جامعة الملك سعود
كلية الهندسة فرع المزاحمية

KING SAUD UNIVERSITY
COLLEGE OF ENGINEERING MUZAHIMYA BRANCH

برنامج الهندسة الميكانيكية التطبيقية

APPLIED MECHANICAL ENGINEERING PROGRAM

الخطة الدراسية ومتطلبات البرنامج

ACADEMIC PLAN AND DEGREE REQUIREMENTS

صفر 1439
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COLLEGE OF ENGINEERING - MUZAHIMIYAH CAMPUS	كلية الهندسة فرع المزاحمية
APPLIED MECHANICAL ENGINEERING PROGRAM	برنامج الهندسة الميكانيكية التطبيقية

Introduction:

The requirements for the Bachelor Degree of Engineering in Applied Mechanical 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 Mechanical Engineering		Credit Hours
COMMON FIRST YEAR		**32**
University Requirements		**8**
College Requirements		**44**
Program Requirements **(76 credits hours)**	COMPULSORY COURSES	**47**
	Elective COURSES	**12**
	COURSES FROM OTHER ENGINEERING SPECIALTY (ELECTRICAL ENGINEERING COURSE)	**3**
	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 common first 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 as follow:

  o 47 credit hours for core courses (Table 4A)

  o 3 credit hours for an electrical engineering course (Table 4B)

  o 9 credit hours of Cooperative Training, Parts I & II (Table 4C)

  o 5 credit hours of Capstone Senior Design Project, Parts I & II (Table 4D)

  o 12 credit hours for elective courses (Table 4E)

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 Pre-	Requisites Co-	Remarks
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 AGE 1320		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 Mechanical Engineering students and divided into five parts as follow:

4.1) Program Core Courses

The student has to complete **47** credit hours of core courses in Applied Mechanical Engineering as listed in the Table 4A.

Table 4A: APPLIED MECHANICAL ENGINEERING PROGRAM CORE COURSES REQUIREMENTS

Course Code	Course Title	Cr. Hr. T(X,Y,L)	Requisites Pre-	Requisites Co-	Remarks
AME 2110	Manufacturing Processes	4(3,1,2)	AGE 1320 AME 2510 AME 2310	---	A new pre-req. added (AME 2310)
AME 2211	Mechanical Engineering Drawing	2 (1,0,2)	AGE 1310		1 credit hour is removed
AME 2310	Mechanics of Materials I	3(3,1,0)	AGE 1330	---	
AME 2510	Engineering Materials Science	4(3,1,2)	PHYS 1221 CHEM 101	---	
AME 2710	Engineering Thermodynamics	4(3,1,2)	PHYS 1221		
AME 3010	Mechanical Engineering Design	4(3,1,2)	AME 3320 AME 2210	---	A new pre-req. added (AME 2210)
AME 3121	Production Management	3(3,1,0)	AME 2110		Name and content modified
AME 3320	Mechanics of Materials II	4(3,1,2)	AME 2310	---	
AME 3330	Mechanics of Machinery	4(3,1,2)	AGE 2320	---	
AME 3610	System Dynamics and Control	4(3,1,2)	AGE 2320 AME 3620	---	
AME 3720	Heat Transfer	4(3,1,2)	AME 3810	---	
AME 3810	Fluid Mechanics	4(3,1,2)	AME 2710	---	
AME 4730	Thermal-Fluid Systems	3(2,1,2)	AME 3720	---	
Total		**47**			

4.2) Electrical Engineering Course

This course is intended to cover necessary electric concepts required to all AME students to enhance their understanding of electric circuits and machines. **3** credit hours of electrical engineering course is listed in the Table 4B

Table 4B: ELECTRICAL ENGINEERING COURSE

Course Code	Course Title	Cr. Hr. T(X,Y,L)	Requisites Pre-	Requisites Co-	Remarks
AME 3620	Electrical Circuits and Machines	3(3,1,0)	PHYS 1221	---	
Total		**3**			

4.3) 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 4C: CO-OP TRAINING REQUIREMENTS

Course	Course Title		Requisites	Remarks

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

4.4)   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 4D: CAPSTONE SENIOR DESIGN PROJECT REQUIREMENTS

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

4.5)   Elective Courses

Each student is required to select 12 credit-hours among a pool of elective courses listed in Table 4E:

Table 4E: ELECTIVE COURSES OF SPECIALIZED AREAS*

Code Number	Course Title	Cr. Hr. (X,Y,L)	Requisites		
			Pre-	Co-	
AME 4020	Finite Element Method	3(2,0,2)	*AME 3010 AME 3720*	---	

AME 4030	Computer-Aided Design	3(3,1,0)	*AME 3010*	---	
AME 4040	Conceptual Design	3(3,1,0)	*AME 3010*	---	
AME 4050	Materials Selection in Design	3(3,1,0)	*AME 3010*	---	
AME 4130	Metal Forming and Metal Cutting Analysis	3(3,1,0)	*AME 2110*	---	
AME 4140	Manufacturing Systems	3(3,1,0)	*AME 2110*	---	
AME 4150	CNC Machines	3(3,1,0)	*AME 2110*	---	
AME 4420	Principles of Refrigeration	3(2,0,2)	*AME 2710*	---	
AME 4430	Air Conditioning	3(3,1,0)	*AME 3720*	---	
AME 4440	Internal Combustion Engines	3(2,0,2)	*AME 2710*	---	
AME 4520	Introduction to Composite Materials	3(3,1,0)	*AME 3010*	---	
AME 4530	Mechanical Behavior of Materials	3(3,1,0)	*AME 3010*	---	
AME 4620	Introduction to Mechatronics	3(2,1,2)	*AME 3330* *AME 3610*	---	
AME 4630	Introduction to Robotics	3(3,1,0)	*AME 3330* *AME 3610*	---	
AME 4750	Renewable Energy	3(3,1,0)	*AME 3720* *AME 3810*	---	
AME 4760	Energy Conversion and Storage Systems	3(3,1,0)	*AME 3720*	---	
AME 4770	Water Desalination	3(3,1,0)	*AME 3720*	---	
AME 4820	Propulsion	3(2,0,2)	*AME 3810*	---	
AME 4830	Power Plants	3(3,1,0)	*AME 2710*	---	
AME 4840	Fluid Machinery	3(3,1,0)	*AME 3810*	---	
AME 4940	Selected Topics in Mechanical Engineering I	3(2,1,2)	*Instructor and Program Approval*		
AME 4950	Selected Topics in Mechanical Engineering II	3(2,1,2)			
Total of 4 Elective Courses		**12**			Additional two elective courses added

5) Typical Study Plan

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

TABLE 5: MODIFIED STUDY PLAN – APPLIED MECHANICAL 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
ENG 140	English Language	6(15,0,0)	---
MATH 150	Differential Calculus	3(3,1,0)	---
ENT 140	Entrepreneurship	1(1,1,0)	---
CHEM 101	General Chemistry	4(3,0,2)	---
ARAB 140	Writing Skills	2(2,0,0)	---
Total		**16**	

Level 2

Course Code	Course Title	Cr. Hr. T(X,Y,L)	Pre-requisite
ENG 150	Academic English Language	6(15,0,0)	---
EDM 150	University Skills	3(3,0,0)	---
IT 140	Computer Skills	3(2,0,2)	---
STAT 150	Introduction to Statistics	3(2,0,2)	---
CHS 150	Fitness & Health Culture	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
AME 2510	Engineering Materials Science	4(3,1,2)	PHYS 1221 CHEM 101
AGE 2320	Dynamics	2(2,1,0)	AGE 1330
AME 2310	Mechanics of Materials I	3(3,1,0)	AGE 1330
AME 2211	Mechanical Engineering Drawing	2(1,0,2)	AGE 1310
MATH 2140	Numerical Methods	3(3,2,0)	MATH 1130
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
AME 2110	Manufacturing Processes	4(3,1,2)	AGE 1320 AME 2510 AME 2310
AME 2710	Engineering Thermodynamics	4(3,1,2)	PHYS 1221
AME 3620	Electrical Circuits and Machines	3(3,1,0)	PHYS 1221
AME 3320	Mechanics of Materials II	4(3,1,2)	AME 2310
IC IV	Islamic Culture IV	2(2,0,0)	---
Total		**17**	

Level 7

Course Code	Course Title	Cr. Hr. T(X,Y,L)	Pre-requisite
AME 3330	Mechanics of Machinery	4(3,1,2)	AGE 2320
AGE 2340	Basics of Engineering Measurements	2(2,1,2)	STAT 150
AME 3610	System Dynamics and Control	4(3,1,2)	AGE 2320 AME 3620
AME 3810	Fluid Mechanics	4(3,1,2)	AME 2710
AME 3121	Production Management	3(3,1,0)	AME 2110
Total		**17**	

Level 8

Course Code	Course Title	Cr. Hr. T(X,Y,L)	Pre-requisite
AME 3010	Mechanical Engineering Design	4(3,1,2)	AME 3320 AME 2211
AME xxxx	Elective Course I	3	Table 4E
AME 3720	Heat Transfer	4(3,1,2)	AME3810
AGE 3351	Introduction to Engineering Design	1(1,1,0)	AGE 1310 AGE 1320
AME xxxx	Elective Course II	3	Table 4E
AGE 4540	Seminar	1(0,1,2)	---
Total		**16**	

Summer Session: AME 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
AME 4920	Cooperative Training – Part II	9 credits	Completion of 125 credit hours
AME 4931	Capstone Senior Design Project I	3(3,0,0)	AME 4910
Total		**12**	

Level 10

Course Code	Course Title	Cr. Hr. T(X,Y,L)	Pre-requisite
AME xxxx	Elective Course III	3	Table 4E
AME xxxx	Elective Course IV	3	Table 4E
AME 4730	Thermal-Fluid Systems	3(2,1,2)	AME 3720
AGE 4530	Engineering Economy	2(2,1,0)	---
AGE 4560	Industry and Environment	2(2,1,0)	---
AGE 4551	Engineering Project Management	2(2,1,0)	---
AME 4940	Capstone Senior Design Project II	2(2,0,0)	AME 4931
Total		**17**	