

## **Electrical Engineering Program 2009-10 Assessment Report**

### **I. Introduction**

The Electrical Engineering program was implemented at the Klamath Falls campus in fall 2007. The initial enrollment during fall 2007 was 36 students and has increased to 52 students for fall 2009.

### **II. Program Mission, Objectives and Student Learning Outcomes**

During the fall 2009 convocation, the program faculty reviewed and approved the following statements on mission, objectives, and student learning outcomes.

#### **Mission**

The mission of the BSEE Program is to provide a comprehensive program of instruction that will enable graduates to obtain the knowledge and skills necessary for immediate employment and continued advancement in the field of electrical engineering. The program will be a leader in providing career-ready candidates for electrical engineering fields. Faculty and students will engage in applied research in emerging technologies and provide professional services to their communities.

#### **Program Educational Objectives**

In support of this mission, BSEE graduates will:

1. Excel as engineering professionals in the various fields and disciplines in electrical engineering.
2. Continue to apply principles of mathematics, science and engineering to solving electrical engineering problems in new and emerging disciplines in the high tech industry.
3. Continue to be known for a commitment to professional development, lifelong learning and social and ethical responsibilities throughout their engineering careers.
4. Excel in areas related to critical thinking, problem solving and effective communication as applied to electrical engineering career assignments.

#### **Expected Student Learning Outcomes**

Graduates of our Bachelor of Science in Electrical Engineering program must have:

- (a) an ability to apply knowledge of mathematics, science, and engineering
- (b) an ability to design and conduct experiments, as well as to analyze and interpret data
- (c) an ability to design a system, component, or process to meet desired needs within realistic constraints such as economic, environmental, social, political, ethical, health and safety, manufacturability, and sustainability

- (d) an ability to function on multi-disciplinary teams
- (e) an ability to identify, formulate, and solve engineering problems
- (f) an understanding of professional and ethical responsibility
- (g) an ability to communicate effectively
- (h) the broad education necessary to understand the impact of engineering solutions in a global, economic, environmental, and societal context
- (i) a recognition of the need for, and an ability to engage in life-long learning
- (j) a knowledge of contemporary issues
- (k) an ability to use the techniques, skills, and modern engineering tools necessary for engineering practice.
- (l) knowledge of differential and integral calculus and advanced mathematics including differential equations, linear algebra, vector calculus, complex variables, series and sequences, LaPlace Transforms, Fourier Transforms, and probability and statistics with appropriate applications.
- (m) in addition to mathematics, knowledge of basic sciences, computer science, and engineering sciences necessary to analyze and design complex electrical and electronic devices, software, and systems containing hardware and software components, as appropriate to program objectives.

### III. Program Assessment Cycle

The program faculty have approved the following three-year cycle for assessment of the student learning outcomes, as shown in Table 1.

EE PROGRAM OUTCOME ASSESSMENT TIMELINE						
SCHOOL YEAR						
PROG OUT	2007/8	2008/9	2009/10	2010/11	2011/12	2012/13
A (Math/Sci)		X			X	
B (LabExp)	X		X			X
C (SysDes)		X			X	
D (Teams)	X	X	X			X
E (ProbSol)	X			X		
F (Ethics)			X			X
G (Comm.)	X			X		
H (Impacts)			X			X
I (LifeLong)				X		
J (Contemp)			X			X
K (EngTools)	X			X		
L (AdvMath)		X			X	
M (EngApps)		X			X	

**Table 1. Assessment Cycle**

#### IV. Direct and Indirect Measures for 2009-10

Currently the faculty use performance criteria rubrics on class and lab assignments as direct measures. The performance criteria were modified as a result of discussion during convocation. The set of performance criteria for each outcome has been reduced to a maximum of 3.

This is a new program with graduates expected in 2009-10. A senior exit survey and alumni survey are being developed for indirect measures when the program has more graduates (2009-10).

The following is a set of tables for the outcomes being assessed for the 2009/10 collection year (Outcomes B, D, F, H, J). Each table is a summary of the various course assignments used to assess the outcomes using the performance criteria rubric for the outcome. The percentage of students performing at a level of 2 or higher (levels 1, 2 or 3) is given for each assignment.

#### **Outcome b: an ability to design and conduct experiments, as well as to analyze and interpret data**

Outcome B: an ability to design and conduct experiments, as well as to analyze and interpret data						
Perf. Criteria	Courses					
	EE331	EE223	EE223	EE223		AVE PC
Conduct Exp	92%	100%	100%	100%		94%
Analyze Data	92%	100%	100%	100%		93%
Design Exp	NA	NA	NA	NA		
Sample Size	12	14	12	11		
Assign. Type	Lab Prj	Lab 6	Lab 8	Lab 9		
Term	F09	W10	W10	W 10		
Faculty	Zipay	Torres	Torres	Torres		

This outcome was assessed in the fall and winter terms in one sophomore class (EE223 Circuits) and a junior class (EE331 Digital Systems) using basic lab assignments and not a special project.

#### STRENGTHS:

Students in the upper class did above the target of 80% at both conducting the experiment and analyzing and discussing results. Labs are a strong focus of the EE program with an emphasis on hands-on and applied engineering so these results are expected. EE graduates will be well prepared for lab and prototype development work.

#### WEAKNESSES

None noted.

#### RECOMMENDATIONS:

When the senior class finishes rolling out, use a project lab to assess design of experiment during the next assessment cycle for this outcome.

**Outcome d: an ability to function on multi-disciplinary teams**

Outcome D: an ability to function on multi-disciplinary teams						
Perf. Criteria	Courses					
	EE331	EE419				AVE PC
Participation	83%	80%				82%
Consensus	92%	80%				86%
Manage	92%	80%				86%
Sample Size	12	5				
Assign. Type	Lab Prj	Lab Proj				
Term	F09	F09				
Faculty	Zipay	Zipay				

This outcome was assessed in a senior course (EE 419 Power Electronics) and a junior class (EE 331 Digital Systems). The assessment was done mostly on lab projects in the course.

**STRENGTHS:**

In the upper division courses most students have been through a group communication class and numerous lab project assignments and do well in this environment. It is the intent of the program to prepare graduates for careers in the engineering field that relies heavily on team approaches. The assessment results reflect this.

**WEAKNESSES:**

None noted.

**RECOMMENDATIONS:**

None at this time.

**Outcome f: an understanding of professional and ethical responsibility**

Outcome F: an understanding of professional and ethical responsibility						
Perf. Criteria	Courses					
	REE201					AVE PC
Code Know	100%					100%
Eval. Dim.	100%					100%
Prof Beh.	NA					NA
Sample Size	15					
Assign. Type	Paper					
Term	F09					
Faculty	Zipay					

This outcome was assessed in a freshman course on Intro to Engineering using a special case study on ethics paper assignment.

**STRENGTHS:**

The freshman level assessment done on this outcome was based on a case study of some ethical issues in industry after a discussion in class on professional ethics. The students did well on understanding code of ethics and evaluating a problem scenario.

**WEAKNESSES:**

None noted.

**RECOMMENDATIONS:**

None noted but the assignment needs to be done in some upper division courses.

**Outcome h: the broad education necessary to understand the impact of engineering solutions in a global, economic, environmental, and societal context**

<b>Outcome H: the broad education necessary to understand the impact of engineering solutions in a global, economic, environmental, and societal context</b>						
<b>Perf. Criteria</b>	<b>Courses</b>					
	EE421	EE419				<b>AVE PC</b>
Identify Impacts	33.3%	100%				68%
Understand Impacts	NA	100%				100%
Sample Size	9	10				
Assign. Type	Exam 2	Final Exam				
Term	W10	F09				
Faculty	Zipay	Zipay				

This outcome was assessed in two senior level classes (EE 419 Power Electronics and EE 421 Analog IC Design). The two classes had a similar student (not identical) cohort and focused mostly on special test questions geared towards analyzing engineering impacts.

**STRENGTHS:**

In the one course a final exam question was used to compare engineering solutions with regard to both function and cost. The students did well here; this approach has been used with other classes to present students with some questions that are more qualitative than quantitative in focus.

**WEAKNESSES:**

The other test question was a bit broader in scope and the students expressed concern over what was being asked. When asked to analyze a solution and identify broad impacts the students did not do well.

**RECOMMENDATIONS:**

Reassess in the 2010/11 cycle and focus on broad impacts, add some discussion to the class to support this approach.

### Outcome j: a knowledge of contemporary issues

Outcome J: a knowledge of contemporary issues						
Perf. Criteria	Courses					
	REE 243					AVE PC
Understand Issues	100%					100%
Temporal Nature	NA					NA
Historical Context	92%					92%
Sample Size	13					
Assign. Type	Exam 2					
Term	SP10					
Faculty	Zipay					

This outcome was assessed in a special power exam assignment in a sophomore electrical power class taken by both EE and REE students (REE 243). The assignment was attached to test 2 as an extra credit assignment question that dealt with the energy problem as a contemporary issue.

#### STRENGTHS:

Based on this one assignment students are knowledgeable of a contemporary issue that pertains to a course.

#### WEAKNESSES:

None at this time.

#### RECOMMENDATIONS:

None at this time but due to one assessment collection it is recommended to use more assignments of this type in other courses.

### V. Summary of Student Learning

The program faculty met on May 27, 2010. The faculty included Bruce Barnes, Paul Dingman, Claudia Torres-Garibay and Jamie Zipay.

During the meeting, the current assessment collections and results were discussed. The group also discussed the continuous improvement results from this year based on previous year's recommendations. The results are summarized below.

#### Outcome b: an ability to design and conduct experiments, as well as to analyze and interpret data

##### STRENGTHS:

Students in the upper classes did above the target of 80% at both conducting the experiment and analyzing and discussing results. Labs are a strong focus of the EE program with an emphasis on hands-on and applied engineering so these results are expected. EE graduates will be well prepared for lab and prototype development work.

## WEAKNESSES

None noted.

## RECOMMENDATIONS:

When the senior class finishes rolling out, use a project lab to assess design of experiment during the next assessment cycle for this outcome.

### **Outcome d: an ability to function on multi-disciplinary teams**

#### STRENGTHS:

In the upper division courses most students have been through a group communication class and numerous lab project assignments and do well in this environment. It is the intent of the program to prepare graduates for careers in the engineering field that relies heavily on team approaches. The assessment results reflect this.

#### WEAKNESSES:

None noted.

#### RECOMMENDATIONS:

None at this time.

### **Outcome f: an understanding of professional and ethical responsibility**

#### STRENGTHS:

The freshman level assessment done on this outcome was based on a case study of some ethical issues in industry after a discussion in class on professional ethics. The students did well on understanding code of ethics and evaluating a problem scenario.

#### WEAKNESSES:

None noted.

#### RECOMMENDATIONS:

Assess in the next cycle in an upper division class (Senior Project) as well as the Introductory Course.

### **Outcome h: the broad education necessary to understand the impact of engineering solutions in a global, economic, environmental, and societal context**

#### STRENGTHS:

In the one course a final exam question was used to compare engineering solutions with regard to both function and cost. The students did well here this approach has been used with other classes to present students with some questions that are more qualitative than quantitative in focus.

#### WEAKNESSES:

The other test question was a bit broader in scope and the students expressed concern over what was being asked. When asked to analyze a solution and identify broad impacts the students did not do well.

#### RECOMMENDATIONS:

Reassess in the 2010/11 cycle and focus on broad impacts, add some discussion to the class to support this approach.

**Outcome j: a knowledge of contemporary issues**

**STRENGTHS:**

Based on this one assignment students are knowledgeable of a contemporary issue that pertains to a course.

**WEAKNESSES:**

None at this time.

**RECOMMENDATIONS:**

None at this time but due to one assessment collection it is recommended to use more assignments of this type in other courses.

**VI. Outcome Continuous Improvement (Assessment in Spring Term 2010)  
(Based on Recommendations in 2008-2009 Assessment Report)**

During the 2008-09 academic year, the EE faculty assessed the student learning outcomes and recommended improvements that are summarized below.

**Outcome c: an ability to design a system, component, or process to meet desired needs within realistic constraints such as economic, environmental, social, political, ethical, health and safety, manufacturability, and sustainability.**

This outcome assessment is based on projects and was performed in three junior EE classes that have a project assignment. Some of the courses do not have a project design requirement section assigned as part of the course.

EE OUTCOME SUMMARY FOR:EE-C (EAC-C) An ability to design a system, component or process to meet desired needs								
Within realistic constraints such as economic, environmental, social, political etc. (Major Project)								
PERFORMANCE CRITERIA	PERCENTAGE > =2 in a COURSE ASSIGNMENT							AVERAGE
	(EE331K)	EE(321K)	EE323K	EE323K	EE333K			PERCENT
Recognition of Need					67%			67%
Define design problem	NA				56%			56%
Design Strategy	100%	50%	50%	17%	67%			57%
Gathers Information	100%	50%	50%	17%	67%			57%
Employs models/simulations	100%	50%	50%	17%	78%			59%
Evaluates solutions	62.5%	50%	50%	17%	44%			45%
Selects best design solution	62.5%	50%	50%	17%	67%			49%
Communication/Document					78%			78%
Sample Size	8	8	6	6	9			Goal 80%

The established program target goal is > 80% of the students performing at a satisfactory level (2) or higher (3). The final column is an average of all the course assignments used for an assessment.

**STRENGTHS:**

None but the courses are in a similar cohort of students.



**WEAKNESSES:**

The two electronic device classes indicate a definite need for a look at project design in a course that is more appropriate to use to assess project design.

**RECOMMENDATIONS:**

Assign outcome in the next assessment cycle in a senior project class and ensure adequate preparation is given for project design and planning in upper division classes. It was decided that assessing this outcome under standard lab assignments did not provide meaningful results. The project preparation provided in this class is not adequate for the performance criteria.

**FOLLOW-UP ASSESSMENT IN 2009/10 CYCLE:**

<b>Outcome C: an ability to design a system, component, or process to meet desired needs within realistic constraints such as economic, environmental, social, political, ethical, health and safety, manufacturability, and sustainability.</b>						
Perf. Criteria	Courses					
	EE401	EE425				AVE PC
Recognize the need	100%	100%				100%
Design Strategy	100%	100%				100%
Evaluate Solutions	100%	100%				100%
Sample Size	5	4				
Assign. Type	Lab Proj	Lab Proj				
Term	SP10	SP10				
Faculty	Zipay	Zipay				

This outcome was assessed using two lab projects that had some design constraints imposed on the design team. The students needed to complete the design and analyze results. One assignment was a communication link using a specific part set and the other performing a TDR experiment on a cable using just standard lab equipment (no optical test sets).

**STRENGTHS:**

Both assignments showed a great improvement over the previous assessment. The students were given some preparation on the design constraints and it was discussed that this is typical in industry.

**WEAKNESSES:**

None noted.

**RECOMMENDATIONS:**

Continue assessment in the next cycle but insure that instructors discuss the constraint issues and importance of resolving these issues.

## APPENDIX

### OUTCOME CURRICULUM MAP for OUTCOMES B, D, F, H & J

**Outcome b: an ability to design and conduct experiments, as well as to analyze and interpret data**

TERM	FRESHMAN			SOPHMORE		
<b>Fall</b>	ENGR 207	Intro Engineering	I	EE221	DC Circuits	I
	MATH251	Diff. Calculus		CST116	C++ Programming	I
	CHEM201	Chem I		PHY 223	Physics III	
	CHEM204	Chem I Lab	I	SS Elective	Soc Science Elec	
	WRI121	Comp I				
<b>Winter</b>				EE223	AC Circuits	R
	MATH252	Int. Calculus		MATH 321	Diff. Eqns.	
	EE131	Digital I	I	MATH 341	Linear Alg.	
	WRI122	Comp II		SS Elective	Soc Science Elec	
	PHY 221	Physics I	I	HUM Elec.	Hum. Elec	
<b>Spring</b>				EE225	LaPlace Trans.	S
	MATH254 N	Vector Calculus		MATH253 N	Sequences/Series	
	EE133	Digital II	R	WRI227	Tech Writing	
	PHY 222	Physics II	I	SS Elective	Soc Science Elec	
	SPE 111	Speech		HUM Elec.	Hum. Elec	

**S = Strengthened (Covered strongly)**

**R = Reinforced (Covered moderately)**

**I = Introduced (Covered lightly)**

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<b>TERM</b>	<b>JUNIOR</b>			<b>SENIOR</b>		
<b>Fall</b>	EE321	Electronics I	S	EE411	Sen. Proj I	S
	EE331	Digital Sys	S	WRI321	Sen. Proj I	
	EE341	Electro/Mag	S	EE431	DSP	S
	IMGT345	Eng. Econ.		SPE321	Team Comm.	
				EE Elec	Engineering Elec.	S
<b>Winter</b>	EE323	Electronics II	S	EE412	Sen. Proj II	S
	EE333	Microcont. I	S	WRI322	Sen. Proj II	
	EE343	Solid-State Elec.	S	EE421	Analog Cir Design	S
	EE Elec	Engineering Elec.		MATH465	Statistics	
				MATH/SC	Math/sci Elec.	
<b>Spring</b>	EE311	Signals/Systems	S	EE413	Sen. Proj. III	S
	EE325	Electronics III	S	WRI323	Sen. Proj. III	
	EE335	Microcont. II	S	EE401	Communication Sys.	S
	EE Elec	Engineering Elec.	S	SS Elective	Soc Science Elec	
				HUM Elec.	Hum. Elec	

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**Outcome d: an ability to function on multi-disciplinary teams**

<b>TERM</b>	<b>FRESHMAN</b>			<b>SOPHMORE</b>		
<b>Fall</b>	ENGR 207	Intro Engineering	I	EE221	DC Circuits	I
	MATH251	Diff. Calculus		CST116	C++ Programming	I
	CHEM201	Chem I		PHY 223	Physics III	
	CHEM204	Chem I Lab		SS Elective	Soc Science Elec	
	WRI121	Comp I				
<b>Winter</b>				EE223	AC Circuits	I
	MATH252	Int. Calculus		MATH 321	Diff. Eqns.	
	EE131	Digital I	I	MATH 341	Linear Alg.	
	WRI122	Comp II		SS Elective	Soc Science Elec	
	PHY 221	Physics I		HUM Elec.	Hum. Elec	
<b>Spring</b>				EE225	LaPlace Trans.	I
	MATH254N	Vector Calculus		MATH253N	Sequences/Series	
	EE133	Digital II	I	WRI227	Tech Writing	
	PHY 222	Physics II		SS Elective	Soc Science Elec	
	SPE 111	Speech		HUM Elec.	Hum. Elec	

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<b>TERM</b>	<b>JUNIOR</b>			<b>SENIOR</b>		
<b>Fall</b>	EE321	Electronics I	R	EE411	Sen. Proj I	S
	EE331	Digital Sys	R	WRI321	Sen. Proj I	
	EE341	Electro/Mag		EE431	DSP	R
	IMGT345	Eng. Econ.		SPE321	Team Comm.	
				EE Elec	Engineering Elec.	
<b>Winter</b>	EE323	Electronics II	R	EE412	Sen. Proj II	S
	EE333	Microcont. I	R	WRI322	Sen. Proj II	
	EE343	Solid-State Elec.		EE421	Analog Cir Design	S
	EE Elec	Engineering Elec.	R	MATH465	Statistics	
				MATH/SCI	Math/sci Elec.	
<b>Spring</b>	EE311	Signals/Systems	R	EE413	Sen. Proj. III	S
	EE325	Electronics III	R	WRI323	Sen. Proj. III	
	EE335	Microcont. II	R	EE401	Communication Sys.	S
	EE Elec	Engineering Elec.	R	SS Elective	Soc Science Elec	
				HUM Elec.	Hum. Elec	

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**Outcome f: an understanding of professional and ethical responsibility**

<b>TERM</b>	<b>FRESHMAN</b>			<b>SOPHMORE</b>		
<b>Fall</b>	ENGR 207	Intro Engineering	I	EE221	DC Circuits	
	MATH251	Diff. Calculus		CST116	C++ Programming	
	CHEM201	Chem I		PHY 223	Physics III	
	CHEM204	Chem I Lab		SS Elective	Soc Science Elec	
	WRI121	Comp I				
<b>Winter</b>				EE223	AC Circuits	
	MATH252	Int. Calculus		MATH 321	Diff. Eqns.	
	EE131	Digital I		MATH 341	Linear Alg.	
	WRI122	Comp II		SS Elective	Soc Science Elec	
	PHY 221	Physics I		HUM Elec.	Hum. Elec	
<b>Spring</b>				EE225	LaPlace Trans.	
	MATH254N	Vector Calculus		MATH253N	Sequences/Series	
	EE133	Digital II		WRI227	Tech Writing	
	PHY 222	Physics II		SS Elective	Soc Science Elec	
	SPE 111	Speech		HUM Elec.	Hum. Elec	

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<b>TERM</b>	<b>JUNIOR</b>			<b>SENIOR</b>		
<b>Fall</b>	EE321	Electronics I		EE411	Sen. Proj I	S
	EE331	Digital Sys		WRI321	Sen. Proj I	
	EE341	Electro/Mag		EE431	DSP	
	IMGT345	Eng. Econ.		SPE321	Team Comm.	
				EE Elec	Engineering Elec.	
<b>Winter</b>	EE323	Electronics II		EE412	Sen. Proj II	S
	EE333	Microcont. I		WRI322	Sen. Proj II	
	EE343	Solid-State Elec.		EE421	Analog Cir Design	
	EE Elec	Engineering Elec.		MATH465	Statistics	
				MATH/SCI	Math/sci Elec.	
<b>Spring</b>	EE311	Signals/Systems		EE413	Sen. Proj. III	S
	EE325	Electronics III		WRI323	Sen. Proj. III	
	EE335	Microcont. II		EE401	Communication Sys.	
	EE Elec	Engineering Elec.		SS Elective	Soc Science Elec	
				HUM Elec.	Hum. Elec	

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**Outcome h: the broad education necessary to understand the impact of engineering solutions in a global, economic, environmental, and societal context**

<b>TERM</b>	<b>FRESHMAN</b>			<b>SOPHMORE</b>		
<b>Fall</b>	ENGR 207	Intro Engineering	I	EE221	DC Circuits	
	MATH251	Diff. Calculus		CST116	C++ Programming	
	CHEM201	Chem I		PHY 223	Physics III	
	CHEM204	Chem I Lab		SS Elective	Soc Science Elec	
	WRI121	Comp I				
<b>Winter</b>				EE223	AC Circuits	
	MATH252	Int. Calculus		MATH 321	Diff. Eqns.	
	EE131	Digital I		MATH 341	Linear Alg.	
	WRI122	Comp II		SS Elective	Soc Science Elec	
	PHY 221	Physics I		HUM Elec.	Hum. Elec	
<b>Spring</b>				EE225	LaPlace Trans.	
	MATH254N	Vector Calculus		MATH253N	Sequences/Series	
	EE133	Digital II		WRI227	Tech Writing	
	PHY 222	Physics II		SS Elective	Soc Science Elec	
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<b>TERM</b>	<b>JUNIOR</b>			<b>SENIOR</b>		
<b>Fall</b>	EE321	Electronics I		EE411	Sen. Proj I	R
	EE331	Digital Sys	R	WRI321	Sen. Proj I	
	EE341	Electro/Mag		EE431	DSP	
	IMGT345	Eng. Econ.		SPE321	Team Comm.	
				EE Elec	Engineering Elec.	
<b>Winter</b>	EE323	Electronics II		EE412	Sen. Proj II	R
	EE333	Microcont. I		WRI322	Sen. Proj II	
	EE343	Solid-State Elec.	R	EE421	Analog Cir Design	R
	EE Elec	Engineering Elec.		MATH465	Statistics	
				MATH/SCI	Math/sci Elec.	
<b>Spring</b>	EE311	Signals/Systems		EE413	Sen. Proj. III	R
	EE325	Electronics III		WRI323	Sen. Proj. III	
	EE335	Microcont. II		EE401	Communication Sys.	
	EE Elec	Engineering Elec.		SS Elective	Soc Science Elec	
				HUM Elec.	Hum. Elec	

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**Outcome j: a knowledge of contemporary issues**

<b>TERM</b>	<b>FRESHMAN</b>			<b>SOPHMORE</b>		
<b>Fall</b>	ENGR 207	Intro Engineering	I	EE221	DC Circuits	
	MATH251	Diff. Calculus		CST116	C++ Programming	
	CHEM201	Chem I		PHY 223	Physics III	
	CHEM204	Chem I Lab		SS Elective	Soc Science Elec	
	WRI121	Comp I				
<b>Winter</b>				EE223	AC Circuits	
	MATH252	Int. Calculus		MATH 321	Diff. Eqns.	
	EE131	Digital I		MATH 341	Linear Alg.	
	WRI122	Comp II		SS Elective	Soc Science Elec	
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	PHY 222	Physics II		SS Elective	Soc Science Elec	
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	EE331	Digital Sys		WRI321	Sen. Proj I	
	EE341	Electro/Mag		EE431	DSP	
	IMGT345	Eng. Econ.		SPE321	Team Comm.	
				EE Elec	Engineering Elec.	
<b>Winter</b>	EE323	Electronics II		EE412	Sen. Proj II	R
	EE333	Microcont. I		WRI322	Sen. Proj II	
	EE343	Solid-State Elec.	R	EE421	Analog Cir Design	
	EE Elec	Engineering Elec.		MATH465	Statistics	
				MATH/SCI	Math/sci Elec.	
<b>Spring</b>	EE311	Signals/Systems		EE413	Sen. Proj. III	R
	EE325	Electronics III		WRI323	Sen. Proj. III	
	EE335	Microcont. II		EE401	Communication Sys.	
	EE Elec	Engineering Elec.		SS Elective	Soc Science Elec	
				HUM Elec.	Hum. Elec	

**S = Strengthened (Covered strongly)**

**R = Reinforced (Covered moderately)**

**I = Introduced (Covered lightly)**

**Blank = No Coverage**