College of Engineering

King Khalid University

Bachelor of Science (BSc.) in Electrical Engineering

Program Study Plan

(Distribution of Courses over Different Levels)

Table of Contents

First Year- Common Engineering Year

LEVEL 1:

Course No.	Course Code	Course Title	Credit Hours	Weekly Distribution of Teaching Hours		Prerequisites
				Lectures	Tutorial	
013	ENG	Intensive English (1)	6	---	6	
107	CHEM	General Chemistry	4	3	1	
119	MATH	Differentiation and Integration (1)	3	3	---	
111	GE	Engineering Drawing (1)	3	---	3	
Total No. of Credit Hours			**16**	**6**	**10**	

LEVEL 2:

Course No.	Course Code	Course Title	Credit Hours	Weekly Distribution of Teaching Hours		Prerequisites
				Lectures	Tutorial	
111	IC	Islamic Culture (1)	2	2	---	
014	ENG	Intensive English (2)	6	---	6	**013 ENG**
129	MATH	Algebra and Geometry	3	3	---	
129	PHYS	Physics (1)	4	3	1	
121	ME	Production Technology and Workshop	3	1	2	**111 GE**
Total No. of Credit Hours			**18**	**9**	**9**	

Second Year- Electrical Engineering Year

LEVEL 3:

Course No.	Course Code	Course Title	Credit Hours	Weekly Distribution of Teaching Hours		Prerequisites
				Lectures	Tutorial	
211	ME	Engineering Mechanics	4	3	1	
219	MATH	Differentiation and Integration (2)	3	3	--	**119 MATH**
219	PHYS	Physics (2)	3	2	1	**129 PHYS**
101	CS	Computer (1)	3	2	1	
211	EE	Electric Circuits (1)	3	2	1	**119 MATH** **129 MATH** **129 PHYS**
Total No. of Credit Hours			**16**	**12**	**4**	

LEVEL 4:

Course No.	Course Code	Course Title	Credit Hours	Weekly Distribution of Teaching Hours		Prerequisites
				Lectures	Tutorial	
112	IC	Islamic Culture (2)	2	2	--	
229	MATH	Differentiation and Integration (3)	3	3	--	**219 MATH**
228	ME	Thermal Dynamics and Hydraulics	3	2	1	**219 MATH** **129 PHYS**
221	EE	Electric Circuits (2)	3	2	1	**211 EE**
222	EE	Electric Measurements and Measuring Instruments	3	2	1	**211 EE**
223	EE	Electronic Engineering	3	2	1	**211 EE** **219 PHYS**
Total No. of Credit Hours			**17**	**13**	**4**	

Third Year- Electrical Engineering Year

LEVEL 5:

Course No.	Course Code	Course Title	Credit Hours	Weekly Distribution of Teaching Hours		Prerequisites
				Lectures	Tutorial	
113	IC	Islamic Culture (3)	2	2	--	
319	MATH	Differential Equations	3	3	--	**219 MATH**
311	EE	Electromagnetic Fields	3	2	1	**219 PHYS 211 EE**
312	EE	Logic Circuits	3	2	1	**211 EE**
313	EE	Energy Conversion	3	2	1	**221 EE**
314	EE	Electric Testing (1)	1	--	1	**222 EE 223 EE**
Total No. of Credit Hours			**15**	**11**	**4**	

LEVEL 6:

Course No.	Course Code	Course Title	Credit Hours	Weekly Distribution of Teaching Hours		Prerequisites
				Lectures	Tutorial	
301	ENG	Technical Report Writing	2	2	--	**014 ENG**
329	MATH	Principles of Complex Variables and Special Functions	2	2	--	**319 MATH**
329	STAT	Principles of Statistics and Probabilities	2	2	--	
321	EE	Electric Testing (2)	1	--	1	**312 EE 313 EE**
322	EE	Signal Processing	3	2	1	**219 PHYS 319 MATH**
323	EE	Electronic Circuits (1)	3	2	1	**223 EE**
324	EE	Computerized Methods for Engineering	3	2	1	**101 CS 319 MATH**
Total No. of Credit Hours			**16**	**12**	**4**	

After finishing the sixth level, the student should practice engineering training within a proper engineering foundation for not less than six weeks. A report should be submitted to the department after finishing the training, which is considered as a graduation requirement.

Fourth Year- Electrical Engineering Year

LEVEL 7:

Course No.	Course Code	Course Title	Credit Hours	Weekly Distribution of Teaching Hours		Prerequisites
				Lectures	Tutorial	
201	ARAB	Skills of Arabic Language	2	2	--	
424	IE	Engineering Economy	2	2	--	
411	EE	Principles of Electric Machines	3	2	1	**313 EE**
412	EE	Automatic Control	3	2	1	**221 EE 319 MATH**
413	EE	Communication Systems	3	2	1	**322 EE 329 MATH**
414	EE	Computer Organization (1)	3	2	1	**312 EE 329 STAT**
Total No. of Credit Hours			**16**	**12**	**4**	

LEVEL 8:

Course No.	Course Code	Course Title	Credit Hours	Weekly Distribution of Teaching Hours		Prerequisites
				Lectures	Tutorial	
114	IC	Islamic Culture (4)	2	2	--	
422	IE	Environment Engineering	2	2	--	
421	EE	High Voltage Engineering	3	2	1	**221 EE**
422	EE	Electronic Circuits (2)	3	2	1	**323 EE**
423	EE	Electric Testing (3)	1	--	1	**411 EE 412 EE**
424	EE	Computer Organization (2)	3	2	1	**414 EE**
425	EE	Electric Power Systems	3	2	1	**313 EE**
Total No. of Credit Hours			**17**	**10**	**5**	

Third Year- Electrical Engineering Year

LEVEL 9:

Course No.	Course Code	Course Title	Credit Hours	Weekly Distribution of Teaching Hours		Prerequisites
				Lectures	Tutorial	
202	ARAB	Arabic Writing	2	2	--	
591	EE	Graduation Project	3	--	3	*
511	EE	Electric Testing (4)	1	--	1	**413 EE 424 EE**
512	EE	Integrated Circuits	3	2	1	**422 EE**
513	EE	Microprocessor Based Systems	3	2	1	**414 EE**
514	EE	Power Electronics	3	2	1	**221 EE 223 EE**
515	EE	Electric Testing (5)	1	--	1	**421 EE 425 EE**
Total No. of Credit Hours			**16**	**8**	**8**	

* Registration for the graduation project is eligible when the student has no more than 38 credit hours left for graduation. Work within the graduation project should continue for two semesters. The student will be given incomplete at the end of the first semester. The final degree of the project will be given the following semester. In case the student failed in the project his is given a chance for one more semester and will be eligible to present and defend the project by the end of that's semester.

LEVEL 10:

Course No.	Course Code	Course Title	Credit Hours	Weekly Distribution of Teaching Hours		Prerequisites
				Lectures	Tutorial	
521	EE	Operating Systems	3	2	1	**424 EE**
522	EE	Electric Power System Analysis	3	2	1	**425 EE**
523	EE	Advanced Communication Systems	3	2	1	**413 EE**
524	EE	Software Engineering	3	2	1	**414 EE**
525	EE	Electric Testing (6)	1	--	1	**422 EE 424 EE**
514	IE	Industrial Management and Project Management	2	2	--	
Total No. of Credit Hours			**15**	**10**	**5**	

General Course Requirements

General Education

S.No.	Course Code	Course Title	Credit Hours	Contact Hours
1	011ENG-6	Intensive English Program (1)	6	12
2	111IC1-2	The Entrance to the Islamic Culture	2	2
3	012ENG-6	Intensive English Program 2	6	12
4	112IC1-2	Islamic Culture (2)	2	2
5	113IC1-2	Islamic Culture (3)	2	2
6	301NGL-2	Technical Report Writing	2	2
7	201ARAB-2	Skills of Arabic Language	2	2
8	114IC1-2	Islamic Culture (4)	2	2
9	202ARAB-2	Arabic Writing	2	2
TOTAL			**26**	**38**

**University requirement, credit hours 12*

Mathematics & Basic Sciences

S.No.	Course Code	Course Title	Credit Hours	Contact Hours
1	101CS-3	Computer Science	3	4
2	107CHEM-4	General Chemistry	4	5
3	119MATH-3	Differentiation and Integration (1)	3	3
4	129MATH-3	Algebra and Geometry	3	3
5	129PHYS-4	Physics (1)	4	5
6	219MATH-3	Differentiation and Integration (2)	3	3
7	219PHYS-3	Physics (2)	3	4
8	229MATH-3	Differentiation and Integration (3)	3	3
9	319MATH-3	Differential Equations	3	3
10	329MATH-2	Principles of Complex Variables And Special Functions	2	3
11	329STAT-2	Principles of Statistics and Probabilities	2	3
TOTAL			**33**	**39**

Common Engineering Courses

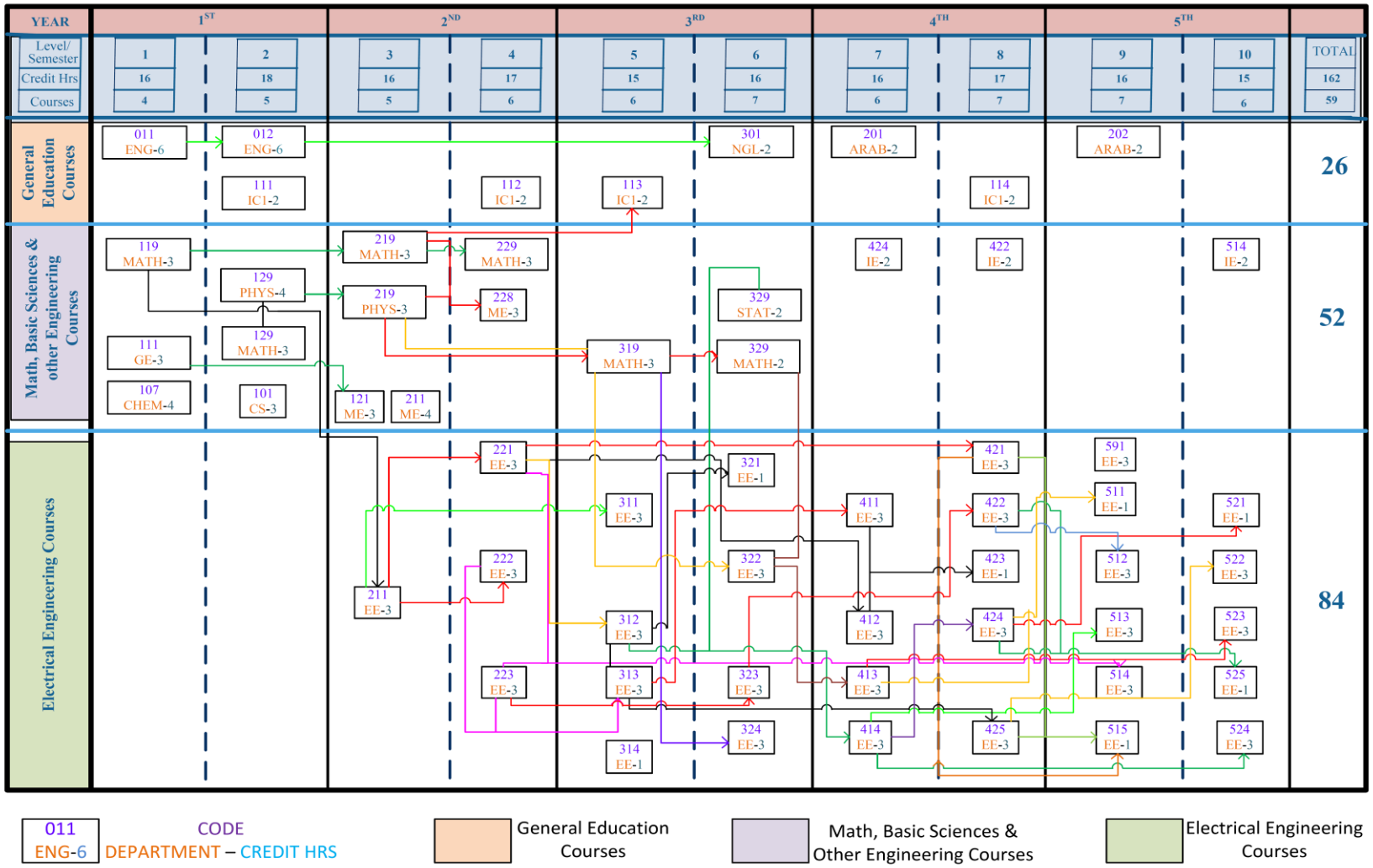
S.No.	Course Code	Course Title	Credit Hours	Contact Hours
1	111GE-3	Engineering Drawing (1)	3	6
2	211ME-4	Engineering Mechanics	4	5
3	121ME-3	Production Technology and Workshop	3	6
4	228ME-3	Thermal Dynamics and Hydraulics	3	4
5	424IE-2	Engineering Economy	2	2
6	422IE-2	Environment Engineering	2	2
7	514IE-2	Industrial Project Management	2	2
TOTAL			**19**	**27**

Electrical Engineering Courses

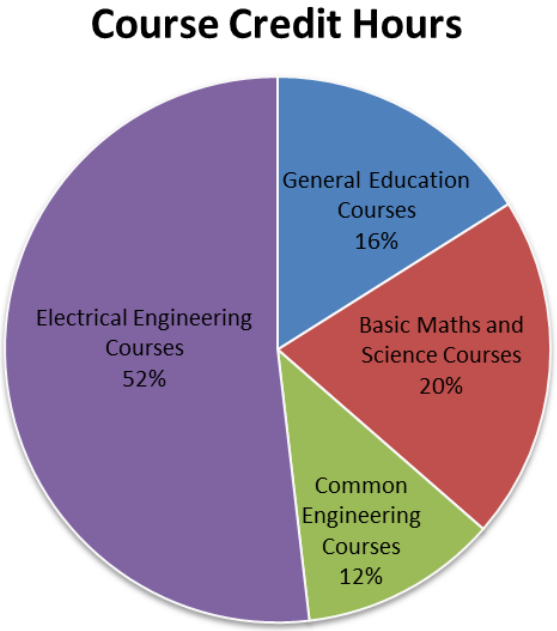
S.No.	Course Code	Course Title	Credit Hours	Contact Hours
1	211EE-3	Electric Circuits (1)	3	4
2	221EE-3	Electric Circuits (2)	3	4
3	222EE-3	Electric Measurements & Measuring Instruments	3	4
4	223EE-3	Electronic Engineering	3	4
5	311EE-3	Electromagnetic Fields	3	4
6	312EE-3	Logic Circuits	3	4
7	313EE-3	Energy Conversion	3	4
8	314EE-1	Electric Testing (1)	1	2
9	321EE-1	Electric Testing (2)	1	2
10	322EE-3	Signal Processing	3	4
11	323EE-3	Electronic Circuits (1)	3	4
12	324EE-3	Computerized Methods for Engineering	3	4
13	411EE-3	Principles of Electric Machines	3	4
14	412EE-3	Automatic Control	3	4
15	413EE-3	Communication Systems	3	4
16	414EE-3	Computer Organization (1)	3	4
17	421EE-3	High Voltage Engineering	3	4
18	422EE-3	Electronic Circuits (2)	3	4
19	423EE-1	Electric Testing (3)	1	2

S.No.	Course Code	Course Title	Credit Hours	Contact Hours
20	424EE-3	Computer Organization (2)	3	4
21	425EE-3	Electric Power Systems	3	4
22	591EE-3	Graduation Project	3	4
23	511EE-1	Electric Testing (4)	1	2
24	512EE-3	Integrated Circuits	3	4
25	513EE-3	Microprocessor Based Systems	3	4
26	514EE-3	Power Electronics	3	4
27	515EE-3	Electric Testing (5)	1	2
28	521EE-3	Operating Systems	3	4
29	522EE-3	Electric Power System Analysis	3	4
30	523EE-3	Advanced Communication Systems	3	4
31	524EE-3	Software Engineering	3	4
32	525EE-1	Electric Testing (6)	1	2
TOTAL			**84**	**116**

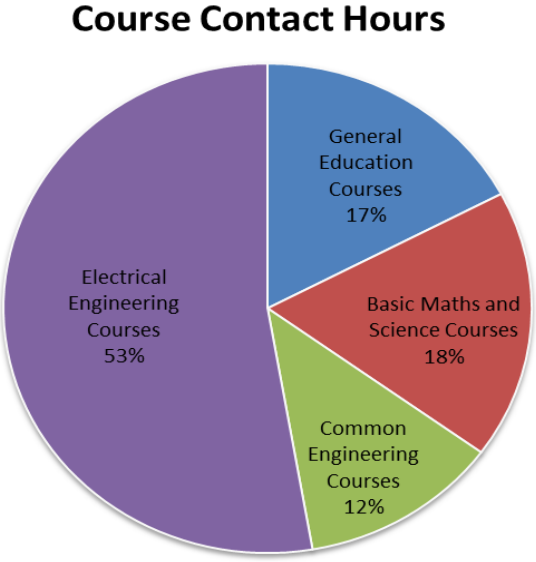
BSc. Electrical Engineering Curriculum – Prerequisite Structure



Distribution of Credit Hours and Contact Hours



Total Credit Hours = 162



Total contact hours = 220

Descriptions of BSc. Electrical Engineering Courses

Math & Basic Sciences

Course Title	General Chemistry	Coordinator			
Course Code	107-CHEM-4	Credit Hrs.	4	Contact Hrs.	5
Prerequisites	None	Level/Year		1/1	

Course Objectives:

After the completion of this course, it is expected that the student be able to:

1. Dealing with the concept of chemicals materials and evaluation of results in terms of accuracy of the measurement and so can understand the standard specifications.
2. Understanding of material cases and thermal chemistry.
3. Understanding of the electronic structure and linked to the periodic table of chemical and links.
4. Gain some skills of practical experience in chemistry .

Teaching Method:

Lectures, Training exercises and some work (Tutorial and Reports for different subjects in this field)

Expected Learning Outcome:

Course Contents:	
Unit 1	• Corn and molecule and ions.
Unit II	• Concentrations in chemistry and chemical calculations according to chemical equations weighted.
Unit III	• Gaseous state. • Electronic structure and the study of the periodic table.
Unit IV	• Covalent linkages. • Thermal chemistry.
Unit VI	• Liquid and solid state.

Text Book (s):

- Masterton ,W. L. and Saunders C. N. H., " Chemistry : principles and reactions ", ThomsonBrooks / Cole Publication, USA, 5 thed , 2004.

Reference Book (s):

- Brown, T.L, Le May Jr, H.E.,.andBursten, B.E, , "Chemistry the Central Science" , Pearson Prentice Hall, 10 th Ed, 2006.

Mode of Evaluation:

- Mid-Term Tests (Not less than two Exams)……..…..(25 %)
- Practical Work and Assignments ……..…….. (25 %)
- Final Exam. ……..……. …….. (50 %)

Course Title	**Differentiation and Integration (I)**	**Coordinator**			
Course Code	119-MATH-3	**Credit Hrs.**	3	**Contact Hrs.**	3
Prerequisites	None	**Level/Year**		1/1	

Course Objectives:

1. Recognize the importance of mathematics for basic science and engineering sciences
2. Get used to the proper logical thinking.
3. Build a strong mathematical basis of the basic concepts in the science of differentiation.
4. Acquire a basic background in materials analysis and differential equations.
5. know the methods and strategies solution in many applications in the science of differentiation.

Teaching Method:

Lectures and tutorial

Expected Learning Outcome:

Course Contents:	
Unit 1	• The real numbers, and inequalities, functions, differentiated function and its inversion, logarithmic and exponential functions, and hyperbolic and trigonometric functions and their inversion.
Unit II	• The definition of the limitation, the continuation, the properties of the periodic continues function, derivation, methods of derivation and derivation of serial functions.
Unit III	• Critical points, the absolute maximum values , local maximum values, the mean value theorem, increasing and decreasing, first derivative test, second derivative test, concavity, turning points, lines convergent.
Unit IV	• Drawing curves, applications of maximum value problems, correlated rates problems, L'Hôpital's rule, Taylor and Maclaurin unscrewed to function.

Text Book (s):

- Swokowski, E. W., Olinick, M. , Pence, D. and Cole, J. A. " Calculus ", PWS Publishing Company, 1994.

Reference Book (s):

- None

Mode of Evaluation:

- Mid-Term Tests (Not less than two Exams)…… (50 %)
- Final Exam. ……. …….. (50 %)

Course Title	**Algebra and Geometry**	**Coordinator**			
Course Code	129-MATH-3	**Credit Hrs.**	3	**Contact Hrs.**	3
Prerequisites	None	**Level/Year**		2/1	

Course Objective: Understanding the basics of analytical geometry and algebra. Gain skills to imagine some regular objects in three dimensions. The acquisition of the application of these fundamentals to resolve issues related to previous topics skills.

Teaching Method:
Lectures and tutorial

Expected Learning Outcome:
None

Course Contents:	
Unit 1	• Engineering: conical sectors, cylindrical and spherical coordinates, analytic geometry in three dimensions that include the straight and level surfaces of the second degree
Unit II	• Algebra: the theory of algebraic equations and the properties of the roots, matrices, operations on the matrices, some types of matrices, initial row transfer and its software applications, row reduction of matrices and its software applications, determinants and its computerized calculations, some limitations algebraic properties, inverse matrix, linear systems homogeneous and heterogeneous and its computerized solutions. Groups of linear equations, Kramer

Text Book (s):
- Arthur Schultze; Frank Louis Sevenoak," Plane and Solid Geometry ", Adamant Media Corporation, 2004.
- David C. Lay, "Linear Algebra and its Applications ", 3rd ed., Addison-Wesley, 2005.

Reference Book (s):
- None

Mode of Evaluation:
- Mid-Term Tests (Not less than two Exams)……(50 %)
- Final Exam. ……..…….. …….. (50 %)

Course Title	Physics (I)	Coordinator			
Course Code	129-PHYS-4	Credit Hrs.	4	Contact Hrs.	5
Prerequisites	None	Level/Year		2/1	

Course Objectives:
After the completion of this course, it is expected that the student be able to:
1. Understanding the basics of material properties.
2. Understand the basics of hydrostatics.
3. Understand the basics of sound and light.
4. The application of these basics to resolve problems related to previous topics.
5. Perform some practical experiments.

Teaching Method:
Lectures , tutorial and practical experiments

Expected Learning Outcome:

Course Contents:	
Unit 1 Material properties:	Units and dimensions, the physical mechanics, include energy effort, rotational motion of inertia, elastic properties of the materials, hydrostatics and surface tension, viscosity and fluid dynamics.
Unit II Electrical:	Vector, the electric field, voltage, capacitors and insulating materials, magnetic field, magnetic force, the law of houses and wasvar, Ampere law, electromagnetic induction.
Unit III Sound:	The nature , types and phenomena of sound.
Unit IV Optics:	Refraction of light, the reflection of light, lenses and disadvantages.

Text Book (s):
- Richard Wolfson, " Essential University Physics", 2006.
- Hugh D. Young, " University Physics ", Volume 2, 2004.

Reference Book (s):
- Hugh D. Young and Roger A. Freedman, " University Physics with Modern Physics", 11th Ed., 2003.
- John D. Cutnell and Kenneth W. Johnson, " Physics ", 2003.

Mode of Evaluation:
- Mid-Term Tests (Not less than two Exams)……..…..(30 %)
- Practical Work and Assignments ……..…….. (20 %)
- Final Exam. ……. …….. (50 %)

Course Title	Computer Science	Coordinator			
Course Code	101-CMS-3	Credit Hrs.	3	Contact Hrs.	4
Prerequisites	None	Level/Year		2/1	

Course Objectives:

- To acquire and recognition computer and computer application
- To solve engineering problems through programming skills.

Teaching Method:
Lectures and tutorial practical applications

Expected Learning Outcome:
1. Identify the main parts of the computer.
2-Recognition computer applications.
3. Identify the way data is represented inside the computer.
4. Identify the peripheral units and how they are used in the extraction and presentation of data.
5. Acquisition of computers running skills and how to build computer networks.
6. Acquire solve engineering problems through programming skills.
7. Identification of artificial intelligence and its practical applications and engineering systems

Course Contents:	
Unit 1 Theoretical Part and includes the following:	• Computer definitions, different types of computers: digital computer, computer analogue, general-purpose computer, special purpose computer, the computer mixed, the fields of computer operation and engineering applications. • Computer architecture, the physical components of the computer: Modular I / O, and storage media, the types of computer memory, the unit of account and logic. • Knowledge of computer networks and communication systems. • Introduction to Artificial Intelligence and its practical applications and engineering systems. • Computer software, software development and programming languages. • Introduction to Algorithms, introduction to programming in a language of programming: arithmetic expressions, simple data types, sentences input and output, control the conditional sentences, sentences repetition and its practical applications and engineering.
Unit II Practical Part:	The application includes programs and resolving issues in laboratories to deepen the understanding of theoretical lessons.
Unit III	• Project

Text Book (s):

- Yahia Habib &TalibSarie, "Introducing to Computers Science and Problem Solving", Dar WAEL, 2001, AmmanJordan, ISBN 9957-11-163-9.
- Greg Perry .. C++ by examples , ISBN 1-56529-038-0, 2002.

Reference Book (s):

- Nell Dall, Chip Weems and Mark Headington, " Programming and Problem Solving With C++" ISBN 0-7637-1063-6. 2000.

Mode of Evaluation:

- Mid-Term Tests (Not less than two Exams)…..…..(20 %)
- Practical Work and Assignments ……..…….. (30 %)
- Final Exam. ……..……. …….. (50 %)

Course Title	**Differentiation and Integration (II)**	**Coordinator**			
Course Code	219-MATH-3	**Credit Hrs.**	3	**Contact Hrs.**	3
Prerequisites	119-MATH-3	**Level/Year**		3/2	

Couse Objective:
1- Understand the basics of the limited and non-limited integration.
2. Recognize the relationship between differentiation and integration.
3. Identify the different ways of integration.
4. Understand serial functions and know how to deal with difficult integrals.
5. Acquire the skill of calculating areas and volumes and resolve issues related to them.

Teaching Method:
Lectures and tutorial

Expected Learning Outcome:

Course Contents:	
Unit 1	• Definition of limited integral using Riemann sum, the properties of the limited integration, the theory of average value in the integration, basic theory in calculus, the original function, the definition of unlimited integration, the substitute integration method, and integration methods : integration by parts, trigonometric substitutions, method of completing the square, the integrals of fractional functions , approximate methods of calculating limited integrations (trapezoidal method), integrals ailing,
Unit II	• Calculate areas and volumes of rotational objects, calculate the length of the curved arc, polar coordinates, draw some well-known curves in polar coordinates, area calculations by polar coordinates.

Text Book (s):
•Swokowski, E. W., Olinick, M. , Pence, D. and Cole, J. A. " Calculus ", PWS Publishing Company, 1994.

Reference Book (s):
• None

Mode of Evaluation:
- Mid-Term Tests (Not less than two Exams)……(50 %)
- Final Exam. ……. …….. (50 %)

Course Title	Differentiation and Integration (III)	Coordinator			
Course Code	229-MATH-3	Credit Hrs.	3	Contact Hrs.	3
Prerequisites	219-MATH-3	Level/Year		4/2	

Course Objectives:

1. Understanding the basics of sequences and infinite series.
2. Learn how to apply these basics to represent different functions by series.
3. Understand the basics of the integration of functions in more than one variable and theirapplications.
4. Acquisition analysis, and inference skills and how to deal with integrals and series.

Teaching Method: Lectures and tutorial

Expected Learning Outcome:

Course Contents:	
Unit 1	• Sequences, infinite series, and convergence tests. The representation of functions by power series. Taylor. Mc Leoran. Binomial theory with any power. Complex numbers, De Moivre. Cartesian, cylindrical, and spherical coordinates. Functions in two or three variables. Limitations.
Unit II	• Continuation, partial derivatives, chain rule, the maximum values of functions in two variables, LaGrange factors, bilateral integration and its applications, bilateral integration in polar coordinates, triple integration and applications, triple integration in cylindrical and sphericalcoordinates , integration on a curve and on the surface, Green theory.

Text Book (s):

•Swokowski, E. W., Olinick, M. , Pence, D. and Cole, J. A. " Calculus ", PWS Publishing Company, 1994.

Reference Book (s):

• None

Mode of Evaluation:

- Mid-Term Tests (Not less than two Exams)……(50 %)
- Final Exam. ……. …….. (50 %)

Course Title	Differential Equations	Coordinator			
Course Code	319-MATH-3	Credit Hrs.	3	Contact Hrs.	3
Prerequisites	219-MATH-3	Level/Year		5/3	

Course Objectives:

1. Understand the types of differential equations of the first degree, second and their applications.
2. Recognize the importance of differential equations in engineering sciences.
3. Understand the basics of solving these equations using the series.
4. Understand the basics of Fourier series and Fourier transformations and their applications.
5. Acquire the skills to solve differential equations and to address different applications.

Teaching Method: Lectures and tutorial

Expected Learning Outcome:

Course Contents:	
Unit 1	• Delete constants, ordinary differential equations of the first degree (separation of variables, homogeneous, full, linear, integral factor, Bernoulli, Rakata, linear coefficient).
Unit II	• Differential equations of the second degree (linear independence and dependence of functions, Runsky.
Unit III	• The equations of the upper class with constant coefficients , heterogeneous rates, demotion method (method unknown coefficients (specified), method of differential effects and their properties, how to change the parameters, differential equations applications, the solution using the series (near regular points, near the anomalous points).
Unit IV	• Electrical circuits and networking applications. Laplace transforms and its applications to solve differential equations. Fourier series and Fourier transformations, unscrewed Fourier compound, Fourier integrals

Text Book (s):

•William E. Boyce, Richard C. Diprima" Elementary Differential Equations and Boundary Value Problems", John Wiley & Sons, 2004.

Reference Book (s):

• None

Mode of Evaluation:

- Mid-Term Tests (Not less than two Exams)……(50 %)
- Final Exam. ……. …….. (50 %)

Course Title	Principles of Statistics and Probability	Coordinator			
Course Code	329-STAT-2	Credit Hrs.	2	Contact Hrs.	2
Prerequisites	None	Level/Year		6/3	

Course Objectives:

After the end of this course the student is expected to be able to:

1. Acquire the skill to organize statistical data and summarized the ways the tabular , guardian of numerical , graphical and related mathematical metrics and descriptive.
2. Knowledge of the principles of statistics and probability.
3. Understand the views of statistical inference by: assessment and selection of hypotheses.

Teaching Method: Lectures ,tutorial and computer applications

Expected Learning Outcome:

Course Contents:	
Unit 1	• Methods of presentation of statistical data, measures of central tendency.
Unit II	• Measures of dispersion, regression and correlation and their applications.
Unit III	• An initial introduction to the theory of probability,
Unit IV	• Random variables and functions related to the probability and probability distributions.

Text Book (s):

- Donald Harnett, " Introduction to Statistical Methods ", Addison Wesley Longman Publishing Co., latest Edition.

Reference Book (s):

- None

Mode of Evaluation:

- Mid-Term Tests (Not less than two Exams)……(50 %)
- Final Exam. ……. …….. (50 %)

Course Title	**Computer for Engineers**	**Coordinator**		Group of teachers	
Course Code	221-GE-3	**Credit Hrs.**	3	**Contact Hrs.**	4
Prerequisites	101-CMS-3	**Level/Year**		General Preparation	

Couse Objective:

Teaching Method:

- Lectures & E Learning classes
- Self Learning

Expected Learning Outcome:

- Memorize the relevant areas of Mathematics, including Statistics and Calculus, to computing
- Describe the necessary of basics of using Computer in engineering applications
- Write program that solve problems cover the matrix algebra, repetition using for and while MATLAB statements

Course Contents:	
Unit 1:	• Introduction to MATLAB
Unit II :	• Array and Matrix Operations
Unit III:	• Loops and Conditional
Unit IV:	• Solving Equations
Unit V:	• Calculus • Graphics • Importing and Exporting Data

Text Book (s):

- Brian Hahn, Daniel T. Valentine "Essential MATLAB for Engineers and Scientists", 3rd Edition, Butterworth-Heinemann, Elsevier Ltd., 2007

Reference Book (s):

- 1. MATLAB Programming for Engineers, by Stephen J. Chapman, Fourth Edition, Cengage-Engineering, 2007

Mode of Evaluation:

- First written test……15%
- Second written test……15%
- Assignment……20%
- Final Exam……50%

Course Title	Numerical Analysis	Coordinator			
Course Code	419-MATH-3	Credit Hrs.	3	Contact Hrs.	3
Prerequisites	319-MATH-3 & 101-CMS-3	Level/Year		7/4	

Course Objectives:

After the end of this course the student is expected to be able to:

1. Identify the numerical solution methods
2. Acquire the skills of numerical analysis and numerical methods to solve the differential equations in the area of specialization.
3. The acquisition of skills in the functions approximation and calculation errors.

Teaching Method:

- Theoretical lectures.
- Computer Applications

Expected Learning Outcome:

Course Contents:	
Unit 1	• Approximate method to solve equations in one variable,
Unit II	• Interpolation by polynomial and Siblin functions, approximation of functions, methods of numerical integration,
Unit III	• Numerical methods to solve the primary values of differential equations,
Unit IV	• Numerical methods to solve algebraic equations linear and nonlinear systems.

Text Book (s):

- Ward Cheney and David Kincaid "Numerical Methods and Computing", Brooks / Cole publishing Company, 2004.

Reference Book (s):

- Richard Hammin,"Numerical Methods for Scientists and Engineers ", last Edition.
- Conte and Boor, "Elementary Numerical Analysis", Purdue University, Indiana, U. S.A., last Edition.

Mode of Evaluation:

- Mid-Term Tests (Not less than two Exams)……(50 %)
- Final Exam. ……. …….. (50 %)

Common Engineering Courses

Course Title	Engineering Drawing-1	Coordinator			
Course Code	111-GE-3	Credit Hrs.	3	Contact Hrs.	6
Prerequisites	None	Level/Year		1/1	

Course Objectives:
To know the principles of engineering drawing and to acquire imagination skills for projections of machine parts and drawings

Teaching Method:
Lectures , tutorial and practical experiments

Expected Learning Outcome:

- Know the principles of Engineering drawing
- Use Mastering engineering drawing tools
- Acquire imagination skills for projections of machine parts
- Acquire skills of using the working drawings.

Course Contents:

- Sheet Sizes, Scales, Lines and Lettering
- Engineering Drawing Tools and their using
- Applied Geometry
- Projections – Isometric Views
- Projections – Multi Views
- Missing View
- Dimensions
- Sectional Views

Text Book (s):

- Simmons, C. and Maguire, D. "Manual of Engineering Drawing", 2nd ed., British and International Standards, 2004

Reference Book (s):

- Giesecke, F.E; "Technical Drawing", 2005
- Griffiths, B. "Engineering Drawing for Manufacturing (Manufacturing Engineering Modular Series)"

Mode of Evaluation:

- Mid-Term Tests (Not less than two Exams)……..…..(50 %)
- Final Exam. ……. …….. (50 %)

Course Title	Production Technology and Workshop	Coordinator			
Course Code	121-ME-3	Credit Hrs.	3	Contact Hrs.	5
Prerequisites	111-GE-3	Level/Year		3/2	

Couse Objective:

- Understanding Production Technology
- The production section and the welding section, where the department offers appropriate education and training to ensure complete orientation of graduates with the equipment that they will deal with.
- Graduates will be capable to make, for relevant equipment and machinery, periodic and major maintenance procedures.

Teaching Method:

Lectures, Training exercises (Tutorial + Labs, Reports for different subjects in this field)

Expected Learning Outcome:

- Acquire a general knowledge about the Production technology
- Understand the principals of the manufacturing processes
- Handle the basics of production technology through the theoretical study and practical training at different workshops

Course Contents:	
Unit 1	• The safety precautions,Classification of the Engineering materials and Study the material properties,Dimensional measuring tools (Vernier caliper, Micrometer)
Unit II :	• Principles of the sand casting
Unit III:	• Sheet metal forming and Fitting process
Unit IV:	• Fundamentals of welding process and its types
Unit V:	• Basics of the metal machining
Unit VI:	• Wood working
Unit VII:	• Electrical connections, circuits items and their rules, and electrical machines • Automobile components and basics of maintenance and repair

Text Book (s):

- R. Thomas Wright, "Processes of Manufacturing", 2004.
- John A. Schey, "Introduction to Manufacturing Processes", (McGraw-Hill Series in Mechanical Engineering & Materials Science), 2000.
- Chapman : "Workshop Technology". Vol. : 1 , 2 & 3. Butterworth-Heinemann, latest edition.

Reference Book (s):

- W. Scott Gauthier, "Automotive Encyclopedia" The Goodheart – Willcox Company, Inc. 2006.
- James, W. Nilsson. "Electric Circuits" , Sixth Edition. Prentice-Hall, Inc.2001.

- Charles Alexander and Matthew Sadiku, " Fundamentals of Electric Circuits", 2006.

Mode of Evaluation:

- Mid-Term Tests (Not less than two Exams.) …… (30 %)
- Practical Work …….. (20 %)
- Final Exam. ……. . (50 %)

Course Title	Electrical Engineering1	Coordinator		Dr. Abdul Aziz	
Course Code	218-EE-3	Credit Hrs.	3	Contact Hrs.	4
Prerequisites	119–MATH-3, 129–MATH-3, 129-PHYS-4	Level/Year		3/2	

Couse Objective:

- Familiarize the students with basic electrical quantities, different components of electric circuits, basic laws: ohm's law and Kirchhoff's Law.
- To understand and apply the different methods to solve DC electric circuit.
- Understanding the concept of maximum power transfer.
- Familiarize with AC circuit components.
- Understanding the different methods to solve AC electric circuit.
- Increasing the student's ability to treat with experimental circuits.

Teaching Method:
Lectures&Tutorial

Expected Learning Outcome:
At the end of this course, the student should be able to study DC and AC circuits.
The topics are:

- Basic concepts, components of Electric Circuits
- Ohm's law & Kirchhoff's laws, Resistance and source combinations.
- Techniques for solving DC electric circuits.
- AC sinusoidal sources, time domain and frequency domain,
- Inductance and capacitance, Phasor, impedance and phasor diagram.
- Techniques for solving AC electric circuits and Steady state power analysis.

Course Contents:	
Unit 1	Basic concepts, components of Electric Circuits.
Unit II :	Laws (Ohm's law & Kirchhoff's laws).
Unit III:	Resistance and source combinations. Voltage and current division.
Unit IV:	Techniques for solving DC electric circuits.
Unit V:	AC sinusoidal sources, time domain and frequency domain,
Unit VI:	Inductance and capacitance.
Unit VII:	Phasor, impedance and phasor diagram.
Unit VIII:	Techniques for solving AC electric circuits and Steady state power.

Text Book (s):

- "Electric Circuits", James W. Nilsson and Susan A. Riedel, Addison Wesley, most recent edition

Reference Book (s):

- "Basic Engineering Circuit Analysis", J. D. Irwin, Fourth edition, Macmillan, 2002

Mode of Evaluation:

- Mid-Term Tests (Not less than two Exams.) …… (30 %)
- Practical Work …….. (20 %)
- Final Exam. ……..…… . (50 %)

Course Title	Engineering Economy	Coordinator			
Course Code	424-IE-2	Credit Hrs.	2	Contact Hrs.	2
Prerequisites	None	Level/Year		9/5	

Couse Objective:

- Understanding basic concept of Engineering Economy
- Understanding fundamental concept of Time value relationship
- Understanding different measures used in comparing alternatives and economic decision making
- Develop skills of estimating cost exchange rate, budget and revenues.

Teaching Method:
Lectures, Training exercises

Expected Learning Outcome:

- Acquire a general knowledge about the Engineering Economy
- Acquire the fundamental concept of Time value relationship
- Achieve knowledge of different alternatives and economic decision making
- Acquire knowledge to work on different engineering project.

Course Contents:	
Unit 1	• Introduction to engineering Economics • Cost concept and design Economics
Unit II :	• Money time relationship and equivalence
Unit III:	• Calculating present and future worth and equivalent uniform Annual series • Comparing alternatives and decision making criteria
Unit IV:	• Method of depreciation • Evaluation and analysis of engineering project and feasibility study • Dealing with risk and uncertainty
Unit V:	• Cost estimating techniques • Market research and exchange rate • Balance sheet and trading account

Text Book (s): William G Sullivan,Ellin M Wicks and James Luxhoj,Engineering economy ,13th Edition,Prentice Hall,2005

Reference Book (s): White Agee and Case,Principle of Engineering Economics analysis,4th Edition ,2001

Mode of Evaluation:

- Mid-Term Tests (Not less than two Exams.) …… (50 %)
- Final Exam. ……. . (50 %)

General Education

Course Title	Intensive English Program (1)	Coordinator			
Course Code	011-ENG-6	Credit Hrs.	6	Contact Hrs.	12
Prerequisites	None	Level/Year		1/1	

Couse Objective:

- To prepare students to communicate in real life situations.
- To enhance students proficiency level in English.
- To enhance their aural comprehension and oral expression.
- To use the forms and constructions of basic grammatical structures.
- To enable students to write different forms of composition, such as letters, recommendations, paragraphs, e-mails etc.

Teaching Method:

Following strategies can be applied in the classroom teaching:

- Activities-based teaching
- Writing Strategy : Guided, Controlled and Free
- Reading Strategy : Silent Reading, Model Reading, Reading Aloud and Shared Reading
- Listening Strategy: Listen-Think-Pair-Share, Questioning, Role-play.
- Speaking strategy: Students will be given opportunities to speak in the classroom

Expected Learning Outcome:

- To acquire the rules of spelling and pronunciation.
- To know different forms of writing.
- To acquire the basic grammatical structures of English.
- To identify different stress and intonation patterns.

Course Contents:	
Unit 1:	• Listening skill focus: Reflecting on listening • Speaking skill focus: Asking for help with vocabulary
Unit II	• Listening skill focus: Activating background knowledge • Speaking skill focus: Reflecting on speaking
Unit III:	• Topic: Plants; bees • Listening skill focus: Activating background knowledge 2 • Speaking skill focus: Asking for clarification vocabulary
Unit IV:	• Listening skill focus: Predicting • Speaking skill focus: Taking time to think
Unit V:	• Listening skill focus: Listening for main ideas • Speaking skill focus: Clarifying
Unit VI	• Listening skill focus: Working out unknown vocabulary • Speaking skill focus: Asking for further information
Unit VII	• Listening skill focus: Identifying speculative language • Speaking skill focus: Using expressions to show interest
Unit VIII	• Listening skill focus: Listening for specific information

	• Speaking skill focus: Elaborating
Unit IX	• Listening skill focus: Identifying sequencers • Speaking skill focus: Saying percentages and fractions
Unit X	• Listening skill focus: Summarizing • Speaking skill focus: Giving presentations
Unit XI	• Listening skill focus: Listening for examples • Speaking skill focus: Giving opinions and responding to opinions
Unit XII	• Listening skill focus: Identifying important points • Speaking skill focus: Rephrasing to check understanding

Text Book (s):

- Blackwell, Angela. Open Forum (1) Academic Listening and Speaking. Oxford: Oxford University Press, 2007
- Blass, Laurie. Well Read 1. Oxford: Oxford University Press, 2008.

Reference Book (s):

- McCarthy, Michael. Touchstone (1) Student's Book. Dubai: Cambridge and Obeikan, 2009.
- McCarthy, Michael. Touchstone (1) Workbook. Dubai: Cambridge and Obeikan, 2009.
- Rivers, Susan. Touchstone (2) Student's Book. Dubai: Cambridge and Obeikan, 2009. (Units 1-6)
- Rivers, Susan. Touchstone (2) Workbook. Dubai: Cambridge and Obeikan, 2009. (Units 1-6)

Mode of Evaluation:

- First written test……25%
- Second written test……25%
- Final Exam……50%

Course Title	Intensive English Program(II)	Coordinator			
Course Code	012-ENG-6	Credit Hrs.	6	Contact Hrs.	12
Prerequisites	011-ENG -6	Level/Year	2/1		

Couse Objective:

- To introduce students to the basic terminology of technology.
- To prepare students to communicate in real life situations.
- To enhance students aural comprehension and oral expression.
- To use the forms and constructions of basic grammatical structures.
- To enhance students proficiency level in English.
- To enable students to write different forms of composition, such as letters, recommendations, paragraphs, e-mails etc.
- To enhance students level of reading comprehension

Teaching Method:

The following strategies can be applied in the classroom teaching:

- Activities-based teaching
- Writing Strategy : Guided, Controlled and Free
- Reading Strategy : Silent reading, model reading, reading aloud and shared Reading
- Listening Strategy: Listen-Think-Pair-Share, Questioning, Role-play.
- Speaking strategy: Students will be given opportunities to speak in the classroom,

Expected Learning Outcome:

- To acquire the rules of spelling and pronunciation.
- To know different forms of writing.
- To acquire the basic grammatical structures of English.
- To identify different stress and intonation patterns

Course Contents:	
Unit 1:	• Listening skill focus: Activating background knowledge • Speaking skill focus: Rephrasing on speaking
Unit II	• Listening skill focus: Reflecting on listening • Speaking skill focus: Elaborating to keep a conversation going
Unit III:	• Listening skill focus: Predicting • Speaking skill focus: Hesitating and taking time to think
Unit IV:	• Listening skill focus: Listening for main points • Speaking skill focus: Using imprecision
Unit V:	• Listening skill focus: Working out unknown vocabulary • Speaking skill focus: Asking for further information
Unit VI	• Listening skill focus: Identifying organizing phrases • Speaking skill focus: Expressing opinions
Unit VII	• Listening skill focus: Intensive listening for numbers • Speaking skill focus: Preparing for presentations
Unit VIII	• Listening skill focus: Identifying the purpose of a story or

	example • Speaking skill focus: Explaining a process
Unit IX	• Listening skill focus: Summarizing • Speaking skill focus: Checking for understanding
Unit X	• Listening skill focus: Identifying opinions and supporting arguments • Speaking skill focus: Using repetition for emphasis
Unit XI	• Listening skill focus: Identifying key words to understand details • Speaking skill focus: Managing conversation
Unit XII	• Listening skill focus: Using phrase to work out meaning • Speaking skill focus: Meaning a group discussion

Text Book (s):

- . Blackwell, Angela. Open Forum (2) Academic Listening and Speaking. Oxford: Oxford University Press, 2006.
- Blass, Laurie. Well Read 2. Oxford: Oxford University Press, 2008.

Reference Book (s):

- Rivers, Susan. Touchstone (2) Student's Book. Dubai: Cambridge and Obeikan, 2009. (Units 7-12)
- Rivers, Susan. Touchstone (2) Workbook. Dubai: Cambridge and Obeikan, 2009. (Units 7-12)
- McCarthy, Michel. Touchstone (3) Student's Book. Dubai: Cambridge and Obeikan, 2010.
- McCarthy, Michel. Touchstone (3) Workbook. Dubai: Cambridge and Obeikan, 2010.

Mode of Evaluation:

- First written test……25%
- Second written test……25%
- Final Exam……50%

Course Title	**The Entrance to the Islamic culture (I)**	**Coordinator**			
Course Code	111-IC1-2	**Credit Hrs.**	2	**Contact Hrs.**	2
Prerequisites	None	**Level/Year**		2/1	

Course Objectives:
After the completion of this course, it is expected that the student be able to:

- Entrenched correct doctrine derived from the Quran and Sunnah in the hearts of students.
- Understanding the assets of Six faith.
- Students realize what is contrary to faith or perfection.

Teaching Method: Lectures

Expected Learning Outcome:

Course Contents:	
Unit 1	The definition of culture and characteristics, and clarify the meaning of faith, and the call to faith, and faith assets.
Unit II	Deism and the unification of divinity and their meaning and their relationship.
Unit III	Methods of the Koran in calling for the unification of divinity, and photos of polytheism and dangerous
Unit IV	Belief in the Angels and the position of the Koran and books of the previous books Belief in the Messengers The definition of heresy and kinds

Text Book (s):

- Book guidance to the true belief and the response to the atheism -Dr.alfozan

Reference Book (s):

- Profiles in Islamic culture-Omar Khatib
- Unification-Mohammed Abdel Wahab
- The religion- Mohammed Draz

Mode of Evaluation:

- Mid-Term-1 Tests ……..…..……..…..(25 %)
- Mid-Term-2 Tests ……..…….. (25 %)
- Final Exam. ……..……. …….. (50 %)

Course Title	Islamic culture (II)	Coordinator			
Course Code	112-IC1-2	Credit Hrs.	2	Contact Hrs.	2
Prerequisites	None	Level/Year		3/2	

Course Objectives:

After the completion of this course, it is expected that the student be able to:

- Identify the implications of applying the Islamic regime the lives of individuals communities
- Knowledge of rights and rulers in Islamic law
- Recognition of human rights in the Islamic systems
- To identify the advantages of Islamic economy
- Identify the characteristics of the Islamic economy system.

Teaching Method: Lectures

Course Contents:	
Unit 1 The political side	• Advantages of the political system in Islam • State concept in Islam • The purpose of the establishment of the state in Islam • Staff of the Islamic state • External relations of the Islamic countries in case of war and peace
Unit II	• The rules of the political system in Islam • Three authorities in the Islamic state • Aspects of the application of Islam in Saudi Arabia • Duties of the Guardian in the Islamic state • Definition of human rights in Islam • Human Rights in Islam • Muslims' relations with non-Muslims in Islam
Unit III The economic side	• The concept of Islamic economics • Islamic economic system properties • It targets the Islamic economic system.
Unit IV	• Mainstays in Islamic Economics • Banks, its history, and its divisions • Banking transactions, Insurance and its divisions

Text Book (s):

- The political system in Islam-facilitation to Dr. Saad
- Economic System in Islam-Dr Omar Faihan

Reference Book (s):

- The relationship between the ruler and the ruled by Sheikh bin Baz
- Treatment of referees in the Quran and Sunnah to Dr. Abdul Salam Barjas

Mode of Evaluation:

- Mid-Term-1 Tests ……..…..……..…..(25 %)
- Mid-Term-2 Tests ……..…….. (25 %)
- Final Exam. ……..…… …….. (50 %)

Course Title	Islamic culture (III)	Coordinator			
Course Code	113-IC1-2	Credit Hrs.	2	Contact Hrs.	2
Prerequisites	None	Level/Year		4/2	

Course Objectives:
After the completion of this course, it is expected that the student be able to:

- Identify the characteristics of the Muslim community
- Acquainted with the teachings of Islam in the area of family formation
- Acquainted with the teachings of Islam and guidance
- The concept of the Muslim community

Teaching Method: Lectures

Expected Learning Outcome:

Course Contents:	
Unit 1	• The concept of the Muslim community • Rights in Islam • The concept of an Islamic society
Unit II	• Muslim community properties • And means of strengthening social ties • The most important social problems
Unit III	• Family in Islam • Introductions of marriage • Marriage and his goals
Unit IV	• The impact of the marriage contract • And means of strengthening family ties • The most important family issues

Text Book (s):

- Islam and society to Professor Hassan Abdul Ghani

Reference Book (s):

- Islam and society to Dr. Ahmed Mohammed El-Assal
- The assets of the social system in Islam Dr. Muhammad Tahir Ashour

Mode of Evaluation:

- Mid-Term-1 Tests ……..…..……..…..(25 %)
- Mid-Term-2 Tests ……..…….. (25 %)
- Final Exam. ……..……. …….. (50 %)

Course Title	Islamic culture (IV)	Coordinator			
Course Code	114-IC1-2	Credit Hrs.	2	Contact Hrs.	2
Prerequisites	None	Level/Year		6/3	

Course Objectives:
After the completion of this course, it is expected that the student be able to:

- Identify intellectual invasion of the Islamic world methods
- Understanding the contemporary Muslim world challenges
- Prevention of destructive ideologies

Teaching Method: Lectures

Expected Learning Outcome:

Course Contents:	
Unit 1	• Colonization • Secularism • National
Unit II	• Christianization • Orientalism • Freemasonry
Unit III	• Zionism • Globalization • Cognitive and technical challenge
Unit IV	• Economic challenge • Political challenge • Unit Muslim world • Economic development

Text Book (s):

- Methods of intellectual invasion of Dr. Ali Abu Gereshsa
- Secular Dr. Mohamed Kotb.

Reference Book (s):

- Critique of Arab nationalism of Sheikh bin Baz
- Orientalism and the intellectual background of the conflict of civilization to Dr. Mahmoud Zaqzouq

Mode of Evaluation:

- Mid-Term-1 Tests ……..…..……..…..(25 %)
- Mid-Term-2 Tests ……..…….. (25 %)
- Final Exam. ……. …….. (50 %)

Course Title	Arabic Language Skills	Coordinator			
Course Code	201-ARAB-2	Credit Hrs.	2	Contact Hrs.	2
Prerequisites	None	Level/Year		3/2	

Couse Objective:

- Development of Students Positive attitude towards the language regarding, reading ,writing, and Performance & the correctness of linguistic expression and avoiding error
- To provide the student with a glance at the language and its figure and the history of Arabic arts

Teaching Method:

- Lectures & E Learning classes
- Dialogues and Discussion
- Self Learning

Expected Learning Outcome:

- To identify the types of words
- To know the sign of each type of words
- To differentiate noun,verb and particle
- To be acquainted with how to parse

Course Contents:	
Unit 1: Introduction to Linguistic Skill+Types of words	• Introduce student to the course,its main goal and included scientific topics • Noun makers,Verb Makers etc
Unit II : Parsing of Noun and Verbs	• Apparent and non Apparent parsing of Nouns • Apparent and non Apparent parsing of Verbs • Major Parsing Sign of movement • Secondary Parsing Sign of movement
Unit III: Suffixation I	• Plural Masculine and Plural Feminine
Unit IV: Suffixation II	• Six Nouns
Unit V: Case Ending	• Nouns Regularities
Unit VI:Semantics	• Generalization and Specialization of words • Indication of Nouns and Verbs
Unit VII:Some Arab Figures	• Khalid bin Ahmed • Fareehidi • Sibawayh

Text Book (s):

- The concise of Arabic language grammer,Said AlAfghani ,Mustafa Ameen
- The philology and Arabic properties, Mohammad Almubarak
- The obvious syntax of Arabic Grammer

Reference Book (s):

• The Arabic Dictionary,D Raid Zaki Qasim • The classical councils for Arabic language science and Arts
Mode of Evaluation: • First written test……15% • Second written test……10% • Assignment……25% • Final Exam……50%

Course Title	Arabic Editing	Coordinator		Group of teachers	
Course Code	202-ARAB-2	Credit Hrs.	2	Contact Hrs.	2
Prerequisites	None	Level/Year		5/3	

Couse Objective:

- To write the correct spelling according to right rule
- Learn techniques of Arabic writing
- Avoid frequent errors
- Master the use of punctuation

Teaching Method:

- Lectures & E Learning classes
- Dialogues and Discussion
- Self Learning

Expected Learning Outcome:

- Enable student to write according to writing rules
- Learn the techniques of Arabic writing

Course Contents:	
Unit 1: Introduction to Arabic Writing	• Introduce student to the course, its main goal and included scientific topics • Clarify the course learning
Unit II :Hamza	• Hamza at beginning, middle and end of words
Unit III: Punctuation	• Punctuation rules
Unit IV: Error	• Common errors
Unit V: Rules of Writing	• Essay • Research • Letter • Report • Summary

Text Book (s):

- The Art of Arabic Writing- Mohammed Saleh Shanti

Reference Book (s):

- The rule of spelling-Abdul Salam Haroun
- Dictionary of Parsing and spelling-Amel Jacob
- Notebook-Abdul Hadi Harb

Mode of Evaluation:

- First written test……20%
- Second written test……20%
- Oral Participation……..5%
- Assignment……5%
- Final Exam……50%

Course Title	Technical Reports Writing	Coordinator			
Course Code	301-NGL-2	Credit Hrs.	2	Contact Hrs.	2
Prerequisites	012-ENG-6	Level/Year		5/3	

Couse Objective:

- To help develop communicative writing skills
- To enrich the understanding of the roles that writing and reading play in activities outside and inside the university.
- To offer a structured approach to writing.
- To familiarize students with the process of writing.
- To develop their grammar and mechanical writing skills.
- To enable students to write technical reports.

Teaching Method:

The following strategies can be applied in the classroom teaching:

- Modeling
- Repeated practice
- Guided, Controlled and Free Writing,

Expected Learning Outcome:

After studying this course, the students will be able to:

- Rules of Capitalization
- Use of punctuation
- Understanding the concept of paragraph
- Three basic types of paragraph
- Chronological process
- Spatial description
- Listing
- How to use examples
- How to express and support their opinions
- How to write brief technical reports.

Course Contents:	
Unit 1:	• Warming up/ Orientation • Organization • Grammar & Mechanics • Sentence Structure • The Writing Process
Unit II	• Prewriting Brainstorming Part 1: Organization • Sentence Structure • Grammar & Mechanics • The Writing Process
Unit III:	• Prewriting Descriptive Details Part 1 Organization • Grammar & Mechanics • Sentence Structure

	• Writing process
Unit IV:	• Prewriting Part 1 Organization • Part 2 Sentence Structure Part 3 Grammar & Mechanics & Part 4 The Writing Process
Text Book (s): • Hogue, Ann. First Steps in Academic Writing.	
Reference Book (s): • Academic Journals • New inventions • Situation based material	
Mode of Evaluation: • First written test……25% • Second written test……25% • Final Exam……50%	

Electrical Engineering Courses

Course Title	**Electric Circuits-2**	**Coordinator**		Dr. Bushara Elnoor	
Course Code	221-EE-3	**Credit Hrs.**	**3**	**Contact Hrs.**	**4**
Prerequisites	211-EE-3	**Level/Year**		**4/2**	

Course Objective:

- The main purpose of this course is to teach the students the design and analysis of electric circuits.
- To understand the relation between three phase variables and to analyze three phase circuits.
- To understand, how to analyze mutually coupled circuits.

Teaching Method:

- Lectures, Training exercises (Tutorial + Labs, Assignments, Reports)

Expected Learning Outcome:

- To understand knowledge of societal, health, safety, legal management, sustainability and cultural issues and the consequent responsibility reverent to Electrical Engineering
- An ability to design and conduct experiments, analyze and interpret data
- The ability to function on multidisciplinary teams

Course Contents:	
Unit 1:	• Transient behavior of electrical circuits
Unit II :	• Transient analysis of RL and RC circuits. • Transient analysis of RLC series and parallel circuits. • Three phase circuits
Unit III:	• Mutually coupled circuits
Unit IV:	• Series and parallel resonance,First order filters,
Unit V :	• Two Ports Networks

Text Book (s):

- Alexandar, Mathew," Fundamentals of electric circuits", 4thEdition

Mode of Evaluation:

- Mid-Term Tests (Not less than two Exams.) ……..…… (30 %)
- Practical Work ……..…….... (10 %)
- Assignments + E-Learning……..…… (10 %)
- Final Exam. ……..…….(50 %)

Course Title	**Measurement and Measuring instruments.**	**Coordinator**		Dr. Fazle Azeem	
Course Code	222-EE-3	**Credit Hrs.**	**3**	**Contact Hrs.**	**4**
Prerequisites	221-EE-3	**Level/Year**		**4/2**	

Course Objective:

- Awareness for the importance of understanding and selection of the suitable measurement instruments in the electrical sites**.**
- Ability to work independently and as part of a team

Teaching Method:

- Lectures, Training exercises (Tutorial + Labs, Assignments, Reports)

Expected Learning Outcome:

- To define knowledge of mathematics, science and engineering fundamentals relevant to engineering, together with in depth knowledge of EE
- An ability to design a system, component or process to meet desired needs within realistic constraints.
- An ability to identify, formulate, and solve engineering problems
- An understanding of professional and ethical responsibility

Course Contents:	
Unit 1:	• Classification of measurement methods Definitions of Measurement:
Unit II :	• The DC instruments PMMC
Unit III:	• The Rectification instruments: Ammeter – Voltmeter • The Rectification circuits and analysis
Unit IV:	• Theory of the AC instruments • The Electrodynamometer wattmeter – errors
Unit V :	• The Bridge measurements • The CRO (construction and operation)

Text Book (s):

- Modern Electronic Instrumentation and Measurement Techniques.", by A D Helfrick & W D Cooper, Prentice Hall International

Reference Book (s):

- A.K.Sawhney, (1985), "Electrical and Electronic Measurements and instrumentation",Dhanpat Rai & Sons

Mode of Evaluation:

- Mid-Term Tests (Not less than two Exams.) ……..…… (30 %)
- Practical Work ……..…….... (10 %)
- Assignments + E-Learning…….……..……. (10 %)
- Final Exam. ……..……..…..(50 %)

Course Title	**Electronic Engineering**	**Coordinator**		Dr. Muneer P	
Course Code	223-EE-3	**Credit Hrs.**	**3**	**Contact Hrs.**	**4**
Prerequisites	219-PHYS-2	**Level/Year**		**4/2**	

Course Objective:

- To inculcate in students with the basic working principle of different electronic devices and their applications in the modern electronic systems.

Teaching Method:

- Lectures, Training exercises (Tutorial + Labs, Assignments, Reports)

Expected Learning Outcome:

- The broad education necessary to understand the impact of nengineering solutions in a global, economic, environmental and societal context.
- An ability to identify, formulate, and solve engineering problems.
- An understanding of professional and ethical responsibility

Course Contents:	
Unit 1:	SEMICONDUCTOR BASICS • Atomic structure • Conductors, Semiconductors and insulators • N-type, P-type Semiconductors
Unit II :	DIODES • Diode V-I Characteristic Carve • Diode Models, Diode testing • DIODE APPLICATIONS • Half wave Rectifier & Bridge Rectifier • Filters, Limiters, Voltage Regulators
Unit III:	SPECIAL –PURPOSE DIODES • Zener diodes • Varacter Diodes • Other Types
Unit IV:	BJT • The transistor as an amplifier • The transistor as a switch
Unit V :	TRANSISTOR BAIS CIRCUITS • DC operating point • Voltage divider bias • Common emitter bias

Text Book (s):

- Electronic Devices (Electron Flow Version), 9th Edition by Thomas L. Floyd

Mode of Evaluation:

- Mid-Term Tests (Not less than two Exams.) ……..…..… (30 %)
- Practical Work ……..……... (10 %)
- Assignments + E-Learning…….……..……. (10 %)
- Final Exam. ……..……..….(50 %)

Course Title	**Electromagnetic Fields**	**Coordinator**		Dr. Mohammed Zubair Mohammed Shamim	
Course Code	311-EE-3	**Credit Hrs.**	**3**	**Contact Hrs.**	**4**
Prerequisites	219-PHYS-2, 211-EE-3	**Level/Year**		**5/3**	

Course Objective:

- To inculcate in students with different aspects of Electromagnetic fields and its applications in modern world communication systems.
- By the end of the course, the student should be familiar with the following topics: Vector Algebra, Co-ordinate Systems and Transformations.

Teaching Method:

- Lectures, Training exercises (Tutorial + Labs, Assignments, Reports)

Expected Learning Outcome:

- Ability to use the techniques, skills, and modern engineering tools necessary for engineering practice.
- Knowledge of contemporary Issues.
- An ability to communicate effectively.
- An ability to identify, formulate, and solve engineering problems.
- To define knowledge of mathematics, science and engineering fundamentals relevant to engineering, together with in depth knowledge of EE

Course Contents:	
Unit 1:	• Vector Algebra, Co-ordinate Systems and Transformations,
Unit II :	• Vector Calculus, Electrostatic Fields
Unit III:	• Electric Fields in Material Space, Magnetostatic Fields
Unit IV:	• Magnetic Forces, Materials and Devices.
Unit V :	• Applications of Electromagnetic Fields.

Text Book (s):

- Elements of Electromagnetics, By Matthew N. O. Sadiku, Oxford University Press

Mode of Evaluation:

- Mid-Term Tests (Not less than two Exams.) ……..…… (30 %)
- Practical Work ……..…….... (10 %)
- Assignments + E-Learning…….……..……. (10 %)
- Final Exam. ……..……..….(50 %)

Course Title	Logic Circuits	Coordinator		Dr. Fakhereldin	
Course Code	312-EE-3	Credit Hrs.	3	Contact Hrs.	4
Prerequisites	222-EE-3	Level/Year		5/3	

Course Objective:

- Understand the basic theorems for logic circuits, principles of operations and their models.
- Analysis of numerical conversion methods and different applications for logic circuits.

Teaching Method:

- Lectures, Training exercises (Tutorial + Labs, Assignments, Reports)

Expected Learning Outcome:

- To define knowledge of mathematics, science and engineering fundamentals relevant to engineering, together with in depth knowledge of EE.
- An ability to apply Knowledge of mathematics, science and engineering.
- Recognition of the need for and an ability to engage in lifelong learning

Course Contents:	
Unit 1:	• Review on number systems • Switching function
Unit II :	• Design using NAND and NOR gates • Storage devices • Sequential circuits
Unit III:	• Adders • Subtractors • Decoders
Unit IV:	• Coders • Multiplexer/de-multiplexer • Memories (ROM,PLA, RAM).
Unit V :	• Introduction to microprocessors.

Text Book (s):

- Moris,"Digital Design", Prentice Hall, most recent editionSpecific course information

Mode of Evaluation:

- Mid-Term Tests (Not less than two Exams.) ……..…… (30 %)
- Practical Work ……..…….... (10 %)
- Assignments + E-Learning…….……..……. (10 %)
- Final Exam. ……..…….….(50 %)

Course Title	**Energy Conversion**	**Coordinator**		Dr. Bushara Elnoor	
Course Code	313-EE-3	**Credit Hrs.**	**3**	**Contact Hrs.**	**4**
Prerequisites	222-EE-3	**Level/Year**		**5/3**	

Course Objective:

- Classify the types of energy sources.
- Define the different components of electromechanical energy converters.
- Mention the main basis of energy conversion

Teaching Method:

- Lectures, Training exercises (Tutorial + Labs, Assignments, Reports)

Expected Learning Outcome:

- To understand knowledge of societal, health, safety, legal management, sustainability and cultural issues and the consequent responsibility reverent to Electrical Engineering
- An ability to design and conduct experiments, analyze and interpret data
- The ability to function on multidisciplinary teams

Course Contents:	
Unit 1:	• Introduction – Magnetic circuit- Flux, flux density • Introduction to electromechanical energy conversion, energy sources, energy, co-energy, storage energy.
Unit II :	• Introduction To Rotating Machines - AC And DC Machines • Elementary Concepts • multi-excited system
Unit III:	• Introduction To AC And DC Machines • MMF Of Distribution Winding • Generated Voltage • Torque In Non-Salient Pole Machines-MMF Of Distribution Winding • Magnetic Field In Rotating Machine
Unit IV:	• Rotating MMF Waves In AC Machines • Renewable Energy
Unit V :	• Solar Energy- solar cell • Wind Energy

Text Book (s):

- Electric Machinery by fitzgerald

Mode of Evaluation:

- Mid-Term Tests (Not less than two Exams.) ……..…… (30 %)
- Practical Work ……..…….... (10 %)
- Assignments + E-Learning…….……..……. (10 %)
- Final Exam. ……..…….(50 %)

Course Title	Signal Processing	Coordinator		Dr. Mohammed Al-RayifAsseri	
Course Code	322-EE-3	Credit Hrs.	3	Contact Hrs.	4
Prerequisites	219-PHYS-3, 219-MATH-3	Level/Year		6/3	

Course Objective:

- To understand the scenario of the telecommunication technique.
- To classify signals and systems.
- To understand the benefits of signals' operation.
- To learn to implement the important signals, and the reasons behind their importance.

Teaching Method:

- Lectures, Training exercises (Tutorial + Labs, Assignments, Reports)

Expected Learning Outcome:

- To define knowledge of mathematics, science and engineering fundamentals relevant to engineering, together with in depth knowledge of EE
- An ability to identify, formulate, and solve engineering problems
- An understanding of professional and ethical responsibility

Course Contents:	
Unit 1:	• Continuous time (CT) and discrete-time (DT) signals, • Basic system properties. Linear time-invariant (LTI) systems • Discrete-time LTI systems
Unit II :	• The convolution sum, Continuous-time LTI systems • Properties of LTI systems.
Unit III:	• Fourier series representation of periodic signals. • Fourier series representation of discrete Signals.
Unit IV:	• The properties of continuous-time Fourier transform. • The discrete-time & Continuous-time Fourier transform
Unit V :	• The Z-transform: Region of convergence, The Inverse Z-transform, Properties of the Z-transform.

Text Book (s):

- Oppenheim, Willsky, and Nawab, "Signal and Systems", Prentice Hall, most recent edition
- Edward W. Kamen and Bonnie S. Heck, Fundamentals of Signals and Systems, using the WEB and Matlab, Pearson Prentice Hall, Inc., New Jersey, 3rd Edition, 2007

Reference Book (s):

- Haykin, and Veen, "Signal and Systems", John Wiley, most recent edition.
- Ifeachor Jervis, "Digital Signal Processing", A practical approach, Pearson Prentice Hall, Inc., 2nd Edition.
- Proakis, Digital Communication, McGraw Hill, Inc., 4th Edition.

Mode of Evaluation:

- Mid-Term Tests (Not less than two Exams.) ……..…… (30 %)
- Practical Work ……..…….... (10 %)
- Assignments + E-Learning…….……..……. (10 %)
- Final Exam. ……..……..…(50 %)

Course Title	Electronic Circuits-1	Coordinator		Dr. Thafasal Ijyas	
Course Code	323-EE-3	**Credit Hrs.**	**3**	**Contact Hrs.**	**4**
Prerequisites	223-EE-3	**Level/Year**		**6/3**	

Course Objective:

- The main purpose of this course is to teach the students the design and analysis of electronic amplifier circuits

Teaching Method:

- Lectures, Training exercises (Tutorial + Labs, Assignments, Reports)

Expected Learning Outcome:

- The broad education necessary to understand the impact of nengineering solutions in a global, economic, environmental and societal context.
- Knowledge of contemporary Issues.
- An ability to communicate effectively.
- An ability to identify, formulate, and solve engineering problems.
- An understanding of professional and ethical responsibility

Course Contents:	
Unit 1:	• Amplifier operation, Transistor AC equivalent circuits • BJT Amplifiers • Common-Emitter, Common-base, Common-Collector • Darlington pair • Multistage Amplifier
Unit II :	• FETs • JFET Characteristics and Parameters • JFET Biasing Techniques & Stability • The MOSFET Transistors Characteristics and Parameters
Unit III:	• FET Amplifiers: Common Source, Common Drain,Common-Gate
Unit IV:	• Power Amplifiers • Class A & B Power Amplifiers • Power Amplifiers
Unit V :	• Class AB • Push-Pull Amplifier • Amplifiers Frequency Response • Low frequency Response • High frequency Response

Text Book (s):

- Electronic Devices , 2nd edition, Thomas Floyd, Pearson

Mode of Evaluation:

- Mid-Term Tests (Not less than two Exams.) ……..…… (30 %)
- Practical Work ……..…….... (10 %)
- Assignments + E-Learning……..…….. (10 %)
- Final Exam. ……..……..….(50 %)

Course Title	**Computerized Methods for Engineering**	**Coordinator**		Dr. Usman Mohammed MohammedFarooq	
Course Code	324-EE-3	**Credit Hrs.**	**3**	**Contact Hrs.**	**4**
Prerequisites	319-MATH-2	**Level/Year**		**6/3**	

Course Objective:

- The course in intended to develop an understanding and ability of the implementation of mathematical techniques on a digital computer.
- Memorize syntax of Matlab commands.

Teaching Method:

- Lectures, Training exercises (Tutorial + Labs, Assignments, Reports)

Expected Learning Outcome:

- Ability to use the techniques, skills, and modern engineering tools necessary for engineering practice.
- Knowledge of contemporary Issues.
- An ability to communicate effectively.
- An ability to identify, formulate, and solve engineering problems.

To define knowledge of mathematics, science and engineering fundamentals relevant to engineering, together with in depth knowledge of EE

Course Contents:	
Unit 1:	• Basics of Matrices and linear algebra • Solutions of Linear Equations: • Direct Methods: • Cramer's Rule, • Matrix Inversion Method, • Gaussian Elimination Method, • Gauss - Jordon Method, • Matlab implementation
Unit II :	• Iterative Method: • Jacobi Method, • Gauss - Seidal Method, • Matlab implementation
Unit III:	• Solutions of Non-Linear Equations: • Root of a function, condition for root to lie between to end-points, • Bisection Method, • Secant Method, • Newton-Raphson Method, • Matlab implementation.
Unit IV:	• Solution of Ordinary Differential Equations: • 1st order differential equation,

	• nth order differential equation, • Solution of 1st order D.E: Taylor Series, Euler's Method, • Modified Euler's Method, • Runge – Kutta Methods
Unit V :	• Matlab programming to solve differential equations • Systems of O.D. Equations and Higher Order Diff. equations.
Text Book (s): • Numerical Methods, R.V.Dukkipati., 2010, New Age International Publishers	
Reference Book (s): • Introduction to numerical analysis Using MATLAB, Rizwan Butt, 2009, Jones and Bartlett Publisher. • MATLAB/SIMULINK: User's Guide", 2016, Mathworks Inc.	
Mode of Evaluation: • Mid-Term Tests (Not less than two Exams.) ……..…… (30 %) • Practical Work ……..…….... (10 %) • Assignments + E-Learning…….……..……. (10 %) • Final Exam. ……..……..….(50 %)	

Course Title	**Principles of electrical machines**	**Coordinator**		Dr. Zakaria Mohamed Salem	
Course Code	411-EE-3	**Credit Hrs.**	**3**	**Contact Hrs.**	**4**
Prerequisites	313-EE-3	**Level/Year**		**7/4**	

Course Objective:

- At the end of this course, the student should be able to study DC machines, transformer and AC machines.

Teaching Method:

- Lectures, Training exercises (Tutorial + Labs, Assignments, Reports)

Expected Learning Outcome:

- To define knowledge of mathematics, science and engineering fundamentals relevant to engineering, together with in depth knowledge of EE.
- An ability to apply Knowledge of mathematics, science and engineering.
- Recognition of the need for and an ability to engage in lifelong learning

Course Contents:	
Unit 1:	• Construction and Types of DC Machines: • DC generator characteristics. • Characteristics and starting of DC motors: • Construction of single phase transformer and difference between ideal and practical transformers.
Unit II :	• Three phase induction motors: construction, theory of operation, equivalent circuit. • Exact and approximate equivalent circuits. Transformer characteristics. Transformer parameters determination,
Unit III:	• Characteristics of 3-phase induction motor, starting and speed control of 3-phase induction motors
Unit IV:	• 3-ph Synchronous Machines: Construction and EMF equation, types of rotors, equivalent circuit.
Unit V :	• Phasor diagram. Loading conditions, voltage regulation. Synchronous motor

Text Book (s):

- "Electric Machines", Drives and Power Systems", Theodore Wildi, Prentice Hall, 1996.

Mode of Evaluation:

- Mid-Term Tests (Not less than two Exams.) ……..…… (30 %)
- Practical Work ……..…….... (10 %)
- Assignments + E-Learning…….……..……. (10 %)
- Final Exam. ……..…….(50 %)

Course Title	**Automatic Control**	**Coordinator**		Dr. Monji Mohamed Zaidi	
Course Code	412-EE-3	**Credit Hrs.**	**3**	**Contact Hrs.**	**4**
Prerequisites	221-EE-3	**Level/Year**		**7/4**	

Course Objective:

- This course introduces the design of feedback control systems as applied to a variety of air and spacecraft systems.
- Topics include the properties and advantages of feedback systems, time-domain and frequency-domain performance measures, stability and degree of stability, the Root locus method, Nyquist criterion, frequency-domain design, and state space methods

Teaching Method:

- Lectures, Training exercises (Tutorial + Labs, Assignments, Reports)

Expected Learning Outcome:

- To understand knowledge of societal, health, safety, legal management, sustainability and cultural issues and the consequent responsibility reverent to Electrical Engineering
- An ability to design and conduct experiments, analyze and interpret data
- The ability to function on multidisciplinary teams

Course Contents:	
Unit 1:	Introduction and System Modeling
Unit II :	Block Diagram reduction technique
Unit III:	Performance of Feedback Control SysteM
Unit IV:	Control of feedback control system
Unit V :	Frequency response

Text Book (s):

- ‘’KATSUHIKO OGATA, Modern Control Engineering, Fourth Edition’’ 2003

Mode of Evaluation:

- Mid-Term Tests (Not less than two Exams.) ……..…… (30 %)
- Practical Work ……..…….... (10 %)
- Assignments + E-Learning……..……..…… (10 %)
- Final Exam. ……..……..….(50 %)

Course Title	Communication Systems	Coordinator		Dr. Usman Mohammed	
Course Code	413-EE-3	**Credit Hrs.**	**3**	**Contact Hrs.**	**4**
Prerequisites	322-EE-3, 329-MATH-3	**Level/Year**		**7/4**	

Course Objective:

- Understand the analysis of communication systems.
- Analysis of types of modulation systems types of receivers, transmitters andmultiplexing methods.
- Understand The digital representation of analog signals, and have introduction to information theory and Coding.
- Apply the communication systems on Lab

Teaching Method:

- Lectures, Training exercises (Tutorial + Labs, Assignments, Reports)

Expected Learning Outcome:

- To define knowledge of mathematics, science and engineering fundamentals relevant to engineering, together with in depth knowledge of EE
- An ability to design a system, component or process to meet desired needs within realistic constraints.
- An ability to identify, formulate, and solve engineering problems
- An understanding of professional and ethical responsibility

Course Contents:	
Unit 1:	• Review of spectrum for periodic and aperiodic signals – continuous and line spectra
Unit II :	• Linear modulation: Need for modulation, Expression for AM wave, power and BW, expression for DSB-SC/SSB, power and BW, comparison
Unit III:	• Modulation and Demodulation of AM – Rectifier detector, envelope detector, Product Modulation and demodulation of DSB-SC, SSB – Frequency discrimination method, Hilbert transform, Phase discrimination method
Unit IV:	• Angle Modulation: FM expression, Bessel function analysis, power and BW considerations, Carsons rule for BW approximation, PM expression, relationship between FM and PM, Armstrong method of FM generation, PLL and FM demodulation using PLL
Unit V :	• Introduction to Information theory – Entropy, Source coding: Huffman code, Shannon Fano code.

Text Book (s):

- Grey Miller" Communication Electronics" McGraw Hill, 1999

Mode of Evaluation:

- Mid-Term Tests (Not less than two Exams.) ……..…… (30 %)
- Practical Work ……..…….... (10 %)
- Assignments + E-Learning…….……..……. (10 %)
- Final Exam. ……..……..….(50 %)

Course Title	Computer Organisation-1	Coordinator		Dr. FakherEldin	
Course Code	414-EE-3	Credit Hrs.	3	Contact Hrs.	4
Prerequisites	312-EE-3	Level/Year		7/4	

Course Objective:

- Name and recognize computer's transfers and microoperations
- Explaining and analyzing computer organization and architecture
- Ability to illustrate and demonstrate different parts of basic computer organization

Teaching Method:

- Lectures, Training exercises (Tutorial + Labs, Assignments, Reports)

Expected Learning Outcome:

- The broad education necessary to understand the impact of nengineering solutions in a global, economic, environmental and societal context.
- Knowledge of contemporary Issues.
- An ability to communicate effectively.
- An ability to identify, formulate, and solve engineering problems.
- An understanding of professional and ethical responsibility

Course Contents:	
Unit 1:	• Introduction to Computer System & fundamentals • Register Transfer Language, Register Transfer
Unit II :	• Bus & Memory Transfer • Arithmetic, Logic, & Shift Micro-Operation ALS Unit
Unit III:	• Computer Register, Instruction Code, • Computer Instructions
Unit IV:	• Timing & Control, Instruction Cycle • Complete Computer Description
Unit V :	• Performance Measures • Introduction to programming the Basic Computer

Text Book (s):

- Morris Mano, "Computer System Architecture", Latest edition

Reference Book (s):

- Mark Balch, "A Comprehensive Guide to Digital Electronics & Computer System Architecture", Latest Edition

Mode of Evaluation:

- Mid-Term Tests (Not less than two Exams.) ……..…… (30 %)
- Practical Work ……..…….... (10 %)
- Assignments + E-Learning……..……..……. (10 %)
- Final Exam. ……..…….(50 %)

Course Title	High Voltage Engineering	Coordinator		Dr. Walid Helmy	
Course Code	421-EE-3	Credit Hrs.	3	Contact Hrs.	4
Prerequisites	221-EE-3	Level/Year		8/4	

Course Objective:

- This course focuses on the high voltage engineering in the electrical power systems, the high voltage benefits, types, generation methods, and laboratories.
- Breakdown theories are illustrated.
- The high voltage cables construction and types are included.
- Electrical circuit 1 and Measurements are prerequisites of this course

Teaching Method:

- Lectures, Training exercises (Tutorial + Labs, Assignments, Reports)

Expected Learning Outcome:

- Ability to use the techniques, skills, and modern engineering tools necessary for engineering practice.
- Knowledge of contemporary Issues.
- An ability to communicate effectively.
- An ability to identify, formulate, and solve engineering problems.

To define knowledge of mathematics, science and engineering fundamentals relevant to engineering, together with in depth knowledge of EE

Course Contents:	
Unit 1:	• Introduction to power system architecture • Advantages and disadvantages of HV
Unit II :	• Types of regulators in the HV testing circuits • Generation of HV – AC at Power frequency by transformer or by resonance transformer
Unit III:	• Generation of HV – DC voltage (1) • Generation of Impulse HV • Generalized HV testing circuit • Generation of HV – AC with High frequency
Unit IV:	• HV Measurement methods • Breakdown theories for Gases
Unit V :	• Breakdown theories for liquids and solids • UGC

Text Book (s):

- "High Voltage Engineering.", second edition, by M S Naidu & V Kamaraju, McGraw Hill - 2004

Mode of Evaluation:

- Mid-Term Tests (Not less than two Exams.) ……...…..… (30 %)
- Practical Work ……..……... (10 %)
- Assignments + E-Learning…….……..……. (10 %)
- Final Exam. ……..……..….(50 %)

Course Title	Electronics Circuits-2	Coordinator		Dr. Muneer P	
Course Code	422-EE-3	**Credit Hrs.**	**3**	**Contact Hrs.**	**4**
Prerequisites	223-EE-3, 323-EE-3	**Level/Year**		**8/4**	

Course Objective:

- To impart knowledge in students about operational amplifiers (Op-Amps), various electronic circuits using Op-Amps, Filters, Oscillators, Timer ICs and their applications in modern electronic systems

Teaching Method:

- Lectures, Training exercises (Tutorial + Labs, Assignments, Reports)

Expected Learning Outcome:

- To define knowledge of mathematics, science and engineering fundamentals relevant to engineering, together with in depth knowledge of EE.
- An ability to apply Knowledge of mathematics, science and engineering.
- Recognition of the need for and an ability to engage in lifelong learning

Course Contents:	
Unit 1:	• Op-amp basics and properties, inverting and non-inverting modes of operation with negative feedback. • Effects of negative feedback on op-amp. • Properties of Op-Amp: input and output impedances, frequency response.
Unit II :	• Op-amp circuits: Comparators, Schmitt trigger, Summing and averaging amplifier, Integrator, Differentiator. • OTA properties and application as amplitude modulator. • Filters: LPF, HPF, BPF. Butterworth response filter design
Unit III:	• Oscillators: feedback and relaxation oscillators, Wein Bridge oscillator, Phase shift oscillator.
Unit IV:	• IC 555 Timer, Astable and monostable multivibrator
Unit V :	• Voltage regulation: Line and load regulation, Series regulators.

Text Book (s):

- Electronic Devices , 9th Edition, Thomas Floyed, Pearson Education, Limited, 2013

Mode of Evaluation:

- Mid-Term Tests (Not less than two Exams.) ……..…… (30 %)
- Practical Work ……..…….... (10 %)
- Assignments + E-Learning…….……..…… (10 %)
- Final Exam. ……..…….(50 %)

Course Title	Computer Organisation-2	Coordinator		Dr. FakherEldin	
Course Code	424-EE-3	Credit Hrs.	3	Contact Hrs.	4
Prerequisites	414-EE-3	Level/Year		8/4	

Course Objective:

- Name and recognize computer's transfers and micro-operations
- Explaining and analyzing computer organization and architecture
- Ability to illustrate and demonstrate different parts of basic computer organization

Teaching Method:

- Lectures, Training exercises (Tutorial + Labs, Assignments, Reports)

Expected Learning Outcome:

- To understand knowledge of societal, health, safety, legal management, sustainability and cultural issues and the consequent responsibility reverent to Electrical Engineering
- An ability to design and conduct experiments, analyze and interpret data
- The ability to function on multidisciplinary teams

Course Contents:	
Unit 1:	• CPU Major Component • General Register Organization, Stack Organization • Instruction Format • Addressing Mode
Unit II :	• Data Transfer & Manipulation • Program Control • Reduced Instruction Set Computers
Unit III:	• Parallel processing, • RISC Pipeline, • Vector Processing
Unit IV:	• Memory Hierarchy, • Memory types
Unit V :	• Memory management hardware

Text Book (s):

- Morris Mano, "Computer System Architecture", Latest edition

Reference Book (s):

- Mark Balch, "A Comprehensive Guide to Digital Electronics & Computer System Architecture", Latest Edition

Mode of Evaluation:

- Mid-Term Tests (Not less than two Exams.) ……..…… (30 %)
- Practical Work ……..…….... (10 %)
- Assignments + E-Learning…….……..……. (10 %)
- Final Exam. ……..…….….(50 %)

Course Title	**Power Systems**	**Coordinator**		Dr. Bushara elnoor	
Course Code	425-EE-3	**Credit Hrs.**	**3**	**Contact Hrs.**	**4**
Prerequisites	313-EE-3	**Level/Year**		**8/4**	

Course Objective:

- The main purpose of this course is to teach the students the design and analysis of electric circuits.

Teaching Method:

- Lectures, Training exercises (Tutorial + Labs, Assignments, Reports)

Expected Learning Outcome:

- To define knowledge of mathematics, science and engineering fundamentals relevant to engineering, together with in depth knowledge of EE
- An ability to design a system, component or process to meet desired needs within realistic constraints.
- An ability to identify, formulate, and solve engineering problems
- An understanding of professional and ethical responsibility

Course Contents:	
Unit 1:	• The Power System: An overview, • Transmission Line Parameters
Unit II :	• Line Model and Performance,Power/
Unit III:	• Load Flow Analysis • Per-Unit System
Unit IV:	• Balanced Faults,
Unit V :	• Mechanical Design of Overhead Lines

Text Book (s):

- Power System Analysis', HadiSadaat, McGraw Hill.

Reference Book (s):

- Power System Analysis', J. Grainger and D.Stevenson, McGraw Hill.

Mode of Evaluation:

- Mid-Term Tests (Not less than two Exams.) ……..…… (30 %)
- Practical Work ……..…….... (10 %)
- Assignments + E-Learning…….……..……. (10 %)
- Final Exam. ……..…….(50 %)

Course Title	VLSI Design	Coordinator		Dr. Mohammed Zubair Mohammed Shamim	
Course Code	512-EE-3	**Credit Hrs.**	**3**	**Contact Hrs.**	**4**
Prerequisites	422-EE-3	**Level/Year**		**9/5**	

Course Objective:

- To inculcate in students the understanding of and experience in the design of VLSI circuits, especially CMOS technology

Teaching Method:

- Lectures, Training exercises (Tutorial + Labs, Assignments, Reports)

Expected Learning Outcome:

- The broad education necessary to understand the impact of nengineering solutions in a global, economic, environmental and societal context.
- Knowledge of contemporary Issues.
- An ability to communicate effectively.
- An ability to identify, formulate, and solve engineering problems.
- An understanding of professional and ethical responsibility

Course Contents:	
Unit 1:	• Introduction to VLSI Systems: • Historical Perspective, • Introduction to IC Technology, • Types of Integrated Circuits,
Unit II :	• VLSI Design Methodology, • VLSI Design Flow, • VLSI Design Styles. • MOS Transistor: MOS Capacitor, • MOS Transistor, • Threshold Voltage, Current Equations, • I-V Characteristics, • Scaling, • Small Geometry Effects, • MOSFET Capacitances.
Unit III:	• VLSI Process Technology: Photolithography, Oxidation, Plasma Enhanced Chemical Vapour Deposition, Diffusion, Ion Implantation, Etching, Metallization, Packaging. • Design Rules & Layout: Stick Diagrams.
Unit IV:	• CMOS Logic Design: Design of CMOS Inverter, • NAND and NOR gates, • CMOS Transmission Gate, • Types of CMOS logic circuits, • Compound Gates.
Unit V :	• Memories & Programmable Logic Devices: • CMOS Memories – SRAM and DRAM cells, • Types of Programmable Logic Devices, • Field Programmable Gate Arrays.

Text Book (s): • CMOS VLSI Design: A circuits and systems perspective. By Neil H. E. Weste
Mode of Evaluation: • Mid-Term Tests (Not less than two Exams.) ……..…… (30 %) • Practical Work ……..…….... (10 %) • Assignments + E-Learning…….……..……. (10 %) • Final Exam. ……..……..….(50 %)

Course Title	**Microprocessor Based System**	**Coordinator**		Dr. Thafasal Ijyas	
Course Code	513-EE-3	**Credit Hrs.**	**3**	**Contact Hrs.**	**4**
Prerequisites	414-EE-3	**Level/Year**		**9/5**	

Course Objective:

- The main purpose of this course is to teach the students the fundamental theory of microprocessors and their applications

Teaching Method:

- Lectures, Training exercises (Tutorial + Labs, Assignments, Reports)

Expected Learning Outcome:

- Ability to use the techniques, skills, and modern engineering tools necessary for engineering practice.
- Knowledge of contemporary Issues.
- An ability to communicate effectively.
- An ability to identify, formulate, and solve engineering problems.

To define knowledge of mathematics, science and engineering fundamentals relevant to engineering, together with in depth knowledge of EE

Course Contents:	
Unit 1:	• Introduction to microprocessors and microcontroller systems, Microprocessor model, • Techniques used in microprocessor, • Microprocessor programming techniques,
Unit II :	• Looping , Counting, Indexing, • Flowchart,
Unit III:	• Timing delay using counters, • Stacks and subroutines
Unit IV:	• I/O memory interface with microprocessor • Input output system, • I/O data transfer techniques • DMA transfer • I/O interfacing techniques with microprocessor
Unit V :	• Microcontrollers • Microcontrollers and microprocessors • Microcontrollers in control systems

Text Book (s):

- "Microprocessor and microcontroller System", A.P Godse and Mrs. D. A. Godse , Technical Publications

Mode of Evaluation:

- Mid-Term Tests (Not less than two Exams.) ……..…… (30 %)
- Practical Work ……..…….... (10 %)
- Assignments + E-Learning…….……..……. (10 %)
- Final Exam. ……..……..….(50 %)

Course Title	Power Electronics	Coordinator		Dr. Zakaria Mohamed Salem	
Course Code	514-EE-3	**Credit Hrs.**	**3**	**Contact Hrs.**	**4**
Prerequisites	212-EE-3, 223-EE-3	**Level/Year**		**9/5**	

Course Objective:

- At the end of this course, the student should be able to study Power electronic elements and application.
- Analyze the equivalent circuit of power electronics , application of different converter types of electrical machines Calculate the operating condition of the machines to have desired condition Analyze the troubleshooting table of machines
- Define basic concepts and basic circuit of power electronics.

Teaching Method:

- Lectures, Training exercises (Tutorial + Labs, Assignments, Reports)

Expected Learning Outcome:

- To define knowledge of mathematics, science and engineering fundamentals relevant to engineering, together with in depth knowledge of EE.
- An ability to apply Knowledge of mathematics, science and engineering.
- Recognition of the need for and an ability to engage in lifelong learning

Course Contents:	
Unit 1:	• Power Semiconductor diodes • Diode circuits and uncontrolled rectifier circuits.
Unit II :	• Thyristors , • firing techniques and protection methods.
Unit III:	• Rectifier circuits applications, • Controlled rectifier circuit.
Unit IV:	• AC voltage controllers • DC choppers
Unit V :	• Single and three phase Inverters • Power electronic application on power system.

Text Book (s):

- "Power Electronics, Circuits, Devices and Applications", Muhammad H. Rashid, Second edition

Mode of Evaluation:

- Mid-Term Tests (Not less than two Exams.) ……..…… (30 %)
- Practical Work ……..…….... (10 %)
- Assignments + E-Learning…….……..……. (10 %)
- Final Exam. ……..…….(50 %)

Course Title	Operating Systems	Coordinator		Dr. Mohammed Abbas	
Course Code	521-EE-3	Credit Hrs.	3	Contact Hrs.	4
Prerequisites	424-EE-3	Level/Year		10/5	

Course Objective:

- Identify the operating systems, processes and systems manage files and folders
- Understanding the interrupt programs and contexts drivers, clock drivers, input and output programs.
- Identify the Unix operating system Windows operating system, file management system on the network.
- Acquire the skills to run operations in parallel

Teaching Method:

- Lectures, Training exercises (Tutorial + Labs, Assignments, Reports)

Expected Learning Outcome:

- To understand knowledge of societal, health, safety, legal management, sustainability and cultural issues and the consequent responsibility reverent to Electrical Engineering
- An ability to design and conduct experiments, analyze and interpret data
- The ability to function on multidisciplinary teams

Course Contents:	
Unit 1:	• Operating system functions, • Structure • architecture and operations
Unit II :	• process management • memory management distributed systems • Special purpose systems.
Unit III:	• user operating system interface
Unit IV:	• Process concept
Unit V :	• Unix operating system Windows operating system • file management system on the network.

Text Book (s):

- Abraham Silberschatz, Peter Galvin and Greg Gagne "Operating System Concepts", 7th edition"

Reference Book (s):

- Stallings William, "Operating Systems: Internals and Design Principles", Prentice-Hall, most recent edition

Mode of Evaluation:

- Mid-Term Tests (Not less than two Exams.) ……..…… (30 %)
- Practical Work ……..…….... (10 %)
- Assignments + E-Learning…….……..……. (10 %)
- Final Exam. ……..……..….(50 %)

Course Title	**Power System Analysis**	**Coordinator**		Dr. Abdelaziz Salah Saidi	
Course Code	522-EE-3	**Credit Hrs.**	**3**	**Contact Hrs.**	**4**
Prerequisites	421-EE-3	**Level/Year**		**10/5**	

Course Objective:

- To understand and analyze the main theories for steady state stability, and the transient stability of the power system.Knowing the modeling and analysis of power system operation and control.
- This course describes the various methods of reactive power compensation in the power system

Teaching Method:

- Lectures, Training exercises (Tutorial + Labs, Assignments, Reports)

Expected Learning Outcome:

- To define knowledge of mathematics, science and engineering fundamentals relevant to engineering, together with in depth knowledge of EE
- An ability to design a system, component or process to meet desired needs within realistic constraints.
- An ability to identify, formulate, and solve engineering problems
- An understanding of professional and ethical responsibility

Course Contents:	
Unit 1:	• The transient stability of power system (analysis and applications). • Swing equation • Equal area criterion
Unit II :	• The steady state stability of power system (analysis and applications).
Unit III:	• Speed governors (analysis and operation). • Outlining Methods of reactive power control
Unit IV:	• Defining Sharing load between units. • Describing the errors elimination in frequency and tie line power.
Unit V :	• Recognizing Automatic generation control. • AVR • ALFC • Describing Voltage stability and excitation systems

Text Book (s):

- Hadi Saadat, Power system Analysis, McGraw hill. 1999. Latest edition

Mode of Evaluation:

- Mid-Term Tests (Not less than two Exams.) ……..…… (30 %)
- Practical Work ……..…….... (10 %)
- Assignments + E-Learning…….……..……. (10 %)
- Final Exam. ……..……..….(50 %)

Course Title	**Advanced Communication Systems**	**Coordinator**		Dr. Usman Mohammed MohammedFarooq	
Course Code	523-EE-3	**Credit Hrs.**	**3**	**Contact Hrs.**	**4**
Prerequisites	423-EE-3	**Level/Year**		**10/5**	

Course Objective:

- Define and describe established rules in digital communications
- Recognize the purpose and importance of techniques used in digital communications
- Calculate parameters such as bandwidth, error rate
- Analyse system conditions by interpreting the specified data
- Design a system/process to satisfy stated conditions and explain engineering trade-offs

Teaching Method:

- Lectures, Training exercises (Tutorial + Labs, Assignments, Reports)

Expected Learning Outcome:

- The broad education necessary to understand the impact of nengineering solutions in a global, economic, environmental and societal context.
- Knowledge of contemporary Issues.
- An ability to communicate effectively.
- An ability to identify, formulate, and solve engineering problems.
- An understanding of professional and ethical responsibility

Course Contents:	
Unit 1:	• Introduction to Digital Communication, • two-sided spectrum • Sampling theory, • Quantization, PCM, DPCM, DM and comparison, • Binary and M-ary signaling
Unit II :	• Signal detection in the presence of AWGN: • ML Detection, Matched Filtering, • Probability of Error for binary and M-ary signaling, • Trade-off between error probability and data rate.
Unit III:	• Introduction to error detection/correction: • Channel capacity – Shannon Hartley law, Parity codes, Hamming code • encoding and syndrome decoding.
Unit IV:	• Random Processes, • Stationary and Ergodic Processes, • Auto-correlation and cross-correlation, • power spectral density, • white Gaussian noise.
Unit V :	• Digital Modulation techniques: • ASK, • QAM, • PSK,

	• QPSK, • FSK
Text Book (s): • Digital Communications: Fundamentals and Applications, Bernard Sklar, 2001, Prentice Hall.	
Reference Book (s): • Modern Digital and Analog Communications Systems, 4th edition (2009, with Zhi Ding), Oxfor University Press	
Mode of Evaluation: • Mid-Term Tests (Not less than two Exams.) ……..…… (30 %) • Practical Work ……..…….... (10 %) • Assignments + E-Learning……..……..……. (10 %) • Final Exam. ……..……..…..(50 %)	

Course Title	Software Engineering	Coordinator		Dr. Mohammed Abbas	
Course Code	524-EE-3	Credit Hrs.	3	Contact Hrs.	4
Prerequisites	414-EE-3	Level/Year		10/5	

Course Objective:

- Understanding the basics of the system architecture based on computer operations and programming
- Recognition system models with a focus on models commonly used.
- Identify the Unix operating system Windows operating system, file management system on the network

Teaching Method:

- Lectures, Training exercises (Tutorial + Labs, Assignments, Reports)

Expected Learning Outcome:

- Ability to use the techniques, skills, and modern engineering tools necessary for engineering practice.
- Knowledge of contemporary Issues.
- An ability to communicate effectively.
- An ability to identify, formulate, and solve engineering problems.
- To define knowledge of mathematics, science and engineering fundamentals relevant to engineering, together with in depth knowledge of EE

Course Contents:	
Unit 1:	• Professional software development • Software process models & The rational unified process • Functional and non-functional requirements
Unit II :	• The software requirements document • Interaction models, Structural models & Behavioral models
Unit III:	• Model-driven engineering • Object-oriented design using the UML
Unit IV:	• Open source development • Test-driven development & User testing
Unit V :	• Program evolution dynamics • Legacy system management • Dependability properties

Text Book (s):

- Ian Sommerville "Software Engineering" 9/E, ISBN 10: 0137035152. Ahern, D. M., Clouse, A. and Turner, R.(2001). CMMI Distilled. Reading, Mass.: Addison-Wesley.

Reference Book (s):

- Leach, R., "Introduction to Software Engineering", CRC Press, most recent edition

Mode of Evaluation:

- Mid-Term Tests (Not less than two Exams.) ……..…… (30 %)
- Practical Work ……..…….. (10 %)
- Assignments + E-Learning…….……..……. (10 %)
- Final Exam. ……..……..….(50 %)