جامعة الملك سعود
كلية الهندسة فرع المزاحمية

KING SAUD UNIVERSITY
COLLEGE OF ENGINEERING MUZAHIMYA BRANCH

برنامج الهندسة الكهربائية التطبيقية

APPLIED ELECTRICAL ENGINEERING PROGRAM

الخطة الدراسية ومتطلبات البرنامج

ACADEMIC PLAN AND DEGREE REQUIREMENTS

صفر 1438

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COLLEGE OF ENGINEERING - MUZAHIMIYAH CAMPUS APPLIED ELECTRICAL ENGINEERING PROGRAM	كلية الهندسة فرع المزاحمية برنامج الهندسة الكهربائية التطبيقية

Introduction:

The requirements for the Bachelor Degree of Engineering in Applied Electrical Engineering Program at the college of engineering – Muzahimiyah campus consist of **160** credit-hours plus COOP Training. The Table below shows the summary for these academic requirements:

Graduation Requirements for Applied Electrical Engineering		Credit Hours
COMMON FIRST YEAR		**32**
University Requirements		**8**
College Requirements		**44**
Program Requirements **(76 credits hours)**	COMPULSORY COURSES	**53**
	Elective COURSES	**9**
	COOP TRAINING REQUIREMENTS	**9**
	Graduation Project	**5**
Total Credit Hours		**160**

The breakdown of the program credit hours is explained below:

- 32 credit hours (two semesters) of skills and pre-calculus. This year is called first common year. (Table 1)
- 8 credit hours of university requirements (Table 2)
- 44 credit hours of college requirements, which are compulsory for all programs (Table 3)
- 76 credit hours of program requirements of which:
  - 53 credit hours for core courses (Table 4A)
  - 9 credit hours of Summer and Cooperative Training (Table 4B)
  - 5 credit hours of Capstone Senior Design Projects, Parts I & II (Table 4C)
  - 9 credit hours for elective courses (Table 4D)

1) Common First Year

The student has to complete **32** credit-hours in the first common year as listed in Table 1:

Table 1: COMMON FIRST YEAR COURSES

Course Code	Course Title	Credits Hours
ENG 140	English Language	6
MATH 150	Differential Calculus	3
ENT 101	Entrepreneurship	1
CHEM 101	General Chemistry	4
CUR 140	Writing Skills	2
ENG 150	Academic English Language	6
COM 140	University Skills	3
IT 140	Computer Skills	3
STAT150	Introduction to Statistics	3
CHS 150	Fitness & Health Culture	1
Total		**32**

2) University Requirements

Each student is required to take one compulsory Islamic course IC 107 and select 3 other courses (A total of **8** credit-hours) from the Islamic Culture Courses pool listed in Table 2.

Table 2: COMPULSORY AND SUGGESTED UNIVERSITY REQUIREMENTS

Course Code	Course Title	Credits Hours
IC 101	Principles of Islamic Culture	2(2,0,0)
IC 102	Family in Islam	2(2,0,0)
IC 103	Economic System in Islam	2(2,0,0)
IC 104	Islamic Political System	2(2,0,0)
IC 105	Human Rights	2(2,0,0)
IC 106	Medical Jurisprudence	2(2,0,0)
IC 107	(Compulsory)	2(2,0,0)
IC 108	Current Issues	2(2,0,0)
IC 109	Women and their developmental role	2(2,0,0)
Total (1 compulsory course and 3 other courses)		**8**

3) College Requirements

There are **44** credit-hours of college requirements, these courses are compulsory courses for all programs and provide the students with the basis and foundation of engineering. These courses are listed in Table 3:

Table 3: COLLEGE REQUIREMENTS

Course Code	Course Title	Cr. Hr. T(X,Y,L)	Requisites		Remarks
			Pre-	Co-	
MATH 1110	Calculus for Engineers	3(3,2,0)	MATH 150	---	
MATH 1120	Linear Algebra and Vector Analysis	3(3,2,0)	MATH 150	---	
MATH 1130	Differential Equations	3(3,2,0)	MATH 1120	---	
PHYS 1211	Physics for Engineers I	4(3,0,2)	---		Contents modified
PHYS 1221	Physics for Engineers II	4(3,0,2)	PHYS 1211 MATH 1110		Contents modified
AGE 1310	Basics of Engineering Drawing	3(1,0,4)	---	---	
AGE 1320	Introduction to Manufacturing	2(1,1,2)	---	---	
AGE 1510	Technical Writing	2(2,1,0)	---	---	
MATH 2140	Numerical Methods	3(3,2,0)	MATH 1130	---	
AGE 1330	Statics	2(2,1,0)	MATH 1110 MATH 1120		A new course
AGE 2320	Dynamics	2(2,1,0)	AGE 1330		A new course
AGE 2340	Basic Engineering Measurements	2(1,1,2)	STAT 150	---	
AGE 2410	Computer programming	3(2,1,2)	---	---	
AGE 3351	Introduction to Engineering Design	1(1,1,0)	AGE 1310		Name changed
AGE 4530	Engineering Economy	2(2,1,0)	---	---	
AGE 4540	Seminar	1(0,0,2)	---	---	
AGE 4551	Engineering Project Management	2(2,1,0)	---		Name changed
AGE 4560	Industry and Environment	2(2,1,0)	---	---	
Total		**44**			

4) Program Requirements

There are **76** credit hours of program requirements. These courses are compulsory courses for all Applied Electrical Engineering students and divided into four parts as follow:

4.1) Program Core Courses

The student has to complete **53** credit hours of core courses in Applied Electrical Engineering as listed in the Table 4A.

Table 4A: APPLIED ELECTRICAL ENGINEERING PROGRAM CORE COURSES REQUIREMENTS

Course Code	Course Title	Cr. Hr. T(X,Y,L)	Requisites		Remarks
			Pre-	Co-	
AEE 2110	Electric Circuits I	3(3,1,0)	MATH 1120	---	
AEE 2120	Electric Circuits II	3(3,1,0)	AEE 2110	---	
AEE 2130	Electronics I	3(3,1,0)	AEE 2110	---	
AEE 2310	Engineering Electromagnetics	3(3,1,0)	MATH 1110 PHYS 1221	---	PHYS 1221 is added as a pre-req. instead of PHYS 1210
AEE 2410	Signal and System Analysis	3(3,1,0)	AEE 2110	---	
AEE 2710	Circuits Laboratory	2(1,0,2)	AEE 2110	---	A new pre-req. added
AEE 3140	Electronics II	3(3,1,0)	AEE 2130	---	
AEE 3210	Fundamentals of Power Systems	3(3,1,0)	AEE 2120	---	
AEE 3221	Electric Machines	3(3,1,0)	AEE 2120	---	Credit hours changed from 2 to 3
AEE 3421	Digital Signal Processing	3(3,1,0)	AEE 2410	---	Credit hours changed from 2 to 3
AEE 3430	Communication System Principles	3(3,1,0)	AEE 2410	---	
AEE 3510	Logic Systems Design	3(3,1,0)	---	---	
AEE 3520	Automatic Control	4(3,1,2)	AEE 2410	---	
AEE 3610	Data Communication and Networking	3(2,0,2)	---	---	
AEE 3721	Electronics Laboratory	1(0,0,2)	---	AEE 3140	Credit hours changed from 2 to 1
AEE 3730	Power Systems Laboratory	1(0,0,2)	---	AEE 3210	
AEE 3240	Power Electronics	2(2,1,0)	AEE 3140		A new course
AEE 3741	Machines and Power Electronics Laboratory	1(0,0,2)	AEE 3221	AEE 3240	Credit hours changed from 2 to 1. A new co-req. added
AEE 3750	Microwave and Communications Laboratory	2(1,0,2)	AEE 2310	AEE 3430	New pre-req. and co-req. added
AEE 3760	Logic Design Laboratory	1(0,0,2)	---	AEE 3510	
AEE 4610	Introduction to Microcontroller	3(2,1,2)	AEE 3510	---	
Total		**53**			

4.2) Cooperative Training Requirements

The student has to complete the Cooperative Training (Table 4C) which is divided into two parts as listed in Table 4C (**9** credit hours):

Table 4B: CO-OP TRAINING REQUIREMENTS

Course Code	Course Title	Cr. Hr. T(X,Y,L)	Requisites		Remarks
			Pre-	Co-	
AEE 4910	Cooperative Training (Part I : during summer session)	0	Completion 125 credit hours	---	
AEE 4920	Cooperative Training (Part II : during the semester next to summer session of part I)	9	Completion 125 credit hours	---	
Total		**9**			

4.3) Capstone Senior Design Project Requirements

The student has to complete the capstone senior design project, which is divided into two parts as listed in Table 4D (**5** credit hours). The project can be taken in conjunction with the Co-Op training since it is highly recommended to be industry related.

Table 4C: CAPSTONE SENIOR DESIGN PROJECT REQUIREMENTS

Course Code	Course Title	Cr. Hr.	Requisites		Remarks
			Pre-	Co-	
AEE 4931	Capstone Senior Design Project I	3	AEE 4910	—	*Course code changed*
AEE 4940	Capstone Senior Design Project II	2	AEE 4931	—	*A new course*
Total		**5**			

4.4) Elective Courses

Each student is required to select **9** credit-hours among a pool of elective courses listed in Table 4D:

Table 4D: ELECTIVE COURSES OF SPECIALIZED AREAS*

Course Code	Course Title	Cr. Hr. T(X,Y,L)	Requisites		
			Pre-	Co-	
AEE 4110	VLSI Circuit Design	3(2,1,2)	AEE 3140	---	
AEE 4120	Real Time Systems	3(2,1,2)	AEE 4610	---	
AEE 4130	Embedded System Design	3(2,1,2)	AEE 4610	---	
AEE 4210	Power System Planning	3(2,1,2)	AEE 3210	---	
AEE 4220	High Voltage Engineering	3(2,1,2)	AEE 3210	---	
AEE 4230	Power System Protection	3(2,1,2)	AEE 3210	---	
AEE 4310	Wave Propagation and Antennas	3(2,1,2)	AEE 2310	---	
AEE 4320	RF Electronics	3(2,1,2)	AEE 3140	---	
AEE 4410	Wireless Communications	3(2,1,2)	AEE 4310	---	
AEE 4420	Optoelectronics and Optical Communications	3(2,1,2)	AEE 3140 AEE 3410	---	
AEE 4510	Artificial Intelligence	3(2,1,2)	AEE 3520	---	
AEE 4520	Introduction to Robotics	3(2,1,2)	AEE 3520	---	
AEE 4940	Selected Topics in Electrical Engineering I	3(2,1,2)	Instructor and Program Approval		
AEE 4950	Selected Topics in Electrical Engineering II	3(2,1,2)			
AEE 4960	Selected Topics in Electrical Engineering III	3(2,1,2)			
Total of 3 Elective Courses		**9**			Additional one elective course added

5) Typical Study Plan

A typical plan for the Bachelor of Engineering in Applied Electrical Engineering Program is proposed in Table 5.

TABLE 5: MODIFIED STUDY PLAN – APPLIED ELECTRICAL ENGINEERING PROGRAM

Color legend: Grey: New course **Added**, Green: Contents/Pre-req./Name/Hours **Modified**, Yellow: Assigned semester **Changed**

Level 1			
Course Code	**Course Title**	**Cr. Hr. T(X,Y,L)**	**Pre-requisite**
MATH 150	Differential Calculus	3(3,1,0)	---
ENG 140	English Language	6(15,0,0)	---
CHEM 101	General Chemistry	4(3,0,2)	---
CUR 140	Writing Skills	2(2,0,0)	---
ENT 101	Entrepreneurship	1(1,0,0)	---
Total		16	

Level 2			
Course Code	**Course Title**	**Cr. Hr. T(X,Y,L)**	**Pre-requisite**
STAT 150	Introduction to Statistics	3(2,2,0)	---
ENG 150	Academic English Language	6(15,0,0)	---
IT 140	Computer Skills	3(0,0,1)	---
COM 140	University Skills	3(3,0,0)	---
CHS 150	Health & Fitness	1(1,1,0)	
Total		16	

Level 3			
Course Code	**Course Title**	**Cr. Hr. T(X,Y,L)**	**Pre-requisite**
MATH 1110	Calculus for Engineers	3(3,2,0)	MATH 150
MATH 1120	Linear Algebra and Vector Analysis	3(3,2,0)	MATH 150
PHYS 1211	Physics for Engineers I	4(3,0,2)	---
AGE 1310	Basics of Engineering Drawing	3(1,0,4)	---
AGE 1510	Technical Writing	2(2,1,0)	---
IC I	Islamic Culture I	2(2,0,0)	
Total		**17**	

Level 4			
Course Code	**Course Title**	**Cr. Hr. T(X,Y,L)**	**Pre-requisite**
MATH 1130	Differential Equations	3(3,2,0)	MATH 1120
PHYS 1221	Physics for Engineers II	4(3,0,2)	PHYS 1211 MATH 1110
AGE 1320	Introduction to Manufacturing	2(1,1,2)	---
AGE 2410	Computer Programming	3(2,1,2)	---
AGE 1330	Statics	2(2,1,0)	MATH 1110 MATH 1120
IC II	Islamic Culture II	2(2,0,0)	---
Total		**16**	

Level 5			
Course Code	**Course Title**	**Cr. Hr. T(X,Y,L)**	**Pre-requisite**
AEE 2110	Electric Circuits I	3(3,1,0)	MATH 1120
AGE 2320	Dynamics	2(2,1,0)	AGE 1330
MATH 2140	Numerical Methods	3(3,2,0)	MATH 1130
AGE 2340	Basics of Engineering Measurements	2(2,1,2)	STAT 150
AEE 3510	Logic Systems Design	3(3,1,0)	---
AEE 3760	Logic Design Laboratory	1(0,0,2)	AEE 3510[C]
IC III	Islamic Culture III	2(2,0,0)	---
Total		**16**	

Level 6			
Course Code	**Course Title**	**Cr. Hr. T(X,Y,L)**	**Pre-requisite**
AEE 2120	Electric Circuits II	3(3,1,0)	AEE 2110
AEE 2130	Electronics I	3(3,1,0)	AEE 2110
AEE 2410	Signal and System Analysis	3(3,1,0)	AEE 2110
AEE 2710	Circuits Laboratory	2(1,0,2)	AEE 2110
AEE 2310	Engineering Electromagnetics	3(3,1,0)	MATH 1110 PHYS 1221
IC I V	Islamic Culture IV	2(2,0,0)	---
Total		**16**	

Level 7			
Course Code	**Course Title**	**Cr. Hr. T(X,Y,L)**	**Pre-requisite**
AEE 3140	Electronics II	3(3,1,0)	AEE 2130
AEE 3210	Fundamentals of Power Systems	3(3,1,0)	AEE 2120
AEE 3421	Digital Signal Processing	3(3,1,0)	AEE 2410
AEE 3721	Electronics Laboratory	1(0,0,2)	AEE 3140[C]
AEE 3730	Power Systems Laboratory	1(0,0,2)	AEE 3210[c]
AEE 3221	Electric Machines	3(3,1,0)	AEE 2120
AEE 3610	Data Communication and Networking	3(2,0,2)	---
AGE 4540	Seminar	1(0,1,2)	---
Total		**18**	

Level 8			
Course Code	**Course Title**	**Cr. Hr. T(X,Y,L)**	**Pre-requisite**
AEE xxxx	Elective Course I	3	Table 4D
AEE 3430	Communication System Principles	3(3,1,0)	AEE 2410
AEE 3520	Automatic Control	4(3,1,2)	AEE 2410
AGE 4551	Engineering Project Management	2(2,1,0)	---
AEE 3240	Power Electronics	2(2,1,0)	AEE 3140
AEE 3741	Machines and Power Electronics Laboratory	1(0,0,2)	AEE 3221 AEE 3240[C]
AEE 3750	Microwave and Communications Laboratory	2(1,0,2)	AEE 2310 AEE 3430[C]
AGE 3351	Introduction to Engineering Design	1(1,1,0)	AGE 1310 AGE 1320
Total		**18**	

Summer Session: AEE 4910 Cooperative Training – Part I (0 credit hours) Pre-requisite: Senior Standing, Completion of 125 credit hours

Level 9			
Course Code	**Course Title**	**Cr. Hr. T(X,Y,L)**	**Pre-requisite**
AEE 4920	Cooperative Training - Part II	9 credits	Completion of 125 credit hours
AEE 4931	Capstone Senior Design Project I	3(3,0,0)	AEE 4910
Total		**12**	

Level 10			
Course Code	**Course Title**	**Cr. Hr. T(X,Y,L)**	**Pre-requisite**
AEE xxxx	Elective Course II	3	Table 4D
AEE 4610	Introduction to Microcontroller	3(2,1,2)	AEE 3510
AGE 4530	Engineering Economy	2(2,1,0)	---
AEE 4940	Capstone Senior Design Project II	2(2,0,0)	AEE 4931
AEE xxxx	Elective Course III	3	Table 4D
AGE 4560	Industry and Environment	2(2,0,0)	---
Total		**15**	

Total credit hours = 160

APPENDIX A

COURSE CODE

Some course codes contain dedicated symbols such as MATH, PHYS and CHEM to represent Mathematics, Physics, and Chemistry accordingly. Other course codes consist of symbol (AGE, or AEE) and a number and they are represented as follows:

For General Engineering: (AGE A B C D)

- A Year
- B Category:
  - 1 Math and Statistics
  - 2 Science
  - 3 Engineering
  - 4 Computer
  - 5 General
- C: Course Number
- D: Version

For Electrical Engineering: (AEE A B C D)

- A Year
- B Category:
  - 1 Electrical, Electronics, VLSI, and Real-Time Systems
  - 2 Power and Machine
  - 3 Microwave, RF, and EM
  - 4 Signal and systems, Communication, and Signal Processing
  - 5 Logic, AI, Robotics, and Control
  - 6 Computer Data and Microprocessors
  - 7 Labs
  - 8 Reserved
  - 9 General, Selected Topics, Summer Training, Co-Op Training and Senior Capstone Design Projects
- C: Course Number
- D: Version