anthropology and Archaeology courses: ANTH 200- 260, 503- 517, 524-618, 630 to 634, 673, 676, 685
	ART	Any course
	CHM	CHM 315, 650
	COMM	COMM 120, 320, 322, 323, 330, 331, 420, 430-435, 470, 480
	DANCE	Performance[3]: DANCE 120-195, Non-performance: DANCE 205, 459
	ECON	Any course[1]
	ENGL	Any of the following courses: ENGL 220- 298, 315- 390, 420, 440, 445, 450, 470, 476, 490, 525, 545, 580
	GEOG	Any course ***except*** 221, 321, 445, 460, 508, 535, 700, 702, 705, 708, 709, 711, 735, 745, 765, 795
	HIST	Any course
	LEAD	LEAD 212, 350, 405, 430, 450
	MC	MC 110-112, 331, 531, 710-725
	MLANG	Any modern language course (***except*** English or the student's native language)
	MUSIC	Performance[3]: MUSIC 103-140, 203-210, 230-239, 251-260, 280-299, 320-373, 400-404, 408-417, 427-490 Non-performance: MUSIC 100, 160, 170, 171, 225, 240, 245, 250, 310, 385, 420-424
	PHILO	Any course ***except*** 110, 320 and 510
	POLSC	Any course
	PSYCH	Any course
	SOCIO	Any course ***except*** 520, 522 and social work courses
	THTRE	Performance[3]: THTRE 211-265, 361, 560, 565 Non-performance: THTRE 270, 572, 573, 662, 667-672
	WOMST	Any course
Engineering	CNS	CNS 110
Human Ecology	FSHS	Any course
	GNHE	GNHE 310

[1] Students canNOT take both ECON 523 and ECON 620 for degree requirements.

[2] Students can ONLY take one of the following, ARCH 290, ARCH 301 or CNS 110, for degree requirements.

[3] Students can take a maximum of 3 credit hours of **performance** courses from DANCE, MUSIC, or THTRE.

COURSE PREREQUISITE TABLE

COURSE	PREREQUISITES
ECE 210 Introduction to Electrical Engineering	MATH 220(c)
ECE 241 Introduction to Computer Engineering	
ECE 410 Circuit Theory I	MATH 221, ECE 210
ECE 431 Microcontrollers	CIS 200 or 209, ECE 241
ECE 441 Design of Digital Systems	ECE 210, ECE 241
ECE 502 Electronics Lab	ECE 511, ECE 526(c)
ECE 511 Circuit Theory II	MATH 240, STAT 510, ECE 410
ECE 512 Linear Systems	ECE 511, ECE 540
ECE 519 Electric Circuits and Controls	PHYS 214
ECE 525 Electronics I	ECE 410 or ECE 519
ECE 526 Electronics II	ECE 511, ECE 525
ECE 530 Control System Design	ECE 511, ECE 512, MATH 240
ECE 540 Applied Scientific Computing for Engineers	STAT 510 and CIS 209 or 308
ECE 542 Computer Networking	ECE 241, high-level programming language
ECE 557 Electromagnetic Theory I	PHYS 214, ECE 410
ECE 571 Intro to Biomedical Engineering	MATH 222, PHYS 214
ECE 581 Energy Conversion I	ECE 410 or ECE 519
ECE 582 Wind Energy Research	Instructor Permission
ECE 590 Senior Design Experience	ENGL 415, DEN 325
ECE 624 Power Electronics	ECE 511, ECE 525
ECE 628 Electronic Instrumentation	ECE 502, ECE 526
ECE 631 Microcomputer System Design	CIS 209 OR 308 OR ME 400; ECE 431; ECE 525 OR 519
ECE 633 Real-Time Embedded Systems	CIS 621, CIS 622
ECE 636 Introduction to Computer Graphics	CIS 308 or 209, CIS 300, MATH 222 or 551
ECE 641 Advanced Digital Design using Logic Synthesis	ECE 441
ECE 643 Comp Engineering Design Lab	CIS 308 or CIS 209, ECE 441, ECE 649(c)
ECE 645 Digital Electronics	ECE 511, ECE 525, ECE 441
ECE 647 Digital Filtering	ECE 512
ECE 648 Multimedia Compression	ECE 512 or MATH 551, CIS 308 or CIS 209
ECE 649 Computer Design I	ECE 441
ECE 660 Communication Systems I	ECE 512(c)
ECE 661 Communication Systems II	ECE 660
ECE 662 Design of Communication Circuits	ECE 526, ECE 502
ECE 670 Engineering Applications of Machine Intelligence	CIS 200 or 209, PHYS 214
ECE 681 Wind and Solar Engineering System Design	ECE 525 or ECE 519
ECE 684 Power Lab	ECE 581, ECE 624
ECE 685 Power Systems Design	ECE 581
ECE 686 Power Systems Protection	ECE 581
ECE 694 Optoelectronics	ECE 525, ECE 557, CHE 354, CHE 356
ECE 696 Integrated Circuit Design	ECE 241, ECE 525
ECE 715 Electroacoustics	ECE 511
ECE 722 Audio Engineering	ECE 525 (ECE 526 recommended)
ECE 724 Analog Electronics	ECE 502, ECE 526
ECE 725 Integrated Circuit Devices & Processes	ECE 525, CHE 354, CHE 356
ECE 728 Mixed Signal Measurements	ECE 512 or graduate standing
ECE 730 Control Sys Analysis and Design	ECE 530 or ME 640, ME 730
ECE 731 Advanced Microcomputer System Design	ECE 631

COURSE	PREREQUISITES
ECE 733 Real-Time Embedded System Design	CIS 721(c)
ECE 736 Discrete-Time and Computer-Control Sys	ECE 530 or ME 640
ECE 746 Fault Diagnosis in Digital Systems	ECE 541(c) or ECE 631(c)
ECE 747 Digital Signal Processing Lab	ECE 512, ECE 647(c)
ECE 749 Computer Design II	ECE 649
ECE 758 Electromagnetic Theory II	ECE 557
ECE 760 Wireless Communications	ECE 660
ECE 764 Design of Microwave Circuits	ECE 502, ECE 512, ECE 526, ECE 557
ECE 765 Digital Radio Hardware Design	ECE 696 (c), ECE 696 or ECE 764 or consent of instructor
ECE 771 Control Theory Applied to Bioengineering	ECE 530(c) or ME 640(c) and a basic physiology course
ECE 772 Theory and Techniques of Bioinstrumentation	ECE 773(c), AP 773(c)
ECE 773 Bioinstrumentation Lab	ECE 772(c), AP 773(c), ECE 502
ECE 780 Power Seminar	Junior standing
ECE 824 Advanced Power Electronics	ECE 624
ECE 828 Topic in Instrumentation	ECE 628
ECE 830 Advanced Systems Theory	ECE 530 or ME 640
ECE 840 Computer Engineering Methods for Analysis, Simulation and Design	ECE 512
ECE 841 Network Theory	STAT 410 or STAT 510, high-level programming language
ECE 842 Parallel Processing	ECE 512, ECE 649
ECE 845 Sequential Machines	MATH 510, ECE 649
ECE 846 Computer Engineering Methods for Analysis, Simulation and Design II	ECE 840
ECE 849 Topics in Computer Engineering	ECE 649
ECE 855 Advanced Topics in Electromagnetic Theory	ECE 758
ECE 861 Applied Probability Theory and Random Processes	ECE 512
ECE 866 Transform Processing of Digital Signals	ECE 861
ECE 867 Digital Image Processing	ECE 512
ECE 870 Neural Networks in Engineering	ECE 670
ECE 881 Advanced Topics in Electric Energy Systems	ECE 686
ECE 882 Power Quality	ECE 624, ECE 685
ECE 885 Power Systems Operation and Control	ECE 685
ECE 887 Distribution System Engineering	ECE 685
ECE 888 Power System Stability and Control	ECE 581, ECE 685
ECE 890 Advanced Electrical Theory	M.S. student
ECE 895 Solid-State Elect Devices	CHE 354, CHE 356, ECE 557, ECE 696
ECE 896 Graduate Seminar in ECE	
ECE 897 Research in EE	Consent of instructor
ECE 898 Master's Report	
ECE 899 Master's Thesis	
ECE 931 Advanced Topics in Control Theory	ECE 830
ECE 949 Advanced Topics in Computer Engineering	ECE 845
ECE 962 Advanced Topics in Communications	ECE 861
ECE 963 Signal Detection Theory	ECE 861
ECE 965 Information Theory	ECE 861
ECE 967 Advanced Topics in Digital Signal Processing	ECE 866 or ECE 968
ECE 968 Advanced Digital Filtering	ECE 647, ECE 861
ECE 971 Advanced Topics in Bioengineering	ECE 771 or ECE 772
ECE 999 Dissertation Research	

c = Concurrent or prerequisite