Preface

In the view of satisfying the essential needs of the industries and the government of Kingdom of Saudi Arabia, the **Bachelor of Science** in **Electrical Engineering (BSEE) Program** is introduced at the **College of Engineering** in **Jazan University**. In the face of the progressive developments, the Electrical Engineering Department has maintained a strong commitment to provide high quality programs and services by conscientiously evaluating priorities and efficiencies of educational functions. Continuous revisions in curriculum have been updated based on the requirements of industries with respect to the recent technological developments. The revisions and modifications with reference to the standards of International Universities provided an opportunity to self evaluate effectiveness of educational procedures and practices. The redesigned program consists of sequential and progressive courses. These courses provide the students with the fundamental knowledge of mathematical and scientific subjects with the basics of Electrical Engineering. The curriculum consists of a broad range of subjects that form the foundation of the electrical engineering discipline including the importance of engineering design.

The developed program is in accordance to the university, the college, and the department requirements. The university requirements include Islamic cultural, and social courses, while the college requirements focus on basic science and other related engineering courses. The department requirements relate to inclusion of advanced courses among the various electrical engineering disciplines. The BSEE program is redesigned to meet the needs of the quality assessment and academic accreditation standards in accordance to both *"The National Commission for Academic Accreditation and Assessment* (*NCAAA*)*"* and *"Accreditation Board for Engineering and Technology* (*ABET*), *Inc*.".

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1. The Bachelor of Science in Electrical Engineering Program

The Bachelor of Science in Electrical Engineering (BSEE) Program at the College of Engineering, Jazan University focuses on molding the minds of graduates and preparing them for productive careers in industry, government and private sectors.

1.1 BSEE Program Vision

To facilitate transformation of students into excellent engineers who are technically competent, professional in practice, and well-rounded with the skills and abilities to become innovative leaders and entrepreneurs to fulfill the needs of the country.

1.2 BSEE Program Mission

Impart quality education to meet the essential requirements of profession and society, and achieve excellence in teaching-learning. Offer training to think creatively, attain the knowledge and develop skills needed to succeed as professionals. Provide innovative platform for integration of research and education. Practice ethical responsibility and accountability in professional civilities and serve the national and international communities.

1.3 BSEE Program Objectives

1. Bestow the industrial communities at Jazan region and the south of Saudi Arabia as a whole with qualified and trained graduates in the field of electrical engineering.
2. Achieve standards of academic accreditation in programs and academic fields by providing technical and practical training to the graduates on par with international standards.
3. Expertise in design, analysis, manufacturing, experimentation and testing of electrical engineering systems and develop solid communication skills with leadership qualities.
4. Accomplish lifelong learning for continued professional development and career advancement by recognizing the ethical, societal and economic implications of contributions of electrical engineering graduates to the society.

1.4 BSEE Program Outcomes

The BSEE Program educational objectives will be measured with respect to the following outcomes of students in every academic year.

Outcome a: Students shall have an ability to apply knowledge of mathematics, science, and fundamental engineering to electrical engineering problems.

Outcome b: Students shall have an ability to design and conduct experiments to study different electrical engineering systems and analyze and interpret data.

Outcome c: Students shall have an ability to design electrical components, processes and systems to meet desired realistic constrains such as economic, environmental, social, political, ethical, health and safety, manufacturability, and sustainability.

Outcome d: Students shall have an ability to work effectively in multidisciplinary teams, to solve engineering problems relevant to electrical engineering.

Outcome e: Students shall have an ability to identify, formulate, and solve practical electrical engineering problems.

Outcome f: Students shall have an understanding of the professional and ethical responsibilities of electrical engineers.

Outcome g: Students shall have an ability to communicate effectively in written, oral, and graphical forms, including the use of professional-quality visual aids.

Outcome h: Students shall have an understanding of the impact of electrical engineering on the society, environment, and global economy.

Outcome i: Students shall have recognition of the need to engage in lifelong learning.

Outcome j: Students shall have an ability to continuously update their knowledge and skills related to contemporary issues.

Outcome k: Students shall have an ability to use modern tools, techniques and skills necessary for practicing electrical engineering, including computational tools, and instrumentation.

2. The Bachelor of Science in Electrical Engineering Program Plan

The study plan of the BSEE Program at the College of Engineering, Jazan University involves different requirements for the university, the college, and the department, as well as courses which satisfy these requirements. Also, the study plan includes the credit units for all courses and the distribution of these credit units on the ten studying levels (terms).

2.1 BSEE Program Plan Requirements

The study plan for the Electrical Engineering Department is designed to satisfy three main requirements. The first is the university requirement which includes the Islamic cultural, and social courses. The second is the college requirement which involves the basic science courses and other courses related to the electrical engineering field. The third is the department requirement which includes the advanced courses in the electrical engineering filed with different sub disciplines. Table (1) displays a general prospective of the studying plan illustrating all requests, courses, credit units, and contact hours for these requirements.

Table (1) Requirements, Credit units, and contact hours

Requirement		Courses	Credit Units		Contact Hours
		Number	Number	%	Number
University		7	15	9.375	16
College	English language	3	15	9.375	39
	Computer science	1	3	1.875	4
	Mathematics and basic sciences	11	35	21.875	40
	Engineering courses	4	10	6.25	16
College		19	63	39.375	75
University and College		26	78	48.75	115
Department		34 conv.	82	51.25	146
		31 co-op			133
Total		60 conv.	160		261
		57 co-op	160		248

2.2 BSEE Program Credit Units-Levels-Requirements

Table (2) illustrates the distribution of the credit units for the university, college and department requirements on the ten studying levels. This table includes the summer training with 2 credit units.

Table (2) Distribution of the credit units on the plan levels

Req. / Level	University	College	Department	Level Sum	Year Sum
First	5	9	0	14	**29**
Second	2	13	0	15	
Third	2	15	0	17	**35**
Fourth	2	9	7	18	
Fifth	2	6	9	17	**34**
Sixth	2	5	10	17	
Seventh	0	3	15	18	**34**
Eighth (Conventional)	0	3	13	16	
Eighth (Co-op)	0	3	14	17	35
Summer Term	0	0	Summer Training	2	**2**
	0	0	Co-op begins	2	2
Ninth (Conventional)	0	0	13	13	**26**
Tenth (Conventional)	0	0	13	13	
Ninth (Co-op)	0	0	7	7	25
Tenth (Co-op)	0	0	18	18	
Total	**15**	**63**	**82**	**160**	

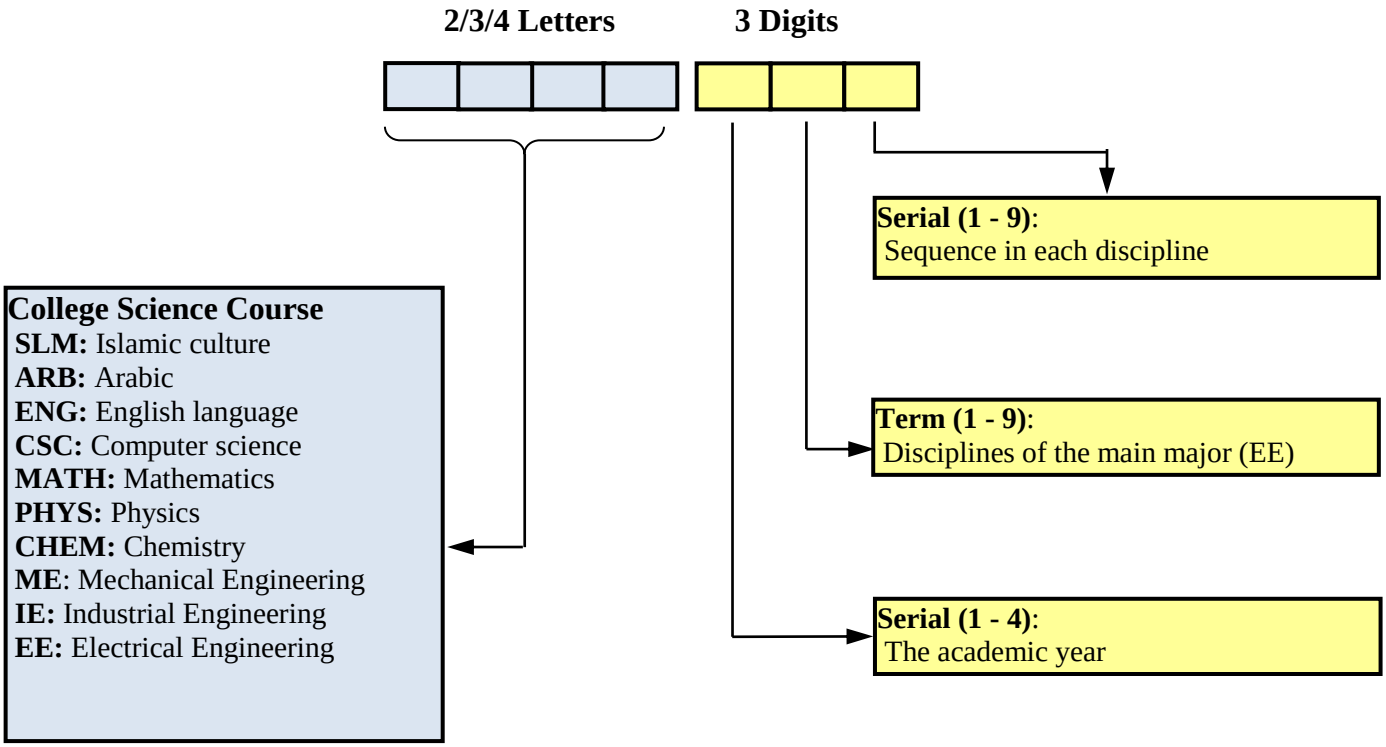
2.3 Course Coding System

The course code is composed of two to four letters and three digits. The letters indicate the major of the course. The first digit indicates the year, 1, 2, 3, or 4. The second digit between 1 and 9 displays the discipline in the major. Table (3) shows the disciplines in Electrical engineering. The third digit is the course sequence in each discipline.

Table (3) Disciplines of Electrical Engineering

Disciplines	The second Digit
Electrical Engineering	**1**
Power Systems	**2-3**
Automatic Control	**4**
Machines	**5-6**
Electronics and Communications	**7**
Training and Project	**9**

The following Figure shows the courses coding system that obeyed throughout the studying plan.



This coding system is applied to the courses taught by collage of engineering departments only, and other courses belonging to other colleges coding system.

2.4 BSEE Program Courses

Tables (4), (5), (6) and (7) illustrate the courses, their credit units and weekly contact hours for the university, college, and department. The core courses are classified according to the discipline in the electrical engineering. The distribution of the courses includes; 15 credit units for the university requirements, 63 credit units for the college requirements, and 82 credit units as requirements for the electrical engineering. The total credit units for the BSEE are 160.

Table (4) The University Requirements

Discipline	No.	Course code	Course Name	Credit Units	Contact Hours
University Requirements	1	SLM 101	Islamic Culture (1)	2	2
	2	SLM 102	Islamic Culture (2)	2	2
	3	SLM 103	Islamic Culture (3)	2	2
	4	SLM 104	Islamic Culture (4)	2	2
	5	ARB 101	Arabic Language Skills	2	2
	6	ARB 102	Arabic Editing	2	2
	7	CSC 101	Introduction to Computer	3	4
Total	**7 Courses**			**15**	**16**

Table (5): The College Requirements

Discipline	No.	Course Code	Course Name	Credit Units	Contact Hours
English Language	1	ENG 101	English Language (1)	6	18
	2	ENG 102	English Language (2)	6	18
	3	ENG 357	Technical Writing	3	3
	3 Courses			15	39
Computer Science	1	CSC 111	Programming Language	3	4
	1 Courses			3	4
Mathematics & Basic Science	1	MATH 118	Mathematics	3	3
	2	MATH 227	Calculus (1)	3	3
	3	MATH 228	Calculus (2)	3	3
	4	MATH 319	Calculus (3)	3	3
	5	MATH 336	Differential equations	3	3
	6	MATH 410	Numerical methods	3	3
	7	STAT 354	Statistics and probability	3	3
	8	CHEM 106	General Chemistry	4	5
	9	CHEM 206	Chemistry (2)	3	4
	10	PHYS 121	General Physics	4	5
	11	PHYS 213	Physics (2)	3	5
	11 Courses			35	40
Engineering Courses	1	ME 131	Engineering drawing	2	5
	2	ME 132	Engineering Design	3	4
	3	IE 346	Engineering economy	2	2
	4	EE 111	Fundamental of Electrical Eng.	3	5
	4 Courses			10	16
Total	19 Courses			63	99

Table (6) Electrical Engineering Requirements (Conventional Approach) Based on Disciplines

Discipline	No.	Course code	Course Name	Credit Units	Contact Hours
Mechanical Engineering	1	ME 118	Thermal Engineering	3	4
	2	ME 137	Engineering Mechanics	2	3
	2 Courses			**5**	**7**
Electrical Engineering (1)	1	EE 112	Electrical Circuits (1)	2	4
	2	EE 213	Electrical Circuits (2)	2	4
	3	EE 214	Electromagnetic Field	2	4
	4	EE 215	Measurements	3	5
	5	EE 216	Electrical Installations	2	4
	5 Courses			**11**	**21**
Powers (2-3)	1	EE 221	Electrical Safety	2	4
	2	EE 322	Power Production and Distribution	3	5
	3	EE 323	Power Systems (1)	3	5
	4	EE 424	Power Systems (2)	3	5
	5	EE 425	Switchgear and protection of power systems	3	5
	6	EE 426	High voltage engineering	3	5
	7	EE 427	Economic Operation of Power Systems	2	2
	8	EE 428	Renewable Energies	2	4
	8 Courses			**21**	**35**
Automatic Control (4)	1	EE 341	Automatic Control	3	5
	2	EE 342	Microprocessor	2	4
	3	EE 343	Robotics	2	4
	3 Courses			**7**	**13**
Machines (5-6)	1	EE 251	Electrical Machines (1)	3	5
	2	EE 352	Electrical Machines (2)	3	5
	3	EE 353	Power Electronics	3	5
	4	EE 354	Electrical Machines (3)	3	5
	5	EE 455	Simulation of Machines	2	4
	5 Courses			**14**	**24**
Electronics and communications (7)	1	EE 271	Electronics	3	5
	2	EE 272	Digital Design	2	4
	3	EE 373	Practical Special Topic	2	6
	4	EE 374	Signal Processing	2	4
	5	EE 375	Communications	2	4
	5 Courses			**11**	**23**
Elective Courses	1	EE 491	Elective Course (1)	3	5
	2	EE 492	Elective Course (2)	2	4
	3	EE 493	Elective Course (3)	2	4
	3 Courses			**7**	**13**
Training & Project (9)	1	EE 496	Summer Training	2	-
	2	EE 498	Senior Design Project (1)	1	3
	3	EE 499	Senior Design Project (2)	3	7
	3 Courses			**6**	**10**
Total	**34 Courses**			**82**	**146**

Table (7) Electrical Engineering Requirements (Co-op Approach) Based on Disciplines

Discipline	No.	Course code	Course Name	Credit Units	Contact Hours
Mechanical Engineering	1	ME 118	Thermal Engineering	3	4
	2	ME 137	Engineering Mechanics	2	3
	2 Courses			**5**	**7**
Electrical Engineering (1)	1	EE 112	Electrical Circuits (1)	2	4
	2	EE 213	Electrical Circuits (2)	2	4
	3	EE 214	Electromagnetic Field	2	4
	4	EE 215	Measurements	3	5
	5	EE 216	Electrical Installations	2	4
	5 Courses			**11**	**21**
Powers (2-3)	1	EE 221	Electrical Safety	2	4
	2	EE 322	Power Production and Distribution	3	5
	3	EE 323	Power Systems (1)	3	5
	4	EE 424	Power Systems (2)	3	5
	5	EE 425	Switchgear and protection of power systems	3	5
	6	EE 426	High voltage engineering	3	5
	7	EE 427	Economic Operation of Power Systems	2	2
	8	EE 428	Renewable Energies	2	4
	8 Courses			**21**	**35**
Automatic Control (4)	1	EE 341	Automatic Control	3	5
	2	EE 342	Microprocessor	2	4
	3	EE 343	Robotics	2	4
	3 Courses			**7**	**13**
Machines (5-6)	1	EE 251	Electrical Machines (1)	3	5
	2	EE 352	Electrical Machines (2)	3	5
	3	EE 353	Power Electronics	3	5
	4	EE 354	Electrical Machines (3)	3	5
	5	EE 455	Simulation of Machines	2	4
	5 Courses			**14**	**24**
Electronics and communications (7)	1	EE 271	Electronics	3	5
	2	EE 272	Digital Design	2	4
	3	EE 373	Practical Special Topic	2	6
	4	EE 374	Signal Processing	2	4
	5	EE 375	Communications	2	4
	5 Courses			**11**	**23**
Training & Project (9)	1	EE 497	Co-op Training	9	-
	2	EE 498	Senior Design Project (1)	1	3
	3	EE 499	Senior Design Project (2)	3	7
	3 Courses			**13**	**10**
Total	**31 Courses**			**82**	**133**

2.5 BSEE Program Curriculum

Following is the BSEE program curriculum of the electrical engineering department. The BSEE course duration is five academic years (**all are in English language)** with ten levels and two levels per academic year. The five academic years involve one preparatory year with no specialist courses, and four remaining years with few special courses in the electrical engineering field. The curriculum presents the credit units and weekly contact hours, either for lectures or for practical work, for all courses. The curriculum also presents the summer training, in addition to the senior project which begins at the ninth level and continues to the end of the tenth level .

Also, the program presents the concept of conventional and co-op approaches and the distribution of courses after the seventh level for both approaches. The main difference between the two approaches is that in the conventional approach the students take 2 credits as summer training and 7 credits as electives courses while in the co-op approach they cover the 9 credits in 24 weeks of training and the students of this path start the senior project in the eighth level.

FIRST YEAR

First Level							
Course Code	**Course Name**	**Prerequisites**	**Credit Units**	**Weekly Contact Hours**			
				Lec	**Lab**	**Tut**	**Sum**
SLM 101	Islamic Culture (1)	----	2	2	--	--	2
ENG 101	English Language (1)	----	6	12	6	--	18
MATH 118	Mathematics	----	3	3	--	--	3
CSC 101	Introduction to Computer	---	3	2	2	--	4
Sum	**4 Courses**		**14**	**19**	**8**	**-**	**27**
Second Level							
Course Code	**Course Name**	**Prerequisites**	**Credit Units**	**Weekly Contact Hours**			
				Lec	**Lab**	**Tut**	**Sum**
SLM 102	Islamic Culture (2)	----	2	2	--	--	2
ENG 102	English Language (2)	ENG 101	6	12	6	--	18
MATH 227	Calculus (1)	MATH 118	3	3	--	--	3
PHYS 121	General Physics	---	4	3	2	--	5
Sum	**4 Courses**		**15**	**20**	**8**	**-**	**28**
Total	**8 Courses**		**29**	**39**	**16**	**-**	**55**

SECOND YEAR

Third Level							
Course Code	**Course Name**	**Pre-requisites**	**Credit Units**	**Weekly Contact Hours**			
				Lec	**Lab**	**Tut**	**Sum**
ARB 101	Arabic Language Skills	----	2	2	-	-	2
CHEM 106	General Chemistry	----	4	3	2	-	5
MATH 228	Calculus (2)	MATH 227	3	3	-	-	3
PHYS 213	Physics (2)	PHYS 121	3	2	2	1	5
ME 131	Engineering Drawing	----	2	-	5	-	5
EE 111	Fundamentals of Electrical Engineering	PHYS 121	3	2	2	1	5
Sum	**6 Courses**		**17**	**12**	**11**	**2**	**25**
Fourth Level							
Course Code	**Course Name**	**Pre-requisites**	**Credit Units**	**Weekly Contact Hours**			
				Lec	**Lab**	**Tut**	**Sum**
SLM 103	Islamic culture (3)	----	2	2	-	-	2
CHEM 206	Chemistry (2)	CHEM 106	3	2	-	2	4
MATH 319	Calculus (3)	MATH 228	3	3	-	-	3
ME 118	Thermal Engineering	PHYS 213	3	3	-	1	4
ME 132	Engineering Design	ME 131	3	2	2	-	4
ME 137	Engineering Mechanics	PHYS 121	2	2	-	1	3
EE 112	Electrical Circuits (1)	EE 111	2	1	2	1	4
Sum	**7 Courses**		**18**	**15**	**4**	**5**	**24**
Total	**13 Courses**		**35**	**27**	**15**	**7**	**49**

THIRD YEAR

Fifth Level							
Course Code	**Course Name**	**Prerequisites**	**Credit Units**	**Weekly Contact Hours**			
				Lec	**Lab**	**Tut**	**Sum**
ARB 102	Arabic Editing	----	2	2	-	-	2
MATH 336	Differential Equations	MATH 319	3	3	-	-	3
CSC 111	Programming Language	CSC 101	3	2	2	-	4
EE 213	Electrical Circuits (2)	EE 112	2	1	2	1	4
EE 214	Electromagnetic Field	EE 111	2	1	2	1	4
EE 221	Electrical Safety	EE 112	2	1	2	1	4
EE 271	Electronics	EE 111	3	2	2	1	5
Sum	**7 Courses**		**17**	**12**	**10**	**4**	**26**
Sixth Level							
Course Code	**Course Name**	**Prerequisites**	**Credit Units**	**Weekly Contact Hours**			
				Lec	**Lab**	**Tut**	**Sum**
SLM 104	Islamic culture (4)	----	2	2	-	-	2
STAT 354	Statistics and Probability	MATH 227	3	3	-	-	3
IE 346	Engineering Economy	MATH 228	2	2	-	-	2
EE 215	Measurements	EE 271	3	2	2	1	5
EE 216	Electrical Installations	EE 213	2	1	2	1	4
EE 251	Electrical Machines (1)	EE 213	3	2	2	1	5
EE 272	Digital Design	CSC 111	2	1	2	1	4
Sum	**7 Courses**		**17**	**13**	**8**	**4**	**25**
Total	**14 Courses**		**34**	**25**	**18**	**8**	**51**

FOURTH YEAR

Seventh Level							
Course Code	Course Name	Prerequisites	Credit Units	Weekly Contact Hours			
				Lec	Lab	Tut	Sum
ENG 357	Technical Writing	ENG 102	3	3	-	-	3
EE 322	Power Production and Distribution	EE 213	3	2	2	1	5
EE 341	Automatic control	EE 213	3	2	2	1	5
EE 342	Microprocessor	EE 272	2	1	2	1	4
EE 352	Electrical Machines (2)	EE 251	3	2	2	1	5
EE 373	Practical Special Topic	EE 271	2	-	6	-	6
EE 374	Signal Processing	EE 272	2	1	2	1	4
Sum	**7 Courses**		**18**	**11**	**16**	**5**	**32**

Conventional Path

Eighth Level							
Course Code	Course Name	Prerequisites	Credit Units	Weekly Contact Hours			
				Lec	Lab	Tut	Sum
MATH 410	Numerical Methods	MATH 228- CSC 111	3	3	-	-	3
EE 323	Power Systems (1)	EE 322	3	2	2	1	5
EE 343	Robotics	EE 341	2	1	2	1	4
EE 353	Power Electronics	EE 251	3	2	2	1	5
EE 354	Electrical Machines (3)	EE 352	3	2	2	1	5
EE 375	Communications	EE 374	2	1	2	1	4
Sum	**6 Courses**		**16**	**11**	**10**	**5**	**26**
Total	**13 Courses**		**34**	**22**	**26**	**10**	**58**

Summer Term

Course Code	Course Name	Prerequisites	Credit Units
EE 496	Summer training	ENG 357 Department approval	**2**

FIFTH YEAR
(Conventional)

Ninth Level							
Course Code	**Course Name**	**Pre-requisites**	**Credit Units**	**Weekly Contact Hours**			
				Lec	**Lab**	**Tut**	**Sum**
EE 424	Power Systems (2)	EE 323	3	2	2	1	5
EE 425	Switchgear and protection of power systems	EE 322	3	2	2	1	5
EE 426	High voltage Engineering	EE 323	3	2	2	1	5
EE 491	Elective Course (1)	According to each course	3	2	2	1	5
EE 498	Senior Design Project (1)	ENG357- EE322- EE342- EE352	1	-	3	-	3
Sum	**5 Courses**		**13**	**8**	**11**	**4**	**23**
Tenth Level							
Course Code	**Course Name**	**Pre-requisites**	**Credit Units**	**Weekly Contact Hours**			
				Lec	**Lab**	**Tut**	**Sum**
EE 427	Economic Operation of Power Systems	EE 322	2	2	-	-	2
EE 428	Renewable Energies	EE 322	2	1	2	1	4
EE 455	Simulation of Machines	EE 342	2	1	3	-	4
EE 492	Elective Course (2)	According to each course	2	1	2	1	4
EE 493	Elective Course (3)	According to each course	2	1	2	1	4
EE 499	Senior Design Project (2)	EE 498	3	-	7	-	7
Sum	**6 Courses**		**13**	**6**	**16**	**3**	**25**
Total	**11 Courses**		**26**	**14**	**27**	**7**	**48**

Elective Courses

(The student must select three courses from the same group)

Power Systems Group							
Course Code	Course Name	Prerequisites	Credit Units	Weekly Contact Hours			
				Lec	Lab	Tut	Sum
EE 491	Elective Course (1)	According to each course					
EE 429	Utilization of Electrical Power	EE 323	3	2	2	1	5
EE 492	Elective Course (2)	According to each course					
EE 431	High voltage applications	EE 426- EE 429	2	1	2	1	4
EE 432	Protection of power Systems	EE 424- EE 429	2	1	2	1	4
EE 493	Elective Course (3)	According to each course					
EE 433	Organization of Power Systems	EE 429	2	1	2	1	4
EE 434	Advanced Power Systems	EE 429	2	1	2	1	4

Automatic Control Group							
Course Code	Course Name	Prerequisites	Credit Units	Weekly Contact Hours			
				Lec	Lab	Tut	Sum
EE 491	Elective Course (1)	According to each course					
EE 444	Advanced Automatic Control	EE 341	3	2	2	1	5
EE 492	Elective Course (2)	According to each course					
EE 445	Special Topic in Control	EE 444	2	1	2	1	4
EE 446	Control of Power Electronics	EE 444-EE 353	2	1	2	1	4
EE 493	Elective Course (3)	According to each course					
EE 447	Computer Control	EE 444	2	1	2	1	4
EE 448	Components of Control	EE 444	2	1	2	1	4

Machines Group							
Course Code	**Course Name**	**Prerequisites**	**Credit Units**	**Weekly Contact Hours**			
				Lec	**Lab**	**Tut**	**Sum**
EE 491	Elective Course (1)	According to each course					
EE 456	Advanced Electrical Machines	EE 354	3	2	2	1	5
EE 492	Elective Course (2)	According to each course					
EE 457	Electrical Drives Systems	EE 456	2	1	2	1	4
EE 458	Design of Power Electronics	EE 456-EE 353	2	1	2	1	4
EE 493	Elective Course (3)	According to each course					
EE 459	Application of Power Electronics	EE 456-EE 353	2	1	2	1	4
EE 461	Electrical Machine Design	EE 456	2	1	2	1	4

Co-op Path

Eighth Level							
Course Code	**Course Name**	**Prerequisites**	**Credit Units**	**Weekly Contact Hours**			
				Lec	**Lab**	**Tut**	**Sum**
MATH 410	Numerical Methods	MATH 228- CSC 111	3	3	-	-	3
EE 323	Power Systems (1)	EE 322	3	2	2	1	5
EE 243	Robotics	EE 341	2	1	2	1	4
EE 353	Power Electronics	EE 251	3	2	2	1	5
EE 354	Electrical Machines (3)	EE 352	3	2	2	1	5
EE 375	Communications	EE 374	2	1	2	1	4
EE 498	Senior Design Project (1)	ENG357-EE322-EE342-EE352	1	-	3	-	3
Sum	**7 Courses**		**17**	**11**	**13**	**5**	**29**
Total	**14 Courses**		**35**	**22**	**29**	**10**	**61**

Summer Term

Course Code	Course Name	Prerequisites	Credit Units
EE 497	Co-op	ENG 357 Department approval	**9**

FIFTH YEAR

Ninth Level		
Course Code	**Course Name**	**Remark**
EE 497	Co-op Training	Continuation of the Co-op Program

Tenth Level

Course Code	Course Name	Pre-requisites	Credit Units	Weekly Contact Hours			
				Lec	Lab	Tut	Sum
EE 424	Power Systems (2)	EE 323	3	2	2	1	5
EE 425	Switchgear and protection of power systems	EE 322	3	2	2	1	5
EE 426	High voltage Engineering	EE 323	3	2	2	1	5
EE 427	Economic Operation of Power Systems	EE 322	2	2	-	-	2
EE 428	Renewable Energies	EE 322	2	1	2	1	4
EE 455	Simulation of Machines	EE 342	2	1	3	-	4
EE 499	Senior Design Project (2)	EE 498	3	-	7	-	7
Sum	**7 Courses**		**18**	**10**	**18**	**4**	**32**
Total	**8 Courses**		**27**	**10**	**18**	**4**	**32**

The following statistics can be drawn from the BSEE program curriculum. Table (8) shows the distribution of the number of courses, credit units, and weekly contact hours in each level and academic year.

Table (8)The Distribution of the Courses

Weekly Contact Hours				Credit Units		No. of Courses		Level	Academic Year
Year Sum	Level Sum	Lab.	Lec.&Tut.	Year	Level	Year	Level		
55	27	8	19	29	14	8	4	1	First
	28	8	20		15		4	2	
49	25	11	14	35	17	13	6	3	Second
	24	4	20		18		7	4	
51	26	10	16	34	17	14	7	5	Third
	25	8	17		17		7	6	
58	32	16	16	34	18	13	7	7	Fourth
	26	10	16		16		6	8 conv.	
61	29	13	16	35	17	14	7	8 co-op	
				2		1		Summer Training	
				2		1		Co-op	
48	23	11	12	26	13	11	5	9 conv.	Fifth
	25	16	9		13		6	10 conv.	
32	0	0	0	25	7	7	0	9 co-op	
	32	18	14		18		7	10 co-op	
261		**102**	**159**	**160**		**60**	**Traditional**		**Total**
248		**96**	**152**			**57**	**Co-op**		

3. Bachelor of Science in Electrical Engineering Program Specialist Course Syllabi

Course Code	EE 111			
Course Title	Fundamentals of Electrical Engineering			
Year/Level	2/3			
Hours	Credit	Lec.	Lab.	Tut.
	3	2	2	1
Prerequisites	PHYS 121			
Course Description	Basic concepts, elements of electrical circuits, basic laws, circuit theorems, current and voltage source and conversion between them, sinusoids and phasors, impedance and admittance, instantaneous and average power, effective and rms value, apparent power and power factor, power factor correction, three phase systems.			
Textbook	Charles Alexander and Matthew N.O. Sadiko, Fundamentals of Electric Circuits, 3rd Edition, ISBN: 0072977183, McGraw-Hill's, 2007			

Course Code	EE 112			
Course Title	Electrical Circuits (1)			
Year/Level	2/4			
Hours	Credit	Lec.	Lab.	Tut.
	2	1	2	1
Prerequisites	EE 111			
Course Description	This course is a continuation of the Fundamental Electrical Engineering course studied in the previews level, it gives to students basic notions and tools to analyze, design and study electrical circuits. The students will be able to analyze single phase AC circuits, series-parallel RC, RL and RLC circuits, powers, phasor diagram, the three phase circuits: generation of three phase voltages and currents, power relationships, Wye and Delta connections, analysis of balanced three phase systems, vector diagrams.			
Textbook	J.D. Irwin & R.N. Nelms, "Basic Engineering Circuit Analysis"; John Wiley; 10th edition, 2011, ISBN-13 978-0-470-63322-9			

Course Code	EE 213			
Course Title	Electrical Circuits (2)			
Year/Level	3/5			
Hours	Credit	Lec.	Lab.	Tut.
	2	1	2	1
Prerequisites	EE 112			
Course Description	This course is a continuation of the Electrical Circuits (1) course studied in the previews level, it gives to students advanced notions and tools to analyze, design and study electrical circuits. The students will be able to do the following: apply the Laplace transform and Fourier analysis for electrical circuits, characterize and specify the two-port networks, analysis of passive			

	filters.
Textbook	James W. Nilsson, Susan Riedel; "Electric Circuits", 10th Edition, Prentice Hall; 10 edition, 2014, ISBN-13 978-0133760033

Course Code	**EE 214**			
Course Title	Electromagnetic Field			
Year/Level	**3/5**			
Hours	**Credit**	**Lec.**	**Lab.**	**Tut.**
	2	1	2	1
Prerequisites	EE 111			
Course Description	This course will give the students a sufficient background on the basic concepts of vector analysis and coordinate systems as an efficient scheme to analyze the Electric, magnetic field and charge distributions. Also, the differential electromagnetic field identities are useful for different electromagnetic applications.			
Textbook	Ulaby F., Fundamentals of applied electromagnetic, Prentice-Hall, 2004 Media Edition			

Course Code	**EE 221**			
Course Title	Electrical Safety			
Year/Level	**3/5**			
Hours	**Credit**	**Lec.**	**Lab.**	**Tut.**
	2	1	2	1
Prerequisites	EE 112			
Course Description	This course will be devoted to the study of rules for protection of persons against direct and indirect contacts. Different part will be developed: the various parameters to assess the danger in an electric network, earthing system TT, TN(S, C and CS) and IT, Residual current devices, Criteria for selection of earthing systems, Thermal-magnetic circuit breaker, Short-circuit currents, Selectivity systems.			
Textbook	John Cadick, Mary Capelli-Schellpfeffer, Dennis Neitzel, Al Winfield; "Electrical Safety Handbook"; fourth edition, ISBN-13: 978-0071745130.			

Course Code	**EE 271**			
Course Title	Electronics			
Year/Level	**3/5**			
Hours	**Credit**	**Lec.**	**Lab.**	**Tut.**
	3	2	2	1
Prerequisites	EE 111			
Course Description	This course will give the students a sufficient background on the concepts of electronic. All the detail of electronic circuits are presented for bothAnalog and Digital electronic circuits. The students will be able to deal with the following: Conduction in Metal and Semiconductor, P-N Junction Diode Circuits, BJT Bipolar Junction Transistor, FET Field Effect Transistor, Low Frequency Equivalent Circuits, Op-Amp Operational Amplifiers Design and Application, Differential Amplifiers and Multi-stage Amplifiers, Frequency Response and			

	Design of the Differential Amplifiers, Analysis of Active Filter, Analysis and Design of Signals Generator, Tuned Amplifier Circuits Design and Applications, Power Amplifiers.
Textbook	Boylestad, Electronics Devices and circuit theory, 10th Edition, India 2004

Course Code	**EE 215**			
Course Title	Measurements			
Year/Level	**3/6**			
Hours	**Credit**	**Lec.**	**Lab.**	**Tut.**
	3	2	2	1
Prerequisites	EE 271			
Course Description	This course will give the students a sufficient background on the concepts of electrical and electronic measurements. All the detail of electrical and electronic measurements instruments are presented for Analog circuits level 6th. The students will be able to deal with the following:Measurements and Generalized Measurements System; Units and Dimensions ; Analog Deflection Instruments ; Moving Coil Instruments; Moving Iron Instruments; Rectifier type Instruments and Induction type Instruments; Measurements of Current, Voltage, and Ohms; Measurement of Power and Energy Potentiometer; Hot wire Instruments; DC Bridges; Transducers and sensors; Electronic Measuring and Digital Instruments; Recording Instruments			
Textbook	K. Sawhney, Electrical and Electronic Measurements Instruments, India 2004			

Course Code	**EE 216**			
Course Title	Electrical Installations			
Year/Level	**3/6**			
Hours	**Credit**	**Lec.**	**Lab.**	**Tut.**
	2	1	2	1
Prerequisites	EE 213			
Course Description	This course will be devoted to the study of electrical installation design. Different parts will be developed: Domestic Installation; Illumination; Control and monitoring; Determining conductor cross-sections area; Installation testing. Outdoor installations.			
Textbook	Schneider, Industrial technical specifications:, ABB, Legrand.			

Course Code	**EE 251**			
Course Title	Electrical Machines (1)			
Year/Level	**3/6**			
Hours	**Credit**	**Lec.**	**Lab.**	**Tut.**
	3	2	2	1
Prerequisites	EE 213			
Course Description	Production of magnetic field. Magnetic circuits; Magnetic behavior of ferromagnetic materials; Energy losses in a ferromagnetic core laws; Production of induced force, voltage and torque; Types and construction of transformers; The ideal transformer; Theory of operation of real single phase			

	tr.; The equivalent circuit of a transformer; Determining the values of component in the tr.; The per-unit system of measurements; Transformer voltage regulation; Types and construction of three phase tr.; Three phase transformers using two tr.; Transformer ratings, autotransformers; Simple rotating loop, induced voltage and torque; Commutation in a simple four loop; Commutation and armature reaction in real dc machines; Solutions to the problems with commutation; Voltage and torque equations, power flow and losses; The equivalent circuit of dc machines, magnetization curve; Separately excited motor/generator, shunt excited motor/generator; Series excited motor/generator, compound excited motor/generator; Permanent magnets dc motor, starters, Ward-Leonard system, efficiency calculations.
Textbook	Stephen J. Chapman. Electric Machinery Fundamentals. McGraw Hill. 4th Ed. 2005.

Course Code	**EE 272**			
Course Title	Digital Design			
Year/Level	**3/6**			
Hours	**Credit**	**Lec.**	**Lab.**	**Tut.**
	2	1	2	1
Prerequisites	CSC 111			
Course Description	This course teach the students how to write numbers in any number system or code and convert between them, to determine the logic function from truth table and design the related combinational circuit, to analyze and design a logic circuit based on multiplexers and decoders and gates, to analyze and design shift and transfer registers based on flip-flops and gates and to analyze and design synchronous and asynchronous counters based on flip-flops and gates.			
Textbook	Thomas L. Floyd, " Digital Fundamentals"; Prentice Hall; 11 edition, 2014; ISBN-13 978-0132737968			

Course Code	**EE 322**			
Course Title	Power Production and Distribution			
Year/Level	**4/7**			
Hours	**Credit**	**Lec.**	**Lab.**	**Tut.**
	3	2	2	1
Prerequisites	EE 213			
Course Description	Introduction to power systems, power plants, electric power generation, synchronous machine steady state and transient operations, structure of power systems, transmission line parameters, characteristics and performances of transmission lines, mechanical design of overhead transmission lines, underground cables, distribution systems, distribution substation design, Analysis of sag and tension.			
Textbook	D. Das, Electrical Power System, 2010			

Course Code	EE 341			
Course Title	Automatic control			
Year/Level	4/7			
Hours	Credit	Lec.	Lab.	Tut.
	3	2	2	1
Prerequisites	EE 213			
Course Description	This course is concerned with automatic control system. Block diagrams reduction. State-space modeling. Open-loop and closed-loop systems, feedback systems characteristics. Time domain analysis of second-order systems and two-dominant-pole model. Performance Specifications: Stability, transient response, and steady-state errors. Root locus analysis and design. Frequency Response Analysis and Design: Nyquist stability criterion, gain and phase margins, compensation using Bode plot. Pole placement design.			
Textbook	Farid Golnaraghi& Benjamin C. Kuo; "Automatic Control Systems", 9th ed, 2009, ISBN-13 978-0470-04896-2			

Course Code	EE 342			
Course Title	Microprocessor			
Year/Level	4/7			
Hours	Credit	Lec.	Lab.	Tut.
	2	1	2	1
Prerequisites	EE 272			
Course Description	This course will give the students a sufficient background on the concepts of Microprocessor and their applications. Microprocessors and microcontrollers evolution. Architecture of a selected 8-bit microprocessor (e.g. 8086/8088 microprocessor). Assembly language and its software development tools, Data movement, arithmetic and logic, program control instructions, Interrupt organization, The hardware of the selected microprocessor. Memory interfaces and addresses decoding. DRAM controllers. I/0 interface, Programmable peripheral interface (PPI), Hardware interrupts, basic interrupt interface , programmable Interval Timer/Counter (PIT), Analog to Digital Converter (ADC)			
Textbook	Barry B. Brey,The Intel Microprocessors, sixth 6th Edition			

Course Code	EE 352			
Course Title	Electrical Machines (2)			
Year/Level	4/7			
Hours	Credit	Lec.	Lab.	Tut.
	3	2	2	1
Prerequisites	EE 251			
Course Description	A simple loop in a uniform magnetic field; The rotating magnetic field; Magnetomotive force and flux distribution on AC machines; Induced voltage in AC machines; Induced torque in AC machines; Winding insulation in AC machines; AC machine power flow and losses and voltage regulation; Synchronous generator construction; Speed of rotation and internal generated			

	voltage; The equivalent circuit of a synchronous generator; Phasor diagram, power and torque in synchronous generator; Measuring model parameters and operation of synchronous gen. with a system; Synchronous generator ratings; Equivalent circuit and torque-speed characteristic of a synchronous motor; The effect of load, field current and power factor correction of a synchronous motor; Induction motor construction and basic concepts; The equivalent circuit and parameter determination; Power and torque; Torque speed characteristics.
Textbook	Stephen J. Chapman. Electric Machinery Fundamentals. McGraw Hill. Fourth edition. 746 pages. ISBN 007-115155-9. 2005.

Course Code	**EE 373**			
Course Title	Practical Special Topic			
Year/Level	**4/7**			
Hours	**Credit**	**Lec.**	**Lab.**	**Tut.**
	2	--	6	--
Prerequisites	EE 271			
Course Description	This course will give the students a sufficient background on Matlab fundamentals for the purpose of skills application of theoretical materials. All the principles and fundamentals of Matlab language are presented. It covers also the design and fabrication of electronic Printed Circuit Boards (PCB).			
Textbook	A Guide to MATLAB for Beginners and Experienced Users, 2nd edition.			

Course Code	**EE 374**			
Course Title	Signal Processing			
Year/Level	**4/7**			
Hours	**Credit**	**Lec.**	**Lab.**	**Tut.**
	2	1	2	1
Prerequisites	EE 272			
Course Description	This course will give the students a background on the concepts of signal processing. Signal classification, functions. Convolution theorem, Fourier analysis and transform. Digital signal processing systems, different types of digital filters and z transformation.			
Textbook	B.P. Lathi, Signal Processing and linear systems, perkeley Cambridge Press, 1998.			

Course Code	**EE 323**			
Course Title	Power Systems (1)			
Year/Level	**4/8**			
Hours	**Credit**	**Lec.**	**Lab.**	**Tut.**
	3	2	2	1
Prerequisites	EE 322			

Course Description	Per Unit calculation and its applications. Symmetrical Short circuit current calculations. Symmetrical components. Unsymmetrical short circuit current calculations. Surges on transmission line. Transmission line compensation, types and degree of compensation. Economic Operation
Textbook	William D. Stevenson, Elements of Power System analysis, McGraw-Hill Book Company 0-07-061278-1

Course Code	**EE 343**			
Course Title	Robotics			
Year/Level	**4/8**			
Hours	**Credit**	**Lec.**	**Lab.**	**Tut.**
	2	1	2	1
Prerequisites	EE 341			
Course Description	This course gives an introduction to the central topics in robotics, robot definition, robot uses, Laws of robotics, robot Key Components, Robot Classifications. This course also outlines the Motion of Rigid Bodies, Robot Kinematics, differential kinematics, Mechanical System of Robots, dynamics, and control of robot manipulators. Finally Electromechanical System of Robots and Control System of Robots are presented.			
Textbook	Max Fogiel. Automatic Control System/ Robotics Problem, the solver,			

Course Code	**EE 353**			
Course Title	Power Electronics			
Year/Level	**4/8**			
Hours	**Credit**	**Lec.**	**Lab.**	**Tut.**
	3	2	2	1
Prerequisites	EE 251			
Course Description	This course will give the students a sufficient background on the concepts of Power Electronics. All the detail of Power Electronic circuits are presented for both DC and AC circuits. The students will be able to deal with the following: Application of Power Electronics, Power semiconductor Switches, Single Phase Rectifier Circuits Three Phase Rectifier Circuits, Application of Uncontrolled Rectifier, Single-Phase Controlled Rectifier Circuits using Thyristors, Three-Phase Controlled Rectifier Circuits using Thyristors, Application of controlled Rectifier, Single & Three Phase AC Voltage Controller, DC To DC Converters, Single & Three Phase DC To AC Inverter, and Three Phase DC To AC Inverter			
Textbook	Rashid Mohamed H, Power Electronics Circuit, Devices, and applications, 3rd, Edition 2003.			

Course Code	**EE 354**
Course Title	Electrical Machines (3)

Year/Level	**4/8**			
Hours	**Credit**	**Lec.**	**Lab.**	**Tut.**
	3	2	2	1
Prerequisites	EE 352			
Course Description	Basic principles for electric machine analysis, magnetically coupled circuits, dynamics analysis of different types for DC-machine, dynamics analysis for induction and synchronous machines. Analysis of different types for special machines (single phase induction motors, permanent magnet machine, three phase induction generator, and stepper motor).			
Textbook	Stephen J. Chapman. Electric Machinery Fundamentals. McGraw Hill. Fourth edition. 746 pages. ISBN 007-115155-9. 2005.			

Course Code	**EE 375**			
Course Title	Communications			
Year/Level	**4/8**			
Hours	**Credit**	**Lec.**	**Lab.**	**Tut.**
	2	1	2	1
Prerequisites	EE 374			
Course Description	This course introduces and teaches students about the basic principles underlying the operation and design of a communication system. It is a core course for students in communications. It starts by an introduction to basic communications systems, information sources, channel types and problems. Major part of this course focuses on analog communications, such as Amplitude Modulation (AM-DSBSC-SSB-QAM) and Angle Modulation (FM, PM). Time and Frequency Division Multiplexing are involved. an introduction to digital communications systems, sampling theorem, quantization and encoding are also covered followed by pulse modulation techniques or line coding such as PCM and PAM and digital modulation techniques such as ASK, FSK.			
Textbook	Lathi, B., Modern Digital & Analog Communication Systems, 3rd Ed., 1998			

Course Code	**EE 496**			
Course Title	Summer training			
Year/Level	**4/8**			
Hours	**Credit**	**Lec.**	**Lab.**	**Tut.**
	2	--	--	--
Prerequisites	ENG 357 and Department approval			
Course Description	8 weeks of training in the industry under the supervision of a faculty member. Each student presents a report on work carried out by during the training period, in addition to any other requirements assigned to him by the administration.			
Textbook	----------			

Course Code	EE 424			
Course Title	Power Systems (2)			
Year/Level	5/9			
Hours	Credit	Lec.	Lab.	Tut.
	3	2	2	1
Prerequisites	EE 323			
Course Description	Oriented graph (tree-cotree) - Admittance matrix formulation (singular transformation/inspection) – Power Flow Load Studies (Gauss-Seidel, Newton Raphson, Fast decoupled) – Power Stability: Definition and assumption, rotor dynamic and the swing equation, power angle equation, Synchronizing power coefficients, Equal area criterion of stability and its applications, Step by Step solution of the swing equation.			
Textbook	William D. Stevenson, Elements of Power System analysis, McGraw-Hill Book Company 0-07-061278-1			

Course Code	EE 425			
Course Title	Switchgear and protection of power systems			
Year/Level	5/9			
Hours	Credit	Lec.	Lab.	Tut.
	3	2	2	1
Prerequisites	EE 322			
Course Description	This course allows the students to design a good protected electrical network using proven equipments. Student will be able to provide suitable protection schemes and relay settings to ensure that faults are quickly disconnected to minimize outage times and improve the continuity of supplies to customers.			
Textbook	Technical documentation: Schneider Electric and ABB.			

Course Code	EE 426			
Course Title	High voltage Engineering			
Year/Level	5/9			
Hours	Credit	Lec.	Lab.	Tut.
	3	2	2	1
Prerequisites	EE 323			
Course Description	Introduction to High Voltage engineering, Generation of testing voltages. Generation of High D.C. and A.C. Voltages Generation of Impulse Voltages and Currents, Measurement of High Voltages and Currents, High Voltage Testing of Electrical Equipment.			
Textbook	C.L. Wadhwa,High voltage engineering, (Second Edition), publishing for one world, new age international (p) limited, publishers, 4835/24, 2007			

Course Code	EE 498

Course Title	Senior Design Project (1)			
Year/Level	5/9			
Hours	Credit	Lec.	Lab.	Tut.
	1	--	3	--
Prerequisites	ENG357- EE322- EE342- EE352			
Course Description	Scheduled sheds light on the study of how to set up a program for the graduation project in the field of Electrical engineering through the design depends on what has been studied in previous years and what the student gained from the training field factories			
Textbook	To be determined from advisor according to the project subject			

Course Code	EE 499			
Course Title	Senior Design Project (2)			
Year/Level	5/10			
Hours	Credit	Lec.	Lab.	Tut.
	3	--	7	--
Prerequisites	EE 498			
Course Description	The student graduation project implementation which have been set up in his ninth level (to fulfill the requirements of the project specifications point of academic accreditation ABET)			
Textbook	To be determined from advisor according to the project subject			

Course Code	EE 427			
Course Title	Economic Operation of Power Systems			
Year/Level	5/10			
Hours	Credit	Lec.	Lab.	Tut.
	2	2	--	--
Prerequisites	EE 322			
Course Description	This course is designed to make the students familiar with the economic operation of power systems, economical load sharing between units and stations and optimum power systems planning. This course allows the student to know the methods of making decision at the dispatch center to dispatch the power to be produced between the different power plants by the economic way and by respecting the safety of the electrical network.			
Textbook	Alen j. wood, Bruce F. Wolenberg, Power Generation, Operation and Control, John Wily & Sons, 1996.			

Course Code	EE 428			
Course Title	Renewable Energies			
Year/Level	5/10			
Hours	Credit	Lec.	Lab.	Tut.
	2	1	2	1

Prerequisites	EE 322
Course Description	This subject focus on the renewable energy sources such as solar radiation solar energy, wind energy, and water energy with emphasis on solar energy. Design technology of solar energy system. Characteristic of single solar cell and solar cell system. Fabrication methods of solar cell. Design of solar panel. Applications of alternative materials in solar cells.
Textbook	Tushar K. Ghosh _ Mark A. Prelas, Energy Resources and Systems, ISBN 978-94-007-1401-4 Springer Dordrecht Heidelberg London New York, 2011

Course Code	**EE 455**			
Course Title	Simulation of Machines			
Year/Level	**5/10**			
Hours	**Credit**	**Lec.**	**Lab.**	**Tut.**
	2	1	3	--
Prerequisites	EE 342			
Course Description	This course will give the students a sufficient study and analysis about the modeling of electrical systems (passive/active), mechanical systems, electromechanical systems, and electrical machines. Using Matlab/Simulink for the purpose of simulation.			
Textbook	Richard C. Dorf and Robert H. Bishop, Modern control systems, Prentic Hall, Twelfth edition, 2011.			

Course Code	**EE 429**			
Course Title	Utilization of Electrical Power			
Year/Level	**5/9**			
Hours	**Credit**	**Lec.**	**Lab.**	**Tut.**
	3	2	2	1
Prerequisites	EE 323			
Course Description	This course aims to acquire the student with the essential knowledge to understand of the utilization of electrical power like illumination engineering, electroplating, heating and welding, electric devices and control, electric traction and finally the economic considerations. The course provides the students with the necessary practical and professional skills concerning the selection the appropriate lamps and designing the indoor and outdoor lighting schemes. In addition, evaluate the different parameters used to control the electric welding and heating, the different oven structures and the types of motors used in electrical devices.			
Textbook	N.V. Suryanarayana, Utilization of electric power, New Age International (P) Limited, Publishers. 2004			

Course Code	EE 431			
Course Title	High voltage applications			
Year/Level	5/10			
Hours	Credit	Lec.	Lab.	Tut.
	2	1	2	1
Prerequisites	EE 426- EE 429			
Course Description	Introduction to the applications of High Voltage engineering , high-voltage power supplies , high-voltage presence and applications in industrial (Electrostatic Precipitation, Electrostatic Painting/Coating- Electrostatic Printing,….), high voltage to initiate ionization in dielectric materials (ignition in internal combustion engines, gas-discharge Lamps,….) live working in high voltage, Grounding of high voltage power systems Hazards And Safety,			
Textbook	Mazen Abdel-Salam, Hussein Anis, Ahdab EI-Morshedy, and Roshdy Radwan, High-Voltage Engineering, Theory and Practice, Second Edition, Revised and Expanded, Marcel Dekker, inc.New York,Basel, 2000			

Course Code	EE 432			
Course Title	Protection of power Systems			
Year/Level	5/10			
Hours	Credit	Lec.	Lab.	Tut.
	2	1	2	1
Prerequisites	EE 424- EE 429			
Course Description	Advanced application tools and protection techniques effectively meet new challenges in power system operation. This course is designed to help students understand how changes to the power system industry create new system reliability problems and how such problems can be mitigated by enhanced protection, monitoring, and control applications.			
Textbook	IDC Technologies, "Power systems Protection, Power Quality and Substation Automation", ISBN 978-87-7681-974-3, 2012			

Course Code	EE 433			
Course Title	Organization of Power Systems			
Year/Level	5/10			
Hours	Credit	Lec.	Lab.	Tut.
	2	1	2	1
Prerequisites	EE 429			
Course Description	This course aims to teach the students the necessary knowledge of power system planning. The course establishes the understanding of generation characteristics, power flow through the power system networks and power system behavior during contingencies. Development of some load forecasting models is explained. Generation rescheduling and rescheduling models corresponding to cost analysis are performed and explained. Constraints applied to generation rescheduling, solving generation rescheduling problem, cost			

	analysis of rescheduling and reliability of power generation systems are also studied. Power system distribution analysis and planning are explained.
Textbook	C. Gross: SE,Power system Analysis, John Wiley & Sons, ISBN 0-471-83732-6, 1986.

Course Code	**EE 434**			
Course Title	Advanced Power Systems			
Year/Level	**5/10**			
Hours	**Credit**	**Lec.**	**Lab.**	**Tut.**
	2	1	2	1
Prerequisites	EE 429			
Course Description	This decision sheds light on the load management, energy conservation, and the use of different methods in controlling the voltage and power losses, optimal economic control.			
Textbook	Michel Crappe, Electric power systems, John Willey, 2008.			

Course Code	**EE 444**			
Course Title	Advanced Automatic Control			
Year/Level	**5/9**			
Hours	**Credit**	**Lec.**	**Lab.**	**Tut.**
	3	2	2	1
Prerequisites	EE 341			
Course Description	This course will be devoted to initiate student to methods used to model electrical problem using Structured Analysis and Design Technique, Bond-Graph and Petri Network.			
Textbook	Automatic Control System, New York: McGraw - Hill, INC 007113639			

Course Code	**EE 445**			
Course Title	Special Topic in Control			
Year/Level	**5/10**			
Hours	**Credit**	**Lec.**	**Lab.**	**Tut.**
	2	1	2	1
Prerequisites	EE 444			
Course Description	This course will give the students a sufficient background on the Expert and Fuzzy Control, Variable Structure Control, Neural Network Control.			
Textbook	Roland S. Burns, Advanced Control Engineering, Library of Congress Cataloguing in Publication Data, ISBN 0 7506 5100 8			

Course Code	EE 446			
Course Title	Control of Power Electronics			
Year/Level	5/10			
Hours	Credit	Lec.	Lab.	Tut.
	2	1	2	1
Prerequisites	EE 444, EE 353			
Course Description	This course will focus on the control methods of power electronics devices such as controlled rectifier, dc-dc, converter, inverter and vector control of ac machine the student will be able to deal with the tradition & modern control methods using analog and digital controller. Modeling of the speed of torque controlling methods of dc & ac motor will be presented using MATLAB/ Simulink and PSIM. Finally implementation of these control methods using dspace1103 kit will be developed, designed, tested in the lab.			
Textbook	Fundamental of power electronics			

Course Code	EE 447			
Course Title	Computer Control			
Year/Level	5/10			
Hours	Credit	Lec.	Lab.	Tut.
	2	1	2	1
Prerequisites	EE 444			
Course Description	This course will give the students a sufficient background on the basic concepts of using computer in modern control systems designs and recognize the difference computer algorithms that are used in programming of digital controller.			
Textbook	Ioan D. Landau and GianlucaZito, Digital Control Systems Design, Identification and Implementation, springer, 2006.			

Course Code	EE 448			
Course Title	Components of Control			
Year/Level	5/10			
Hours	Credit	Lec.	Lab.	Tut.
	2	1	2	1
Prerequisites	EE 444			
Course Description	This course will give the students a sufficient background on the several components of automatic control systems and industrial controller and study their real industrial applications.			
Textbook	Norman S. Nise, Control systems engineering. 5th ed. John Willey. ISBN:978-0471794752, 2008.			

Course Code	EE 456			
Course Title	Advanced Electrical Machines			
Year/Level	5/9			
Hours	Credit	Lec.	Lab.	Tut.
	3	2	2	1
Prerequisites	EE 354			
Course Description	Direct and quadrature axis theory: general rotating field machine; transformation from 3 to 2 phases; transformation of the 2 phase rotor and stator to an arbitrary revolving coordinate system; voltage equations and balance of power and torque. Induction machines: steady-state operation, rapid acceleration, sudden load change, field oriented coordinate system, control of induction machines with injected currents, steady state operation using variable frequency and voltage converter, field oriented control using variable frequency and voltage converter. Synchronous machines: Steady state operations of salient-pole machines, determination of X_d and X_q, sudden short-circuit of the cylindrical-rotor machine, sudden short-circuit of salient pole machines, transient operation of salient-pole machines.			
Textbook	Stephen J. Chapman. Electric Machinery Fundamentals. McGraw Hill. Fourth edition. 2005.			

Course Code	EE 457			
Course Title	Electrical Drives Systems			
Year/Level	5/10			
Hours	Credit	Lec.	Lab.	Tut.
	2	1	2	1
Prerequisites	EE 456			
Course Description	This course will give the students a sufficient study and analysis about the using of electrical drive systems and converter types in residential and industrial applications. Also this course will give the basic principles for control methods for 1- DC-machine different types, 2- induction machines 3- synchronous machines 4- analysis of control method for special machines different types.			
Textbook	Ned Mohan, Tore M. Undeland, and William P. Robbins, Power Electronics Converters, Applications, and Design, second edition, John Wiley & sons INC.			

Course Code	EE 458			
Course Title	Design of Power Electronics			
Year/Level	5/10			
Hours	Credit	Lec.	Lab.	Tut.
	2	1	2	1
Prerequisites	EE 353, EE 456			

Course Description	This course includes, introduction to simulations methods for analysis of power electronic converter systems – review of power electronic devices and circuits, computer formulation of equations for power electronic systems, sequential method of simulation, efficient computation of steady-state periodic solutions, computer-aided analysis and design method for power electronic systems.
Textbook	Rashid, M., Simulation of Power Electronic Circuits using PSPICE, PHI, 2006.

Course Code	**EE 459**			
Course Title	Application of Power Electronics			
Year/Level	**5/10**			
Hours	**Credit**	**Lec.**	**Lab.**	**Tut.**
	2	1	2	1
Prerequisites	EE 353, EE 456			
Course Description	This course will give the students a sufficient study and analysis about the using of power electronics in residential and industrial applications lighting control, dc power supplies and speed control of dc & ac motor using different topology of power electronics circuit.			
Textbook	Ned Mohan, Tore m. Undeland, and William P. Robbins, Power Electronics Converters, Applications, and Design, second edition, John Wiley & sons INC.			

Course Code	**EE 461**			
Course Title	Electrical Machine Design			
Year/Level	**5/10**			
Hours	**Credit**	**Lec.**	**Lab.**	**Tut.**
	2	1	2	1
Prerequisites	EE 456			
Course Description	Basic principles of electrical machines and transformers design – output equation – standard values of magnetic field density – current loading and their determination – winding arrangement – effect of harmonics produced by winding arrangement and how they can be avoided – principles of application of computer in design			
Textbook	M.G. Say, Performance and design of A.C. Machines- Affiliated East West Press Pvt. Ltd, New Delhi			

NOTICE

Basic science courses and others courses from different colleges and department Syllabi and Description will be taken from the colleges.

References

1- The national Commission for Academic Accreditation and Assessment (NCAAA), www.ncaaa.org.sa/

2- Accreditation Board for Engineering and Technology (ABET), Inc., www.abet.org/

3- The Bachelor of Science in Electrical Engineering, Electrical Engineering Department, College of Engineering, Jazan University, KSA, www.jazanu.edu.sa/

4-The Bachelor of Science in Electrical Engineering, King Fahd University of Petroleum & Minerals, KSA, www.kfupm.edu.sa/

5- The Bachelor of Science in Electricall Engineering, College of Engineering, King Saud University, KSA, www.ksu.edu.sa/

6- The Bachelor of Science in Electrical Engineering, College of Engineering, Qassim University, KSA, www.qu.edu.sa/